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Extension Service and Smallholder Agriculture in Achefer Woreda of Amhara Region

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Acronyms

AADU	Ada Agricultural Development Unit
AISCO	Agricultural Input Supply Corporation Organization
AMC	Agricultural Marketing Corporation
ARDU	Arusi Rural Development Unit
BOA	Bureau Of Agriculture (Amhara Region)
BOEDP	Bureau of Economic Development and Planning (Amhara Region)
CADU	Chilalo Agricultural Development Unit
CSA	Central Statistics Authority
DA	Development Agent
EPID	Extension and Project Implementation Department
EPRDF	Ethiopian Peoples Revolutionary Democratic Front
HADU	Humera Agricultural Development Unit
MOA	Ministry of Agriculture
MPPI	Maximum Package Projects
MPPII	Minimum Package Projects
NIEP	National Intervention Extension Program
PA	Peasant Association
PADEP	Peasant Agriculture Development Extension Program
PADETES	Participatory Demonstration and Training Extension System
PC	Producers Co-operative
SC	Service Co-operative
THADU	Thachi Adiabo Agriculture Development Unit
WADU-	Walamo Agriculture Development Unit

Glossary

Abeleij	god –child
Aqumada	a leather sack used as measurement of yield and container of grain.
Areqi	local liquor made from finger millet, maize with hops.
Astemaj	a household or person who share crop out land or oxen
Awudema	a circular threshing ground, which could may vary from 5 to 9 diameter in size.
Badema	a farmstead, which is usually fertilized by manure andcompost
Betezemed	relation by blood as far as seven generation
Beret	a fence in open air where the cattle spent the night in the dry season
Diger	two wooden wings fastened to hoe at one end of *mofer*, which push the soil aside
Gabi	a cotton garment made by local weaver, usually dressed by males.
Gat	a section in the house where small animals are kept at night
Got	a core community in the parish which has its own local name
Gult	the right to collect tribute over the fiefs given.
Injera	the thin round flat bread made from cereals on a large round flat clay pan
Kada	a local unit of measurement of land, which is approximately equal to one-fourth hectare
Kebele	the lowest unit of administration in government structure.
Kurt	a contractual labour agreement based on a specified amount of grain per year
Lemena	(lit. begging) it is a system to borrow oxen and labour for one or two days
Madeberia	a fertilizer sack which is used as grain container and yield measurement
Mahiber	a religious association dedicated to one of saints, angels or Christ observed on every month in members house in rotation.
Mekenajo	a local contractual agreement to team a single ox of a household with a single ox of another household for equal use on each other's plot.
Mengestawi-Buden	a committee below kebele administration in the core community consisting of 30-70 households.
Mofer	long wooden pole agricultural implements fastened to the *digger* and *maresha* together and at the opposite end of which is fastened wooden neck –yoke.
Rist	a system of land tenure based on kinship and decent prevailed in northern Ethiopia before the 1975 land reform.
Senebete	a Sabbath Association observed every month in the compound of the Church
Semanya	a nominal payment made by the parents of the bride-groom to the brides family which legalize the contractual marriage agreement.
Shema	a cotton garment made by local weavers from the household cotton spun used to wear in different ways.

Tella	local beer made from mixture of finger millet, maize, and barley
Timad	local contractual agreement of sharecropping in oxen and land with hops.
Tetemaj	a person who share crop in land or oxen
Tekerchem	a man who make his residence to the wife's parent's locality.
Yaser mere	committee of the village consisting of ten households
Yareje meret	a plot, which are overused and unable to grow crops.
Yekend gabicha	a marriage between poor male and female without cattle.
Yezemed genegnu	a kin association recently developed after the fall of *Derge* regime, which aims at introducing relatives one with another.
Woreda	the level of administration unit in government structure above the kebele and below zonal administration
Wonfel	a work party mainly organized by close relatives on the basis of immediate reciprocity
Wobera	a work party arranged mainly by influential persons.
Worebetcha	a place where the cattle of the village are kept at night in the rainy season.

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Abstract

This study tries to portray the interaction between smallholder agriculture and extension service in Achefer Woreda of Amhara Region. Different methods of data collection are employed to generate reliable data to the description of the interaction between extension service and smallholder agriculture. The study also reviews the theoretical background and the Ethiopian experience in agricultural extension.

The study focuses on two areas. The first area is the description and analysis of the socio-economic factors, which may hinder or facilitate the adoption of innovation. The second point is the socio-economic impact of extension service on smallholder agriculture with in the framework of agricultural extension.

The study identifies land and oxen as a major constraint to the adoption innovation. Although labour is an important factor in smallholder agriculture, it is not found in the kebele as basic as land and oxen in the adoption of innovation. The local arrangements in the form of *wonfel,lemena ,wobera* allows the flow of labour among households in critical times. *Timad* as a means of access to both land and oxen allow the flow of these resources among households. *Mekenajo* as a means of access to oxen also has enabled the two households to combine their single ox resources for mutual benefit. It argues that some of local arrangements like *timad* as access to oxen shed light on the prospect of overcoming oxen constraints with the proper adoption of innovation. It also describes credit and marketing as one of important factors to the adoption of innovation. This study identifies that a delay on the availability of inputs is a major constraint in the adoption of innovation. It demonstrates that agricultural extension is a very good institution to improve the smallholder agriculture in the kebele, though it has limitation in some aspects.

The study has also demonstrated the considerable impacts of extension service on the smallholder agriculture. It describes its impact in the form of cultivation, Productivity, cropping patterns and household economic improvements. It also identifies areas like agricultural implement where agricultural extension has not yet made significant impacts. Some of the impacts seem to lack continuity. It argues the need to address some problems associated with the impact of extension service on dietary changes and decline of productivity.

The role of the extension service in the study area in terms of introducing better natural resources management practices is very minimal and insignificant as compared to its impact on crop production. Change in the level of productivity has also brought improvements in the household economic status. The study has also identified some of the trends in socio-cultural changes, resource utilization and household furniture.

CHAPTER I: INTRODUCTION

1.1. Background to the Research

Agriculture in many developing countries seems to be in vicious circle. Its deep-rooted problems and the degree of complexity are well described by the well-known anthropologist, Clifford Geertz (Geerz, 1963) as Agricultural Involution. The fast growth of population, the rapid scales of resource degradation and horrible famines in many developing countries have brought a considerable attention to smallholder agriculture.

Ethiopia is one of the agrarian countries with severe problem of food security. Major known famines repeatedly broke out and took the lives of thousands. Unpredictable weather condition in combination with rapid resource deterioration, inappropriate policies, lacks of appropriate agricultural technology, limited capital and infrastructure continue to entail famine in a cyclical basis.

Agriculture in Ethiopia is almost exclusively rain-fed agriculture, though it has abundant water resources. It accounts for 45% of the country's GNP. It employs 85% of the country's population. It can be considered in general as the backbone of the country's economy. And yet it has failed to feed even the farmers themselves. Therefore, the concern on smallholder agriculture in Ethiopia from academic and development point of view is no longer an alternative to ignore.

The introduction of agricultural extension has been one of the endeavors to improve the smallholder agriculture. Agricultural technologies for crop production, animal husbandry, post-harvest technology and resource conservation is shedding light on prospect of agricultural development. So far, different studies indicate that those available technologies are not properly adopted. Political and socio-economic factors are taken as a point of departure to explain its

deep-rooted problems. Continuous research in relation to adoption of agricultural technologies has a considerable contribution for success and sustainability of agriculture.

The focus of this study is on the interaction between extension service and smallholder agriculture. The study attempts to describe and analyze the socio-economic factors that may negatively or positively affect the diffusion and adoption of new agricultural technologies through the institution of agricultural extension. It also provides an in-depth understanding of the perspectives, attitudes and behavior of smallholder farmers in relation to extension service.

1.2. Problem Statement

> *"In dealing with problems of Ethiopian agricultural development we have to be alert to this reality that economic phenomenon have social, political, and even historical background and that trying to isolate the 'purely' economic considerations is as vain as attempting to split hairs" (Eshetu, 1964:25).*

The quotation above clearly explains the complexity of the problems of Ethiopian agriculture and the necessity of multi-disciplinary approach. Its development has long been a critical issue for Ethiopian governments since the 1950s. Ethiopia is believed to have significant potential for agricultural development (Tewolde-Birhan, 1984; Habtemariam, 1994). Many scholars (Dejene, 1994; Desalegne, 1995; and Shiferaw, 1995) argue that if these potentials (fertile land, water, good climate, hard-working people) are skillfully and appropriately exploited, agricultural development can occur. They also stress the need for new agricultural technology, good policies and development of infrastructure for the transformation or improvement of smallholder agriculture.

Extension service has been implemented in the country in the last five decades. Its methods and objectives have been shaped and reshaped by internal and external ideological, economic and political strategies. And yet both extension service and the various plans and programs for agricultural development in general have not been fruitful (Mesfin, 1991; Mulat, 1999). Different empirical studies revealed that extension service suffered from inappropriate policies and lack of cultural and environmental consideration in its implementation in the past four decades (Brune, 1990; Taye, 1992; Goshu, 1994). Such experiences attract research interests to examine the socio-economic problems of the current Ethiopian agricultural extension.

The current extension service is reorganized in a new comprehensive and participatory basis (MOA, 1995) by the Ethiopian peoples Revolutionary Democratic Front (EPRDF)- led government. The introduction and implementation of this new extension approach is said to have brought considerable changes and improvements in smallholder agriculture. There are socio-economic factors that enhance and hamper the program. Moreover, the socio-economic impact of the current extension service on the agrarian society is not given sufficient attention.

Therefore, this study attempts to address two important issues. The first issue is to examine the socio-economic factors that affect the diffusion and adoption of agricultural technologies. Secondly, it tries to investigate the socio-economic impacts of extension service on the agrarian society. The problem is examined through case study of the extension service in Achefer *Woreda* of Amhara Region where the new extension approach has been extensively introduced and implemented.

1.3. Purpose of the Study

The purpose of this study is to describe and analyze the socio-economic factors in th diffusion and adoption of agricultural technologies in Lalibela kebele in particular and Achefe

Woreda in general. It also focuses on the socio-economic impact of extension service on smallholder agriculture. An attempt is made to draw a picture of interaction between extension service and smallholder agriculture in the context of the current extension approach. Therefore, this research is conducted to achieve the following general and specific objectives.

1.3.1 General Objective

The general objective of the study is to describe and analyze the socio-economic factors that affect the activities and effectivéness of the extension service in the study area. It also attempts to analyze the socio-economic impact of extension service on smallholder agriculture.

1.3.2 Specific Objectives

The study has the following specific objectives:

1.To identify the constraints that affect the implementation and adoption of agricultural technology such as resource, labour, credit, market and inputs.

2.To examine the impact of the extension service on methods of cultivation, productivity, cropping patterns and agricultural implements.

3.To investigate the impact of the extension program on application of agricultural inputs.

4.To explore the role of extension service on differentiation and improvement of household economic status.

5.To examine the interaction between the extension service and smallholder agriculture and its socio-cultural dimension at the grass roots level.

1.4. Methodology

The data was collected over two months of fieldwork from the last week of October 2002 to the first week of January 2003. It was collected in Lalibela rural ***kebele*** administration of Achefer ***woreda***. The ***kebele*** is found at a distance of 18 km from the administrative office of the ***Woreda***. According to the ***kebele*** officials it has more than 2700 households. The ***kebele*** is divided into more than 16 major ***gotes*** (core locality in the parish or kebele) and *38* units *locally known as* ***mengestawi buden*** *(lit. governmental team).* The data was collected in two adjacent ***gotes*** of the ***kebele*** known as *kessel terara* and *seol meda*. The two ***gotes*** have more than 249 households and organized in to four governmental teams. The site is selected based on different criteria. First, geographically the ***kebele*** is the center of the woreda. Second, according to agricultural officials, it is one of the ***kebeles*** in the ***Woreda*** where the current agricultural extension service was first started and rapidly expanded. Third, it has also rural market center, *Lalibela*- that attracts people from all over the ***woreda***, which creates the chance of interaction among smallholders coming from distant places. The mix of these factors justifies the reliability of the data collected from this research site to draw a general picture of agricultural extension in the *woreda*. To achieve the objectives of this study a combination of data collection methods were employed. These are:

1. **In-depth Interviews:** - were held with more than 8 key informants within and outside the ***gotes***, the Development Agent (DA), three ***woreda*** agricultural officials, two ***kebele*** officials, and three service co-operative committees to collect local traditions, the introduction and implementation of extension program, constraints on the diffusion and adoption of agricultural technologies, availability of inputs, attitude and indigenous knowledge of smallholders. The DA, some smallholder informants and other officials are repeatedly interviewed. The informants are

purposely selected for their knowledge, experiences, public and government responsibilities in the locality.

2. **Focus Group Discussion:** - Two focus group discussions were held to collect data about smallholders' reaction to the extension service, the impacts of extension service on local agricultural practices, productivity, cropping patterns, the role of credit and market in the adoption of technologies. The first group consists of four male household heads that were pioneer participant of the extension program. The second group was comprised of two Pioneer participants, two female and three male household heads. The interactions of different group of interests provide valuable information about the major constraint of the adoption of innovation. Moreover, a type of informal group discussion was held in different places of the *kebele* such as ***senbete***, ***mahiber*** and local drinking houses and with smallholders coming from different parts of the ***woreda*** to the rural market center over the same issue.

3.Case Studies: - were conducted to collect information on the introduction and implementation of the current agricultural extension, problems on the adoption of innovation, the impact of resource, labour, credit and market on the adoption of agricultural technologies, cropping patterns, and the role of extension service on the improvement of household economic status. Three household heads from pioneer participants of the program, one female and six male household heads were purposely selected. Their composition is believed to have brought the diverse attitudes, constraints, and perspectives of the program in terms of resource, gender, and political and social participation.

4. Observation: was also used to gather information about the nature of cropping patterns in the field, local production practices, agricultural implements and interaction of farmers with DA. An

attempt to observe most of the fields in the two ***gotes*** is made. Moreover, one field trip from Durbete to Quinzella town located at the shore of Lake Tana was also made. The trip was important in that it enabled the researcher to make general observation and comprehend the geographical settings and the cropping patterns in the ***woreda***.

5. Primary Statistical data from the DA, service co-operative, governmental teams, ***woreda***, and zonal and regional agricultural offices has been collected and used in this study.

1.5. Organization of the Study

Together with the Introduction in Chapter one, this thesis contains seven chapters. Chapter two attempts to present the theoretical background and basis of agricultural extension. Chapter three consists of an overview of experiences of extension service in Ethiopia. The fourth chapter tries to introduce the study area's geographical and socio-economic settings. The fifth chapter contains description of the socio-economic factors that affect the extension service. The sixth chapter examines the socio-economic impacts of the extension service on smallholder agriculture as a whole. The last chapter tries to brief important findings, and contains summary and conclusion.

1.6. Limitation of the Study

Several problems limit this study in many ways. One of the major limitations was that the research fund was not released on time. Moreover the small amount of the fund also created constraints on the full employment of research methods. Another major limitation was that the research was conducted in a very intense harvesting period. As a result, it was difficult to get informants, discussants and other necessary persons on time and frequently. The study is also

limited in two ***gotes*** of a kebele in Achefer ***Woreda***. Therefore, despite reflections of a general picture of extension service in the ***Woreda***, the conclusion and recommendations in this thesis have more relevance to the kebele than to the ***Woreda*** because of the possible variation in cropping patterns and soil types.

CHAPTER II: THEORETICAL BACKGROUND

Introduction

This chapter deals with conceptual and theoretical issues of smallholder agricultural extension and adoption of innovation. It tries to review the different views and features on the definition and the current implication of the term peasant. It also tries to discuss the theoretical background of agricultural extension and the behavior of smallholders on the adoption of innovation.

2.1. Some Points About the Term 'Peasant'

2.1.1 Debates on the Definition of the Term 'Peasant'

The appearance and controversy of the definition of the term 'peasant' as a concept of category in anthropological literature has a relatively a short history. Kroeber established the term 'Peasant' as an analytical conceptual framework in anthropology in 1948 (Silverman, 1979:51; Roseberyy, 1989:109). He provides the first and what may still be considered one of the best references in the definition of the term 'peasant'. He states: "peasants are definitely rural – yet live in relation to market towns. ... They constitute part societies with part cultures" (*Kroeber, 1948:284*). But, the definition has long been subject to criticism mainly by its homogenous character (Mintiz, 1973).

The debate about, who peasants are? And on definitions of the term 'peasant' have not been successful. It is not appropriate to reproduce all debates in this paper, which have no practical purposes (see Firth, 1951; Redfield, 1956; Wolf; 1967; 1973; Mintize, 1973). Some tend to describe peasants as a social group who suffered from poverty, exploitation and oppression (Hobsbawm, 1973:7). Other scholars concentrate on the description of peasants in terms of

interrelated facets such as family farm, land and animal husbandry, and traditional culture (Shanin, 1973: 63-64). There are also debates on the expression of peasants as 'homogeneity' 'heterogeneity' and 'differentiation' on one hand and the historical 'closed' and 'open' peasant communities on the other hand (Cancian, 1989:129). But, the creation of such dichotomy is criticized because such rigid categories would obscure the in-depth understanding of peasant communities in dynamic world situation (Cancian, 1989:164)

It is true that finding a universally accepted definition of the term 'peasant' is very difficult and the attempts seem to end in vain (Mintiz, 1973; Millasoux, 1978; Ellis, 1990). There are scholars who argue that the definition of the term 'peasant' should be abandoned as otiose and old fashioned, as it has no practical purposes (Hobsbawam, 1973:3; Hill, 1989:12). Wolf (1973:xviii) makes a distinction of peasants from both primitives and farmers and nor he generalizes the peasants as a homogenous social group. Of course, scholars agree that the term 'peasant' denotes distinct socio-cultural groups in stages of human social development (Shanin, 1971, 1973:64; Hobsbwam, 1973:4). Marxist and Modernization theorists argue that peasants would no longer remain as distinct social group. The loss of their distinctive character is inevitable (Cancian, 1989:166). If so, it poses a question on the practical implication and current usage of the term 'peasant'. This is the reason why Shanin tends to conclude that scholars so far failed to agree whether the peasantry exists (in Mintiz, 1973:92).

The term 'peasant' in Africa had long been synonymous with the term folk and native until 1960 (Hill, 1989:8). The very term 'peasant' even in Africa by Africans used as a term of distinction between urban and rural dwellers. It assumes the meaning of uncivilized and irrational on the one hand and civilized and rational on the other (Hill, 1989:9). According to Clammer (1985:148) the term 'peasant' has an ideological reflection that reduced the peasant to be depicted

as passive recipient in any development intervention. This is also true in Ethiopia, which needs critical remarks on conceptual implication in the research area.

2.1.2. Remarks on the Current Usage of the Term 'Peasant'

The term 'peasant ' has long been stigmatized as uncivilized, resistant to change and irrational which is not yet fully eradicated. It has an equivalent Amharic term *'geberie'*[1] that contains all the negative connotations of the term 'peasant'. However, this writer has observed more similarity in the form of dress, household furniture, desire for change, housing components between peasants and local town residents. Peasants are also made up of different individuals who have different educational background from illiterate to those who have completed high school and even college dismissals. Moreover, elementary school teachers, development agents (DA) and merchants, by virtue of different forms of access to land, plough land and produce different crops. So there is no socio-cultural reason to apply the term 'peasant' as appropriate address of the farmers.

Therefore, the term 'peasant' needs to be either redefined or abandoned for practical purposes of this research. The redefinition of the term 'peasant' may not be helpful in the complete eradication of the negative connotations, which have practical impacts on policy makers and program executors. I argue to abandon the practical use of the term 'peasant' for two reasons. First, it avoids the absence of conceptual clarity of the term 'peasant' that may continue to create confusion on policy formulation and program implementation in any agricultural development projects. Secondly, it helps to eradicate the negative connotation, which has practical influence

[1] 'geberie' is a general Amharic name for rural residents whose livelihood depend on crop production and animal husbandry. I have understood from the informal group discussion that even the farmers perceive the term 'geberie' as illiterate, poor, and ignorant. Key informants: Priest Hadis, Tadele, and Amare, from Lalibela kebele, Belete, Tarekegne, from yismala also agree with the above depiction of peasants.

on program executers. Moreover, probably to avoid such conceptual risks, the Amharic term '***geberie***' begins to disappear in most of contemporary documents in favor of '***ariso-ader***'[2] (Lit. living by cultivation of the soil). This is a term that defines the farmers as occupational group just like the categories teachers, nurses, soldiers and so on define occupational groups.

In this regard, I prefer the term smallholder to define agriculturalists that are the subject of this research. According to Netting "smallholders are rural cultivators, practicing intensive, permanent diversified agriculture on relatively small farm in areas of dense population" (*1993:2*). The definition of smallholder is appropriate to adopt in the context of the research area mainly for three reasons. First, it excludes temporary farmers such as teachers, merchants and others from permanent farmers, and secondly because of land redistribution small-holders, in spite of minor differentiation within, perform intensive and diversified agricultural practices in small fragmented plots of not more than 3 hectares in law, and finally it avoids the negative connotation attached to the term 'peasant.

To sum up, smallholder as a concept of socio-economic category has a strong foundation. It has well-established characteristics such as family farm, small and fragmented farmland, family labour, animal husbandry and so on. A detailed knowledge about the cultural, ecological and resource base of smallholders is needed for positive policy intervention. The first knowledge begins from basic understanding of the concept, which defines the subject of the issue semantically. This is an attempt of semantic understanding towards the 'smallholder'.

[2] Informants (foote note1) agree that the term 'ariso-ader' is better than the term 'geberie' as a term of address if the choice is given.

2.2. Theoretical Background of Agricultural Extension

2.2.1 Origins and Definition of Agricultural Extension

Extension service has a long history since the Cambridge University started to expand education outside the campus of the university in 1871 (Van den Ban and Hawckins, 1999:7). But, Agricultural extension, as a practical activity, was first started in theUSA in 1914 when the Smith-Liver Act was passed to expand non-formal education for the farming communities (Adams, 1984). The purpose of the Act was to transfer useful and practical information to farmers on agricultural and home-economic issues. Currently, agricultural extension is adopted as a key factor for development of smallholder agriculture in various forms and contents in almost all developing nations (*Van den Ban and Hawckins, 1999*).

There are various definitions of agricultural extension. However, the definition provided by FAO seems to be relevant and holistic to adopt here in the context of the current Ethiopian extension approach. It is defined as:

> "An informal out-of-school education service for training and influencing farmers (and their families) to adopt improved practices in crop and livestock production, management, conservation, and marketing ... with changing the out-look of the farmer to the point where he will be receptive to and on his own initiative continuously seek, means of improving his farm business and home" (in Zaman and Bose, 1974:469).

2.2.2. Debates on the issue of Agricultural Development

Scholars conceptualize the process of agricultural development in two ways: either by cultivation of more land or increasing productivity per unit of land (Arnon, 1987:25;Daniel, 1995: 17). The current theoretical debates tend to focus on the second option because of demographic changes and consequently the scarcity of land in many developing countries. This theoretical debate rests on technological change to increase the level of productivity per unit of land. Development theories also put emphasis on technological change as one of the major pre-conditions to economic development (Gregori and Pi-Sunyer, 1969). Boserup has also stressed the importance of technological change to raise agrarian production per unit of land. She further rightly emphasized the role of agricultural technology as the "Primary, indeed the sole, engine for agriculture change" (in Netting, 1993:270). Moreover, empirical sociological studies support the role of technological and social change for increases of agricultural production (Barnes, et. al, 1982:251). Technology is a broad concept that contains biological, chemical, institutional and mechanical technology. It is the combination of these elements that are called together as agricultural technology.

It is true that smallholder agriculture is characterized by traditional agricultural practices, subsistence orientation and low productivity. Of course, there are ample evidences that smallholder agriculture has been unable to support the fast growing population in many developing nations (Shannin, 1974; Barlett, 1980; Cleaver, 1993). The reason for low productivity is mostly attributed to the low level of technology (Gregori and Pi-sunyer, 1969). Therefore, the idea of transforming or improving smallholder agriculture by the adoption of new agricultural technologies has become the major issue in the theoretical foundation of agricultural development (Ashby, 1982:234). The importance of adoption of agricultural technologies for the

development of agriculture is already proved in the Green Revolution programs of India and other countries (Joshi, 1974; Roy, 1981; Koppel and Oasa, 1987).

There is of course a hot debate over the choice of agricultural development strategies in developing nations between transformation and improvement (Shanin, 1974; Foster-Carter, 1985; Dejene; 1995). Empirical studies reveal that agricultural transformation projects, which is shaped by theory of modernization, were found to be capital intensive, class-biased and therefore unsuccessful in many countries of Africa such as Niger, Ghana, Sudan...etc. (Berry, 1993:182). The theory of modernization has long been criticized for equating development with westernization and industrialization, which has a long lasting consequence on the socio-cultural base of the developing nations (Nisbet, 1972). Clammer (1985:144) depicts the theory of modernization as a two-edged sword, which creates a new opportunity in one hand, and breakdown of the social value, culture, norm and others on the other hand. Despite much rhetoric about the defects of modernization theory, it continues to shape the formulation of agrarian development strategy in many developing countries.

Some argue that the improvement of smallholder agriculture is the most appropriate strategy of development from equity, economic and cultural point of view (Shanin, 1974; Foster-Carter, 1985; Dejene, 1995). However, the debate is not yet concluded. We have to underline at this point Clamer's suggestion (1985:15) that it is important to avoid two opposite and equally serious errors in the conception of development: "the uncritical adoption of non-appropriate foreign models and theoretical presuppositions and indigenisation to the point of relativising". Therefore, a systematic attempt is needed to move towards the formulation of a genuinely shared and integrated local theory in the conception of agrarian development.

2.2.3. The Theoretical Framework of Agricultural Extension

The very idea of dissemination and adoption of new and proven agricultural technologies (innovation) to change smallholder agriculture is not challenged. What makes the difference over the idea of adoption is 'how' and 'what' agricultural technologies to be adopted in a certain economic, environmental and cultural contexts. As we have seen, agricultural extension is, for all purposes and intents, non-formal education. Therefore, how to effectively transmit useful information, from the centers of invention to those who can use it, is a basic theoretical debate that continues to attract the attention of scholars. An educational input for agricultural development is increasingly recognized as essential element to diffuse the new agricultural technologies.

Smallholders must learn about the application, utilization and advantage of the new agricultural technologies to adopt. Diffusion of an innovation is a major pre-requisite for the adoption (Singh and Sahay, 1972). Therefore, the theory of diffusion is the underlying principles to the introduction and implementation of agricultural extension (Stier, 1974; Adams, 1984). The concept of introducing agricultural extension with the mission of diffusion of innovation is principally shaped by the theory of modernization. It is an instrument to change traditional agricultural practices through the dissemination of innovations (Roling et. al, 1976:65).

Diffusion is a broad theoretical concept, which implies the spread of culture from one group to another through different agents (Kroeber, 1948). In the particular case of agricultural extension, it could mean the spread of agricultural technologies from research centers to smallholder agriculture by different agents (Stier, 1974; Rogers, 1976). However, the theory of diffusion of an innovation is criticized for its linear approach that ends up by forming giver-receiver relationship. It fails to consider the potential of indigenous knowledge and the chance of farmers' invention.

The latest empirical studies have stressed that farmers must be capable of actively and continuously creating new local knowledge to make agriculture sustainable (Reij and Waters-Bayers, 2001). Thus, the successful diffusion of agricultural technologies requires an understanding of the potential and limitation of environmental, economic, political and cultural factors (Gregori and Pi-sunyer, 1969). Moreover, to tackle the limitation of diffusion theory, a new paradigm is developed which underline the particular consideration of indigenous knowledge, equity, participation, self-reliance of farmers as a major factor for the successful diffusion of innovation (Rogers, 1976; Carls, 1990). Despite all rhetoric about local conditions and participation, some argue that the concept of Transfer of Technology (TOT), an offshoot of diffusion theory, continues to dominate in most of African countries (Reij and Waters-Bayers, 2001: 1). Experiences reveal that TOT model, which fails to take local conditions into consideration, is unable to function well in Third World agriculture (Chambers and Toulmin, 1991:26).

Different models for the transfer agricultural technologies have been developed. Ellis (*1994:226*) enumerates them as transfer of technology, adaptive technology transfer, farming system research, farmer – first research and multiple sources of innovation. Some scholars argue that farmer-first approach and farming system research is the best current model to integrate research and extension service (Chambers and Toulmin, 1991:43; Bachee, 1994:27). The five models have their own merits and limitations because of various source of innovation and methods of diffusion. The widely accepted form of diffusion of innovation recommended primarily to be dictated by the objective condition of the locality (Waters-Bayer et.al, 2001:350). The diffusion of agricultural technologies to facilitate its adoption is planned, managed, and conducted by the institution of agricultural extension.

Therefore, many scholars agree that there should be close triangular relationship between farmers, agricultural extension and agricultural research institutions for effective diffusion of innovation (Bachee, 1994:59). Agricultural extension with a mission of innovation diffusion would not be successful if there are no profitable research results to diffuse (Stier, 1974). This profitable research results would also not be equally fruitful without farmers' participation.

Moreover, diffusion is considered as a message, which needs careful transfer to avoid distortion (Roling et.al, 1976). The diffusion agents should be well trained to enable farmers accurately adopt the technology according to the environmental and cultural contexts (Adams, 1984).

Different countries have adopted different approaches to extension service to facilitate agricultural development. According to FAO, there are three approaches of extension service as all inclusive concept, the service concept and education concept (Zaman and Bose, 1974:468). Agricultural extension has also stages of development. According to Stier (1974) agricultural extension has three consecutive stages of development in the developing nations. In the initial stage, it is in most cases production oriented. This is because agricultural extension is a response to low productivity and other problems (Berry, 1993). Extension service entered into the second phase when it started addressing farmers concern not only on the question of out-put, but also the question of advice on market and prices. A third phase is the stage of specialization. And yet agricultural technologies have not been introduced in Africa on a significant scale (Cleaver, 1993: 5). Therefore, extension service is the only institution that bridges this gap.

To sum up, theories in agricultural extension have provided a conceptual framework to the introduction and implementation of agricultural extension. But, there is a general theoretical consensus that agricultural extension should not be designed and implemented without tangible objectives. Therefore, it would be a great mistake if it is implemented without appropriate

technology to be adopted and availability of inputs to be supplied, direct copy of the system without modification to the objective reality of the locality, and without necessary co-ordination between research and extension (Leagons, 1971:110). This theoretical approach seems to be the result of a careful assessment of past experiences, which has direct implication to Ethiopian experience to be reviewed in the next chapter.

2.3. Characteristics of Adoption of Innovation

Adoption of innovation has a wide foundation in rural sociology and peasant studies. The review of all these literatures would take this study out of its scope. But, an attempt is made to recapitulate major theoretical debates on the adoption of innovation, which has implication for our study of agricultural extension. Adoption is defined as "referring to the behavior and actions involved in both the acceptance and the use of what was invented" (Leeuw and Torrence, 1989:3). In different way of explanation, adoption means the use or non-use of a particular innovation by a farmer in time.

The adoption of innovation has a complex set of interactions among actors, which has effects of blockage, delays and even speed of diffusion of innovation (Yerasworeq, 2002:2). Moreover, adoption of innovation, as a process, require stages of developments which Rogers put sequentially as awareness, interest, evaluation, trial and adoption (in Arnon, 1987:295). And yet, the methods of communication on one hand and adoption behavior on the other hand must have positive interaction for adoption (Hooks, et. al., 1983:309).

Adoption of innovation is in the first place a decision making process. Studies of adoption of innovation used to focus on attributes of individuals. Rogers (1960:409) categorize such attributes as innovators, early adopters, early majority, late majority and laggards. The psycho-cultural

theoretical paradigm, which tended to blame smallholders for the failure of adoption by depicting smallholders as traditional, irrational and resistant to change has been found erroneous and is not part of the current theoretical debates (Shanin, 1974). However, there are also socio-economic variables, which shape the behavior of adoption (Freeman, et. al, 1982:68; Hooks, et.al, 1983:*308*). Adoption behavior primarily depends on the knowledge, willingness, resource, labour and other factors of the society (Zaman and Bose, 1974; Roling, et.al, 1976; Berry, 1993).

2.3.1. Theory of Differentiation

One of the major theories that are used to describe smallholder's behavior on the adoption of innovation is the theory of differentiation. The central focus of the theory is that adoption of agricultural technologies mainly depends on the resource of smallholders – who are inherently stratified economically (Berry, 1980:325; Byres, 1981;Hooks, et.al, 1983:322). A person may have a strong desire to adopt the innovation but unable to do so due to resource constraints (Berry, 1980:326; Hooks, et.al, 1983:310). And yet there are no agreements to identify who are the early adopters: the rich, the middle or the poor? According to Dewalt and Dewalt, (1980:290-93) some argue that farmers can be early adopters in different conditions with and without resource consideration. But, rural sociologists tend to conclude that resource, in the form of oxen, land and cash, is the major factor in the adoption of agricultural technologies (Roling et.al, 1976:70; Layton, 1989). One of the major criticisms of agricultural extension is its role of differentiation as the rich become early adopter and benefited much from adoption (Roling et.al, 1976; Byres, 1981). Resource-rich farmers have opportunities to easily adopt innovations because in the first place it requires capital investment (Barlett, 1980).

2.3.2. Risk and Adoption of Innovation

Another explanation, which affects the adoption of innovation, is risk and uncertainty (Scott, 1976; Cancian, 1980; Colman and Young, 1989). According to Cancian (1980:167), risk is related to natural condition and thus remains constant in the behavior of smallholders. Farmers used to plant different crops and varieties as basic livelihood strategies to escape from possible risks. Therefore, the degree of risk varies from household to household according to resource, family size, labour and other household factors. Scott (1976:21) argues that risk is a key factor in the decision of adoption. It is not profit maximization that governs the smallholders in the process of adoption, but primarily risk aversion that is 'safety first' formula. According to Scott, whenever there is a substantial increase in risk, agricultural development could not occur.

Similarly, uncertainty is a form of smallholder's behavior to suspect new technology over the reliability and usefulness of the innovation when there is no prior local experience (Cancian, 1980; Ortize, 1980). It affects farmers to different degrees that emanates from individual differences in imagination, access to sound information and secured livelihood strategies. Cancian tends to conclude that poor farmers are the early adopters where there is uncertainty, as they lose nothing. But the debate remains inconclusive (Colman and Young, 1989:65). This experience is not supported in the case of Ethiopia, where the resource -rich farmers were the first adopters (MOA, 1970; Nichola, 1985).

2.3.3. Social and Technological Factors in the Adoption of Innovation

Different empirical studies indicate that education, status, age, and social and political participation have significant roles in the adoption of innovation. Although the role of education in the form of literacy in the adoption of innovation is debatable (Barners, et.al, 1982), in some cases those who have educational background are found to be early adopters of the innovation in

the extension program (Singh and Sahay, 1972; Roling et. al, 1976). In some cases status, age, social and political participation have positive and negative relationship to the adoption of innovation (Freeman, et.al, 1982:78).

Another major factor, which affects the behavior of smallholders in relation to the adoption of innovation, is the appropriateness of the agricultural technologies (innovations). Norman and Hays (in Arnon, 1987:210) enumerate the quality of appropriate technology as technical feasibility, economic feasibility, and social acceptability. Therefore, the technologies that have such qualities have the chanee of early adoption. In some cases traditional varieties are found to be more important than High Yielding Varieties (HYV) as they have secondary functions in the form of straw, and other cultural purposes (Dixon, 1990: 97). Therefore, the nature of the technology has a significant role to shape the behavior of smallholders' adoption.

2.3.4. Institution and the Adoption of Innovation

The speed of decision-making on the adoption of innovation depends on the efficiency of institutions on one hand and on farmers' expectation, preferences, technical knowledge and markets on the other hand (Berry, 1980; Gladwin and Murtaugh, 1980). Studies reveal that one of the main constraints to agricultural development is the existence of weak and inefficient institutions. Lack of promoting adoption of improved technologies- the institutional constraint of agricultural extension- is one of them (Bachee, 1994:26; Cleaver, 1995: 6). Therefore, extension service must give technical assistance that is persuasive, informative and reliable according to the situation to farmers to form sound opinion and make decisions on the adoption of agricultural innovation. It is here that the indispensable role of extension service, as a basic institution, is clearly manifested in the process of adoption of innovation. Information flow is a critical variable that hampers the adoption of innovation (Ellis, 1994:127). The training of personnel and resource

allocation strategy deserve careful consideration to strengthen the institution of agricultural extension. Moreover, agricultural research center is very important institution that facilitates adoption by identifying and producing appropriate technologies (Bachee, 1994).

And yet extension service alone cannot make agriculture productive and successful without having credit, marketing, inputs, rural infrastructure and other supportive institution (Weitz, 1971; Long, 1985). Supporting institutions such as those providing inputs on credit, need to be given much consideration to tackle the limitation of resource on the adoption of innovation (Singh and Sahay, 1972, Lele, 1974). This is because smallholders' capital is limited and much of it is invested in socio-cultural expenses (Shanin, 1973). Market is also another productive force, which facilitates the adoption of technology (Ellis, 1994). Institutions in the form of research centers, extension service, system of provision of credit and the structure of market in general plays significant role in the adoption of agricultural innovation.

CHAPTER III: AGRICULTURAL EXTENSION IN ETHIOPIA: AN OVERVIEW

This chapter reviews the experience of agricultural extension in Ethiopia. It describes the genesis of agricultural extension and the nature of organization and implementation of agricultural extension during the Imperial period, under the *Derg* regime as agrarian socialism and finally the current extension program.

3.1 The Genesis of Agricultural Extension

Ethiopia is considered as one of the oldest places where agriculture was practiced. According to the historical and archeological evidences (Pankhrust, 1968; Westphal, 1975), one can say that agriculture is not only an economic activity, but also a long established way of life of the people. Smallholder agriculture has remained stagnant and subsistence oriented for centuries, though dynamism in some technique of agriculture has been observed (Desalegn, 1995:152). Backward technology, traditional agricultural practices, low-level productivity and poor management characterized Ethiopian farmers. The contribution of smallholder agriculture to the overall economic development of the country remained minimal, in spite of considerable potentials. Moreover, one of the reflections of its feature is expressed by its failure in supporting the fast growing population of the country (Eshetu, 1988; Daniel, 1988; 1990).

Gradually, agriculture has become the object of state policy. The plan of agricultural development has been formulated for purpose of obtaining surplus food, raw materials for industry and export products since 1950, (MOA, 1970, Desalegn, 1993). The idea of transformation of traditional agricultural practices and backward technology, which was believed

to have curtailed the development of agriculture, was guided by and founded on the concept of modernization.

The intervention program to transform the sector of agriculture was closely related to, and highly influenced by, the Point Four[3] program of USA, the program of World Bank, Swedish International Development Agent (SIDA) and other Donor Agencies (Pankhrust, 1957; MOA, 1970; Mulat, 1999). These funding agencies have continued to exert a considerable influence in the process of formulation and reformulation of the Ethiopian agricultural development program.

The first government intervention in the sector of agriculture was implemented after the technical agreement was signed between Ethiopia and USA in 1951 (Pankhrust, 1957). Since then, subsequent initiatives to modernize agriculture were steadily implemented. These initiatives and strategies were later on reflected in a different degree of attention in the three Five-years Development Plans (1957-62, 1962-67, 1968-73) (in Dejene, 1990; Shiferaw, 1995). As a result on the basis of American model, as a vehicle for development of agriculture, extension service has been introduced in the country since 1952 (Pankhrust, 1957; Goshu, 1994).

The formal genesis of agricultural extension in Ethiopia started with the opening of agricultural schools in Jima in 1952 and the college of Agriculture of Alemaya in 1953 (Nichola, 1985). Particularly Alemaya Agricultural College had assumed the national role in co-ordinating and expanding agricultural extension. It played a triangular role by integrating extension, training and research. The examination of extension service's experience in Ethiopia needs to be separately treated on the basis of different consecutive governments for the sake of convenience as they had different strategies.

3. Point Four Program of USA was a program that was established by the United State Co-operation administration to assist the governments of economically underdeveloped countries (Pankhrust, 1957:311).

3.2 Agricultural Extension During the Imperial Period (1952-74)

Agricultural extension, which has been introduced for the first time during the imperial period, had its own success and failure. In theory, agricultural extension is difficult to implement without having an overall rural development plan. But in practice the imperial government had no formalized and clear vision of rural development policy until 1958 (Tesfaye, 1999:226). Moreover, the First Five-Year Development Plan (1957-62) did not give sufficient attention to agriculture (Shiferaw, 1995).

It was in the absence of clear vision of rural development policy that Alemaya Agricultural College tried to provide extension service in the framework of American land grant system. Its approach focused on the introduction of mechanized and scientific technique of cultivation and farming. This was criticized as the act of direct implementation of the diffusion theory without the consideration of the objective reality in the country (Brune, 1990). Moreover, until recently the curriculum in the agricultural college had no sufficient methodologies and approaches of extension service (Habtemariam, 1994:38). As a result, the approach of its extension service did not bring significant change in Ethiopian agriculture. It had also spatial limitation because of financial and personnel constraints. When its mission was transferred in 1963 to MOA, it had only 132 extension workers. The transfer of extension service to MOA also marked the separation of training and research on one hand and extension service on the other hand, which had long affected the efficiency of extension service.

Agriculture gradually received a growing attention from the government. Particularly the focus on agriculture as the major development strategy was emphasized and reflected in the Third Five-Year Development Plan (1968-73). One of the main reasons for this attention was the influence of the theory that focuses on agriculture as engine to development in developing

countries (Cohen, 1987; Krieder, 1964). As a result, a concept of community development project had been widely accepted by Ethiopian policy makers and donor agencies (Dejene, 1990). Extension service is also redesigned to implement in the framework of community development projects. Its service was directed in the provision of improved seeds, fertilizer, pesticides, introduction of mechanized farming and other post-harvest technology (Cohen, 1987). Modern farm technologies as a sole source of agricultural development were widely accepted (Dejene, 1992:45). One of the basic technologies fertilizer (Dap and Urea) has been used mostly for cereals in Ethiopia since 1970 (Mulat, 1995:230).

An agricultural research Institution was also established in 1966 under the auspices of MOA to support agricultural development. However, until recently, it was not capable to produce culturally and economically feasible agricultural technology to the smallholder agriculture (Habtemariam, 1994:40). Moreover, its research focused on major commercial agriculture and cash crops (Goshu, 1994:1).

One of the results of community development program was the formulation and implementation of the Maximum Package Projects (MPPI). Its theoretical foundation came from the concept of modernization (Desalegn, 1995). The premise of the program was that the introduction of mechanized farming could be diffused, if model projects are established as center of demonstration and dissemination. As a result a series of development projects had been designed in the form of package projects.

Chilalo Agricultural Development Unit (CADU) was, the first of its kind in the country, founded by the technical agreement of Ethio-Sewdish governments in 1967 (Cohen, 1987, MOA, 1970). In the same line and objectives, Walamo Agricultural Development Unit (WADU) in 1970, Ada Agricultural Development Unit (AADU) in 1972, Humera Agricultural Development

Unit (HADP) and Thai Hdiabo Agricultural Development program (THADP) had been established consequently in different parts of the country to balance regional agricultural development. Of all development units, CADU had played a significant role in testing and disseminating new technologies for small farmers in the surrounding region until it was transformed into Arsi Rural Development Unit (ARDU) in the *Derg* period (Cohen, 1987; McCann, 1995). But the cost of modern technologies was also a major constraint that limited the adoption of innovation (Dejene, 1992:45).

The resource-rich farmers benefited much from the extension service of the project in the form of application of fertilizer, renting tractor, combiner and threshing machines. But, there were problems of input application (Mulat, 1995), which was the reflection of the weakness of extension service. The implementation of extension service in the lower level was to be conducted by extension worker. Model formers were selected to receive extension service and by their own turn to influence the diffusion of adoption innovation to the surrounding farmers (Habtemariam, 1994:42). Moreover, different studies indicate that the cost of modern technologies was a major constraint that limited the wide adoption of innovation (Dejene, 1992:45).

Gradually, extension activities had become a major operation and needed administrative reforms for effective management. Thus, Extension and Project implementation Department (EPID) was established in 1970 to co-ordinate extension service in the country (MOA, 1970; Brune, 1990). Extension and Project Implementation Department was responsible for distribution of inputs, which mainly focused on smallholders. Model farmers were used as a method of technology diffusion. The service of the program was limited along all weather roads. By 1974, EPID has only 1020 field agents and reached only 50,000 beneficiaries (Desalegn, 1995). It functioned as coordinator of extension program until it ceased in 1976 (Habtemariam, 1994).

However, extension services in the form of maximum packages had various problems. Empirical studies revealed that the program did not consider the experiences of smallholders, it had limited manpower, it facilitated regional inequality, it was expensive, and class-biased in that it was directed towards landlords (Brune, 1990; Bahru, 1991; Goshu, 1994). It was also characterized by absence of local specific technology to be adopted, weak extension service and poor infrastructure (Dejene, 1992:46). Cohen (1987) argues that these problems had also provided a conceptual framework to the critics and attacks of community development theory. Thus, the program initially marginalized the majority of smallholders by neglecting focuses on small-scale production technology, irrigation, animal husbandry and home-economic issues. This was because; the first two Five Years Development plans were engaged in the encouragement and supports of large-scale commercial farms and export crops (Dejene, 1990:49). The failure of the program was also expressed by the decline of crop-production and growing food importation.

The imperial government had already identified the problems on the focuses of extension service and its results. A major shift in the extension approach was made in the time of the fourth Five Year Development Plan preparation to be implemented after the termination of MPPI (MOA, 1970; Desalegn, 1995; Shiferaw, 1995). Accordingly, a new strategy was formulated to give special assistance to smallholders in the name of Minimum Package Projects (MPP II) in 1971 with technical assistance of SIDA (Nichola, 1985). Extension and Project Implementation Department (EPID) ran the operation of the program. However, the proposal of MPP II continued to be shaped and reshaped according to the changes in the political arena.

And yet the limited extension service and its shift of emphasis did not make a difference in agricultural production. With exception of limited biochemical innovation adoption, methods of cultivation, agricultural implements, methods and appropriation of animal husbandry remained the same without significant change. Different factors in combination are given to the failure of

the regime. However, there is a general consensus that it was mainly the failure in area of agricultural development that contributed greatly to the demise of the Imperial State in 1974.

3.3 Agrarian Socialism: 1974-1991

The military government, which came to power in 1974, took a series of actions to facilitate agricultural development. One of the fundamental actions was the Land Reform proclamation of 1975 (MOA, 1978). Many studies agree to accept the Proclamation as one major step forward in the eradication of constraints in rural development endeavors (Dejene, *1990:50*).

However, land reform was not followed by appropriate rural intervention program (Ottoway, 1989) and nor by technical change in agricultural production (Desalegn, 1985:64). The Minimum Package projects which encourage participatory models, was implemented and continued to function until 1985. The implementation of the program was limited around 3 to 5 km on either side of the motor road (Habtemariam, 1994:42). There were differences on methods of technology transfer. The model farmer approach was dropped in favour of Peasant Associations (PA) as center of extension channels.

Agrarian socialism against the smallholders approach as a development strategy for the sector of agriculture was adopted (Dejene, 1990; Cohen and Isakasson, 1988). Pausewang *(1990:25)* criticizes the creation of dichotomy in Ethiopian agriculture as agrarian socialism and smallholder as it can obscure the in-depth understanding of the problem. However, the making of dichotomy is not the result of creation out of non-existence but the reflection of the realities. Moreover, the dichotomies as objective reality are helpful in the provision of conceptual framework to the comparative analysis of the two strategies.

The Ministry of Agriculture drafted a new agricultural program known as Peasant Agriculture Development and Extension Projects (PADEP) in 1984 as perspectives of 10 years development Plan (Dejene, 1990; Alem, 2000). Its approach and forms of implementation was to be in accordance to the goal of socialism. Two of the major objectives of PADEP were to provide the necessary support for the organization and growth of producers' co-operatives (PC), which was being implemented since 1979, and improve linkage between extension and research (Dejene, 1990; Nichola, 1985). Its extension approach was a modified Training and Visit (T and V) system by which the innovation to be disseminated. The Development Agents (DA) was the lowest contact unit in the extension network. Their duty was to give technical assistance to contact farmers and the contact farmers to spread the innovation to the follower farmers (Goshu, 1994:5). The T and V system is said to have narrowed the communication gap between the farmer and DA. However, this approach was designed to implement in the selected high potential ***Woredas*** (districts) in the country. Besides the financial, infrastructure and limited appropriate technology constraints, the extension service continued to suffer from the shortage of personnel. MOA had only one extension agent to serve over 8,000 households in the early 1980s (Habtemariam, 1994:44).

Moreover, extension service was geared towards the producers' cooperatives (PC) (Brune, 1990:23, Alemayehu, 1992). But they only accounted for 10% of the total agricultural production and even lower proportion of the total cultivated land in the country (Mekonnen, 1987; Cohen and Isakasson, 1988). They were also out-performed by the smallholders in terms of productivity for various reasons (Brune, 1990; Desalegn, 1994). According to Cohen and Isakasson (1988:325) state farms absorbed 40% of all government expenditure on agriculture from 1980 to 1985. And yet it contributed only 5% of the total agricultural production of the country. The post-1975 agricultural development policy in the form of credit and technology

selection has also excluded the poor (Gebrehiwot, 1992:106). The establishment of Agricultural Marketing Corporation (AMC) has also made grain market static, which reduced the incentive on the growth of food production (Alemayehu, 1992; Mulat, 1999). These studies directly support Tadesse's argument that the policy was the major constraint to agricultural development (Tadesse, 1999:231).

With exception of limited biochemical adoption, the absence of appropriate agricultural technologies to be adopted and the neglect of smallholder agriculture made extension service unable to bring a break-through in traditional agricultural practices.

The policy seems to have suffered from lack of cultural and social organizations' consideration. As Daniel (1990:172) rightly pointed out "Any solution must be adjusted to local conditions and tuned to peasant culture and self-understanding to have a chance of success". Inappropriate training of extension agents, the top-down approach, absence of farmers' participation in the generation and transfer of technology, strained relationship between farmers and the DA, and limited infrastructure were all factors that hampered the function of extension service. Thus, Ethiopian agriculture in general and extension service in particular under agrarian socialism had suffered a general stagnation. But, it does not mean that agricultural extension had faced a total failure. It has also success on the introduction of bio-chemical innovations like fertilizer and pesticides.

3.4 The Current Extension Approach: 1995 -

After the fall of the Derg regime, Transitional Government of Ethiopia (TGE) was formed in 1991. It established federal system of administration in the country on the basis of linguistic groups. The government has introduced different reforms to liberalize the command economy.

One of them was the Agricultural Development-led Industrialization (ADLI) policy (MOA, 1995; Mulat, 1999). ADLI is a strategy, which sees agriculture as engine to the country's economic development. The current agricultural extension program was launched within the framework of ADLI.

Before the formulation of the new agricultural extension program, Sasakawa Global-2000[4](SG-2000), an international NGO, has implemented a new extension approach in selected regions of the country since 1993 (SG-2000, 2002:iii). It has produced a significant change in agricultural production in a short period of time (MOA, 1995:2). It gives a broader experience to the foundation of the current extension packages.

On the basis of SG-2000 experiences (MOA, 1995:1;SG-2002: iv), the Transitional Government of Ethiopia adopted a new formal extension program in 1995 known as Participatory Demonstration and Training Extension System (PADETES) (MOA, 1995: 3; Mulat, 1999:53).

The intervention program was to be conducted by the program known as National Extension Intervention Program (NEIP) (MOA, 1995:2). Thirty five thousand selected farmers have started the program implementation in 1995 (Habtemariam, 1997:19). The program, which was started on crop production, expanded to include livestock, post-harvest technology and other packages (Belay, 1999). There was also mass training of Development Agents (DA) to meet the demands of personnel. A review of production factors is important to have a picture of resource constraints in smallholder agriculture. The review of debates also helps to identify and design interventions according to the resource patterns, which may have regional characteristics.

Scholars argue the importance of taking in to consideration of the general environmental and socio-economic conditions of the target population before the implementation of the

[4]. Sasakawa Global-2000 is an American based international NGO. It works in Ethiopia since 1993 focusing on rural development in general and agriculture in particular.

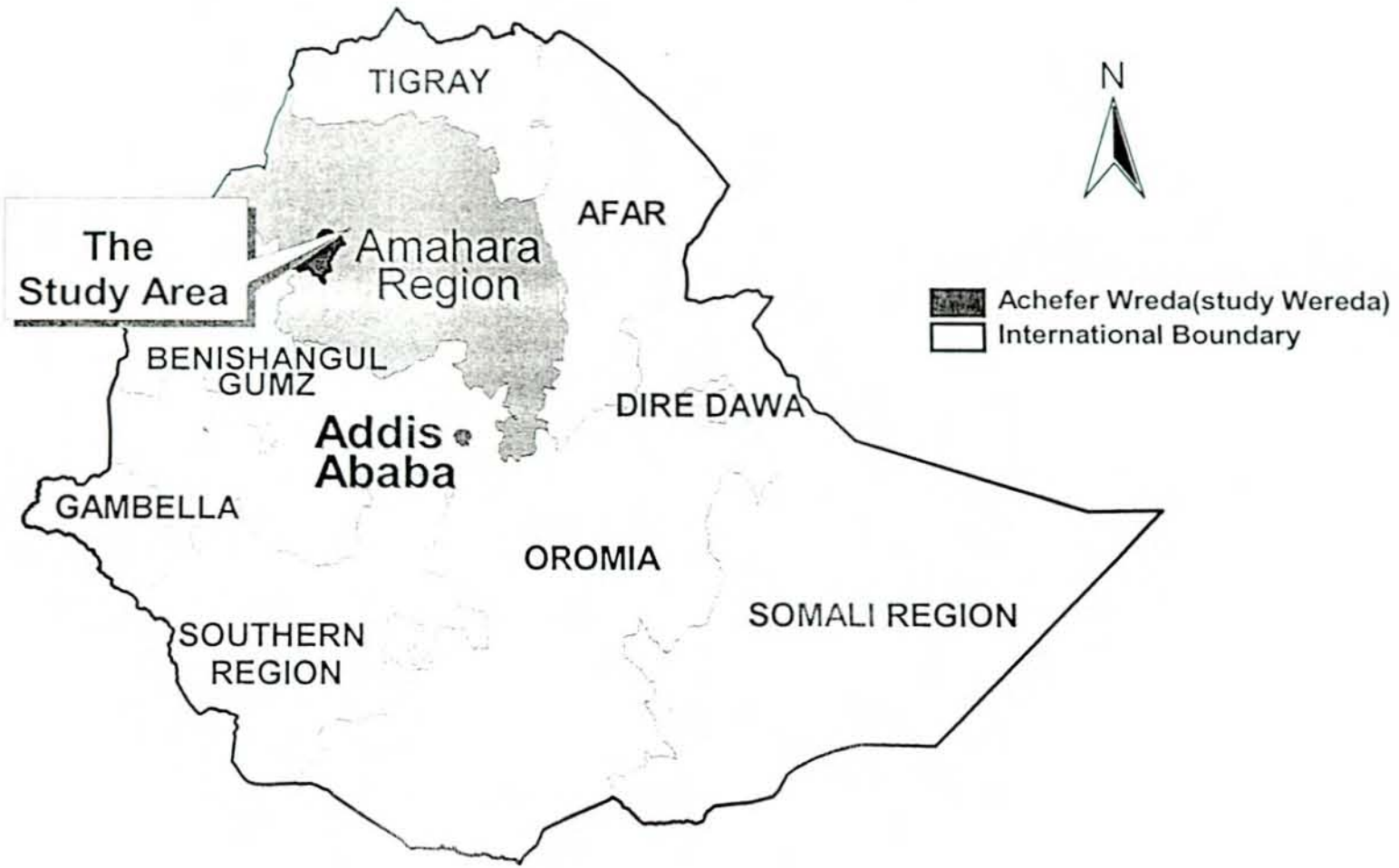
program. Dejene (1995:16) stressed the need to carefully examine the pattern of resource endowments, institutional set-ups, cultural, social, environmental and political factors before the formulation and implementation of agricultural projects. Effective agricultural production requires the availability and efficient utilization of factors of production such as land, capital, labour and knowledge (Befekadu and Berhanu, 2000:177).

There are also anthropological debates on resource patterns and the role of factors of production such as land, oxen and labour that can affect smallholder agriculture projects. The debate can give a clear conceptual framework to identify the appropriate contents and regional variation in relation to the design and implementation of agricultural development projects. The debate revolves around scarce resources and basic differentiation factors, which seems to have regional variation even within north and central Ethiopia. Hoben (1973) stresses on livestock cattle as a very important asset to measure wealth although land is a basic production factor. Bauer (1977) identified oxen as basic production factor, and as a source of stratification. Yared on the other hand (1999), identified Land as more important production factor where as Teferi (1998) argued on the quality of labour, which makes difference in household social and economic status. The debate above on production factors excludes the role of agricultural technologies particularly inputs in the smallholder agriculture. It is not only production factors such as land, labour and oxen but also agricultural technology that has significant role on agriculture.

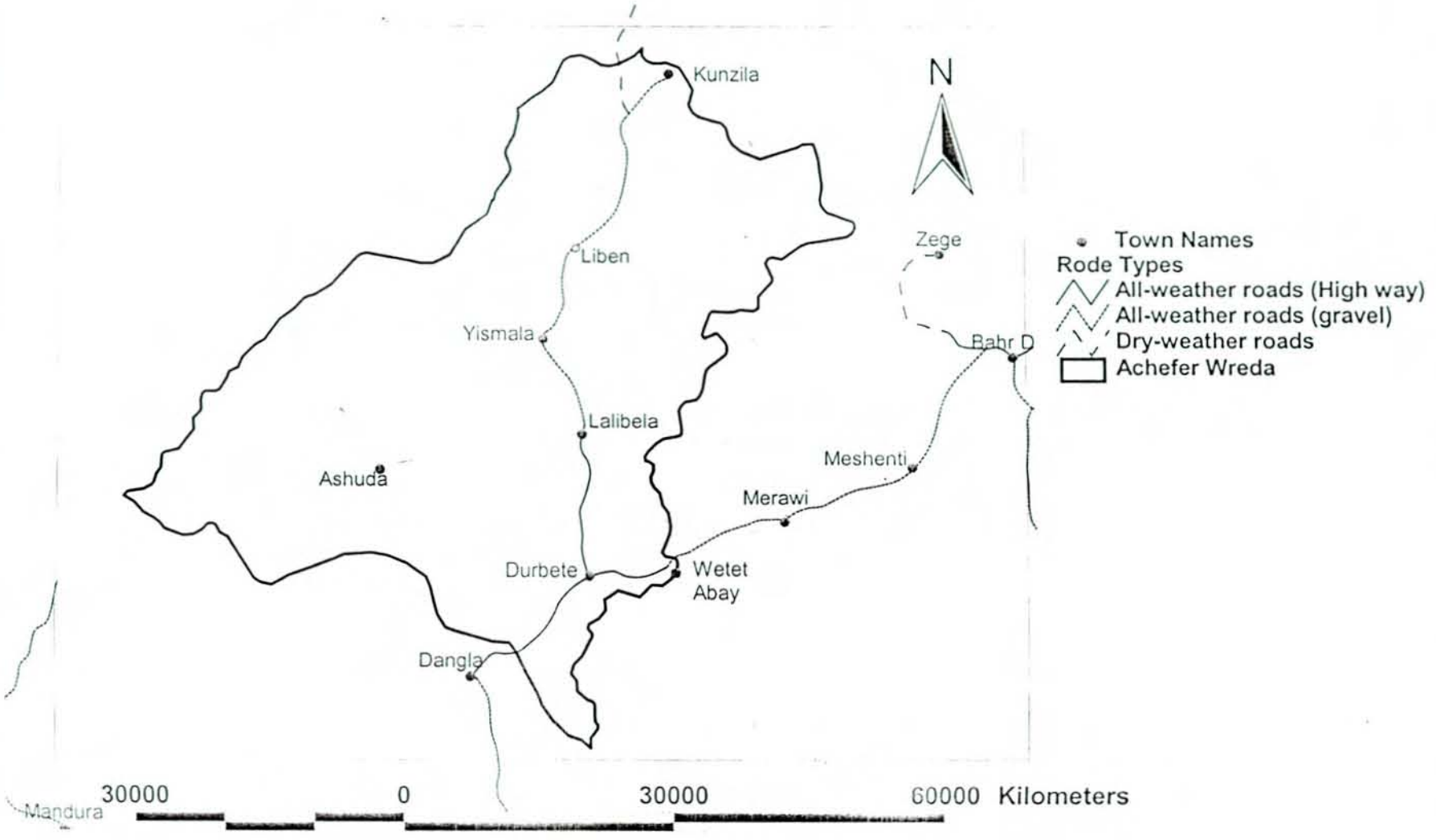
This study considers the importance of agricultural technologies in the form of inputs as a fourth production factor. Moreover, the socio-economic impact of the current extension package on smallholder agriculture at the micro-level is not given sufficient attention by previous studies. It focuses on this issue as an attempt to contribute in the description of its socio-economic impacts at a micro-level.

The Amhara Regional state has adopted the federal agricultural extension program according to the regional situation in 1995 (BOA, 1995). The new extension program was therefore launched in the region according to the federal document and plan. It is this plan that has been implemented throughout the region including Achefer ***woreda***, which is treated in the consecutive chapters.

Map-II Location map of Achefer wereda in Ethiopia



Map II - Map of Achefer Wereda



CHAPTER IV: THE STUDY AREA: ACHEFER WOREDA

This chapter tries to introduce the geographical and socio-economic settings of the woreda. It contains the description of location, topography, climate, history, household, and access to land, social networks and agricultural practices.

3.1 Location, Topography and Climate

Achefer ***Woreda*** (district) is one of the districts in Amhara Region. Located in west Gojjam Zone just south of Lake Tana, it borders on North Gonder and Lake Tana in north and north west, Mecha and Bahir Dar Zuria *woreda* in the east – where Gilgel Abay (Little Blue Nile) forms a natural boundary until it reaches Lake Tana, and Awi zone in the south and southwest. The Highway from Addis Ababa via Bure to Bahir Dar passes through the district political town - Durbete. It is one of the largest districts in West Gojjam Zone, with total land area of 256615 hectare (2566.1 km2)(WAO[5], 1993).

The topography of the ***Woreda*** is almost plain bisected by a number of springs, rivers, and small hills here and there. The only chains of mountains, including the highest mountain-Debre-Sina with more than 2500-meter height, are found in the western periphery of the ***Woreda***. The Chains of Mountains, with various elevations, start from Mount Mar Madehanealem and extended as far as Sankara. In general, the altitude in the ***Woreda*** varies from 525 to 2500.

A number of rivers flow in the ***Woreda*** throughout the year. Gilgel Abay (Little Blue Nile), Ashar, Kelti, Biranti, Beles and Areb are some of the rivers, which are all tributaries of the

[5] WAO (Woreda Agricultural Office) has a document known as Basic information Document in Amharic that contains basic information of the woreda. But I have understood that it lacks accuracy and updating which is duplicated every year without significant change in geographical aspects.

Blue Nile (WAO, 1993). These rivers have a significant potential for irrigation development. Of course, some of the above rivers are exploited in a very small scale on the basis of traditional irrigation. Kelti River with high potential and appropriate irrigation dam is not fully exploited by lack of management skills and market incentives. Moreover, it does not currently function because of drainage problem.

In general the Woreda climate can be divided in to two: ***Woina Dega*** (Moderate) and ***Kolla*** (lowland). According to the agricultural office documents (WAO, 1993), ***Woina Dega*** covers 83% of the W***oreda,*** though insignificant percent of ***Dega*** (highland) is included in it. The remaining 17% of the territory, which is found in the western periphery, is categorized in ***Kolla*** climatic zone. The chains of mountains form a sharp geographical division between ***Woina dega*** and ***Kolla*** zones. According to West Gojjam Zone Planning and Economic Development Department (WGPED[6], 2001:21) the ***Woreda*** has always got sufficient amount of rainfall. The annual average rainfall, for instance, from 1995 to 1999 varies between 1339 and 1870 mm. The annual average temperature also varies from 16°c to 27°c according to the difference in altitudes

The agro-ecological zone of the ***Woreda*** is not yet established. On the other hand informants divide the agro-ecological zone of the ***Woreda*** on the basis of soil types and cropping patterns based on their experiences. But, they said that the difference of cropping patterns is narrowed in the whole of ***woina-dega*** climate zone as a result of extension service. According to the agricultural office (WAO, 1993), there are three types of soils categorized red, brown and black, which cover 75%, 10%, and 15%, of the ***Woreda*** respectively.

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[6]. WGPED (West Gojjam Zone Planning and Economic Development Department) Five Years statistical Bulletin contains important information of the ***Woreda***s. Basic geographic and some aspects of the statistical data of agricultural extension of the ***Woreda*** are also found in this Bulletin.

3.2 Tradition and History

The Bible, and the story of Queen of Sheba and Menelik-I have shaped the general framework of tradition in the ***woreda***, as elsewhere in Amhara society. The history of the ***Woreda*** is full of oral tradition without written evidences if one goes further back in the past.

According to the oral tradition[7], Gumuz – commonly known as ***shanqella*** by the community, originally inhabited most of the territory of what is now Achefer. From 6th century onwards, the Agaws from Lasta began to settle south of Lake Tana including this ***Woreda*** (Tadesse, 1972:27). The process of settlement seems to be gradual but there is no evidence about their interactions with the Gumuz. Undoubtedly, the Agaws remained settlers in the ***Woreda*** for long period of time. Its evidence comes from linguistic source. Names of rivers, parishes and hills, which are still used, have ***Awi*** origins both semantically and linguistically. Moreover, some individuals traced their descent to Agaws, though they now claim to be Amhara.

Informants[8] do not have a clear idea about the coming and settlement of Amharas in the ***Woreda***. But, the process of Amhara settlement or Amharization of the Agaws seems to have been a gradual and peaceful process. This probably is the reason why informants fail to speak about the myth and legend of Amhara occupation of the ***Woreda***. Their relationship has long been harmonious and friendly. The ***Woreda*** seemed to have been incorporated in the country's political system from both tradition and historical sources in the reign of Amed-seyon (1314-1444). According to the informants, the first church in the ***Woreda*** was established in this period. Historically, it was also Amede Seyon who annexed and supported the christianization of the

[7]. Informants: Haddis and Tadele agree that the early setllers of the woreda were the Gumuz.
[8] My informants Hadis and Tadele who are said knowledgeable about the history of the ***Woreda*** are unable to explain how and when the Amharas came to the area. They only associate their coming with the legend of Menelik-I.

people around Lake Tana and Gojjam (Tadesse, 1972:189-191). This period was probably the beginning of Amhara intrusion and/or Amharization of the Agaws in the woreda.

The administrative structure and status of the ***Woreda*** had not been clear until 1942. After liberation, Achefer has assumed the status of ***Woreda*** accountable to the Agaw medir ***Awraja*** (sub-province) centered at Dangela. In 1956, there was reorganization of administrative structures that divided the Agaw Medir *Awraja* in to two: Bahir Dar and Agaw Medir Awraja. Achefer ***Woreda*** was also transferred to Bahir Dar Awraja – which remained the same until 1987.

The ***Woreda*** was divided in to four ***Mikitil gizat*** (sub-districts): Durbete, Arussie, Densir and Wondeye. Each ***Mikitil gizat*** had been further divided administratively into ***Atbeya dagna*** (local Judges). The Parish provided a political boundary to local judges.

The fall of Haileselassie had brought the formation of Peasant Association (PA) that replaced local judges. In 1975, there were 107 PAs in the ***Woreda***[9]. The number of PAs was reduced from time to time because of continuous reorganization. Two or more neighboring parishes of manageable size merged together to form one PA. The present Lalibela ***kebele*** administration is formed out of the union of other two independent PAs. The reorganization continued and today there are 39 rural and three urban ***kebele*** administrations. The name Peasant Association is now dropped in favor of rural ***kebele*** administration.

There are also 18 Service Co-operatives (SCs), which have been established since 1980. The union of two or more rural kebele administrations has established them. Lalibela service co-operative, which has been established by the union of Lalibela and Shambla ***kebeles*** is one of them. It still functions in supplying of inputs, distributing of commodities and buying of

[9] From the discussion with the former Wreda peasant Association chairman and the present ***Woreda*** council chairman about the number of ***kebele*** administrations and service co-operatives in the ***Woreda.***

agricultural products at a reasonable price. But, according to agricultural officials, all SCs do not function properly because of limited capital and infrastructure.

3.3 Socio-economic Condition

4.3.1 Household Organization and Function

Household in Amhara society is almost a production, reproduction and consumption unit. The production practices, property management, rearing of children and consumption are based on the household structures. Household in the ***Woreda*** tends to assume the form of nuclear family. As a result, most households consists of spouses, children and in some cases hired labour

4.3.1.1. Marriage and the Formation of Household

Theoretically, marriage is the foundation in the formation of households. But in practice it is not always true. Females, for instance, can form a household without having marriage. Informants[10] mentioned different female households in the ***kebele*** that are originally formed by females. But, the unique household role of the female and the strict gender division of labour put males in the disadvantageous position to form household without females.

Even marriage in Achefer does not immediately entail the formation of new household. According to my informants, early marriage is the norm in the ***Woreda.*** They said that on average it takes 10 years for every child to form an independent household after marriage. Moreover, cases of divorce are frequent without the knowledge of children if the parents' disagree over personal and future career of their children .The arrangement of marriage in the ***woreda***, as elsewhere in Amhara society (Hoben, 1973; Yared, 1999) has a similar pattern. Marriage is still

[10] Informants: Tadele, Haddis and Guade said that the formation of households without marriage by females is usual and is not new things.

arranged by careful consideration of resource, bloodline and social position of the family. Its legalization is approved by both parents' contribution of equal number of cattle, payment of ***semanya*** (nominal marriage payment that legalize marriage) to female parents, and finally wedding. The number of cattle and amount of ***semanya*** vary according to the wealth and social positions of the families. Cattle are the first original endowment to the spouses. In most cases the cattle are supposed to stay under the control and appropriation of the male parents until spouses form an independent household. This happens from the nature of patri-local residence of Amhara society. There are also cases of marriage without cattle where the families are poor. This type of marriage is usually known as ***Yekind***[11] ***gabicha*** (Lit. arm marriage). According to my informants, this is a marriage, which express the formation of an independent household on the basis of their labour (arm).

Wedding is one of the lavish banquets that impede the improvement of the household economic status. One of the informants Tadele, mentioned the name of two households in the ***kebele*** who faced food and seed shortage last summer as a result of wedding. But, this informant and others see wedding as a social and moral obligation. They feel that marriage without wedding has a socio-cultural risk to the parents and even the spouses. The socio-cultural value of weeding in this aspect seems to be still strong.

Usually males between 19 and 22, and females between 14 and 18 years age can form an independent household by building new small huts near the house of male parents. At this stage, the spouses receive their livestock property and began to manage them as independent household. Some household furniture is provided as a gift by both parents to strengthen the new household.

[11]. 'Yekind gabicha' is a form of marriage that expresses a union of poor persons without cattle. According to informants it also indicates that married persons would form their household on their labour without having endowments.

For some time, the spouses continue to farm with male parents on the sharecropping contractual basis. After a few years, if the new householder has sufficient oxen, they begin to farm independently. Most male parents give some plots of land as a gift to the new householder. Then, the new household begins to function as a production, reproduction, and consumption unit to be a viable household. The developmental cycle continue in these ways.

4.3.1.2. Intra-household Structure and Divorce

Intra-household structure has also a similar pattern as elsewhere in Amhara society (Hoben, 1973, Yared, 1999). The terms of address with in the household clearly express the structure of the household. Fathers and mothers are not directly addressed by their personal names. The wife does not even address her husband by his personal name. If the wife speaks 'he', the second person would directly understand that she is speaking about her husband. If she speaks to her husband, she uses the term 'you' instead of his personal name. When they are asked why they do not use their husbands' personal name, they answer that it is their culture. But, it shows that how wives respect their husband by not using his personal name as children do to their parents as a sign of respect. Children are taught to address their parents by prefixes[12], which express respect and attachment. The junior child must also respect the elders. The juniors must address their elders by adding a prefixes to express respect. There is a top-down structure, which is basically gerontocracy. The management of agricultural practices, social position of members of families and appropriation of household resources are dictated according to this structure.

[12] Children address their parents by the terms such as: ***baba, abaye,babegie***... for fathers;***and mama,tata nana***...for mothers, And the young address their elders by the term such as ***gashe,guagua,giagia***,for brothers and ***tata , ehetalem*** for sisters.

The father is the ideal head of the household in the making of decisions over agricultural activities, resource exchange, inter-household agreement and resource appropriation. My informant Tadele said that things in the household management are being changed. The power of father in the household management is now highly reduced. He stated that practically household decisions could not be realized, if members of the family do not agree. "The father considers the opinion of his wife and matured children and finally makes decision in the name of the household. Mother has also a recognized right of control and distribution of household consumption". In general, there is still a gender-based division of labor. Although the females' role in taking part in agricultural tasks is growing, they are still the main responsible bodies in conducting all sorts of household activities (cooking, fetching water, taking care children and others). It is still only the task of ploughing that remains to be the work of males. Therefore, a viable household requires a collective decision and activities in all of agricultural tasks, resource appropriation and mutual protection and emotional attachment.

Divorce is a common and frequent social phenomenon as a result of different factors. According to my informants, bad-behavior, health problem, laziness, extravagance and adultery are problems that cause divorce. In the past, though the women had the theoretical right to equally share the land, they did not practice at the time of divorce mainly for reasons associated with geographical distance and land was not scarce resource. But now a day, land has become a scarce resource. And the women strictly share it at the time of divorce. Moreover, land has increasingly become one of the major economic factors for the arrangement of immediate remarriage. Divorcees and widows' remarriage tend to change the pattern of patri-local residence. Informants stated that these females have fixed resources like land and house and thus they do not want to go out for marriage to the resident of the new husband as before. Conversely males

begin to move to those female households, leaving their house to ex-wives and children. This type of marriage is known as ***tekerachim***[13](lit. entering to the house of the female). The one who enter to the female house is mostly known as '***tekerchim***'. This form of marriage has mostly a socio-cultural risk. It strongly challenges the traditional role of males in the household management. Females in such form of household plays a significant role in the household management as they control most household resources.

4.3.2 Access to Land: An Overview

Land is the socio-economic foundation for any agrarian country, like Ethiopia. Before the fall of Haile Selassie regime, land in the ***Woreda,*** as elsewhere in Amhara society had been communally owned. It had been characterized by ***rist*** and ***gult*** system. Although there was communal land ownership, according to informants, land was not equally shared among the corporate groups. A few individuals possessed the largest portion in a corporate group by virtue of political and economic powers.

After the nationalization of land in 1975, Land in Achefer ***Woreda*** had been under the control of peasant association (PA). The redistribution of land was conducted by PA leaders every year between February to end of April by using the pretext of redistributing farmland to new householders. The period of land redistribution had of course considered the seasonal agricultural tasks. But at the same time the householders did not perform ploughing their plot every year until the end of April. This is because, according to my informants, they had to be sure that the land remains with them before ploughing. It is known only after the period of land redistribution was over.

13. Informants mention different persons who are called' tekerchem' in the kebele. They also express that such males are powerless in the household management and mostly despised by the community.

Moreover, the establishments of producers' co-operatives (PC) controlled the most fertile large land in the ***kebele*** beyond the size of their members. One of the ***kebeles*** where PC was established was Lalibela ***kebele***. Some of my informants who were not members of the PC express the establishment of the PC as "ruthless eviction of most of the farmers who did not want to join the PC". Even other informants of the ex-member of the PC agree with the idea of the above informants. They testify their idea by mentioning different smallholders who were forced to migrate to ***Kolla*** Zone in search of farmland.

When the PC was dissolved just before the fall of the ***Derge*** regime, the PC's land was redistributed to only its members on the family basis. Therefore members of the PC received more land by virtue of membership. This trend had created discontent among smallholders who were not members of the PC.

4.3.2.1. The 1997 Land Redistribution: An Overview

The coming of Ethiopian Peoples Revolutionary Democratic Front (EPRDF) to power in 1991 has aggravated the issue of farmland redistribution. The Amhara Regional Government in 1996 addressed the issue by passing a decree of land redistribution. According to my informants it was a positive response to the demand of farmers.

According to informants and kebele officials, smallholders were classified in to two categories as 'bureaucrat' and 'feudal remnants' on the one hand and the mass of poor farmers on the other hand. The former who are old rich farmers and farmers, who served as PA officials in the Derge period, are blamed to have owned and used large fertile land illegally for long period of time by virtue of their political and economic power. Therefore, they deserve the minimum

size of landholding, which is 4 ***Kada***[14](1 ha.). The remaining land was taken and redistributed to the mass poor farmers. Some informants agree with this labeling though they felt that many innocents were included.

But, informants and the present ***kebele*** officials agree that the redistribution of farmland was not implemented according to the interest of the farmers. The maximum size of landholding was decided to be 12 ***Kada*** (3 ha.). It is only from those who have more than 12 ***Kada*** and the 'bureaucrats' who have more than 4 ***kada*** that land was taken and redistributed. This act did not enable the land redistribution committee to have more farmland for redistribution on equal basis. As a result there were households (both female and male) who received less than 4 ***Kada*** (1 ha.). Those farmers, who held 12 ***Kada***, were allowed their holding to be intact. Therefore, those who were members of PC are still in a better position of landholding. Moreover, many farmers and even the present ***kebele*** officials agree that land was not redistributed according to the rule. The ***kebele*** officials told the researcher that they know farmers whose landholdings are above 12 ***kada***.

4.3.2.2. The Current Trends Towards the Tenure

The process of farmland redistribution does not seem to satisfy the interest of most of the farmers. There is still a growing demand for land redistribution. The demand is more critical and sensitive to the new householders. According to the ***kebele*** officials the number of landless households is steadily growing. Informants describe the existence of different types of land use[15], which allow the flow of this resource among households.

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[14] Kada is a unit of land measurement, which is approximately equivalent to 0.25hectare. In some other regions like wollo, the unit of land measurements are known as 'timad' and 'gamed' (Teferi, 1998:99)

[15] See about the Size of land distribution and different forms of access to land and land use patterns of the kebele in chapter five.

Informants divided the present system of landownership into two: communal and private land ownership. They categorize grazing land, mountains and other uncultivable land under communal land ownership. Whereas they categorize the private cultivated land under private ownership, though they know that land is a state property by law.

4.3.3 Social Networks: Forms and Functions

Social networks in this thesis are used to describe the different ties that emanates from biological, sociological and economic relationship. Social networks are social ties that form the connections and interactions for different purposes among individuals, households and communities. The conceptual and practical framework for the formation of social networks is provided by kinship, religion, common residence and other social factors. However, the formation of networks is flexible and is in a continuous process of formation and reformation, entrance and withdrawal, according to the individual interests and socio-economic changes.

4.3.3.1. Kinship as a Form of Network

Although the Amhara society is described as non-kin group (Hoben, 1973:16), it has kin groups, which regulate property relationship, marriage, residence and co-operation. Kin groups (*Bete Zemed*) in Amhara society is recognized as those who have biological relationship as far as seven generation in ascending level. Marriage is arranged outside the seven generation. According to my informants, kinship is now a day in Achefer has been strongly revived by organizing a kin-party (***Yezemed-gengnu***) for two reasons. First, because of its patri-local residence and bilateral kinship system, kin-groups in distant places have not an opportunity to introduce with one another which affects the rule of marriage. The party has been created as a forum of introducing kin groups with one another. All of my smallholder informants participate

in more than two kin parties in both husband and wife bloodlines. Secondly, according to informants, they thought that the fall of *Derg* regime would restore the previous ***rist*** system. The formation of kin party was made to be a method of selection and introduction of members one with another to avoid membership crises when the ***rist*** system was restored. Informants explain that although ***rist*** system is not restored, the kin party benefits them to introduce distant relatives as far as the neighbouring ***Woreds*** in a distant place. This forum provides them the formation of network to help each other in time of problems and to avoid marriage within seven generation. But there are also informants who criticized kin party as burdensome to household economy and labour allocation as participation requires contribution of money, food and other activities. From the dynamic perspective, the revival of kin-party shows how the society can easily be organized by revitalizing the past tradition to avoid the prospective crises.

Most of the paternal male kin groups live in common residence areas known as ***mender*** (village). The ideal persons households need to have the nearest neighbours are close relatives such as sons, parents, brothers and the like. My informant Guade stretching his hand to the direction of his village explained to me " look there is no non-relatives (***bada***) in this village. By virtue of common residences", he continues," we arrange different forms of co-operation such as joint-cattle herding, ***wonfel***[16] and ***lemena*** in agricultural activities, borrowing of agricultural equipments and household resources and other co-operation in time of need". Therefore, kinship forms a network to individuals and communities for various social, economic and political factors.

[16] Such forms of social institutions, which are based mainly on kinship, are reflected more in section 5.3.

4.3.3.2. Religion as a Form of Network

Almost, all farmers in Achefer ***Woreda*** are followers of Ethiopian Orthodox Church. Religious associations are formed in various forms dedicated to Saints, angels and Sabbath. It has in general three forms, which have more or less the same functions. These could be expressed as church, ***senbete*** and ***mahiber***. Every adult person, according to my priest informant, should go to church every Sunday for religious purposes. But I have observed that some persons go to church not only for spiritual purposes but also for various social and political reasons. One of the farmers this writer met in Lalibela Michael Church on Sunday told him that he came to condole with two persons who lost close relatives in other ***kebele***. This writer has also observed that Church is a center of discussion to solve communal and individual problems such as farmland boundary conflict, cattle destruction of crops, utilization of water and grazing land and promotion of community development. There is a tradition every Sunday after mass service to seat in a common place around the compound of the church to discuss the problems of individuals and the parish as whole.

Senbete and ***mahiber*** have almost the same forms and functions. ***Senbete*** is a monthly Sabbath association observed every month on Sunday. A group of individuals in the parish form this religious association[17] by contributing a limited size of roasted pulses and a pot of local bear in turn in a certain place around the compound of the church. A ***senbete*** where the informant Molla is a member and this writer has a chance to observe in the Church has 118 members. Where as ***Mahiber*** (religious association), which is dedicated to one of the saints, angels or Christ is conducted in the house of members. Unlike ***senbete***, mostly closely related persons in

[17] Informants: Haddis and Tadele confirm that religion association is not only a religious matter. It is also a social and moral obligation. Those who do not want to join at least one forms of the religious associations would be considered by the society as greedy and infidel. Therefore, most of the households are members of at least to one religious association.

the form of kin-groups, common residence and friendship form ***mahiber***. The size of ***mahiber*** members is also less than the size of ***Sabbath*** members. For instance, my informant Ewenetu is member of Micheal ***mahiber*** whose members are 18. The ceremony of ***mahiber*** is usually conducted in evening after the agricultural task is over. Such religious associations have both spiritual and social purposes. Socially, they give network to members to interact closely in time of social, economic and political needs. Particularly, members of the ***mahiber*** have promised to help each other in time of crises in agricultural activities.

4.3.3.3. Ties Established Through Common Residence

Common residence can be characterized as those who live in village and ***got*** (core locality in the parish). In most cases, residents are established on the basis of close relatives but not necessarily. Common residence is very important that create immediate interactions in the form of resource exchange, borrowing, sharing social problems and happiness. They said that neighborhood enable us to form joint-cattle keeping, sharing coffee ceremony, sharing common grazing land and ***worebetcha*** (a place where the communities cattle kept in the night time of summer season). My informants give high value to neighborhood. They emphasize the importance of neighborhood by Amharic saying as "ከሩቅ ዘመድ የቅርብ ሽማኔ ይሻላል::". (lit. neighbouring weaver is better than close relatives at a distance).This is to imply that the person residing nearby shares the problem of his neighbor more immediately than the close relatives at a distance.

4.3.3.4. Other Forms of Social Networks

According to informants, the formation of network such as godchild (***abelij***) friendship (***wodaj***) and other from of fictitious kin depend on the qualities and aspiration of persons. Those

who want to take part in political activities form a network with higher officials and supporters. These could be made possible by local drink invitation and forming affinities in the form of godchild (***abeleij***) with higher officials. My informant Haddis describes how individuals form networks with higher officials in the past for political purposes. Now a day farmers need to have at least one friend (***wodaj***) who resides in town for social and economic reasons. According to Haddis, this network could be established by different mutual relationship. For instance, if a farmer regularly sells his grains and other products to one merchant, their relationship would strengthen and help each other in time of problems.

4.3.4 Agricultural Practices: An Overview

Agriculture in the ***Woreda*** is a combination of crop production and animal husbandry. Each household has an initial endowment such as land, cattle and other household property from parents. On the basis of these resources, each household, plan, manage and conduct agricultural practices independently and/or with co-operation of other households and hired labour on contractual, reciprocal and moral basis.

Agricultural activities (crop production and animal husbandry) could easily be described in seasons. My informants divided agricultural activities in to three seasons as rainy, harvesting and dry seasons. But, it is difficult to establish a clear-cut line of the three agricultural seasons from the various natures of different crops. The three agricultural seasons has guided the rhythm of social life.

4.3.4.1. Calendar of Agricultural Operation

Agriculture in the ***Woreda*** is almost rain-fed, though it has abundant water resource. The crucial task is carried out in ***kiremt*** (rainy season). It is a period when intensive cultivation[18], sowing, weeding and other activities are performed. If the rain starts in May, intensive cultivation and sowing will be started and continued until early September. Maize and potato are sown in May. Barley and finger millet, in a very small-scale ***teff*** and ***noug***(niger seed) are sown in June. Teff, peas, beans are mostly sown in July. Chickpeas, lentils, ***mesno noug***, and ***guaya*** (vetch) are sown in late August and early September. Pepper, onions and cabbage are also grown in a very small scale for household consumption. This is the time that makes households very busy.

The second period, which extends from September to late January, is ***Mahier*** (harvesting season). It is a period when harvesting, collecting, threshing and storing are performed. These seemingly separate tasks are done in most cases side by side. The very difficult task is harvesting (cutting the dry ripen crops) and threshing. It starts in early September by harvesting barley and completed by harvesting check-peas, lentils in early February.

The third season is ***Bega*** (dry season) when both agriculture laborers and oxen take a relative annual rest. It starts from almost late January and continue to early May. But people said that it is not a period of rest in the strict sense of the term. A number of socio-economic activities are performed. Agricultural implements are supervised, readjusted, prepared, and minor cultivation of the plot early in the morning and evening are carried out. Old houses are maintained or replaced by a new one in this time. The new householders construct their independent house. They conduct wedding, ***teskar*** (memorial feast), ***Yezemed-genegnu*** (kin-party). They travel long distances for medical reasons or to see friends and relatives. A plan of

18 See how agricultural activities are performed in Chapter Six

action about the process of cultivation, contractual labor agreement, the arrangement of access to inputs, contractual agreements for access to land are done in this period.

4.3.4.2.The Pattern of Livestock Raising

Farm households in the study area keep domestic animals along side with crop-production. Cattle are the most important domestic animal. Ownership of livestock is still used as a one of criterions to measure wealth. Besides cattle, most farmers also raise sheep, goat, own donkey, poultry and beehives for household consumption and generation of income. Some smallholders also have mules and horses used as pack animals. The domestic animals are herded together on common grazing land. According to informants, it is only the rich households and those, but rare, who have no smooth relations with neighbors keep cattle independently. Most of the farmers used to herd their cattle jointly with their neighbours. Joint cattle keeping is primarily established by common residence and close kin-groups. It has a lot of contribution to the allocation of household labour. The main function of cattle keeping is to watch cattle and other domestic animals not to destroy crops in the field. Therefore, cattle keeping need a careful watch in the rainy and harvesting seasons.

During the rainy season, cattle are kept at night a special fenced cattle kraal known as *Bert*. But small animals as well as donkeys, mules, and horses spend the night in the house in a special section known as ***gat***.

During the rainy season (from July to early September), cattle are kept at night outside the fenced camp in open stony places around the village. This place is known as ***worebetcha.*** However, this practice is changing. Most of the households have started to keep cattle at night in the house throughout the year. Informants said that this happens for security and comfort reasons. They know that changes in the pattern of cattle keeping affected the traditional method of

fertilizing the farmstead and grazing land by animal manure. Some of my informants told me that they begin to use chemical fertilizer for the farmstead to grow crops, which they did not know before.

4.3.5 Socio-economic Services in Achefer Woreda

According to the 1994 population and Housing census of Ethiopia (CSA, 1996) the total population of the ***Woreda*** was 238.255. Almost 95% (224.058) of its population lived in the rural areas. The current size of the population is estimated to be more than 315,000(BOFED[19], 2002:15).

The first elementary school was opened in 1962 and a high school in 2001. Overall there are now 43 schools in the ***Woreda***. The intake capacity of schools is still beyond the demand of the people. There are one health station, two clinics and more than 7 health posts. And yet, malaria has become an epidemic, which affects every household particularly in the crucial period of agricultural activities.

The motor road almost divides the ***Woreda*** in to two equal parts. It is extended from Durbete via Yismala to Qvenzella (recognized towns in the woreda). Rural market centers recently developed in to rural local towns such as Lalibela, Liben and Ashuda. The emergence of such local towns has become the center for the socio-economic facilities to the surrounding smallholders. Most of the founders of these rural towns come from the rural society. These rural backgrounds strengthen rural-urban relationship. The facilities such as medicine, use of cart, important manufactured goods and other facilities in the near distance begin to influence the rural communities.

[19] BOFED (Bureau Of Finance and Economic Development) of Amhara Region

CHAPTER V: THE ROLE OF SOCIO-ECONOMIC FACTORS IN THE ADOPTION OF INNOVATION

Introduction

This chapter attempts to describe the major socio-economic factors that affect the adoption of innovation in the extension program. It focuses on the introduction and organization of the current agricultural extension, the content of the program, resource, labour and the institutional functions in the form of credit and marketing. It analyzes the significant contribution of the socio-economic factors in facilitation or impediments in agricultural extension program.

5.1 Methods of Introduction and Implementation

5.1.1 Organization, Implementation and Recruitment

The current extension program has been implemented since 1995 in the ***Woreda***. It has been implemented under the guidance of the ***Woreda*** Agricultural Office (WAO). According to the agricultural officials and the DA, the implementation of the extension package was first made in a few ***kebeles*** as a pilot project. It was to be implemented in those ***kebeles*** found along all weather roads. The form and content of the program and methods of introduction was uniform throughout the ***Woreda***. According to agricultural officials, they choose this form of implementation from the desire to facilitate the adoption of innovation in a very careful condition and to ensure the success of the program.

The Development Agent (DA), who is government salaried official, is the lowest contact point in the structure of extension service next to the ***Woreda*** Agricultural Office. In most cases,

the DA is supposed to give technical assistance to one ***kebele*** administration. Lalibela ***kebele*** was one of the ***kebeles*** found along the motor road. According to the ***kebele*** officials, the total household size of Lalibela ***kebele*** is estimated to be more than 2700. During my stay in the field, a DA was responsible for the extension program to the whole of the ***kebele***. Tewenty smallholders[20] were selected from the ***kebele*** as pioneer[21] (contact) farmers. They said that this form of recruitment and few numbers of participants was made to overcome resource and management constraints. According to the statistical document of the DA four of the pioneer farmers in Lalibela ***kebele*** were selected from *kessel terrara* and *seol meda*.

The DA and agricultural officials said that in principle the recruitment of pioneer farmers was to be made on the participation of ***kebele*** administration, the community and the DA together. This method would bring contact and copy farmers together to exchange experiences to properly adopt and diffuse the innovation. But, in practice this did not happen. Informants[22] confirm that they were not invited to discuss and choose the participants of the program. Some of the informants did not see participation as their right. They said that the government knows what to be done. On the other hand the agricultural officials have their own reasons why they recruited participants in this way. They said that their focus was to get good and convinced farmers with ability to properly adopt innovations[23] according to the instruction. Accordingly, the DA with *kebele* officials recruited able farmers as pioneer participants in the program.

Informants agree that most of the farmers did not know how the pioneer farmers were selected. But, the first focus group discussion revealed that some smallholders did not have interest to participate the program for various reasons, although they were not requested to be

[20] From the discussion with woreda agricultural officials and the DA
[21] There are two interchangeably used terms to call extension participants: pioneer and contact. But agricultural officials and the DA mostly address them as pioneer farmers and I adopt their preference.
[22] From the discussion with my informants such as Amare, Guade and Fetene
[23] See the content of innovations in section 5.1.4

participants. They said that some of them underestimated the technical knowledge of the DA in cultivation. Others suspected the reliability of the DA's information and the advantage of innovation. And still others did not want to see their agricultural activities controlled by others (DA). But, other informants did not support the above arguments, as they do not know farmers who refused the adoption of innovation. The following cases can more illustrate the methods of recruitments of the first pioneers in1995.

Case-1 Molla

Molla, 42, was one of the pioneer farmers in Kessel Terara got. He was active participant in the kebele politics since the fall of the Derge regime, as member of EPRDF. He did not have information about agricultural innovation that can change productivity before 1995. He heard this information from the DA in 1995. His political participation has helped him to establish good relationship with the DA. He has got reliable information about research results of the innovation from the DA by virtue of his political participation. The DA recruited him to be pioneer farmer and he accepted.

Case-2 Tackel

Tackele, 52, was another pioneer farmer in Kessel Terara *got*. He was health officer of the *kebele* since the Derg time. He continues to serve the *kebele* as health officer. This position helped him to establish good relationship with kebele officials. He also used to discuss, by virtue of his position, health issues with DA. The relationship developed in to friendship. When they meet, they discuss about the content of extension program. He learned much from the DA about the advantage of the hybrids. He desires to be participants on the basis of this information. Fortunately, he said that the DA told him to be the pioneer farmer and he accepted.

Unlike the above participants, there are also smallholders who were recruited without discussion in advance. The case of Ewenetu is one of the best examples.

Case-3 Ewenetu

> Ewenetu, 49, was another pioneer farmer in Seol-Meda *got*. He is known to be a hard worker and successful smallholder. He did not hear the information about agricultural innovation before the DA introduced them in the Church in 1995. He had the desire to participate in the new extension program after he had the information. But, he did not ask the DA. Fortunately, he was recruited without being consulted in advance by the DA and *kebele* officials. He was simply told to participate in the program by the DA and he was eagerly accepted. He still believed that he was probably recruited by his hard-working quality.

As we can understand from such cases, the method of recruitment was not participatory. It was done by the will of *kebele* officials and DA's limited knowledge of smallholders. The method of recruitment has been an issue of argument in the second focus group dissussion[24] participants and in informal discussions in different places. They said that some pioneer farmers were not selected by virtue of ability. There were other able farmers who could have properly adopted the innovation. They agreed that the first pioneer farmers were selected because they had good relationship with the DA and ***kebele*** officials. According to informants the first participant recruitment seemed to have focused on those smallholders who were in local power structure. This happened probably, because the DA and ***kebele*** officials knew those in local power structure more than other farmers. This recruitment approach did not hamper the diffusion of innovation. But, the argument is that it benefited individuals who have special access to the officials. On the other hand informants stated that the late adopters did not remain poor or disadvantageous. There are late adopter farmers who properly adopt the innovation and benefited much from this program. In this case, it is not the early or late adopters that made a difference among smallholders but the proper adoption and the existence of resource base that facilitate adoption.

[24] The second group discussants: Girma, Feleg, Hebstie, Molla, Aserat, Amare, and Asrese

5.1.2 The Introduction of Agricultural Innovation

Informants recalled that the DA introduced the innovation to smallholders in different places. The DA first simply introduced the innovations to smallholders in the church. This writer has also observed that the church is still a very important center of information dissemination. The DA explained to smallholders about the type of innovation, the research results, advantages and his role in the adoption of the innovation. But particularly the non-pioneer participants argue that was a simple introduction without giving the chance of participation to all smallholders.

For a number of reasons, the introduction of innovation did not require persuasion and special methods of convincing the participants[25]. First, the numbers of participants was very few. Secondly, the recruitment approaches was not on the basis of participation. Thirdly, the innovation to be introduced was only one maize hybrid in a very small manageable plot. The DA stated that the candidate smallholders were eager to listen and properly practice the DA's instruction. According to the pioneer farmers' background, the participants were middle smallholders. Because, the recruitment require smallholders with oxen to properly cultivate the plot so as to properly adopt the innovation. This indicates that the first chance of adoption of innovation in principle excluded the poor smallholders.

The first important innovation that was introduced to the pioneer farmers was Maize High Yielding Variety (HYV) known as Awasa variety (A-511). The first focus group discussants said "the DA gave us strict instruction about the methods of cultivation, sowing and weeding in special meetings of the twenty pioneer farmers at Lalibela Service Cooperative office". They were told to prepare 0.5-hectare plot. The plot requires 12.5 kg seed of maize HYV, and 75 kg fertilizer Dap and Urea. The plot of each pioneer farmer was measured and the DA strictly

[25] From the discussion with agricultural officials

supervised the preparation. They practiced in an open space how to put fertilizer in a limited amount and plant A-511. This was, according to the first group discussants, how the current extension program was introduced and implemented in the locality.

Of course, the utilization of fertilizer and pesticides was not new. According to the agricultural officials, these inputs have been used since 1970s in the area. The utilization of chemical fertilizer (Dap and Urea) has increased rapidly and by now most of the land in the ***kebele*** and even in the whole of the ***Woreda*** could not grow major crops such as ***teff***, finger millet, and maize without fertilizer. The DA and agricultural officials said that the current extension package changed only the amount and methods of application of fertilizer. All my smallholder informants emphasize that chemical fertilizer is a basic production factor without which it is impossible to grow crops. They said, " Currently Smallholders in Lalibela ***kebele*** do not think agriculture without fertilizer". Particularly my informant Guade describes the importance of fertilizer as a question of " life or death" for farmers. They describe the major advantage of fertilizer to increase yield not only when applied on HYV but also on traditional varieties. It helps to the proper growth and strength of crops such as ***teff***, finger millet and others, which is good to easily cut and have more straw for animal feed.

According to the pioneer farmers, the extension program was soon proved advantageous. They recalled that the government facilitated everything. The supply of inputs with provision of credit was arranged and strictly followed up by the local government. The required amount of seed and fertilizer was provided on time. The pioneer farmers planted the A-511 carefully according to the instruction of the DA. The DA also strictly supervised the planting and the application of inputs. Sometimes they mixed their discussion with the comparison of the current situation that this government endeavors does not exist today.

According to the pioneer smallholders, they properly protected the HYV from weeds and the DA supervised the entire plot and gave technical assistance. However, some informants considered the DA as authoritative who has manipulated the household labour allocation in favour of the extension plot at the expense of other plots. This was how the current extension program was introduced.

5.1.3 Diffusion of the Agricultural Innovation

The pioneer farmers stated that the HYV grew well and found it to be very attractive. They were highly pleased. The performance was also surprising and incredible not only to themselves but also to non-participants. The yield was tripled in comparison to traditional varieties. But, they confirm that the yield was not similar in most of participants' plots. The quality of land and frequency of cultivation made a difference. They received between 27-30 quintals in a half-hectare plot. The news was widely spread in the locality by different networks. According to the pioneer farmers, most people learned the advantage of High Yielding Variety (HYV) from the field and its results in different networks. They said that the result of HYV in that year was almost the center of discussion in market places, church, ***mahiber***, and coffee ceremony. Moreover, according to the pioneer farmers, in1996 the year they started adopting the HYV, the price of maize was attractive and they benefited much. In this regard the first phase of the program was successful. The success of the program can be measured by its wide adoption of maize HYVs in the consecutive years (see Table 1). Access to reliable information, practical experiences and market factors can be taken as major factors for wide diffusion of innovations.

After learning much from the pioneer farmers, most of the farmers in the ***kebele*** asked the DA to supply them with the improved HYV in the following year. According to the DA and my informants, HYVs was and still is not available in the market in sufficient quantities. Its

distribution was strictly controlled and guided by the ***Woreda*** agricultural office. In 1996/97-production year, the number of farmers who demanded the adoption of HYV was beyond the capacity of extension service. The DA confirms that the limited resources in the form of HYVs did not allow the participation of all smallholders who wanted to benefit from the program. My informant Amare, said that he did not get the chance to participate in the program in1996. According to the data inTable.1, the number of adopters increased rapidly in consecutive years.

Gradually, a number of HYVs and hybrids have been introduced. The most important and widely spread innovation is maize hybrids. I call all hybrids and High Yielding Varieties (HYV) together HYV in this thesis for the sake of convenience. Pioneer hybrid (PH.B-3253), Baco hybrids (BH-540, BH-660, BH-160) and Awassa variety (A-511) are some of them. According to my informants, of all these HYVs, PH-B.3253, BH-540 and A-511 are popular and widely adopted. They said that particularly PH.B 3253 is more productive than other HYVs and at the same time the price of the yield is very high (see Table 7 and 9). Thus, the degree of productivity, prices and sensitivity to weather condition vary from one form of HYV to another. They are conscious in deciding to choose the type of HYV by careful consideration of their resource and weather condition. But according to the DA the performance of farmers on the adoption HYVs tends to decline over time. The increasing number of participants (see Table .1) makes the DA unable to follow up the progress in participants' plots and then give technical assistance. The number of participants in the extension program from 1995 to 2002 in Lalibela kebele is presented in table below.

Table .1. Extension program participants from 1995 to 2002 in Lalibela kebele

Packages		1995	1996	1997	1998	1999	2000	2001	2002
Crop production	Maize	20	72	120	974	1171	2218	1660	1136
	Other crops*	-	13	50	395	456	797	825	1178
	Total	20	85	170	1296	1627	3015	2485	2314
Animal Husbandry	Chicken	-	-	-	16	20	60	33	15
	Cattle fattening	-	-	-	-	12	19	30	40
	Sheep	-	-	-	-	6	8	4	30
	Others	-	-	-	-	-	-	-	-
	Total	-	-	-	16	38	87	67	85
Natural Resources Development	Eucalyptus	-	-	-	25	40	30	15	6
	Others	-	-	-	11	3	8	9	1
	Total	--	-	-	36	43	38	24	7
Post –Harvest Technology	Granary	-	-	-	-	-	-	-	2
	Cart	-	-	-	-	-	-	-	2
	Total	-	-	-	-	-	-	-	4

Source: compiled from the statistical data of the DA in Lalibela Kebele.

*Note that other crops include both improved seeds and traditional varieties with the use of recommended amount of fertilizer.

The table shows how the number of participants particularly in maize production rapidly increased. It indicates the positive interaction of smallholder agriculture with extension service on crop production. It also shows how the number of participants affected by market failure (look on the 2002 participants on maize production). The focus on crop production gradually expanded to include animal husbandry, post-harvest technology, resource conservation and currently home-economic issues (Table .1). One of the new developments my informants revealed was gradual change in animal husbandry. Almost all households collect hay; straw and other animal feed and give care about animal health. Cattle fattening has widely been practiced in all households. It is a good beginning. But most of these are practiced without seeking advice from the DA. And hence they are not included in the statistical data of the DA. But the introduction of exotic breeds has not yet started. The smallholders are not yet benefiting much from milk, butter and other

byproducts, though they own large size of cattle. Another change, according to informants, is raising and keeping more sheep as a cash asset is widely spread. They describe that most households get cash source by selling sheep for various expenses. I have also observed the wide practice of sheep keeping. Chicken for egg is also introduced to a lesser extent. But, According to adopters the mortality rate of this chicken is very high and thus significantly affected the benefits. The DA stated that the traditional methods of bee keeping continue without positive intervention in the kebele. As can be seen from the data on Table 1,Post-harvest technology is one of the packages that least adopted. Only two smallholders have built granary in the *kebele*. But, according to informants pesticides are widely used for maize. On the other hand, herbicides are not widely adopted. An attempt to introduce home technology on food preparation, housing compartments and others has not yet started. Table 1 shows the insignificant attention on other packages other than crop production.

5.1.4 Failures on some Improved Seeds and some Limitation of the Program

Besides maize HYV, ***teff,*** wheat and bean HYVs were also introduced. However, the different varieties[26] of ***teff*** and wheat are found unsuitable to the environment. Many smallholders, who adopted ***teff*** HYV, faced a crop failure. According to the DA some smallholders tend to make the DA responsible for the crop failure. One smallholder who faced ***teff*** crop failure sadly said to me " the DA persuaded me to adopt the innovation that has no advantages". The adoption of bean HYV was also one of the innovations that were soon rejected. It grew well and had good standing. But it was unable to bear fruit and hence faced problem of sterility. My informant Haymanot remembered his crop failure with deep sorrow. Of course such crisis was too high if one thinks the labour input on the preparation of the plot, the price of HYV,

fertilizer and overall crises of the livelihood strategy. Insurance for crop failure particularly in the case of HYV failure is not yet established. The following case is the best example of such crises.

Case- 4 Haymanot

Haymanot was one of the smallholders who adopted the bean HYV in 1999/2000-production year. He prepared the plot carefully. He took the HYV seed and 50kg fertilizer on credit. He sowed it in June 1999. It grew very well and he was happy. But it was unable to bear fruit. He soon appealed to the DA to exempt him from the credit. His appeal was rejected. He refused to pay the credit. The case was taken to social court. In the process he was prevented from the provision of inputs on credit till he settled the previous credit. The prohibition affected the calendar of his production. Finally, he was forced to pay all his debts with interest.

Problems such as this strained the relationship between the DA and smallholders. It indicates the absence of close relationship between the agricultural research institution and extension program. The agricultural research institution does not have any co-ordination with the farmers and the DA about the innovations. Moreover, the DA stated that he has no any direct relationship with the research centers. The relationship between the DA, smallholders and researchers are indirect. The DA simply report the failure of the innovation to the ***woreda*** office and the report continue up to the higher body according to the structure in the regional state. Finally the Bureau of Agriculture organizes the reports and sends these to the research institution. This bureaucratic procedure does not co-ordinate the activities of researcher, the DA and the smallholders together to discuss over the nature and failure of the innovation. This can be considered as one of the constraints that have affected the program on areas of sustainable crop production. With exception of maize hybrids, there is no other innovation in the areas of crop production. There are also cases of crop failure as a result of spoiled and expired inputs (HYVs and fertilizers).

[26] Asres and kebede are also other smallholders who faced crop failure in teff and wheat respectively in the kebele.

Informants[27] said that smallholders need extension service very much. The current demand of smallholders is to be ensured on the supply of inputs, which have been already adopted. They need extension service to be the center of advice and distribution of inputs, seedlings and diffusion of innovation. But, at the same time, they criticize it as bureaucratic, indifferent and inflexible. They stated that there are a number of factors, which discourage the smallholders' initiatives in the adoption of innovation.

There are more smallholders who wanted to be engaged in area of horticulture. But, the agriculture office is unable to provide smallholders with seeds and advices. The inability of agricultural offices to supply the necessary seeds on time is one of the limitations of the program. Extension service also applied rigid requirements on adoption of innovations. The requirements such as minimum size of plot on crop production, and horticulture discourage the smallholders' participation. For instance, farmers are required to prepare a quarter of hectare plot if they want to be engaged in horticulture activities and half-hectare plot for crop production. This requirement does not encourage smallholders to participate in the program according to their interest and capacity. But in general smallholders have a strong desire to adopt innovations, if these are appropriate technologies.

5.1.5 The Role of the DA in the Adoption of Innovation

The DA is the most important person in the extension program. The DA introduces and facilitates different innovations to farmers. He is the center of communication between research results (innovations) and the farmers. The proper adoption of innovations requires understanding between the DA and smallholders. But according to informants the relationship between

[27] Informants who participated in the interview, focus group discussion, and case studies recognize the importance of extension service to their agricultural activities.

smallholders and some of the DA was not friendly. Of the five DAs[28] reshuffled in Lalibela *kebele* in the past nine years, there is only one popular DA. He is remembered by his quality of equal treatment to all smallholders and consideration of the smallholders' experiences. It shows that the quality of DA in terms of knowledge of the culture of the community, training and interest plays a significant role in the success of extension service.

Smallholders now simply buy inputs on cash or credit and apply them according to their experience. They go to the DA office only when they want to adopt new other improved seeds and animals. The DA is currently occupied in advising smallholders to be more diversity and market – oriented in relation to crop production, animal husbandry and other activities. This advice is disseminated in church. Informants see that agricultural extension is a positive intervention, though it has limitations.

The limitation is not only reflected in extension service, but also the smallholders are affected by different socio-economic factors. Some of these factors are land, oxen and cash. The following section treats such factors in relation to agricultural extension.

5.2 The Relationship Between Resource and the Adoption of Innovations

Resource is a recognized factor in the adoption of agricultural technologies by smallholders. The most important resources in smallholder agriculture are land, oxen and cash. In the past wealth was measured in terms of cattle[29]. It shows that cattle were not only economic

[28] Farmers, I meet in the research field still remember the work of the DA- Zeyede. They even said " extension service does not exist today-it went with Zeyede".
[29] Messing (1957:119) has shown how cattle were the expression of prestige and wealth.

bases but also expression of social status. Currently, however, smallholders categorize wealth in terms of different assets such as cattle, quality of land and cash.

5.2.1 Land and the Adoption of Innovation

Informants agree that the size and fertility of the land is important basis for differences in production and wealth between households. They label their land as fertile and infertile plot. Table 2 shows that the distribution of land in two ***gotes*** of the Lalibela ***kebele*** *is* not equal, though some informants claim to be homogenized. According to Table 2 the average landholding of the two ***gotes*** is almost 8 *kada*[30] (2ha.). The size of landholding seems to be large in comparison to other regions (See Teferi, 1998:99). This condition invites comparative research to find out the role of land in earning livelihood in different regions.

Table 2. Farmland Distribution per Households and the Respective Land Taxes of the two *gotes*(Seol-Meda and Kessel Terara)

Size category in hectare	Households		Land tax
	No.	%	
Landless	7	2.8	-
< 0.5	9	3.6	20
0.5 – 1	21	8.43	25
1.0- 1.5	34	13.6	30
1.5 – 2.0	80	32.1	35
2.0 - 2.5	59	23.6	40
2.5 – 3.o	39	15.6	45
Total	249	100	-

[30] This shows how the size of land holding is steadily diminishing when we see that the average farmer landholding in Gonder in 1950s was estimated to be 50 kada (Messing, 1957:257).

Source: compiled from the interview of four governmental team heads of the two *gotes*

Table 2 shows that land is not owned equally even after redistribution. But the society has different mechanisms that allow the flow of this resource among the community through different forms of local arrangements. Sharecropping (***Timad***), rent (***Kiray***), purchase (***Gizie***), gift (***Sitota)*** and inheritance (***wurse***) are different forms of access to land. But the most important forms of access to land are sharecropping, and to some extent rent and purchase. The remaining forms of access to land are not yet widely reflected due to the recent effect of the law since 1997. Those who have shortage of the land could plough land by using one of the accesses to land.

Sharecropping is a local form of contractual agreement to plough and use land usually on an annual basis. This is a widely practiced form of access to land in the research area. And those who have no oxen or weak oxen use to sharecrop out their land to those households who have more oxen and land shortage. Such form of land arrangement is made between the one who sharecrop in the land (***tetemaj)*** and the one who sharecrop-out the land (***astemaj).*** The land is usually sharecropped ***siso*** (one third) of the product. Most householders said that they could plough more than their personal landholding. Case study informants such as Molla, Ewenetu, and others (Table 11) sharecrop land in a considerable degree because they have adequate oxen. This seems a fact that the large size of the ***kebele*** land is under cultivation (Table.3). But, sharecropping the land has become expensive which require additional money to confirm the sharecropping agreement. This money came to be known as ***semanya***[31].

This does not mean that land is a commodity in the form of sharecropping to be freely sharecropped by market values. Social networks in the form of kinship and common residence

[31] Informants cannot explain how and why the term is used. But, they said that the term is borrowed from the word semanya marriage .It confirms sharecropping agreement by a payment to the owner of the land, as that one confirms contractual marriage agreement.

prevent free access to land. When a household plans to sharecrop out a plot, priority is given to close relatives, neighbours and so on. This is not without reason. Such kin groups have also moral obligation to support such poor relatives when they are in critical problem. It is this socio-cultural dimension that prevents the commoditization of land in the form of sharecropping.

Sharecropped land requires expenses as a result of adoption of innovation. The ***tetemaj*** should cover all expenses in the form of inputs, labour and other activities to prepare the plot. On the other hand, most ***astemajs*** need their land to be sown maize hybrids because of high level of productivity (Table .9). And yet there are risks of heavy or shortage of rain that damaged more the ***tetemaj*** than ***astemaj.*** As far as possible, the ***tetemaj*** tries to avoid sowing sharecropped land the type of crops that need high inputs. Because the application of inputs has proved to be more expense than before. Therefore, those who use land through sharecropping are affected by such risks, which are associated with the adoption of innovation in time of crop failure, bad weather and market failure. The high price of inputs, land scarcity and the risks in combination jeopardizes the benefit of smallholders from sharecropped land. Households, who have no adequate land, have become in difficulty in the adoption of innovation. The following cases show how the adoption of innovation affected access to land through sharecropping.

Case –5 Bekele

Bekele used to reside as ***tekerchem*** *in his wife's parent's locality in seol meda got. He came to his wife's parents' locality for permanent residence one and half years before the land redistribution of 1997. He has used to plough land through sharecropping. His parents-in--law also gave him some land. But, his father-in-law was labeled as bureaucrat and the land above 4 kada (1 hectare) was all taken. Bekele was not also entitled to have the right to get land, as he did not live in the kebele more than two years. When he attempted to return back to his original place, the committee refused to recognize him as permanent resident of the kebele and he was unable to get land in both cases. He is now one of the landless smallholders in the kebele who continues to plough land on the basis of sharecropping. In 2001 he sharecropped in half-hectare plot and adequately cultivated and planted it maize. The result was good and earned 22 quintals. But one third of the yield went to the astemaj and another one fifth from the remaining yield went to the labourer. He has received almost half of the product .He has to*

sell some of this product so as to pay the credit of inputs. In the final analysis, he is unable to get benefit from sharecropped land, as it requires high amount of inputs. As the result, he is thinking to abandon farming and focus his livelihood strategy towards the rearing of sheep.

Case-6 Hibeste

W/ro Hibste is a female household head. She has 2 kada (0.5 hectare). She used to sharecrop her land. But last year the tetemaj was sick in the very period of maize planting. The planting season passed and the land was sown finger millet. It is not as productive as maize hybrids. She complained that the tetemaj has destroyed her livelihood. She is planning to take the land and Sharecropping out it to a better farmer next year.

Another form of land access is rent which is to some extent less expensive and less available. It is a land use agreement made by the payment of limited amount of money once for one year. According to my informant, it is made available when a household without oxen and sometimes with oxen faces acute problems to get cash. Those smallholders who rent out land are described by the society as poor and disorganized. The amount of rent varies depending on the quality, size and frequency of cultivation. Half hectare of quality plot can be rented for Birr 200. According to my informants, this type of agreement is found cheap when the weather is reliable. However, it is not always available.

Disguised purchase is another form of access to land. According to my informants, the agreement is made in the form of gift, money lending mortgage and other methods, in such a way that the law cannot discover it. But, the question of land purchase seems to have brought intense litigation and conflict. In most cases the sellers reclaim the land that they have sold it. I have observed such cases in the social court and elders. This happened because of the growing value of land and its scarcity.

These different forms of access to land has major role in allowing the flow of this resource among households according to the local arrangements. But, land seems to be scarce resource as

there is no vacant cultivable land in the kebele. The following table shows the land use pattern of the kebele.

Table 3 Land Use Pattern in Lalibela Kebele

Land Use	Hectare	Percentage
Cultivated Land	5516	77
Grazing Land	1003	14
Forest	60	0.8
Uncultivable Land	127	1.7
Others	450	6.2
Total	7156	100

Source: compiled from the statistical data of the Lalibela DA office.

Table 3 shows the pattern of land uses in the ***kebele***. Most of the land 77% is already under cultivation. It shows that fallow land has no longer existed in the ***kebele***. As a result most farmers are forced to leave one of their plots uncultivated to grow hay because of degradation and diminution size of grazing land. According to the ***kebele*** officials, cultivation highly encroaches grazing land. The attempt to protect grazing land from cultivation encroachment was the major activity of ***kebele*** officials during my stay in the field. The application of high amount of fertilizer in a small plot was growing through extension service to overcome the loss of soil fertility. The method of production twice a year in some plots has increased. Particularly those plots sown maize and barley are reused in the same year to grow other crops such as chickpeas, lentils, vetch, Niger seed and the like.

Moreover, the smallholders have a highly fragmented plot. Of course, they like to have land in different places as the quality of land could vary from place to place in a few distances.

But, they do not like highly fragmented plot – which creates management and time problems. One of my informants, Abetew said that he has 9 ***kada*** (2.25 ha.) in five separate places, which he complained about. Land is one of the basic resources that smallholders have. But, land alone without oxen cannot be realized into production. The following section looks on the importance of Oxen.

5.2.2 The Role of Oxen in the Adoption of Innovation

Animal traction is the only means used for cultivation of land. Oxen are still the sole power for ploughing land and threshing crops in the ***Woreda***. Table 4 in the following page shows that households on average have two oxen. Households without oxen are considered to be poor in the stratification scale of the community. Households that have two oxen are self-reliant smallholders. However, according to my informants, there is no rigid category in this stratification. The risk of oxen mortality is high and thus, upward and downward mobility is common.

Moreover, it is not the number but the quality of which is crucial. Those who have two quality oxen can prepare and sow their plot on time. Timing in preparation and sowing is a key point that makes a difference in smallholder agriculture. According to my informants a team of oxen can plough 1-***kada*** (0.25 ha) in a day. A household, which has a team of oxen, could not plough its 8-***kada*** (2ha.) plot once in over two weeks because of the possible interruption of holidays and other social factors. Therefore, if one thinks the high frequency of ploughing (see Table.8), oxen seems to be one of the most important resource factor in the adoption of innovation. Thus, oxen affect the adoption of agricultural technologies in many ways. As we have seen, HYVs need adequate cultivation and they are sensitive in time of planting and

weeding. Those who lack oxen are unable to perform such activities on time. The following table shows distribution of oxen by households.

Table 4. Oxen Distribution by households in Seol-Meda and kessel Terara Gotes of Lalibela kebele.

No. Of oxen	Households	
	No.	Percentage
0	28	11.2
1	42	16.8
2	105	42.1
3	56	22.4
4 and above	18	7.2
Total. 508	249	-

Source: compiled from the interview of four governmental team heads of the two gotes. (Average oxen per household =2.0)

As can be seen from Table 4, there is substantial number of households without a single ox. These households mostly live through sharecropping their land and hiring their labour. On the other hand there are some households who can perform their agricultural activities by two teams of oxen[32]. These households can adequately cultivate their plot and sow it on time, which has a great effect on productivity. Of course there are different forms of local arrangements,

[32] Case study informants: Ewenetu and Molla have more than four oxen each. In the focus group discussion, they are recognized as successful farmer because they have sufficient oxen to adequately cultivate their plots by two ploughmen each and plant them on time.

which allows access to oxen from one household to another. These are ***Mekenajo*** (the teaming of a single ox of a household with an ox of another household to plough in turn), ***Timad***[33] (Sharecrop oxen) and ***Lemena***[34] (lit. begging for oxen usually for one day). The examination of such forms of access to oxen is necessary to identify the roles of local arrangements in overcoming constraints in smallholder agriculture.

Households who have one ox each team their oxen (***mekanajo***) and plough on each other's plot in turn. It is a very important institution that enables poor households to bring their resources together for the operation of ploughing their plots in turn. But according to my informants this does not make a significance difference in ploughing. As the frequency of ploughing is high for a good seedbed preparation, such access to oxen suffers from time constraints. Ploughing which requires a continuous process is not completed in one or two days work. Without adequate draft power, therefore, they could not properly cultivate and sow their plot on time. But, this is a widely practiced social institution in the research areas.

Poor farmers can cultivate their farmstead (***badema***) and plant maize through the institution of ***lemena***. This is an aged-old institution that allows the sharing of resources particularly among close relatives. For example, Feleg –the second focus group discussion participant, a female household head, plant her farmstead maize in 2002 by oxen obtained through ***lemena*** from her brothers. But ***lemena*** as an institutional access to oxen is not always available which a household can only borrow oxen from a close relative not for more than four days in a year. This form of access to oxen is in most cases applied when the household plant the farmstead (***badema***) which is believed by the society as necessary, or one of the ox of a household get sick in a critical time

[33] The term 'timad' is commonly used for both sharecropped land and oxen in the research area. But, the term for sharecropped oxen in Wollo is known as kitir (Teferi, 1998:71).
[34] Lemana is a very important broad institution that enables households to borrow both labour and oxen in critical time mainly among relatives without reciprocity but with expectation of future cooperation in time of need.

of agricultural activities. Therefore, ***lemen***a as regular form of access to oxen is not applied and the society does not accept. This moral and social value of the society does not encourage a household to become dependent on the institution. At the same time, the moral and social value of the society justifies the use of this institution when a household is in critical situation. So ***limena*** is a broad concept that regulates the sharing of resources in the form of borrowing mainly on kinship basis in critical times.

Timad is also a local arrangement of access to oxen, which allows the flow of oxen from the households who have surplus oxen, and/or lack of male labour to the households who lack oxen. The arrangement of ***timad*** is not widely used mainly for reasons that the owner of oxen suspects that the ***tetimaj*** would not give care to the oxen. They prefer to sell the ox rather than sharecropping. But from the research site, there is one successful smallholder from ***timad.*** The case of Bekalu can express more about the potential of this institution to overcome oxen constraints in ploughing.

Case-7 Bekalu

Bekalu, 48, was one of the poor smallholders in kessel terrara got without oxen. He used to live by share cropping out his land and minor horti-cultural activities. But, a popular DA known as Zeyede convinced him to participate in the extension programe in 1990 E.C. He sharecropped in oxen from his sister. The DA arranged a zero- down payment of inputs on credit to him. He properly cultivated his half-hectare plot and sowed it HYV of A-511. He said that he was lucky and able to get more than 28 quintals. Fortunately, the price of maize was very high. He sold some of them and the money was used to pay the credit of inputs and the rest of the money enabled him to buy two oxen.

The ***timad*** agreement seems to be potential local arrangement to enable poor households to adopt innovation and then to be pulled out of poverty like Bekalu. With the new technology of innovation in the extension program, ***timad*** shows one of the possibilities to overcome oxen constraints in a few period of time. But it needs revitalization, which can avoid the suspect of the

household who sharecrop out oxen. The different forms of access to oxen are very important institutions to overcome oxen constraint in the adoption of innovation.

5.2.3 Cash and the Adoption of Innovation

Cash is a very scarce resource to smallholders. Cash can be made from various sources such as from sales of honey, grains, animals (cattle, sheep goat), perennial crops (*gesho* and eucalyptus trees), and non-agricultural activities and remittance. According to the *Woreda* Agricultural Office survey conducted in 2001, more than 80% of smallholders' income obtained from crop production. And yet the amount of cash also varies from one source to another in different households.

The cash obtained from different sources is first used to meet household basic needs. Every household purchase basic need such as dietary ingredients, cloth, and other household consumption from the market. Then they also purchase construction materials and agricultural implements. They also pay land tax, credit and other debts. My informants agree that the highest expense to all households is payment of the credit for inputs. All these are transacted through the medium of money. But, according to informants, it is only few households who have sufficient cash to purchase the basic needs. The two focus group discussion participants categorize those households who are engaged in bee keeping, raising sheep, and proper adoption of HYV to have extra cash.

Smallholders who have cash can easily buy inputs so as to plant the HYV on time. My informants such as Ewenetu, Tackel and Molla said that they begin to buy all agricultural inputs on cash long before. Cash can give a chance to smallholders to adopt innovation in different area such as rearing of sheep, cattle fattening, granary building-which require cash for adoption. They can buy another oxen whenever their oxen get sick or dead. They can take care for their animals

with medicine that has a significant value on rearing of animals. They can buy hay and other animal feed which keep their oxen healthy and strong for cultivation process. The following case indicates how lack of oxen and cash affects the adoption of HYV.

Case 8- Girma

Girma is a poor smallholder without oxen. He borrowed (lemena) oxen from his parents and uncle one ox each for one day. He crudely ploughed and sowed his farmstead (bademe) traditional varieties in 2001. He knew that HYV would be more productive than traditional varieties. But, he did not want to take credit for two reasons. First he had no extra cash to make down payment of the credit for inputs and oxen for adequate cultivation. Secondly, if he faces market and crop failure he will be unable to pay the Credit. Therefore, he wanted first to secure his livelihood avoiding risk of market and crop failure by rejecting the adoption of HYV.

To sum up, resources in the form of land, oxen and cash are important for adoption of agricultural technologies. Smallholders who lack land, oxen or cash, or the combination of them are unable to purchase and apply inputs properly. Moreover, the resource limitation forced the smallholders to distort the application of agricultural inputs i.e. purchasing a small amount of inputs (fertilizer) and use them to the large size of the plot. Instead of using the original HYVs, they use the second generation, which has biological limitation in productivity. They are unable to cultivate their land on time. This is done not because they do not know, but because they do not have such adequate resources. And yet resources in the form of land, oxen and cash could not be realized into production without labour. The following sections deals with the issue of labour in smallholder agriculture.

5.3 Labour

Agricultural operation is carried out with the great support of human labour. It requires a minimum labour force, which could vary from household to household according to their resources. The poor have extra labour. But, new householders and the old householders are the

most who require additional labour. And yet the size of households in relation to labour is subject to changes all the time due to various reasons: death, divorce, marriage, conflict and health factors. According to my informants, particularly sending children to school has reduced the availability of family labour. The following table shows the demographic feature of the kebele. It shows age and sex category with household number that have significant implication on the issue of labour.

Table 5. Size of Lalibela Kebele Population by Sex and Age.

	AGE					No. Of Households
Sex	0-7	8-20	21-60	65 and above	Total	
Male	1247	2109	3200	371	6927	1747
Female	1277	2007	3288	408	6980	194
Total	2524	4116	6488	779	13907	1941
Percentage	18.1	29.5	46.6	5.6	1oo%	-

Average Household size- 7.2

Source: compiled from the data of the Woreda Agricultural Office collected in 2000.

Labour can be divided in to two as productive and domestic labour in household level. It has more or less gender-based division. In general, informants agree that persons between 7 and 65 years old[35] and even more are active labour force in different agricultural and domestic tasks depending on the health condition. Households who have boys more than ten years are considered labour rich households. Table 5. Shows that the large size of the population lies on the

[35] The second focus group discussion participants, however, believe that persons up to 75 years old can be active labour force if they are healthy.

ages that contain active labour force. Households whose daughters are above 14 lose a major source of labour because of marriage.

Domestic labour involves household activities. It includes cleaning, cooking, fetching water, making coffee, ***tella*** (local bear), collecting firewood, fuel dung and others. It is the domain of daughters under the guidance of the wife. If there is no daughter, boys assisted their mother in minor domestic activities.

The major agricultural activities, which require labour, are ploughing, sowing, weeding, harvesting, threshing and collecting. Smallholders in the peak agricultural season work from early in the morning to sunset. Cattle keeping also require labour, which is mostly the job of children who are above 7 years old.

According to informants, ploughing, the exclusive task of male, is the greatest task of all agricultural activities. It requires strength and knowledge of agricultural implements. Males above 14 are capable of ploughing. Even children above 7 years also support the work of ploughing by watching extra-oxen and removing bushes in farmland. Children are also active in weeding, cultivation, harvesting and threshing. Therefore, rich households like Ewnetu and Molla need a minimum of two males labour to conduct agricultural activities. Therefore, because of unavoidable social and political activities, such rich households hired or sharecropped labour for ploughing. Those households,that have no oxen and extra labour, hire-out or sharecrop-out their extra labour to those who lack.

5.3.1 Labour and the Adoption of Innovation

With extension service, the methods of cultivation, planting and weeding of HYVs need more intensive labour and care than the traditional varieties. For instance, according to case study informants, to plant maize HYV require including the ploughman from 3 to 4 labour force per day – which was conducted by one ploughman in traditional varieties. The planting of maize and

application of fertilizer is changed from traditional broadcasting to the modern planting in rows. Moreover, the requirement of additional labour is seen with the sensitive nature of HYV to time of planting. Therefore, household members regardless of sex participate in planting of maize. Without adequate labour force, a work of a day in planting maize could take two days which is risky because of the possible interruption by holidays, social and climatic factors. In the research site, there is a strong belief to abstain from work on many holidays in a month. Working in holidays is associated with heavy rain that destroys crops. Informants said that the area has been affected many times by heavy rain.

In general, cereals require more intensive labour in cultivation, weeding and threshing than pulses and oil seeds. The first focus group discussion participant sort out that maize, finger millet and *teff* are the crops, which need more labour than other crops. Therefore, as maize is becoming the dominant crop (See table 10 and 11), it requires intensive labour. Hard working and labour rich households are in a more advantageous position than labour poor households in the adoption of innovation.

But, labour is available if a household wants to obtain. There are different forms of local arrangements, which allow the flow of labour from one household to another. Sharecropping, ***kurt*** and daily labourer are some of them. Moreover, the social institution in the form of ***wonfel, lemena*** and ***wobera,*** which has long been useful in labour arrangement and allocation in the community, is widely used. Let us see these local labour arrangements one by one.

The widely practiced form of labour contractual agreement is sharecropping. The labour on the basis of sharecropping may have two forms of residence in and out of the household. Labourer resident in the household requires feeding the labourer and at the same time the labourer is required to perform non-agricultural activities. The contractual agreement depends on the size of land, number of oxen, and household labour force on the one hand and the labour

quality and age of the labourer on the other hand. Sharecroppers usually receive 1/4 or 1/5 of the produce. The sharecropper is also expected to contribute to the cost of inputs according to his share. This type of agreement has become risky as a result of market failure. In time of harvest failure, the labourer is the most affected as he is required to pay the price of inputs according to his share. These risks have become an important point in labour arrangement because of adoption of innovation through extension service.

As a result, according to my informants, another form of labour contractual agreement, which has mutual risks and benefits in different condition, is widely practiced as a result of the adoption of innovation. It is known as ***Kurt*** (a form of local labour agreement to pay the labourer a limited sack of grain per year without the consideration of crops failures). If a labourer entered in to *Kurt* labour agreement, he will be free from the contribution of money to the price of inputs according to his share. And yet, it is known that the ***Kurt*** labourer gets less than the sharecropper might have got in the normal condition. In time of drought, heavy rain and market failure, the ***Kurt*** labourer is more advantageous than sharecropper and the vice-versa. ***Kurt*** labour arrangement with the adoption of innovation has become the best option in the pattern of local arrangement of labour when risk is expected.

Moreover, the sensitive nature of timing and planting of HYVs increased the wide use of daily labourer in time of planting and weeding. For instance, Felge, a female household head, was employed as a daily labourer in different households to plant maize in 2002. However, the first group discussion participants have also pointed out that some households delay the sensitive time of planting and weeding by lack of labour. This happened not because there is no labour in the market but they have no cash at hand to pay to the daily labourer.

Wonfel is a very important method of labour exchange among households in time of planting, weeding, harvesting and construction of houses. It is arranged primarily on the basis of

common residence, friendship and close relatives on the basis of immediate reciprocity. This type of working party is arranged when a household is in critical need of labour for timely planting, weeding, and harvesting. Case study informant Molla widely used ***wonfel*** in time of maize planting and threshing maize because of lack of labour.

Lemena (lit. begging) is a local labour arrangement particularly when a household has no male labour or in critical need of additional labour to perform activities on time. ***Lemena*** is mainly arranged within close relatives and neighbours. This form of access to labour is not necessarily reciprocal and mostly an individual labour. For instance my case study informant hebstie has planted maize her farmstead in 2002 through the ***lemena*** institution. She has got oxen from the one sharecropped her land and labour (ploughman) from her brother's household. *Lemena* is applied when a household is in critical labour shortage on the genuine basis of the above factors. Therefore it is not regularly applied.

Wobera, which is more or less similar to ***lemena, is*** another form of access to labour in time of planting, weeding, harvesting and firewood collection mostly arranged by influential persons in the community, which is not reciprocal. However, this does not mean free at all. These influential persons in return are expected to perform social and security affairs of the community such as conflict resolutions, appeal the problem of the community to higher officials and mobilize the community to common ends. One of the key informants, Tadele is one of the influential persons in the ***kebele*** who organize ***wobera*** to harvest his maize during my stay in the field. ***Lemena*** and ***wobera*** are both non-reciprocal and at the same time unforced laboure arrangements. The difference between ***lemena*** and ***wobera*** labour arrangements is that the former reflects how households, both rich and poor, have access to mainly individual labour on the basis of moral and spiritual obligation among relatives in critical time. The latter pull more labour forces at one time in the community. The social institutions in the form of ***lemena, wonfel*** and

wobera that allows the flow of labour among households have one common characteristic. The households who organize such labour arrangements provide the participants with food and drink mostly *tella* (local beer). Informants agree that the cost of food is very simple in comparison to the critical agricultural tasks performed.

Therefore, those households who have adequate oxen and land can easily obtain labour through different forms of access to labour. In this regard, land and oxen tends to be more basic[36] production factors than labour in the adoption of innovation. But, the three production factors with fertilizer are all indispensable in the production processes. The point that is emphasized here is an attempt to single out the major constraints in the process of agricultural production in the research area.

To sum up resource has been seen as a major factor in the adoption of innovation. One mechanism to overcome such constraint is supportive institutions like credit and market. The following section deals with the issue of credit and marketing.

5.4 Credit and Marketing

5.4.1 Household Economic Condition

The resources of farmers are very limited. Most of the production is used for household food consumption. Some of the grains are sold to purchase dietary ingredients such as salt onion, coffee and others, cloth and pay land tax and other expenses. Part of the production is used for

[36] In the focus group discussion, there was an interesting comparative argument over the basic production factors. They believe that the difference on agricultural production comes from their difference on oxen and to some extent on land. Girma and Feleg who have land and no oxen, in the second focus group discussion, argued that they do not plough their land because, they do not have oxen. They agree on oxen and land as basic production factors. They also argue on the importance of labour. But, the case of Girrma and others mentioned in the discussion who remained unemployed last year because of, according to the argument,surpluslabour, undermined the case of labour as basic production factor. No discussant raises the issue of a household who was affected by the shortage of labour in the community in the adoption of innovation.

socio-cultural expenses such as wedding, ***teskar*** (memorial feast), ***mahiber***(religious asscíation) and other similar expenses. As a result, most farmers do not have adequate grains until the next harvest. Some of them will not even have seed to sow their plot.

But, the social networks make life in the rural society bearable. Inter-household relationship, which is founded on kinship, residence, and friendship, has played a major role in resource exchange. Borrowing in the form of grain, seed, money, and even household furniture make socio-cultural ceremonies and agricultural activities possible under harsh economic condition at the household levels.

Informants agree that food shortage in the rainy season is a common phenomenon to some householders. It is more serious and acute for smallholders without oxen. Therefore, it is a common phenomenon to borrow grains in the summer season for household food consumption. In most cases, household food and seed crises is the result of either social obligations like wedding, crop failures, or lack of resource bases. But, according to my informants, the total collapse of household existence and agricultural activities as a result of food shortage is very rare. Those households who borrowed grain and seed will return it soon after harvest to the lender. The remaining grain will be small and cannot sustain the household in most cases till next harvest. For instance, the case of Girma expresses the recurrent borrowing of grains.

> Girma, a household head, has borrowed grain from his parents and brother in the rainy season of 2001. Almost a fifth of what he collected from his farmstead and sharecropped land went to his parents and brother next year. The remaining grain does not sustain his household till next harvest. As a result he again borrowed grain in the rainy season of 2002.

The case of Girma shows how the poor households lead their life. Therefore, food shortage and then borrowing will continue as cyclical phenomena in some households. This indicates that credit is not a new institution among the community, which has more socio-cultural elements than economics.

However, the system of money loan is not available on time and the interest of it is very high. Borrowing is also difficult for the poor if they have no rich relatives or the rich who can be guarantee to the lender. The Church, rich farmers, merchants and sometimes ***mahiber*** are some of the rural institutions that provide loan in cash and in kind. Church has collected cash from different religious services and this cash known as church money (***yedebir birr***). This cash under the control of the parish community (usually known as kebele) is borrowed to the member of the community on the basis of interest ranging from five to ten percent per month. Rich farmers and merchants also lend some of their money on the basis of interest, which is more or less similar to the church money interest. The money is borrowed to persons who can bring guarantee. This interest rate is also very high in comparison to the interest of the banks.

5.4.2 Credit and the Adoption of Innovation

As it has been explained above, most of the smallholders do not have extra cash at hand to buy necessary inputs. Adoption of innovation requires payment of the price of inputs (fertilizer and improved seeds). Without the provision of inputs on credit, adoption of biochemical innovation for most of the farmers is difficult. Informants agree that credit is an indispensable factor for the adoption of innovation. Table 6 shows how the society increasingly depends on credit for agricultural inputs. The provision of inputs on credit is important not only to the adoption of the innovation but also to the regular agricultural activities of smallholders.

Table 6. Inputs (fertilizer and HYVs) Distribution on Credit (in quintals) and Loan Distribution in Lalibela Service Cooperative

	Fertilizer			Improved seeds			
Years	Dap	Urea	Total	Maize	Other HYVs	Total	Loan in Birr
1998	1235	620	1855	135	7.25	142.25	359,935.47
1999	1398	806	2204	171.5	3	174.5	488,869.88
2000	1513	875	2388	189.75	0.3	190.05	490,913.8
2001	1446	828	2274	205.75	-	205.75	579,421.26
2002	1004.5	403.5	1408	68	-	68	182,119.48

Source: compiled from the statistical data of the service cooperative and DA office of Lalibela.

Lalibela Service Co-operative (SC) has long made available inputs on credit by the cash mostly obtained from Commercial Bank of Ethiopia. The SC provides inputs on credit equally not only to its members but also to non-members who reside in the kebele. It is a lower unit of both credit provision and input distribution. It is the only institution of smallholders, which facilitates and manages the provision of inputs on credit. But, according to informants, the provision of inputs on credit has long and time taking procedures.

The service co-operatives (SC) and the DA first register the farmers' demand of inputs on credit through governmental teams (locally known as ***mengestawi buden***) every year in March. After the collection of the whole data on inputs, the SC will send the information to the ***Woreda*** input supply co-ordination committee for credit permission. Once the amount of credit is permitted, the input supply committee will decide the amount of down payment to be collected from farmers in May. The decision will be notified to the SC and the SC will again require

governmental teams to collect the down payment from the registered farmers. The smallholders are categorized every year in to poor, middle and rich to make down payment. For example, according to the SC committee, in 2002 the down payment was collected in 25%, 30%, and 45% from the poor, middle and rich farmers in the ***kebele*** respectively. There are also farmers who are considered very rich to buy inputs on cash without credit.

The time to collect the down payment is a period when, most households begin to run out of grain. Some smallholders need to borrow money or sell some domestic animals to fulfill the demand of inputs. Therefore, the formal input credit does not protect smallholders from borrowing money with high level of interest. There are also smallholders who do not take input on credit simply because they do not have the case to pay the down payments.

Once the SC made the down payment to the ***Woreda*** co-operative offices, the SC collects and transports the inputs from input supply organizations Ambassel General Trading House and Agricultural Input Supply Corporation Organization (AISCO) to SC stores. Most of the SCs do not have transport facilities. The farmers have to travel long distances to collect their inputs and transport it by pack animals.

In Lalibela, where there is vehicle road, inputs are easily transported. However, the distribution system is very inefficient which affects the sensitive period of planting and labour allocation. The following cases can express the delays and inefficient system of input distribution and its consequence.

Case 9- Guade

> *Guade is a member of Lalibela SC. He complained about the delays of inputs, inefficient and corrupt system of SC's distribution of inputs. He recalled that in the previous year he wasted four working days waiting to receive inputs from the SC. He is highly regretted how his labour was wasted and the conducive time of planting maize passed. There was also another occasion when the planting time passed due to delays of inputs and he was forced to sow the plot another crop.*

Case 10 – Abetew

> *Abetew is also another member of Lalibela SC. He is very disappointed about the inefficient and corrupt system of input distribution. Last year he tried lawsuit against the committee. But he was unable to find a responsible body that can solve the problem.*

According to these cases, the problem of delays and inefficient system of distribution is a major constraint to the proper adoption of the innovation. The SC committee and *woreda* officials also admit the problem. They know that the delays and inefficient system of distribution affects the time of planting and proper utilization of labour. But, they justified that this happened because of lack of management skills and large size members and the delays on the making of input availability by supply organizations.

Such delay creates a big difference between the rich and the poor. The rich can directly buy inputs on cash from the input supply organizations (Ambassel and AISCO). They can plant on time and no wastage of labour. Planting on time has increased productivity and facilitated the calendar of other agricultural activities. Moreover, credit is not allowed to the SC, which was unable to collect more than 85% of the previous credit from smallholders. But, Lalibela SC has so far fulfilled such requirements. According to the Lalibla SC committee, there were neighbouring SCs that were affected by such rules. The members of such SCs created inefficiency on their distribution of inputs as they come to Lalibela SC through the name of relatives who reside in Lalibela kebele.

Informants and Lalibela service co-operative Committee agree that shortage of inputs is not a major problem. But, they complained on the high price of inputs. The high price of inputs has sideeffects on the proper application of inputs, which can affect the adoption of innovation. They recalled that some years in the past there was shortage of improved seeds. According to the

Lalibela service committee, they have currently extra-improved seeds in quintals and some quintals of fertilizer from 2002's distribution in the store. Despite high price of inputs, and delays and inefficient system of distribution, the shortage of inputs is not found that much a problem. But, informants complained much about market failure, which affected the adoption of innovation. The following sections attempts to look at this problem.

5.4.3 Market and Adoption of Innovation

And yet the settlement of the credit has become difficult in time of market failure. A year before, the price of maize was very low (see table 7). According to my informants it was a great depression to most of farmers. Informants mentioned a smallholder who sold 15 quintals of maize and the money he obtained did not enable him to pay his credit estimated to be more than 800 ***birr***. The time was even harsher to sharecroppers whose production share was hardly sufficient to cover their credit share. A few sharecroppers are reported to have returned home barehanded. Other smallholders who did not have enough grain were forced to sell their domestic animals. Worse still, according to my informants, the price of domestic animals was also very low. Most households had been sunk in the traditional loan and many of them have not yet recovered.

The smallholders tend to discredit the advantage of HYV in times of market failure. As a result, most of them avoided taking inputs on credit in time of market failure. Others tried to avoid the HYVs because its price is very expensive and needs high amount of fertilizer. In 1994\5 production year, maize hybrids were not all taken. According to Table 6, the distribution of maize hybrid seeds significantly decreased from 205.75 quintals in 2001 to 68 quintals in 2002 in Lalibela SC. The same thing happens to fertilizer. According to my informants many farmers have resorted to traditional varieties, which does not require that much fertilizer. This decline in

taking of inputs was caused by market failure. According to the data on Table 7, the price of inputs is very high in comparison to the price of grains in the last two consecutive years. My informants believe that if the government wants to support them, it has to increase the price of grain or reduce the price of inputs. Table 7 provides information on how smallholders were affected by low price of grains and high price of inputs.

Table 7. The Comparative Average Price of Inputs and Grains in Two Consecutive Years (in quintals).

Year 1993 E.C. (2000/1)				**Year 1994 E.C. (2001/2)**			
Grains	Price in birr	Inputs	Price in birr	Grains	Price in birr	Inputs	Price in birr
Maize	60-70	Dap	292.50	Maize	35-40	Dap	255.49
Finger-millet	60-70	Urea	214	Finger millet	4o-45	Urea	192.45
Teff	100	PH-B3253	993	Teff	80-90	PH-B-3253	766.50
		PH .540	626			BH-540	580
		A.511	211			A-511	211

Source: compiled from the statistical data of Lalibela service cooperative and interview of informants.

Some of my informants who avoided HYVs last year regretted when they see the increasing price of maize this year. So market is both incentive and risky to the adoption of agricultural technologies. As long as the farmers enter to the system of credit, market will continue to be the dominant factor in the growth and improvement of agricultural production. When they consider credit to buy inputs, they have in mind about the weather condition, heavy rain, and price of the products. Without reasonable price of grains, it will be very difficult for farmers to settle their credit and consequently the sustainable adoption of innovation.

However, because of high price of inputs and low price of grains, the application of inputs has become inefficient just using small amounts of inputs for large size of plot which does not

bring much change in productivity. They have also resorted to the use of traditional varieties and the second generation of the improved seeds that have low level of productivity. They know that it affects productivity. But farmers consider it as risk aversion of market failure and the vagaries weather condition. They are careful when they decide to adopt innovation not to destroy their livelihood strategy by the notion of profit maximization.

5.5 Summary

This chapter has attempted to discuss on important issues that has direct relationship in the adoption of innovation in smallholdef agriculture. Agricultural extension, as institution has focused on crop production in general and maize hybrids in particular. Although some HYVs are introduced, they are soon rejected because of environmental factors. But, the focus on animal husbandry, natural resource development and post-harvest technology is insignificant and the least adopted packages in the research areas. In general the smallholders have a positive attitude to the current extension service, though it has some limitation.

The adoption of innovation has also direct relationship on resource bases. It tries to identify the importance of land, oxen, labour and cash on the adoption of innovation. It also describes the social institution that allows the flow of these resources between households. Sharecropping, ***mekenajo***, ***kurt***, daily labourer, ***wonfel*** ,***limena*** ,***wobera*** and others are some of them. It argues that oxen, land and cash are found more important production factors than labour in the process of production in the research areas.

Credit and marketing has also a direct impact on the adoption of innovation. Credit is important institution to overcome resource constraints. SC has provided inputs on credit to smallholders. Market is also both a risk and incentive in the adoption of innovation. The management and structure of these institutions are found inefficient. The discussion argued that

Delays and inefficient system of input distribution, high price of inputs and market failure have affected the adoption of innovation.

Agricultural extension has its own success and constraints. It has also brought considerable positive impacts on smallholder agriculture. These positive impacts and associated changes are presented in the following chapter.

CHAPTER VI: THE SOCIO-ECONOMIC IMPACTS OF EXTENSION SERVICE ON SMALLHOLDER AGRICULTURE

Introduction

This chapter contains the analysis of the socio-economic impacts of extension service on smallholder agriculture. It analyzes how extension service affects the smallholder agriculture in wider contexts. It discusses its impacts on agricultural implements, mode of cultivation, productivity, cropping patterns, household economic improvements, resource conservation and Scio-cultural aspects. The methods of description assume the experiences of smallholder agriculture before and after the introduction of the current agricultural extension.

5.1 Agricultural Implements

Traditional hand tools characterize smallholders' agricultural operation in the ***Woreda***. These agricultural implements have been used for centuries without change[37]. The implements used for cultivation, weeding, threshing and winnowing reflect this reality. The following sections describe the effects of agricultural extension on agricultural implements in the study area.

6.1.1 Traditional Agricultural Implements

The ploughing implements, which are pulled by oxen, are made up of various materials such as iron, leather and wood. The ploughing implements that make up a full set of ploughing (*Yersha-eqa*) consists of more than 20 separate elements. It is believed that these agricultural

[37] Musa and Abiy(1996:189) such agricultural implements have been in use since many centuries a go.

implements together have weights ranging from 17-26 kg (Abiye and Frew, 1993:86). This writer has also observed that these agricultural implements are easily transported from one plot to another by one human labour. These components are fastened together by different iron, wooden and leather materials. Of all the 20 elements, the two are product of iron such as ploughshare ***(Maresha)*** and plough-beam (***Wogel***). These tools are basic for ploughing. Traditional craftsmen can also readjust them. The implements made from leather are very few. Sometimes, they can be replaced by rope. But Yoke beam ***(minar)*** is a very important implement made from leather by local tanner. These iron and leather products are purchased in market.

The wooden implements are mostly made in the household. But, wooden tools are not all made at home. Preparation of some wooden implements such as ***yoke, mofer(the*** long pole which fastened ***digger*** and ***maresha*** together at one end and yoke at another end***)*** and ***digger(*** wooden wings which are fastened at one point of ***mofer*** with ***maresha*** to push the soil aside***)***, require skills. As a result, it was common to request skilled individuals who are either friends or close relatives in the community to prepare such wooden implements. But, my informant Tadele said that this trend is being changed. Those wooden materials, which need skill for preparation, begin to appear in the market for sale in May and June. This indicates the gradual emergence of specialization on the preparation and commoditaization of traditional wooden agricultural implements among smallholders. The remaining wooden implements are simple. Therefore, any individual can make the rest of wooden agricultural implements in very simple way at home.

The major and sole agricultural implement in harvesting is sickle. It is with the help of the sickle that all crops are harvested. Since it is purchased in the market, the availability of sickle in the household depending on the resource of the household. Local craftsmen can easily resharpen this tool. This is also one of the tools that are commonly borrowed through social networks particularly among neighbours in time of weeding and harvesting.

Informants Guade and Asrat said that increases in maize price this year (2003) enable smallholders to purchase new sharp sickle, which facilitates harvesting. The quality of sickle makes a difference in facilitating crops and hay harvesting. The smallholders with the help of sickle cut the ripen crops properly and put handful cut crops carefully over the plot. It is collected and piled together by hand in a place where it is conducive to the preparation of threshing place (*Awudema*).

Then ***Awudema*** (threshing place) is prepared around the piled crops in circular way on the ground. It has to be cleaned by using digging tools and water to protect the yield from dusts and other impurities. Oxen are the very important force for threshing. Minimum of four oxen are needed to thresh crops on ***awudema*** according to the size of threshing place and resource of the household. As some farmers do not have enough cattle, they conduct threshing by ***wonfel*** or ***lemena***. Access to cattle for threshing in the form of ***wonfel*** and ***lemena*** mostly from close relatives are the most common phenomena in the area.

Threshing implements are all locally made from wooden materials. The most important wooden implement in threshing is pitchforks (***meshen).*** It is used to turn over the crops in the *Awudema* so that it could be properly threshed. They also use different materials mostly prepare at the spot from branches at the end of threshing to clean the impurities from the yield. Basket-like local-made household furniture, made from grass by females, is also used for winnowing. These are the traditional agricultural implements used for ploughing, weeding and threshing crops in smallholder agriculture.

6.1.2 The Impact of Extension Service on Traditional Agricultural Implements

Extension service has not yet brought an appropriate technology in area of agricultural implements. My case study informants Molla and Ewenetu still use the traditional agricultural

implements. They said that there are no improved agricultural implements that could help them to facilitate agricultural activities. The DA said that agricultural extension has so far no appropriate agricultural implements to facilitate ploughing, harvesting, and threshing with the exception of maize threshing machine.

According to the ***Woreda*** agricultural officials, there is one attempt to introduce maize thresher machines in two SCs of the ***Woreda.*** One of them is found in Lalibela SC. But, key informants revealed that smallholders do not yet use it. One reason for the non-adoption of the threshing machine, according to case study informants, is high rent which is 1.50 ***birr*** per quintal.

Moreover, the threshing season of maize probably contributed to the non-adoption of the threshing machine. According to my case study informants[38], Maize is usually threshed in February and March when there is no labour constraint. They found the use of traditional institution in the form of ***wonfel*** ,***lemena*** and ***wobera*** less costly than using the threshing machine. Moreover, the new trend of using oxen to thresh maize has also affected the use of the threshing machine. From such perspective, one can realize the value of labour in the production process in the research area.

After threshing and winnowing, the yield is usually piled on the center of ***Awudema***. There are various cultural rituals that are performed before the transportation of the yield to home. A symbol of cross over the yield is made. Food and drinks are presented to satisfy the spirit of threshing place for the increment of yield. The food and drinks, after a blessing, are served to the team who are ready to transport the yield to home.

After these rituals are performed, the smallholders use leather sack (***aqumada***), which is now being replaced by fertilizer sacks ***(madaberia)***, to transport the yield from ***Awudema*** to

[38] Case study informants such as Asrat, Ewenetu and Tackele do not want to use the threshing machine. They believe that threshing maize by oxen and human labour is cheaper than the cost of threshing machine

home granary – made of mud (***gota***) by using pack animals (donkey). Inter-household teams in the form of ***wonfel*** and ***lemena*** carry out the transportation of the yield from ***awudema*** to home granary. It is now this sack ***(madaberia)*** not the usual leather sack that has become the unit of yield measurement. The widely use of fertilizer sack also indicate the increasing use of fertilizer. With extension service, the yield of maize has radically increased and smallholders around the rural local town use cart for transportation of crops. My case study informants such as Molla and Ewenetu use cart for transportation of their yield, which they recognize as a product of Lalibela town. But, the traditional agricultural implements do not prevent the impact of extension service on methods of cultivation. The following section attempts to describe the traditional cultivation system and the impact of extension service on methods of cultivation

6.2 Methods of Cultivation

Cultivation is the preparation of the plot to grow crops by using traditional agricultural implements. It is a process of land preparation to modify and manipulate the land features and soil properties for good seedbed preparation. Tillage, harrowing and weeding can be considered as parts of cultivation. Cultivation of the plot has procedures, which is dictated by the agricultural seasons. But, there is no a single pattern of ploughing of the plot as it could vary from crop to crop and from one soil to another soil types

Cultivation in traditional and extension approaches needs a separate treatment. It is very important to see the traditional methods of cultivation in order to identify the impacts of extension service on traditional methods of cultivation. Let us see first the traditional methods of cultivation and then the extension approaches.

6.2.1 Traditional Methods of Cultivation

The first round of ploughing is breaking the surface of the land – which is locally known as ***gemesha***. 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. 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 in early September. Ploughing is made after harvest of 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. According to informants' experience, brown and black soil need several time of ploughing than red soil (***borebore).*** Traditionally *teff*, finger millet and barley plots need more frequent, intensive ploughing as well as more care than other crops. The final phase of ploughing for *teff*, finger millet and barley is known as ***gulgualo*** (ploughing with additional labour to remove the remaining plant as residues and weeds). Finally, they drive many cattle- a process known locally as ***tiqitaqo***- on *teff* and finger millet plots to make the muddy soil level to anchor seeds evenly. Then, the seed is broadcasted. Plouphing the plot to sow beans, peas, oil seeds and even maize do not require much intensity. These crops were sown with the first ploughing or second round without having a good seedbed preparation. They said that the methods of cultivation for those crops had been crude.

Traditionally, according to my informants, the most important crops that need weeding were: maize, finger millet and to some extent *teff*. The other crops such as barley, pulses and oil seeds were not given care for weeding. Informants said that these crops were not given attention as minor crops.

Crop rotation as a mode of cultivation and maintenance of soil fertility has long been common in the area. Crops are sown in a plot in a normal rotation at least once in three year. There are also plots, which need rotation once in two year depending on the type of soil. For instance, a black soil plot can be sown *teff* one year and then chick-pees, vetch, lentil or ***noug*** *another year and* then again teff. So there is no single pattern of crop rotation.

6.2.2 The Impact of Extension Service on Methods of Cultivation

With the introduction of extension service, a significant change is made as the result of technical advice by the DA over the cultivation process. Informants[39] agree that the seedbed preparation has become essential to all crops. It is also said that it is this form of preparation, as one of the factors, that makes a difference in yield productivity. The households that have adequate oxen can properly refine the cultivation of the plot. Table 8 shows changes in frequency of ploughing under traditional and extension approaches.

[39] Informants: Haimanot, Fetene and Tadele agree that the method of seedbed preparation has been highly refined after the introduction of the current extension service to all crops. The first focus group discussants also argued that the farmers has developed from their experiences a new technique of cultivation calendar which fits to grow better maize out of the advice of the DA. They said that a plot, which is adequately ploughed in Oct. and Nov., would grow maize better than the plot ploughed in March and May.

Table 8. Frequency of Ploughing Under Traditional and Extension Approaches.

Crops	Traditional	Extension
Barley, teff, finger millet	5 – 7	5 – 7
Maize	2 – 3	5 – 7
Pulses (beans and peas)	1 – 2	3 – 4
Chickpeas, lentils, vetch	4 – 5	4 – 5
Oil seed	1 – 2	3

Source: compiled from Focused Group Discussion and Case study informants

The most important change has been made on the cultivation of maize plot. The frequency of ploughing to prepare maize plot in the extension program has been significantly changed. The methods of cultivation on the plots of pulses have also made a significant change. But, it should be noted that with the exception of maize there is no change over the cultivation of other cereal plots. Probably it indicates that *teff*, finger millet and barley as major crops were given traditionally much care on methods of cultivation. As a result extension service has no techniques beyond the farmers' experiences. The DA admited that extension service has no other better method of cultivation to grow *teff*, finger millet and barley other than adopting the smallholders' experience.

The major ploughing time for *teff*, finger millet, maize and barley can be in September, November, October, March and then may and June. But, it is not necessarily ploughed strictly in all of those months. Informants, from their experiences, believe that if the soil is turned over in time when there is moisture and heat, the soil will maintain fertility and eliminate the possible weeds.

Another significant change is made on methods of sowing. The traditional form of sowing the seed was by means of broadcasting. Broadcasting is still a very important means of sowing *teff*, barley, finger millet, chick-pees, lentil and oil seeds. Moreover, according to informants, these crops are difficult to plant in rows as the size of the seed is very small. Thus so far, planting in rows is adopted for three crops: maize, beans and peas. Planting maize, bean and peas in a row is advantageous for proper utilization of fertilizer, distribution of the seed and weeding. According to informants, it is widely adopted by all smallholders even those who use traditional varieties.

Extension service has intensified the traditional weeding system. Weeding as a practice of sorting out and removing unwanted plants from a given plot is also part of cultivation. Harrowing is an important means of protecting the young germinated maize from weeds. A delay in weeding has a consequence of great production loss. As a result, a social institution in the form of ***wonfel*** as access to labour and daily laboureer are widely used in weeding. Informants said that weeding[40] has become a very important operation for all crops in the extension program. The weeding of bean has become a very important feature in smallholder agriculture. Weeding barley, peas and oil seeds has also started. The smallholders found this intervention as a necessary element of cultivation to get very good yield.

To sum up, cultivation in the form of increased frequency of ploughing, improved methods of sowing and protecting crops from weeds are some of the changes because of extension service. The smallholders seem to have adopted these practices as the necessary parts of the cultivation process. This improved methods of cultivation has changed the traditional level

[40] Focus group discussants (both the first and second groups) agree that they now understand that there is no crop that does not need weeding.

of productivity. The following section attempts to describe the level of productivity in traditional and extension approaches.

6.3 Productivity

Productivity is a major issue in smallholder agriculture. The low level of productivity has long been the feature of Ethiopian agriculture. The treatment of the level of productivity is important so as to have a clear picture of the impact of extension service on productivity in smallholder agriculture. This section describes the traditional level of productivity in comparison to the impacts of extension service.

6.3.1 The Traditional Level of Productivity Before 1995

Key informants describe the low level of productivity in terms of many interrelated factors. They put the loss of soil fertility as the major factor for decline of 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). They express such plots as ***yarej-maret*** (lit.old-plot). This shows how the plot is overused and exploited for a long period of time. In the past when land was abundant, such plots would be left uncultivated as fallow land for sometime to recover. But now, land has become scarce so that fallowing is difficult. This expression is a fact that can be easily observed from the statistical data of land use pattern of the ***kebele***. There are farmers who complained that their plots are highly degraded by erosion

because of their location in sloppy area. Some elderly farmers[41] also blame the introduction of fertilizer as the causes of deterioration of soil fertility. They justify their belief by associating the failure of plots to grow crops without fertilizer as before. But, this is important to note that traditional approaches do not mean the non-use of fertilizer. The farmers have been using fertilizer since 1970s, though in a very small scale.

But the traditional application of fertilizer was very poor. Informant Ewenetu, for example, stated that the type of soil, resource and frequency of cultivation determines his fertilizer application. He used to apply 50 kg of fertilizer on a hectare of plot, which he recognizes now as a very low rate of application in comparison with the recommended level. This low level of fertilizer application did not prevent the decline of traditional level of productivity. Informants said that the decline of productivity was the major issue that had worried the smallholders before the introduction of the current extension program. The declining of productivity has resulted food insecurity in most households in the rainy season. They said that this problem instigated thefts of grain and domestic animals.

6.3.2 The Impact of Extension Service on Traditional Level of Productivity

The current extension package, which focuses on the problem of productivity, has changed the situation and made a difference on the productivity of some crops. My informants agree that the change in productivity has become possible by a combination of the introduction of new methods of cultivation, proper application of fertilizer and more importantly the introduction of new

[41] An old man said in the informal discussion at one of the ***senbete*** in Lailbela Micheal Church that the introduction of fertilizer has seriously affected the fertility of the land. When fertilizer was introduced in1970s E.C., he quoted somebody and said " a plot, which taste fertilizer, would never grow crops again without fertilizer and he warned the people not to use it". He continued with regret" no one listened to him. And this is what happens today". But most of the members of the ***senbete*** rejected the idea of the old man as unfounded saying.

improved seeds (HYVs). They now realize that one of the reasons for the previous decline of productivity was mainly due to the less amount of fertilizer application. Attempts have been made by the DA to convince farmers to apply recommended amount of fertilizer to obtain high level of productivity. As a result, according to Aserat and Ewenetu, they are now applying 75 kg fertilizer on a half-hectare plot. The improved seeds have better response to fertilizer than traditional varieties.

The widely adopted chemical fertilizers are Dap and Urea. And yet Dap is more important to increase yield and it is widely used. Urea is also used after the germination of the seed. It is used in a lesser amount than Dap. But, both types are used in combination in a particular plot. Over the years farmers become increasingly dependent on the application of high amount of fertilizers in order to overcome the loss of soil fertility.

But key informants believe that the adoption of HYV changed the level of productivity more than the effects of fertilizer on traditional verities. Farmers believe that the rate of productivity has changed more by the introduction of hybrids. The hybrids are not only important for productivity but also important in increasing the amount of straw for animal feed. The community encourages the adoption of HYV through different social occasions. For example a poem expresses the enthusiasm for the adoption of the new hybrids and it goes as follows.

ምርጥ ዘር ዝራ· ምርቱ ጎተራ· የሚሞላው·ን

ገለባው· ለከብት· የሚተርፈው·ን::

Sow the selected seeds variety,

Its yield fills the granary,

With abundant straw for the cattle.

As has been explained in Chapter V, the only HYV that has been widely adopted in the ***woreda*** is maize hybrids. According to West Gojjam Zone statistical bulletin (2001:34), the

productivity of maize hybrids in a hectare varies from 61 to 72 quintals. But, my informants do not confirm this in the research area (see Table 9 below). Productivity in some other crops by using traditional varieties has also increased. The growth of productivity on some traditional varieties is due to focuses on method of cultivation, weeding and the application of high amount of fertilizer. Traditionally with exception of *teff*, finger millet and to some extent barley, fertilizer was not used to other crops such as maize, pulses and oil seeds. Now, the use of fertilizer has become essential to all crops. However, there are some crops, which show no improvement in productivity in spite of the use of fertilizer and improved methods of cultivation. According to my informants *teff* is one of the crops which productivity still remained unchanged.

Table 9. Comparative Rate of Productivity (Yield: Quintal/ Yectare)

Traditional Approaches		Extension			
		HYVs		Traditional verities *	Yield (Q/ha)
Type of Crops	YIELD (Q/ha)	TYPE	Yield (Q/ha)		
Teff	6 – 7	PH.B3253	57 – 60	Maize	33 – 35
Finger-millet	13 – 14	BH – 540	55 – 57	Teff	6 – 7
Barley	18 – 20	A – 511	55-57	Barley	25 – 27
Maize	20 – 22			Finger millet	14 – 15
Peas	4			Peas	7 - 8
Beans	5			Beans	20
Chick-peas	16 – 18			Chick-peas	16 – 18
Oil seeds	4			Oil seeds	4

Source: Compiled from focus group discussion and case studies
*Traditional varieties, which are used with the recommended amount of fertilizer.

Table 9 shows a major increase in the productivity of maize hybrids. Increased productivity in maize is really the major significant achievements of extension service recognized by smallholders. One can also see from Table 9 that the traditional varieties of maize also have a great potential in productivity. But, key informants said that the traditional varieties, with exception of a few farsighted farmers, are in danger of disappearing. This is because improved seeds are replacing the traditional varieties seeds. The productivity on traditional varieties of bean and barley also shed a light on smallholders' focus of interests.

However, the rate of current productivity of maize hybrids does not continue on the same level. The decline of productivity seems to be a common problem faced by all smallholders. Informants have various responses towards the reason for decline of productivity. One of their major reasons for decline of productivity is change of the original hybrids. They believe that the current hybrid seeds are not the originals. They said that they are able to identify the original HYVs by their size and rate of germination. Informants argue that they use the same amount of fertilizer, the same methods of cultivation, weeding and other activities; and yet the rate of productivity continues to decline. The first focus group discussion participants agreed that the present rate of hybrid productivity does not surpass 47 quintals per hectare. If this trend continues, the situation is alarming once again to farmers.

But, the DA and agricultural officials have mixed opinions about the decline of productivity on maize hybrids. In the first place, they suspect that the smallholders do not apply the recommended amount of inputs, which reduces the level of productivity. Informants agree that this is of course true to resource-poor smallholders. Some of the agricultural officials have also recognized the gradual biological limitation on germination and then productivity of hybrids.

Under such circumstances, the focus on traditional varieties, which are ecologically tested, deserves attention. The change in the level of productivity as result of extension service is a fact, though it has limitation of continuity. This changes in the level of productivity has also affected the traditional cropping patterns. The following sections looks on this issue.

6.4 Cropping Patterns

Cropping Pattern is a broad concept, which has direct relationship to dietary habits, soil types, market, risk and other social factors. Although household grows different crops, they grow some crops more widely than others. The traditional cropping patterns have been changed. The year 1995 is taken as a landmark to show the impacts of extension service on the traditional cropping patterns. The following sections describe the nature of traditional cropping patterns and the impact of extension service on such pattern.

6.4.1 The Traditional Cropping Patterns Before 1995

In Achefer, my informants recalled that *teff* was the major staple crop and favorite food grain. Finger millet and barley were also used next to *teff* as staple food crops, which were all considered as major crops. Other crops such as maize, beans, peas, oil seeds, chickpeas, lentil and potato were also grown as complementary for household food consumption and sale. These crops were in general considered as minor crops to most households.

The most favorite food in household was ***injera*** mostly made from *teff*-powder. But, one of the key informants, Tadele explains that *teff* ***injera*** was regularly consumed only in rich households. Eating *teff* ***injera*** was also a sign of prestige and wealth. The poor and even the middle smallholders sell *teff* rather than consuming *teff* as it has the highest price. So *teff* was a

crop that had both social and use values. The poor usually consume ***injera*** made from finger millet and barley– which were and still are relatively cheap in price. They used to eat *teff* ***injera*** only in holidays. Supplementary food in the form of toasted and boiled cereals and pulses is served in the morning as breakfast and evening as super. Stew (***watt***) is also prepared from various species with ingredients of potato, beans, peas, chickpeas and lentil. The major importance of pulses is their use as indispensable ingredients of stew. The use of butter in stew is also one of the major distinctions between the poor and rich households. Boiled potato is also a very important food item in the rainy season to most of the households.

Tella (local beer) was and still is favorite drink in all households and every social ceremony. It is made from the ingredients of finger millet, barley, maize and ***gesho*** (hops). According to informants, like the consumption of ***teff injera***, it is only rich households who regularly use this favorite drink. ***Areqi*** (local liquor) is also prepared from the combination of maize, finger millet, barley and hops. Oil seeds are also used in small quantities for making food oil on traditional basis and it is more produced for cash needs. 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 was no permanent cropping patterns in all households.

On the basis of dietary habits, *teff*, and finger millet were widely grown which covered the largest plot in 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. Lalibela ***kebele*** has even different ***gotes***, which favored one crop more than others. In general in Lalibella, according to informants, *teff*, finger millet and barely were grown in almost equal proportions. The next crops were maize, pulses and oil seeds. This was the cropping

pattern, according to informants, that had sustained for a long period of time before the introduction of extension service in 1995.

6.4.2 The Impacts of Extension Service on Cropping Patterns

My informants recalled that the cropping patterns in the ***kebele*** have been significantly changing since the introduction of agricultural extension program in 1995. The introduction of maize HYV enabled the farmers to grow maize more widely than before. Farmers grow maize on most of their plots for reasons of productivity. *Teff* and finger millet, which are still traditional varieties, are going to decline in terms of the amount of land cultivated (see Tables 3 and 10). Therefore, maize has become the major crop that covers most of the plots in every household. Key informants stated that maize begins to cover most of their plots since they become participants of the current extension program. This reality is clearly shown in Table 11 that is compiled from case study informants in the level of households.

Table 10. Crops Coverage of 2000/20001 in Hectare in Lalibela kebele

Type of Crops	Area coverage	
	Hectare	Percentage
Maize	1661	30
Finger millet	891	16.1
Barley	860	15.6
Teff	760	13.8
Beans	410	7.4
Peas	281	5
Oil seeds	426	7.7
Chickpeas	75	1.4
Vetch	37	0.7
Potato	61	1.1
Pepper	54	1
Total	5516	100%

Source: compiled from the statistical data of the DA in Lailbela kebele.

In *seol meda* and *kessel terrara,* one can even realize the cropping patterns in harvesting period by a simple observation. The writer of this thesis has observed this realty. The change in cropping patterns is surprising even for smallholders. The change in cropping patterns has also brought changes in the dietary patterns of the society. The major staple food has become maize. Most households make ***injera*** from maize flour only. Others make ***injera*** with ingredients of

finger millet, maize and barley. But, the dominant crop in the ingredients is maize. Informants said that ***Injera*** made from maize is not tasty. Moreover, it is very dry and easily fragile. Therefore, it is difficult to eat in the way they eat ***teff injera***, which is soft. Maize as a major staple food is not popularly accepted. One of the women in lalibela market said about maize injera" ***alish aybelgn enij ,mashila injeran atenesaw'*** lit.(God) excuse me, do not mention maize injera). They complained that changes in dietary patterns have brought physical and health defects. They said that it makes them easily susceptible to diseases like malaria and TB. They also said that it makes them physically weak and unable to work hard for long hours as before. This is of course the belief that smallholders associated with change of dietary patterns. It is difficult at this point to analyze the caloric content of maize ***injera*** so as to justify their complain. But, it reveals something unusual as a result of dietary change. Therefore it needs a combination of medical and nutritional investigation.

On the other hand, ***teff injera*** is becoming a rare food item in most households. Key informants: Hadis and Tadel said"***teff injera bedegu gizie qere***"(lit. teff injera passed with the good time). For them the good time was the period of Haileselassie when the level of productivity of teff was high. Now it is not widely grown by most of households for reason of low-level productivity. Table 11 shows that there are of course smallholders who do not grow *teff*. The list of crops according to the plot coverage varies from household to household and from year to year. Tables 10 and 11 shows that cereals, pulses, oil seeds and root crops assumed the orders of plot coverage. The cropping patterns could be best observed from the following Table 11.

Table 11. Cropping Patterns of Case Study Informants

Case study informants	Maize	Finger Millet	Barley	Teff	Pulses	Oil Seeds	Root crops
Tackele Landholdingsize-12 kada Sharecroppedland-4kada Total -16kada	6kada	3kada	2kada	___	2kada	2kada	1kada
Guade Landholdingsize-12 kada Sharecropped land - Total- 12kada	4kada	2kada	3kada	1kada	2kada	___	___
Ewenetu Landholdingsize-12 kada Sharecroppedland-4kada Total- 16 kada	4kada	6kada	2kada	1kada	2kada	____	1kada
Molla Landholdingsize-10 kada Sharecroppedland-2kada Total-12 kada	6kada	2kada	____	___	2kada	2kada	___

Source: compiled from case study informants

As one can see from the Table 11, maize covers almost 37%, of the plot of case study farmers. Focus group discussion participants and informants said that they grow maize as the dominant crop because of its comparative advantage in terms of productivity. The high level of productivity is one of the major factors to grow maize as the major crop. Another factor, they said, is the decline of productivity of their favorite grain-teff. The cropping patterns tend to be

shaped more by level of productivity. The high level of productivity of maize enables most households to ensure regular food supply throughout the year and also to meet cash needs. The attitude of farmers towards the maize crop is more shaped by use– value orientation than socio-cultural values. They said that if there is a change in productivity of *teff*, they like it to be their favorite food.

6.5 Resource Conservation

6.5.1 Traditional Practices on Résource Conservation

Key informants said that smallholders consider farmland, grazing land and water as very important resources. Natural forests have also been considered as a good resource. One of the key informants Tadele mentioned different localities in the *kebele*, which had been covered by dense forest four decades a go. Different wild animals also lived there. But, according to his explanation, theses forests have been rapidly destroyed without leaving the trace.

The attitude of the communities towards wildlife was and still is negative and considers them as useless and harmful. They recalled that soon after the Ethiopian Easter, there had been a tradition of hunting wild animals. As a result of hunting and destruction of forests, the size of wild animals are now very small and the remaining wild animals are now confined in ***Kolla*** Zone of the *woreda*.

Key informants also stated that they have experiences on conservation of farmland, grazing land and water resources. Their experiences are applied in technique of farming and method of sowing of the level and sloppy plots to protect soil erosion. The construction of long drainage ditches in and around the farmland to divert the flood is still a very important practice. The method of crop rotation is also a strategy for the renewal of soil fertility, though now limited

because of the dwindling size of farm plot. Grazing land is also protected and conserved in many ways.

According to key informants, grazing land was not in fact a problem three decades a go. They said that they had large communal grazing land that could support more than the livestock population the community had. But, most of the grazing land is now under cultivation as a result of population growth. They describe the degradation of the current situation of grazing land as "***getaba ahya yimeslal***"(The grazing land looks like the skinless back of a donkey). This is their best expression that indicates the extent of degradation or lack of grass on grazing land. As a result, farmers are forced to leave part of the plots uncultivated to grow hay. Moreover, the growth of hay on a plot is considered as a cash asset. Because of the degradation of grazing land, most households buy hay on cash every year. This tradition is widely adopted in most of the villages. The proper collection of straws of all crops is also widely adopted. Previously only *teff* straw was considered as the best animal feed and therefore the straw of other crops was not collected. From a dynamic perspective, this shows how the society adjusts itself according to environmental and demographic changes.

This researcher has observed the attempt of ***kebele*** officials to protect grazing land from cultivation encroachment. The social court of the ***kebele*** imposes penalty on farmers who encroach on grazing land. Otherwise, there are no other visible activities or technologies introduced in the ***kebele*** for the conservation of grazing land. The DA has also admitted that their primary focus was so far on crop production.

Informants said that springs are also traditionally protected and cleaned once in a year. The cleaning of spring's mostly practiced in the dry season with small rituals. I did not get a chance to observe such cultural rituals. But, my key informant Taddel narrates the rituals as follows:

The influential person appoints the community members on convenient date sometimes at the spot to clean the spring. The members of the community who use to fetch water in the spring are required to participate in the cleaning. Before the operation of cleaning, food particularly *injera* with the mixture of butter, cheese and powder of pepper, a bottle of *areqi* (local liquor) and a pot of *tella* (local beer) will be presented. Foods and drinks are contributed from voluntary households who in return receive blessing and respect. One of the elders will give blessing and then small amounts from the food and drinks will be first thrown to the upper part of the spring to propitiate the spirit of the spring. Then all participants should taste what are presented in the form of food and drinks at least a small amount for the sake of the spirit. Then, a person who is considered by the community to have special luck would be asked to start the operation of cleaning. Such persons are believed to have special luck, which make the spring to continuously flow. Conversely, they believe that there are also other persons when they first start the operation of cleaning, the spring would dry up instead of flowing. The selection is made on the basis of experiences, the individuals manifested. For instance, if all seedlings the individual plant grows effectively, or when the individual is considered innocent and genuine. Once the person identified starts the operation, then participants would cooperate to clean the springs.

However, key informants stated that such traditional practices on the promotion of springs are not properly performed. The population growth and the decline of elders' power in the community have contributed to the decline of such practices. Tadele complained about the young generation and the government who do not want to listen the elders. Moreover, springs, which are used, for drinking begin recently to dry up. Some of informants said that springs dry up because of the wide planting of eucalyptus tree around springs.

Key informants describe that the ***kebele*** has almost lost all what can be called indigenous vegetation. According to their explanation the main cause of destruction of forests is population growth. They mentioned densely settled localities, which were previously covered by dense forests. With exception of some natural vegetation such as ***Wanza(crodia abyssinica)***, ***Misana*** *(albiza anthelemintica)* and bushes Scattered along the homesteads and in most of farmlands, no other indigenous plants are widely found. ***Misana*** is an important early-maturing tree, which is used for different purposes such as fencing and firewood. ***Wanza*** is also used mainly for timber and considered by most households as cash crop, though the maturity period is long. As a result they are carefully protected. Scattered trees are found mainly on the farmland. The only sign of forests and vegetation are found only around the compound of churches. Big trees such as

woiera(olea chrysophyla) ,***sesa*** *(albezia schimperinal)* , ***tide****(juniperus procrea)* and other shrubs survive in the compound of the church. According to key informants, shortage of wood forces some member of the community to fetch firewood from the church, which was previously a taboo. As a result the church have employed monks who take care the property of the church.

According to informants, extension service does not yet focus on the conservation of resources like water, natural vegetation and wildlife. But, it does not mean that extension service has no at all activities on resource conservation. It has attempts on resource conservation such as farmland conservation and expansion of eucalyptus tree.

6.5.2 The Impacts of Extension Service on Resource Conservation

The extension package in the study area is also engaged in resource conservation activities. For this and other purposes, each ***kebele*** is organized in groups locally known as ***mengistawi buden*** (lit. governmental team). A community consisting of 30 to 70 households can establish one governmental team. The governmental team which is accountable to ***kebele*** administration, is further divided in to smaller groups consists of 10 households known as 10 – head (***yaser mere***). One of the major functions of governmental teams is mobilizing the community for the conservation of natural resources. Their major focus was on the conservation of farmland.

6.5.2.1. Farmland Conservation

Of all the conservation activities, terracing and construction of wide ditches are to some extent the major activity of the resource conservation section of extension service. The community has been mobilized for the construction of terrace and ditch for systematic flow of flood without affecting the farmland. The DA said that ditches and terracing are not properly protected because of lack of understanding among smallholders. Informants said that they have

no full participation in the execution of such conservation activities. Lack of farmers' participation probably affects the protection of the terracing and ditches. Moreover, the imposition does not allow the use of traditional experiences over the conservation activities. It is the DA, according to informants, who facilitated the program by measuring the depth, width, direction and form of construction of terracing and ditches without consulting the farmers. The farmers are required only to do the terracing and ditches according to the instruction. The absentees would also be penalized. The conservation activity does not show the input of smallholders' experiences.

But, making terracing does not immediately recover the fertility of the soil. Absence of fallowing and limited crop rotation because of land scarcity hampers the efforts of farmers to maintain soil fertility even in those plots, which are not seriously affected by flooding. Animal dung, which had been used to manure particularly the farmstead ***(bademа)***, is now used as fuel wood. There is no now other technology that can be used to recover soil fertility other than chemical fertilizer. As a result, they are forced to use increasingly more and more amount of fertilizer to grow crops.

6.5.2.2. Eucalyptus Tree (bahir zaf)

On the other hand, eucalyptus tree is widely grown in the area. Forests of eucalyptus tree cover some villages. It is considered as a good tree for its quality of short-maturity period, marketability and as a source of firewood, and good construction material. It is grown between borders of farmland and grazing land. Even the people now focus on the planting of eucalyptus tree rather than planting indigenous trees around the compound of new established churches. New churches are established in some parts of Lalibela kebele in a place where there is no much trees. In this case, the community wanted to plant eucalyptus tree for qualities mentioned above.

There are also farmers who plant their farmland with eucalyptus tree. The case of Bekalu expresses the widely planting of eucalyptus tree on farmland.

Case 11- Bekalu

> *Bekalu is one of the smallholders who planted his half-hectare plot with eucalyptus tree. He said that he planted eucalyptus tree mainly for cash. He has sold such tree in the past in different time and earned a significant amount of cash. But, he is now regretting his decision to grow eucalyptus. After the introduction of HYV of maize, he realized that planting the plot with eucalyptus tree is unprofitable. Eucalyptus tree has a long maturity period as compared to annual crops. Moreover, the annual yield of HYV of maize from the same land could have earned him more income than the income he obtains once in five years from eucalyptus trees. But, he has no plan to uproot eucalyptus planting.*

The planting of eucalyptus tree encroaches on farmland and competes with the production of food crops. The extension service has facilitated such encroachment by planting seedlings and distributing them to farmers annually. According to informants, most smallholders including Bekalu receive seedling of eucalyptus tree with reasonable price from the *woreda* agricultural office distributed through the DA.

6.6 The Improvement of Household Economic Status

Important indicators of the socio-economic conditions of rural households include food consumption, type of housing and clothing, and household furniture. In the past, cattle were a basic unit of wealth measurement. Therefore, those who owned large number of cattle were considered rich.

Most households used to consume poor quality food. ***Injera*** with poor ingredients of stew can characterize poor quality of food. Another characteristics are dress and shelter. Although dress is traditional in all households, the quality and dressing on time make a difference among households. Shelter, which has circular shapes made of wood plastered with mud, has a

significant variation in quality and size between poor and rich households. Rich households have proper mud bench, leather bed, and mat and other necessary household furniture. It is logical to assess household socio-economic status based on food consumption, clothing and shelter among other indicators.

6.6.1 Food Consumption

Production of food crops is a primary requirement to smallholder farmers. However, not all farming households can feed themselves throughout the year. The socio-cultural expenses such as weeding, memorial feast, religious association and others, lack of proper planning and low level of production have usually affected their food sufficiency. According to my informants, vagaries of climate, lack of resource base and lack of adequate efforts also contribute much to the shortage of food. However, different socio-cultural institutions tackled all these problems. Borrowing in the form of grain, seed and cash in time of food shortage from close relatives is one of most important institution. Selling some of domestic animals to buy grain is another method of tackling food shortage. According to informants, rich households can have 3 to 4 meals a day. But poor households, in addition to the poor quality of food they consume, they cannot afford more than two meals a day.

As we have seen, extension service has brought significant increase on production of food crops. The increase in production of food crops has at least direct reflection on quantity and quality of food consumption. Some smallholders even said '***edmie lemashela, ekul honen***' (thanks to maize, we are all have become equal in terms of the kind of injera we consume). There are a number of cases, which show that extension service enables smallholders not only to be self-reliant in regular food consumption but also to become better off. The following two cases express improvements in food consumption.

Case 12- Asrat

Asrat is now one of the rich and strong farmers in the kebele. Before 1995, he recalled that he faced shortage of food in the rainy season. After he started involving in the extension program he became in a position to produce surplus production. He is now providing his family with sufficient supply of food both in quality and quantity throughout the year. He has built corrugated iron roof house. He said that he has extra cash for emergency purposes. He always buys agricultural inputs on cash. Asrart said selling -maize enabled him to do all these. For this he thanks the government and the extension service.

Case 13- Molla

Molla is another strong and rich farmer. He has experienced the shortage of food sometimes in the rainy season. He also faced some problems of supplying the family with clothing on time. But now because of extension service he is able to feed his family on regular basis. He can slaughter sheep or goat when he desires for meat. He has also extra cash, which could be used for medical and other emergency purposes. He plans to sell more grain this year. He buys agricultural inputs on cash since 1998.

But, the point is that such happy development does not reach to poor households without oxen. So far, extension service does not have programs to make poor households benefit from such development with exception of Bekalu (case-7). Unlike Asrat and Molla, there are also households who faced recurrent shortage of food. The problem is particularly serious to households without oxen as the following of w/o Hibestie indicates.

Case 14- Hibestie

W/ro Hebeste, a female household head, has no oxen. She uses her land by sharecropping. But, her share from the land does not sustain the whole family for a year. She hired out her two daughters as a servant to rich householders. She still faces food shortage in the summer season.

The case studies indicate that though there is surplus food crop production, food self-sufficiency is not yet solved at the household level. For the poor, eating meat even in the holidays

considered as debt. Because, they are unable even to afford to the price of meat and take the meat most of the time on credit. According to my informants, poor households only take handful meat when the community slaughtered an ox share of meat (***Kirtcha)*** in holidays only for the sake of the household sprit (***yebet qole***). It is only those rich households who now begin to eat meat, of course, on irregular basis according to the calendar of religion (outside fasting time).

6.6.2 Shelter

Shelter is also another expression of household improvement. Informants said that farmers are competing to change their dwelling into corrugated iron roof houses. I have observed that a quarter of houses in *seolmeda* and *kessel terrara* have been changed in to the corrugated iron roofs. Most of the smallholders built such houses by selling grains. Building corrugated iron roofs requires more cash than the traditional thatch roofs. Therefore, it reflects household improvement. Informants agree that most households built such houses with cash obtained by selling maize grain. Molla, Ewenetu, Tackle and Asrat (the participants of the current extension program) are cases of such changes. There are also few individuals who build corrugated roofed houses by selling domestic animals, honey and others.

But changes in the types of houses do not fully reflect household improvement in the strict sense of the word. Some households are forced to build their houses with corrugated iron roof because of shortage of grass for thatch. They sell most of the grains and they pass the rainy season by tightening their belt - reducing the regular food consumption of the family. But, according to informants, the number of such households is insignificant.

6.6.3 Clothing

Clothing is another expression of household improvement. Able households dress members of the family at least once a year. The poor household cannot do so on time. They dress torn and patched clothes. They are also unable to get sleeping clothes such as ***gabi*** (cotton garment) and blanket. But, those who successfully adopt maize HYVs, like the family of Asrat, Molla and others are able to dress their family with quality cloth and even shoe on time. They own leather bed with proper sleeping clothes to the whole of the family.

6.6.4 Other Improvements

According to informants, previously modern medical treatment was difficult by traditional factors and financial constraints. However, this trend is now changing. As the area is highly affected by malaria, most households used to travel long distances by bus for treatment. They can now cover their entire medical, transport and other expenses. Such expenses indicate the improvement of households in which extension service has a significant role. But, this cannot be fully expressed as the impact of extension service in terms of avoidance of traditional medical practice.

Most of the households send at least one child to school. But, this trend is not directly impacted by extension service. Examples of past-educated individuals in the locality, the development of local rural towns, awareness of the benefit of modern education, and land scarcity encourage households to send some of their children to school even under poor household economic condition.

There are also significant changes in household furniture. Most households use furniture made of factory. Metal and plastic products are also widely used for different purposes in the household.

Mules and horses are widely used for transportation. They are also a sign of wealth and prestige in the community. Some smallholders told the researcher that they bought these transport animals by cash obtained from the sale of maize.

All these are elements in the household economic improvement. It shows in one way in the considerable degree, the impact of extension service on the improvement of household economic condition. Such developments have impacts on the trend of socio-cultural changes.

6.7 The Socio-cultural Dimension

Agriculture has long been not only the main source of livelihood to smallholders but also a way of life. The household furniture, dress, agricultural equipments, social and religious ceremonies, and mode of agricultural activities can be taken together to explain the socio-cultural aspect of the society.

6.7.1 The Socio-cultural Features

The circular thatch roof houses, household furniture, dress and most of agricultural equipments, which characterize smallholders, had long been local made. Clay pots, clay cups and clay cooking materials were almost the most important household furniture. Cotton garment (*Shema)* made by a local weaver had been the most important family dress. The female make different basket (***yesfiet eka)*** like furniture in different forms from grass. This furniture is the most important in the household mainly as service and container of food. These materials are used in different ways according to cultural practices. Some furniture and dress are only used in time of holidays and other social and cultural ceremonies. Grain was transported from place to place for different purposes by the container leather sack (***aqumada***) which is made by local

tannery. The view of treating diseases as the agent of Satan and anger of God was widely accepted. They had a strong tradition to treat disease by holy water, traditional medicine and witchcraft. The smallholders' perception on resources was more status oriented than use values. These were the major socio-cultural features in the research area.

6.7.2 Trends of Socio-cultural Change

Of course, change is a continuous process that has no demarcation point from one phase of situation to another. It is also complex to put change in clear and definite cause and effect relationship. Therefore, it is difficult to describe the trend of socio-cultural changes, exclusively as consequence of the extension program. There are different variables such as demographic change, resource scarcity, expansion of modern education; the development of rural local towns and political changes that can facilitate change in rural society.

A change in socio-cultural aspects of rural society seems to be more facilitated by the emergence of rural local towns. The rural towns emerged out of rural market center, which facilitate the provision of social services. The founders are those smallholders who were highly engaged in non-agricultural activities. They opened shops and local drinking houses. New manufactured goods and social services have become more available than before.

Modern manufactured metal and plastic products replace the traditional household furniture. These utensils in the rural society are seen as a sign of modernity and status. Of course, these furniture have become more popular and widely used in almost able householders.

The way of dressing is also changed from traditional weaving products to manufactured product. Male, female and children use to dress manufactured cloth. The traditional female cotton garments with all their traditional decoration are used only in holidays. They said that

manufactured clothes are light, easily washable and suitable to any activities. They also found it hard which served them for long time. As a result, tailoring has become a very important job opportunity to many smallholders in the rural local towns. Shoe is also widely used in the rural society. Fertilizer sack (***madaberia)*** replaced the leather sack (***aqumada***) as a unit of yield measurement and container of grains. The trend of socio-cultural change has impacts on tannery, poetry and to some extent weaving.

Informants said that their attitude towards traditional medicine tends to decline. This change encourages smallholders to go clinics and hospital whenever they get sick.

Any dispute, which arises out of crop destruction by domestic animals and boundary conflicts, began to assume more economic than socio-cultural characteristics. Informants said that in the past the elders could have settled the problem, a strong word against the guilty was enough and it was considered as punishment. Compensation in real economic terms was considered taboo. The guilty is also required to spray milk over the damaged field crops, which they believe that it will make the crops to revive. But now a day, this socio-cultural practice is changing in favour of claiming the guilty in economic terms – as compensation.

Demographic factors have also changed the pattern of straw collection. There are signs indicating important changes in the attitude and practice of farmers towards the utilization of resources. A good case is the use of crop residue. In the past, it was only *teff* straw that was collected for animal feed in the dry season from March to June. But, now almost the straw of all crops is not only carefully collected, but also made available in the market. The maize straw has become the most important animal feed. According to my informants, in the past cattle was not allowed to feed maize straw, as it was considered the source of disease.

To sum up, the trend in the socio-cultural change is complex to describe under the consequence of extension program. But, there are elements of socio-cultural change, which is

facilitated by the emergence of rural local towns side by side with extension program. Therefore, the extension service and the adoption of innovation involved is one factor among many, which is contributing to the process of social change in the study area described in this study.

6.8 Summary

This chapter has discussed the impacts of agricultural extension on a wider context of smallholder agriculture. The agricultural implements that are used for ploughing, weeding, threshing are still traditional implements. Extension service does not yet attempt on the introduction of improved agricultural implements. These agricultural implements, however, do not prevent the impact of extension service on improved methods of cultivation in smallholder agriculture. Improved methods of cultivation can be expressed by increasing frequency of ploughing, planting in rows and application of fertilizer and careful protection of crops from weeds.

This improved methods of cultivation has changed the level of crops productivity. This high level of productivity is obtained by a combination of different factors such as the introduction of HYVs, increased amount of application of fertilizer and refined methods of cultivation. But, the productivity of maze hybrid is higher than other HYVs and traditional varieties. These changes in the level of productivity have also changed the traditional cropping patterns of the study area. As a result, maize has become the dominant and staple crop.

Extension service has also made positive impacts on the conservation of farmland and planting of eucalyptus tree. But, the focus of extension service on conservation of grazing land, natural resources such as water, wild life and vegetation is found minimal or non-existent. The household economic improvement in the form of food security, clothing and shelter has been

impacted by extension service. Trends of socio-cultural changes in the form of resource utilization, metal and plastic product of household furniture are observed in the research area.

Extension service has made considerable positive impacts on smallholder agriculture. And yet there are some limitations, which need careful attention to make such positive impacts sustainable. The general summary and the necessary recommendations on the basis of the discussion in the thesis are given in the next Chapter.

CHAPTER VII: SUMMARY, CONCLUSION AND RECOMMENDATION

7.1. Summary and Conclusion

This study has attempted to draw a picture of interaction between smallholder agriculture and extension service in Achefer ***woreda*** of Amhara Region. Agricultural extension as a tool to improve smallholder agriculture has been introduced in the country since 1952. But, empirical studies revealed that it has not brought the desired changes on smallholder agriculture. This study has focused on describing the role of the socio-economic factors on the adoption of innovation and the socio-economic impacts of extension service on smallholder agriculture.

Qualitative research method has been used in this study to describe and explore the major issue of the study. Various methods of data collection such as in-depth interview, focus group discussion, case studies and observation have been employed. Statistical data, which supports the description, is also widely used.

The current theoretical debate on extension service tends to focus on the careful consideration of the local, social, economic and cultural context. It also underlines the need of appropriate technologies and farmers' participation over the implementation of the extension program. The different research reviews indicate that behaviors of smallholders' adoption of innovation are shaped by different economic, sociological, cultural and environmental factors. The institutions in the form of extension service, research institution, credits and other factors have also a considerable role to shape the behavior of adoption.

Different studies indicate that past experience of Ethiopian agricultural extension had been shaped and reshaped by internal and external factors. There is a consensus that inappropriate

policies, lack of cultural consideration, the top-down approach and absence of appropriate technologies characterized the past extension service in Ethiopia. The document (MOA, 1995) that contains the current extension program Participatory Demonstration and Training Extension System (PADETES) in the form of packages, at least theoretically, tends to learn from past experiences and gives due emphasis to the local condition and participation.

The study has pointed out that adoption of innovation in the kebele is facilitated more by access to reliable information, practical experiences and resources. Of all the innovations introduced in the kebele, maize hybrids have been more successfully and widely adopted. The failure of some improved seeds indicate the absence of close relationship between research institutions, the extension service and farmers. Such failure has also discouraged smallholders' initiatives on trial of new innovations. The rigid requirements and top down approach of extension service have also affected the consideration of diverse interests of smallholders in the kebele.

The attitude of smallholders towards cattle fattening in the kebele is positive and encouraging. However, the smallholders do not yet properly benefit much from cattle products such as milk, butter, cheese and others. In general animal husbandry, post-harvest technology and home-economic issues are untouched components of the program and need to be the focal area of extension service. But, as demonstrated in the discussion, this study find out that the smallholders' attitude in the kebele towards extension service is positive and there is a lot of enthusiasm to actively involve and benefit from the program.

The study has also pointed out the role of socio-economic factors on the adoption of innovation. Land, oxen and cash are found in this study as very important resources that affect the adoption of innovation in a considerable degree. Access to land in the form of sharecropping has become expensive particularly for the households that have very limited of land. The high

cost of sharecropping land is associated with the adoption of innovation, which is in return affected by risks of crop and market failure. Lack of oxen is also a major constraint in the adoption of innovation, as the innovations require adequate cultivation. But the discussion showed that with success of extension service on productivity, access to oxen in the form of ***mekenajo***, and ***timad*** can be potential local arrangements to overcome oxen constraints. If extension service continues with the recorded level of productivity, these local arrangements shed light to overcome oxen constraints within the short time possible.

The introduction of HYVs require labour intensive task in time of ploughing, planting and weeding. Quality labour has of course made a lot of contribution in difference of production between households. But, the study indicates the existence of a flow of labour between households in various ways through different contractual labour arrangements and social institutions. Therefore, a household, with lack of labour, can easily obtain labour through different mechanism. Moreover, the diminution of landholding size undermines the demand of labour as the small plot can easily be managed by family labour. Thus, this study has reached to a different conclusion from Teferi's *(1998:121)* conclusion on the issue of labour in Southern Wollo probably because of regional variation. Labour is not found as scarce resource as those of land and oxen in the adoption of innovation. However, it is not to undermine the input of labour in agricultural production. It is a fact that land and oxen cannot be realized in to production without human labour.

The discussion has also made an attempt to examine how credit and marketing have been affecting the adoption of innovation in smallholder agriculture. Smallholders have a limited resource. Therefore, credit is a basic means to overcome resource constraints in the adoption of agricultural technologies. So far, Service Cooperatives are the only institution that provides inputs on credit. As demonstrated from the discussion, the delay and high price of inputs are

found in this study as a major constraint that affects the proper adoption of innovation and thus mitigated the benefits. Moreover, the structure of market and fluctuation of grain price have discouraged the smallholders' initiatives to adopt innovation. Therefore, the availability of inputs and its form of distribution on time and market fluctuation needs to be given due emphasis to facilitate the proper adoption of innovation.

Extension service has also made considerable impacts on the smallholder agriculture in many ways. The study discusses the impacts of extension service on agricultural implements, methods of cultivation, productivity, cropping patterns, resource conservation and household economic improvement and socio-cultural aspects of the society in the kebele. But, one of the major areas in smallholder agriculture, which has not yet been affected by extension service, is agricultural implement. There is no an attempt of introducing new and appropriate implements that could facilitate ploughing, weeding, harvesting and threshing. But, these traditional equipments do not prevent the impact of agricultural extension on improved methods of cultivation.

Extension service has made considerable impacts on cultivation. The discussion shows how the pattern of ploughing, methods of sowing, application of fertilizer and weeding for some crops have been changed in the kebele. This improved methods of cultivation has brought a considerable impact on the high level of productivity. The smallholders' experiences on methods of cultivation for some cereal crops are also found as good as the extension service recommended methods of cultivation.

The high level of productivity is found to be the results of a combination of factors such as changes in pattern of cultivation and input application. But, the change in increasing productivity is more attributed to the proper application of fertilizer and the introduction of maize hybrids (HYV). Productivity has been one major element in the wide adoption of maize hybrids

in the kebele. But, the smallholders worry about the decrease in rate of productivity. Although some smallholders distorted the proper application of inputs, which adversely affects productivity, agricultural officials also acknowledge the gradual biological limitation of hybrids on productivity. The study suggests the need of careful research follow up on such hybrids in different ecological and cultural contexts before the specter of crop failure, which may have long enduring consequence on extension service.

Productivity has also affected changes in cropping patterns. Because of productivity, a considerable size of the plots in every household is covered with maize plant in the kebele. The smallholders' interest on cropping patterns is shaped by high level of productivity. Their focus on maize crop comes from the advantage that the productivity of maize is much higher than other crops. The change in cropping patterns has brought dietary changes as the smallholders primary interest is on the production of household food requirement. Therefore, Maize has become the major staple food. As demonstrated in the discussion, smallholders do not like the taste of maize ***injera*** and they describe it as low level of nutrition, which make them easily susceptible to diseases. Of course, this is a difficult issue, which needs nutritional and medical investigation. But, it indicates one thing that smallholders identify changes associated with dietary change. One point can be made important in the food culture of the society. There is a strong prejudice on some important maize food items such as porridge, bread, vegetables as a low status and insignificant food. So, they could not consider a meal without ***injera*** as a full meal.

The study has also discussed the role of extension service on resource conservation in the kebele. Although the conservation of farmland, grazing land, water, natural vegetation and wild life is made clear in theory, in practice extension service focused only on the conservation of farmland. The eucalyptus tree is widely planted, though the smallholders now favour more on food crop production than planting eucalyptus tree from economic point of view.

Another point that has been discussed in this thesis is the impact of extension service on household economic improvement in the kebele. One of the ways on which the positive impacts can be expressed is the quality and food security in most of the households throughout the year. But, there are also still poor households who are unable to get a minimum food throughout the year. The building of corrugated iron roof houses and clothing can also be seen as another impact of extension service on household economic improvement.

The socio-cultural dimension of the community can be seen in different ways. One form of socio-cultural aspect in this study indicates the trend of social change. The trend of socio-cultural change can be expressed in terms of resource utilization, the wide use of manufactured household furniture and so on. Changes in the utilization of resources like straw and crop residues are observed. The decline of local tanner is facilitated by utilization of high amount of inputs that provide input sack as grain containers. The sack of inputs is also used as a matt on mud benches to seat and even as a sleeping mat. The inner plastic cover of the input sack is also used as a raincoat to cattle herders and farmers. There are also significant changes in household furniture and clothing, which are products of factory. Metal and plastic materials replace most of the household furniture.

Extension program as one element of interventions with other developments operating in the kebele has contributed to improve smallholder agriculture and household economic conditions. Although extension service has made considerable positive impacts on smallholder agriculture in the kebele, it has limitations, which need reconsideration to make those positive impacts sustainable in particular and to bring other positive developments in general. The study tends to forward the following recommendations below.

7.2 Recommendation

Based on the findings and analysis presented in this thesis, the following recommendations are forwarded. But the recommendations are mostly applicable to the kebele where the study is conducted, though they may have a general relevance to most of kebeles in the woreda.

1.Agricultural extension as institution has made a significant contribution to the improvement of smallholder agriculture in the kebele. Particularly, its contribution in terms of increased use of fertilizer, the introduction of improved seeds and improved level of productivity are the major and significant achievements. However, the main focus so far has been in the area of crop production. These good endeavors should also extend to focus on particularly animal husbandry, which has great potentials in the area, and resource conservation, which seems to be in the state of rapid degradation in the kebele.

2.The failure of some improved seeds and the decrease of the recorded level of productivity indicates the weak co-ordination of agricultural research with extension service. Therefore, this study strongly recommends the creation of close relationship between agricultural research and extension service so as to make the results of extension service sustainable.

3. Although agricultural extension has significant results mainly on maize production in the kebele, it still remains to be characterized by rigid and top down approach. The types of innovations are selected on the basis of general consideration by the higher body. This approach does not consider the diverse individual interests and resource endowments of smallholders in the kebele. Therefore the institutional framework of extension service needs to be

flexible and bottom-up in its structures and organization so as to accommodate the interests and problems of individual smallholders.

4. The adoption of innovation is highly affected by the shortage of oxen. However, from the logic of the recorded results of extension service on maize production in the kebele, one can derive the possibility to alleviate oxen constraint in the shortest time possible. As demonstrated in the case study, a household has a chance to buy oxen using incomes derived from maize production in a half-hectare plot if the risk in the form of weather and market are minimized. Therefore, this study recommends the integration of agricultural extension with the provision of oxen on credit to poor households. This can also be one of the approaches to reduce poverty in rural areas.

5. As shown in this study, the adoption of innovation and access to land has been affected by the risks of crop and market failure. Risk in different forms has seriously affected the decision of smallholders' behavior on the adoption of innovation. As Scott (1976:21) clearly pointed out that if there is increase in degree of risk, agricultural development cannot occur. Therefore, this study recommends the establishment of insurance to compensate farmers who may face crop failure due to different factors. So that this institution would overcome constraints associated with risks.

6. As demonstrated in the discussion, maize has become the staple food in the kebele in particular and the Woreda in general. The change in dietary habits brings unusual experiences, which the smallholders associated with health issues. This issue indicates the need to take into considerations culture in general and home economics in particular. The study recommends for serious studies on dietary habits, food preparation from crops such as maize as well as attitudes towards maize food in general.

References

Abiy Astatike and Frew Kelemu .1993. "Modifying the Traditional Plough-maresha for Better Managements of Vertisols". In ***Improved Management of Vertisols for Sustainable Crop-Livestock Production in the Ethiopian Highlands: Synthesis Report*** 1986-92. Addis Abeba.

Achefer Woreda Agricultural Office. 1993 E.C. Basic Information Document. Durbete.(In a Amharic translated)

Adams, M.E .1984. ***Agricultural Extension in Developing Countries. Intermediate Tropical Series***. Essex: Long Man Group Ltd.

Alemayehu Lirenso.1992. "Economic Reforms and Agricultural De-coopertivisition in Ethiopia: Implications for Agricultural Production in the 1900s". ***In the Proceeding of the First Annual Ethiopian Economic Association.*** Addis Ababa.

Alem Aberha. 2000. "Review of the Agricultural Sector in Ethiopia". In *Ethiopia: An Introduction in to Culture ,Economic, and Cooperation*. Sudwind:Brands and Apsel.

Arnon, I. 1987. ***Modernization of Agriculture in Developing Countries***. Cambridge: Cambridge University Press.

Asheby, J.A.1982. "Technology and Ecology: Implications for Innovation Research in Peasant Agriculture". ***In Journal of Rural Sociology***. Vol. 47 No. 2.

Bachee, Aruna .1994. ***Agricultural Extension on Africa***. Washington: World Bank Discussion Paper No. 231.

Bahru, Z. 1991. ***A History of Modern Ethiopia: 1855 – 1974***. Addis Ababa: Addis Ababa University Press.

Barners,D.F; Fliegel, F.C and Vanneman, R.D. 1982. "Rural Literacy and Agricultural Development: Cause or Effect". In ***Journal of Rural Sociology***. Vol. 47. No. 2.

Barellet, F.B .1980. "Cost-Benefit Analysis: A Test of Attentive Methodologies". ***In Decision Making: Anthropological Contribution to Rural Development***. London: Academic Press. Inc.

Bauer, D.F.1977. ***Household and Society in Ethiopia: An economic and social Analysis of Tigray Social Principles and Household Organization***. East Lansing: Michigan State University.

Befekadu Degefe and Birhanu Nega (eds.).2000. ***Annual Report on the Ethiopian Economy***. The Ethiopian Economic Association. Addis Abeba.

Belay Ejigu .1999. "Extension Policy and Its Implementation in Relation to Sustainable Land Use and Food Security Intervention". ***In Proceedings of the First National Workshop of NOVIB Partners Forum on Sustainable Land Use***. Addis Ababa.

Berry, S. 1980. "Decision Making and Policy Making in Rural Development". ***In Agricultural Decision Making: Anthropological Contribution to Rural Development***. London: Academic Press Inc.

Berry, S. 1993. ***No Condition is Permanent: The Social Dynamics of Agrarian Change in the Sub-Saharan Africa***. Macson: The University of Wisconsion Press.

Brune, S. 1990. "The Agriculture Sector". In ***Ethiopia: Options for Rural Development***. London: Zed Books Ltd.

BOA.1995. Amhara Region Agriculture:Extension Policy.Bahir Dar(In Amharic translated)

BOEDP. 2002. Amhara Region Bureau of Economic and Development Planning *Annual Statistical Bulletin: 2000-2001*. Bahir Dar.

Byers, J. T. 1981. "The New Technology, Class Formation and Class Action in the Indian Countryside". In ***Journal of Peasant Studies***. Vol. 8. No. 4.

Cancian, F.1980. "Risk and Uncertainty in Agricultural Decision-making". ***In Agricultural Decision Making: Anthropological Contribution to Rural Development***. London: Academic Press Inc.

Cancian, F.1989. "Economic Behavior in Peasant Communities". In ***Plattner, Economic Anthropology***. California: Stanford University Press.

Carls, J. 1991. Abstracts on Sustainable Agriculture. Compiled by GTZ. Escobern: Lengrich.

Chambers ,R.and Toulmin,C. 1991. "Farmers-First: Achieving Sustainable Dry Land Development in Africa". In ***Rural Household in Emerging Societies: Technology and Change in Sub-Saharan Africa***. New York: St. Martin's Press.

Clammer,J.1985. ***Anthropology and Political Economy: Theoretical and Asian Perspectives***. New York: St. Martin's Press.

Cleaver, M.K. 1993. Strategy to Develop Agriculture in Sub-Saharan Africa and Focus for World Bank. Washington: World Bank: Technical Paper No. 2003.

Cohen, J.M and Iskassan ,M.1988. "Food Production Strategy Debates in Ethiopia". In ***Journal of World Development***. Vol.16. (3).

Cohen, J.M. 1987. ***Integrated Rural Development: The Ethiopian Experience and The Debate***. Uppsala: The Scandinavian Institute of African Studies.

Colman, D. and Young, T. 1989. ***Principles of Agricultural Economics: Markets and Price in Less Developed Countries***. Cambridge: Cambridge University Press.

CSA. 1996. The 1994 Population and Housing Census of Ethiopia: Results for Amhara Region. Vol. I. Addis Ababa.

Daniel Gemetchu.1990. "Environment and Mass Poverty". In ***Ethiopian: Options for Rural Development***. London: Zed Books Ltd.

Daniel Gemetchu.1988. "Environment and Development in Ethiopia". In ***Beyond the Famine: An Examination of the Issues Behind Famine in Ethiopia***. Geneva: International Institute for Relief and Development Food for the Hungry International.

Desalegn Rahmato. 1995. "Peasant Agriculture Under the Old Regime". In ***Economic History of Ethiopia: The Imperial Era 1941-1974***. CODESREA Book Series.

Desalegn Rahmato .1985. ***Agrarian Reform in Ethiopia***. Trenton: The Red Sea Press.

Desalegn Rahmato.1994. "Agrarian Change and Agrarian Crisis: State and Peasantry in Post Revolution Ethiopia". ***In the Proceedings of the Seventh International Conference of Ethiopian Studies***. IES: Addis Ababa University Vol. III.

Dejene Aredo .1990. "The Evolution of Rural Development Policies". In ***Ethiopia: Options for Rural Development***. London: Zed Books Ltd.

Dejene Aredo.1992."The Relevance of The Improvement Approach to Agricultural Growth in Ethiopia". In ***the Proceeding of the First Annual Conference on the Ethiopian Economy***. The Ethiopian Economic Association. Addis Ababa

Dejene Aredo .1995. "Transforming Peasant Agriculture: A conceptual Framework". In ***Proceedings of the Fourth Annual Economic Association of Ethiopia***. Addis Ababa.

Dejene Aredo .1996. "Agricultural Supply Responses to Structural Adjustment Policies: The Priciest Versus Structuralism View in the Ethiopian Context". .In the ***Proceeding of the Fifth Annual Conference of Economic Association on Ethiopian Economy***. Addis Ababa.

Dewalt, B.R and Dewalt, R.M.1980. "Stratification and Decision Making in the Use of New Agricultural Technologies". I***n Agricultural Decision Making: Anthropological Contribution to Rural Development***. London: Academic Press INC.

Dixon, Chris .1994. ***Rural Development in the Third World***. London: Roultedge.

Dudley, Eric .1993. ***The Critical Villager: Beyond Community Participation***. London: Roultedge.

Eshetu Chole. 1964. "Economic Problems of Ethiopian Agricultural Development". In *Economic Journal*. Addis Ababa. Vol. I. Pp.25-33.

Eshetu Chole. 1988. "The Ethiopian Economy: An Overview". In ***Beyond the Famine: An Examination of the Issues Behind Famine in Ethiopia***. Geneva: International Institute for Relief and Development Food for the Hungry International.

Ellis, F. 1990. ***Peasant Economics: Farm Households and Agrarian Development***. Cambridge: Cambridge University Press.

Ellis, F. 1994. ***Agricultural Policies in Developing Countries***. Cambridge: Cambridge University Press.

Firth,R. 1951. ***Elements of Social Organization***. London: Watts and Co.

Foster-Carter, A. 1985. ***The Sociology of Development***. Canshier: Cause-way Books.

Freeman, D.M. Azadi, H. and Lowdermilk, M.K. 1982. "Power Distribution and Adoption of Agricultural Innovations: A Structural Analysis of Villages in Pakistan". *In* ***Journal of Rural Sociology***. Vol. 47. No. 2.

Gebrehiwot Agba .1992. "Rural Credit and Peasant Indebtedness: A Case Study in North Shewa". ***In Proceeding of the First Annual Conference on Ethiopian Economy.*** Addis Ababa.

Geertz, C. 1963.***Agricultural Involution: The Process of Ecological Change in Indonesia***. Berkely: University of California Press.

Gladwin, H. and Murtaugh, M. 1980. "The Attentive and Pre-attentive Distinction in Agricultural Decision Making". *In* ***Agricultural Decision Making: Anthropological Contribution to Rural Development***. London: Academic Press INC.

Goshu Mekonnen.1994. "Agricultural Reseqarch and Extension in Ethiopia: An Overview". *In* ***Proceedings of Fourth Aannual Conference of Ethiopian Economic Association***. Addis Ababa University.

Gregori, T.R. and Pi-Sunyer, D. 1969. ***Economic Development: The Cultural Context***. London: John Wiley and Sons.

Habtemariam Abate. 1997. *Targeting Extension Service and the Extension Package Approach in Ethiopia*. A Bulletin, MOA, Addis Ababa.

Habtemariam Kassa .1994. "The Historical Development, Current Status and Levels of Integration of Agricultural Education, Research and Extension in Ethiopia". *In the* ***proceeding of the 12th International Conference of Ethiopian Studies***. Red Sea Press Vol. II.

Hill, P. 1989. ***Development Economics on Trial***. Cambridge: Cambridge University Press.

Hoben, A. 1973. ***Land Tenure Among the Amhara of Ethiopia: A Dynamic Cognatic Descent***. Berkeley: University of California Press.

Hobsbawm, E. 1973. "Peasant and Politics". *In* ***Journal of Peasant Studies***. Vol. 1 No. 1.

Hooks, G.M., Napier, T.L. and Carter, M.V. 1983. "Correlates of Adoption Behavior, the Case of Farm Technology". *In* ***Journal of Rural Sociology***. Vol. 48. No. 2.

Joshi, P.C .1974. "Land Reform and Agrarian Change in India and Pakistan Since 1974". ***In Journal of Peasant Studies***. Vol. 1. No. 3.

Krieder, C. 1964. "Government Intervention in Agriculture". In ***Economic Journal***. Vol. 1.

Kophel, S and Oasa, E .1987. "Induced Innovation Theory and Asia's Green Revolution: A Case Study of an Ideology Neutrality". *In* ***Journal of Development and Change***. Vol. 18 No. 3.

Kroeber,A.L.1948. ***Anthropology***. New York:Hart,Brace and Co.

Layton, R.1989. "Pella Port". ***In what is new? A Closer Look at the Process of Innovation***. London: Uneswin Human Ltd.

Leagons, P.J.1971. "Extension Education and Modernization". In ***Behavioral Change in Agriculture***. London: Cornell University Press.

Leeu, S.U, and Torrence, R .1989. "Introduction: What is New About Innovation?" *In* ***what is New? A Closer Look at the Process of Innovation***. London: Umwin Hyman Ltd.

Lele, F.1974. "The Roles of Credit and Marketing in Agricultural Development." In ***Agricultural Policy in Developing Countries***. London: Macmillan Press.

Long, N. 1985. "Rural Development Strategies and Out-comes: A Critical Review." Iin ***Anthropological Contributions to Planned Change and Development***. Cotenber: Acta Universitats.

Macann, J. 1995. ***People of the Plow: An Agricultural History of Ethiopia: 1800-1990***. London: The University of Wisconsin Press.

Messing, S.D.1957. *The Highland-Plateau Amhara of Ethiopia*. Ph.D. Thesis,University of Pennslvania.

Meillosoux,C .1978. "The Social Organization of the Peasantry; The Economic Basis of Kinship." I*n* ***Relations of Production: Marxist Approach to Economic Anthropology***. London: Fonk cost and Company Ltd.

Mekonnen Getu .1987. ***Socialism, Participation and Agricultural Development in Post-Revolutionary Ethiopia: A Study of Constraints***. Stockholm: Almqust and Wisksell International.

Mesfin Wolde-Mariam .1991. ***Suffering Under God's Environment: A Critical Study of the Predicaments of Peasants in North Central Ethiopia***. Brene: The African Mountain Association.

Mintiz, S. 1973. "A Note on the Definition of Peasantries". In ***Journal of Peasant Studies***. Vol. 1. No. 1.

MOA. 1970. Master Plan of EPID. EPID Publication No. 1

MOA. 1978. Ethiopia: Measures for Rural Transformation. Addis Abeba.

MOA. 1995. Extension Package Study: Extension Task Force. Addis Ababa (in Amharic).

Muhammed Musa and Abiy Astatike.1996. "Diversified Uses of Animal Traction for Poverty Allevation in the Ethiopian Highkands". ***In the Fifth Annual Conference of Economic Association of Ethiopia on Ethiopian Economy***. Addis Abeba.

Mulat Demeke .1995. "Fertilizer Procurement, Distribution and Consumption in Ethiopia". In ***Proceedings of 4th Annual Conference of Ethiopia Economic Association***. Addis Ababa.

Mulat Demeke.1999."The Challenge of Increasing Food Production in Ethiopia". In the ***Proceeding of the 8th Annual Conference on the Ethiopian Economy***. Nazreth.

Netting, M.R.1993. ***Smallholders Householders: Farm Families and the Ecology of Intensive, Sustainable Agriculture***. California: Stanford University Press.

Nicholas,T. 1985. Agricultural Research and Extension in Ethiopia: The State of the Art. Addis Ababa: IDR Research Report No. 22

Nisbet, R. (ed) .1972. ***Social Change***. Oxford: Basil Blackwell.

Ortiez, S.1980."Forecasts, Decisions and the Farmers' Response to Uncertain Environments". In ***Agricultural Decision Making: Anthropological Contribution to Rural Development***. London: Academic Press.

Ottoway, M .1989. "The Ethiopian Land Reform: From Political Change to Economic Development". In the ***Proceeding of the8th International Conference of Ethiopian Studies***. *Vol. II.*

Pankhrust, S .1957. "Agricultural Extension" *in* ***Ethiopian Observer.*** A.A. Vol. II.

Pankhrust, R.1968. ***Economic History of Ethiopia: 1800-1935***. Addis Ababa: HSIU.

Pausewang, S. 1990. " The Peasants Perspectives". In ***Ethiopia: Options for Rural Development.*** London: Zed Books Series Ltd.

Picering, D.C. 1984 ."Agricultural Extension: A Tool for Rural Development." I***n Agricultural Extension by Training and Visit: The Asian Experience.*** Washington: World bank Symposium.

Redfield, R. 1956. ***The Little Community and Peasant Society and Culture.*** Chicago: University of Chicago Press.

Reij, C. and Water-Bayer, A. 2001. "Introduction." *In* ***Farmer Innovation in Africa: A Source of Inspiration for Agricultural Development***. London: Earthscan Publications Ltd.

Robesebery, W. 1989. "Peasants and the World." *In Plattner,* ***Economic Anthropology***. California: Stanford University Press.

Rogers, M.E .1960. ***Social Change in Rural Society***. New York: Appletion– Century Crafts Inc.

Rogers, M.E.1976. "New Perspectives on Communication and Development Overview." In ***Communication and Development: Critical Perspectives***. London: Sage Publication.

Roling, G, Ascroff, S. and Chage; W.I .1976. The Diffusion of Innovation and the Issue of Equity in Rural Development." *In* ***Communication and Development: Critical Perspectives***. London: Sage Publication.

Roy, Prannoy.1982. "Transition in Agriculture: Empirical Indicators and Results". In *Journal of Peasant Studies*. Vol. 8 No. 2.

Shanin, T. 1971. "Peasantry as a Political Factor." *In* ***Peasants and Peasant Societies***. New York: Hazel Watson and Viney Ltd.

Shanin, T.1973. "The Nature and Logic of the Peasant Economy." *In* ***Journal of Peasant Studies***. Vol. 1 No. 1

Shanin, T. 1974. "The Nature and Logic of the Peasant Economy: Diversity and Change, Policy and Intervention." *In* ***Journal of Peasant Studies***. Vol. 1. No. 2.

Shiferaw Jamo .1995. "An Overview of the Economy." *In* ***Economic History of Ethiopia: The Imperial Era 1941-1974 Edited by Shiferaw Bekele***. CODESREA Book Series.

Singh, I.B and Sahay, B.N .1972. ***Communication Behavior and Social Change***. New York: Bookhive Publishers and Bookletters.

Stier, H. 1974. "Extension Service, Education and Agricultural Development." In ***Agricultural Policy in Developing Countries***. London: Macmillan Press.

Silverman S. 1979. "The Peasant Concept in Anthropology." In ***Journal of Peasant Studies***, Vol. 7 No. 1.

Scott, J.C.1976. ***The Moral Economy of the Peasant: Rebillion and Subsistence in South East Asia.*** *London: Yale University Press.*

SG-2000 .2002. SG-2000 Agricultural Projects in Ethiopia: Activities and Output: An Assessment: 1993-2001. Addis Ababa.

Tadesse Berriso.1999. "Agricultural Development and Food Security in Ethiopia: Policy Constraints." *In* ***Aspects of Development Issues in Ethiopia***. AAU. IDR.

Taddesse Tamerat .1972. ***Church and State in Ethiopia: 1270-1527***. London: Oxford University Press.

Taye Mengestie .1992. "Public Policy, Markets and Technical Progress in the Grain-Plough Culture." *In* ***Proceeding of the First Annual Conference of Ethiopian Economic Association*** .Addis Ababa.

Teferi Abate .1998. ***Land, Capital and Labor in the Social Organization of Farmers: A Study of Household Dynamics in South Western Wello, 1974-1993***. Social Anthropology Dissertation Series, AAU.

Tesfaye Beshah .1999. "Orienting Agricultural Extension Towards Sustainable Land use." *In* ***Food Security Through Sustainable Land use: Policy on Institutional, Land Tenure, and Extension Issues in Ethiopia.*** Addis Ababa.

Tewold-Birhan, Z.1987. ***Agricultural Development Policy In Ethiopia:A Retrospective and Prospective Analysis.*** PH.D. Dissertation.University of Petersburg.

Van den Ban, A.W. and Hawkins, H.S. 1999. ***Agricultural Extension***. London: The Blackwell Science Ltd.

Waters-Bayer, A; Veldvizen, L.U and Reij, C. 2001. "An Encouraging Beginning." *In* ***Farmer Innovation in Africa for Agricultural Development***. London: Earths can Publications Ltd.

Westphal, E.1975. ***Agricultural System in Ethiopia***. Wegenien Center for Agricultural Publishing Documents.

Weitz, R. 1971. ***From Peasants to Farmer: A Revolutionary Strategy for Development***. New York: Columbia University Press.

West-Gojjam Zone Plan and Economic Development Office .2001. *Five Years Statistical Bulletin: 1994 – 1999*. Bahir Dar.

Wolf,E.1973. ***Peasant Wars of the Twentieth Century***. London: Faber and Faber limited.

Wolf,E.1967. "Closed Corporate Peasant Communities in Mesoamerica and Central Java". In ***Peasant Society: A Reader***. Boston: Little Brown and Company

Yared Amare .1999. ***Household Resources, Strategies and Food Security in Ethiopia: A Study of Amhara Households in Wogeda Northern Shewa***. Monograph Series in Sociology and Anthropology. Addis Abeba :Addis Ababa University Press.

Yerasworq Admassie.2000. ***Twenty Years to Nowhere: Property Rights, Land Management, and Conservation in Ethiopia***. Lewrenwill: The Red Sea Press Inc.

Zaman, M.R. and Bose, R.S .1974. "Extension Service, Education and Agricultural Development with Special Reference to Bangladish". ***In Agricultural Policies in Developing Countries***. London: Macmillan Press.

Declaration

I, the undersigned, declare that this thesis is my work and that all sources of materials used for the thesis have been duly acknowledged.

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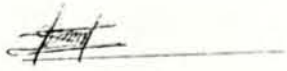
Signature	
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