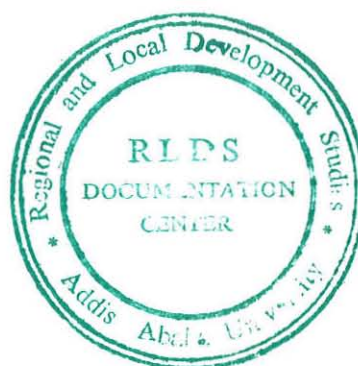


**ADDIS ABABA UNIVERSITY**  
**RESEARCH AND GRADUATE PROGRAMS OFFICE**  
**REGIONAL AND LOCAL DEVELOPMENT STUDIES**  
**(RLDS)**

**The performance and challenges of the current Agricultural Extension  
approach in food crop packages-a case study in Assosa and Bambasi  
Woredas of the Benishangul Gumuz National Regional State**

**By: Hailu Kassaye**



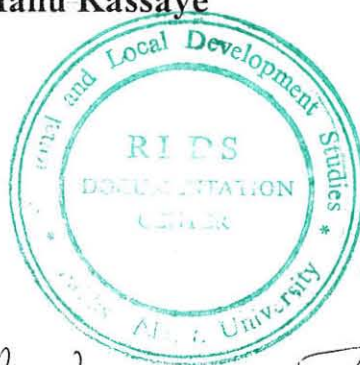
**June, 2002**

**Addis Ababa, Ethiopia**

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*We rejoice, then, in the hope we have of sharing Gods glory!  
And we also rejoice in our troubles,  
because we know that trouble produces endurance,  
endurance brings God's approval,  
and his approval creates hope. (Romans 5: 2)*

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## List of Acronyms

|         |                                                           |
|---------|-----------------------------------------------------------|
| AAU     | Addis Ababa University                                    |
| ADLI    | Agricultural Development Led Industrialization            |
| BGNRS   | Benishangul Gumuz National Regional State                 |
| BOA     | Bureau of Agriculture                                     |
| BRDA    | Benishangul Rehabilitation and Development Association    |
| CADU    | Chilalo Agricultural Development Unit                     |
| CD      | Community Development                                     |
| CSA     | Central Statistical Authority                             |
| EARO    | Ethiopian Agricultural Research Organization              |
| EHNRI   | Ethiopian Health and Nutrition Institute                  |
| EMTP    | Extension Management Training Plots                       |
| FAO     | Food and Agricultural Organization                        |
| FDRE    | Federal Democratic Republic of Ethiopia                   |
| GDP     | Growth Domestic Product                                   |
| IDA     | Institute of Development Association                      |
| IDR     | Institute of Development Research                         |
| IFAD    | International Fund for Agricultural Development           |
| MOA     | Ministry of Agriculture                                   |
| MPP     | Minimum Package Program                                   |
| NEIP    | National Extension Intervention Program                   |
| PADEP   | Peasant Agricultural Development Project                  |
| PADETES | Participatory Demonstration and Training extension system |

|       |                                              |
|-------|----------------------------------------------|
| NGOs  | Non Governmental Organizations               |
| RLDS  | Regional and Local Development Studies       |
| SIDA  | Swedish International Development Authority  |
| SSDP  | Seed System Development Project              |
| TOT   | Transfer of Technology                       |
| T&V   | Training and Visit                           |
| UNECA | United Nation Economic Commission for Africa |
| UNHCR | United Nation Higher Commission for Refuges  |



## Abstract

Currently, agricultural extension activity has been widely implemented indifferent parts of the world. Agricultural extension is both a science and an art, which aims at improving the over all productivity of the rural farmers. It usually introduces new technologies or innovations for targeted groups of the society. In short, agricultural extension can be considered as a bridge that links and facilitates a kind of horizontal relationship among researchers, policy makers and farmers.

The main objective of this study is to see overall performance of the current extension approach in food crop packages- in the case of Assosa and Bambasi woredas of the Benishangul Gumuz National Regional State (BGNRS). These two woredas are relatively accessible and pioneers to introduce the current extension approach. Due to such and other similar reasons, they were purposively selected for this particular study. Cross sectional survey method was employed to gather data from the selected sample households of the areas. Each sample household was randomly selected from the stratified groups (participants and non-participants) of the sampling frame. In processes of data collection; constraints of money and time, scattered type of settlements, unfavorable climate and lack of road transportation were major problems. Descriptive statistics, measures of statistical significance and logistic regression model were used to analyze the data. In addition to that, group discussion was administered with representatives of agricultural offices of the two woredas, development agents of the areas, Woreda administrators and different experts of the regional agricultural bureau.

As the over all results of the study clearly shows, each sample households knows at least about the existence of the current extension program. On the other hand, average yield; gross benefits and net benefits of extension plots are found better than non-extension plots. The program is also found contributing a significant change on food intake of the sample participants. But, on activities like demonstrations, field visits, and group discussions; supports given to farmers of the areas are not much satisfactory. Besides to that, the role of farmers is not also well considered in the over all planning and implementation process of the program. Among hypothesized variables; number of oxen, access to credit services, and dummy variables for settlers are found significantly affect extension participation.

In the study areas; high illiteracy rates, language, marginalization of women, declining in crop prices, financial problems, lack of access to credit services, absence of input delivering agencies, poor transportation, and absence of research institution are identified to be the main problems (challenges) of the current extension program. Planners, policy makers, researchers, administrators, extension agents, and others stakeholders need to work collaboratively to tackle these problems. As much as possible, early measures are highly recommended. Other wise, farmers will not be willing for continuing to participate in the program.

## **Chapter one    Introduction**

### **1.1 GENERAL BACK GROUND**

#### **1.1.1 Status of Agriculture in the Economy**

Agriculture had always played a significant role in economic growth and development. It provides food for both rural and urban population, creates employment and also forms a kind of backward and forward linkage that Stimulating growth and development. Due to its direct or indirect linkages to industry and services through production, consumption and employment; agriculture is known as the powerful source of growth. It has also the potential to generate adequate income and employment in the economy. Agricultural growth also plays a role in poverty alleviation and in improving household food security (Assefa Admassie, 1995).

Agriculture is the main stay of the Ethiopian Economy. The sector accounts for 52 percent the GDP, 90 percent of the total foreign exchange earnings and 85 percent of employment. It also plays a crucial role in providing raw material to the local industry. The country, having an abundant biodiversity potential, is favorable for growing 146 types of crops and is endowed with various domesticated animal species which play an important role in supporting human populations and is generating income and economic activity.

The agriculture sector is dominated by small-scale resource-poor farmers who produce 90 -95 percent of all cereals, pulses and oil seeds and grow 98 percent of the coffee produced in

Ethiopia. Cereal production accounts for nearly 80-85 percent of the total cultivated land and nearly 70 percent of the caloric intake of the Ethiopian population. Wheat, maize, barley, and teff accounting for more than 70% of the total crop production in the country (Assefa Admassie, 1995). Livestock farms are part of the mixed farming system where crop production is the main economic activity of the small- holder farmers. It is also the main resource base of subsistence pastoralists in the arid and semi arid low lands (MOA, 1998).

According to Assefa Admassie (1995), Ethiopia's agriculture is described as one of the most ancient in the world. Majorities of farmers have been using oxen and plough as the basic means of cultivation. The style of agriculture remaining unchanged for centuries. The agricultural production is highly susceptible to frequent natural disasters. He further said that increasing in out put from rain fed production methods only through area expansion or improvement in efficiencies is exhausted sooner or later. It is basically necessary for raising of agricultural productivity through technological changes.

It is therefore widely believed that effective technology generation and transfer systems which would properly cover all agro-ecological zones of the country, coupled with improving access of farmers to in put and credit as well as the performance of the market and distribution system, will enhance food security at household and national levels and improve the standard of living of the society (MOA, 1998).

### 1.1.2. Rural development Approaches and Evolution of Agricultural Extension in Ethiopia

In Ethiopia, agricultural Extension service is said to be operational since 1930's. However, a formal extension was started only after the establishment of the Alemaya College of Agriculture. Extension is underway in the country for over 70 years. Over this period, several development as well as extension approaches were employed side by side (Belay, 1959).

During the first five year plan (1958–62), the program of community Development (CD) was initiated as a strategy for stimulating population efforts to identify and tackling problems of a given community through self-help projects. The program of community development was concerned with almost all areas of development, using extension concepts as the communication strategy. Its particular emphasis was in agriculture, rural artisan's development and in social infrastructure and welfare activities. The approach was completely assumed small farmers as poor decision-makers who required out side assistance in planning local development projects. This program continued until the third five year plan (1968–73).

The other program where extension has been exercised was the package program that emerged during the third five-year plan. The typologies of package approaches implemented in Ethiopia since 1960's were formulated as a project.

The first, Comprehensive package project was that of Chilalo Agricultural Development Unit (CADU). This is the long-standing major project in the country was started as CADU in the

Chilalo Awaraja of Arssi region in 1967. It was established with the assistance of the Swedish International Development Authority (SIDA) and World Bank. Besides the Chilalo Awraja, the project later on in 1976/77 was expanded to cover the other two Awrajas of Ticho and Arba Gugu in the region (Tesfaye Besha, 1996).

The extension method employed by CADU was the “Model farmer” approach until 1975. But the model farmer’s approach to extension was criticized both from outside and with in CADU it self. Empirical Studies concluded that the approach was only partly successful and that it was not the most efficient way of disseminating knowledge (Waktola, 1975).

One of the main reasons for implementing the comprehensive package projects was to use the experiences in these projects to establish similar ones in other areas. However, because of high financial costs and shortages of skilled manpower, it was realized that it would not be possible to implement such project throughout the whole country. As a result of that, the initial plan to reach 90% of the farming population with in 15 to 20 years through large-scale intensive package projects became unattainable. Then, all these conditions forced policy makers to change the idea of comprehensive projects and to look for others less expensive rural development approaches (Assefa Admassie, 1995).

The second comprehensive package project was initiated in Wollamo province in 1970 under the Wollamo Agricultural Development Unit (WADU). Understanding the weakness of CADU’S model farmer approach, WADU avoided the “model farmers” approach and instead

demonstrated technologies on peasants' farms that were relatively resource poor. Technology transfer under WADU'S approach has been found to be more effective than that of CADU. WADU'S performance has been found to be more efficient than CADU both in terms of numbers of farmers reached and in raising of agricultural productivity with in a short period of time.

As early as the 1970's, it was apparent that it would not be feasible to implement the comprehensive package projects through the whole country. Hence, the minimum package program (MPP) was initiated in Ethiopia with a claim to address the problems of the lower income bracket farmers and also with greater reliance on people's participation.

The MPPs were designed to cover large areas so that as many farmers as possible could be reached for extension, input supply, credit provision and marketing services. Thus, under Ministry of Agriculture, the Extension Project Implementation Department (EPID) was created in 1971 to provide peasant farmers production and to carry out the minimum package program started in 1970. Under this program, the basic unit of development was the MPP areas that contained about 10,000 farm families and extended 5km on either side of a 75-km stretch of all-weather road. MPP- I adopted CADU's grain technology and also applied its extension methodology. Although the minimum package concept worked well in the limited areas of its operation under MPP- I (1971-74), certain shortcomings like inadequacy of manpower at the Woreda level and little or no in service training for the extension staff became apparent as the program was extended to more farmers (Tesfaye Besha, 1996).

According to Assefa Admassie (1995), although the MPPs were successful in achieving the growth objectives to certain degree, the equity objectives were not met. Since it did not employ extension strategies substantially different from the comprehensive projects, it was impossible to achieve in offering a low cost package to a large number of farmers. In addition to that, there was an either inadequate or totally lacking logistical support for the basic organizational unit of the MPP. There was also a very low participation of tenants in the credit program of the MPP. The location of MPP areas were also others major drawbacks. MPP areas were limited to only 3 to 5km on either side of the main road. As a result of such a policy, farmers living far away from the main road were not able to benefit from the operation of the MPP. The regional impact of the MPP was limited and unsatisfactory. More than 50% of the annual fertilizer sales were sale only in Shoa region.

At the termination of MPP- I in 1974, there was a plan to under take an expansion of MPP. - I under the name of MPP- II which was implemented starting from 1980/81 after efforts were done to adapt it with the new socio- economic and political system of the country. The main objective of the project was institution building and strengthening of infrastructure while of the same time extending the use and availability of inputs to the small holder farmers. The overall objectives of the MPP- 11 were more or less similar to that of MPP-1. The MPP-11 included the promotion of cooperative development, expansion of applied researches and demonstration and seed multiplication responsibilities. The MPP-11 had covered around 440 sub districts (Woredas) in 13 regions in contrast to only 280 Woredas under MPP-1. MPP-11 was also dropped “the model farmer” approach and instead peasant associations were used as extension channels. The model farmer approach was criticized because of its tendency to enrich those farmers serving as



models and widening the income gap between them and the laggards. The project was operated in 440 districts out of the 580 districts of the country. The components of the project were an agricultural extension package, a cooperative marketing package and supporting services. Farmers associations and cooperatives were the focal points of implementation (MOA, 1996).

Similar to any other programs in the country, the MPP-11 was followed the societal path of development in the agriculture. Due to that, the contribution of the program to increase productivity and food production has been minimal. Similar to MPP-1, the program has not properly served farmers living far away from the district capital. Generally, the performance of MPP-11 was poor and the transfer of new technologies has been constrained by the lack of transport facilities, inadequate financial resources, lack of trained extension agents, weak linkages between research and extension and limited capacity to multiply research products to be distributed to farmers.

After the termination of MPP in 1985, Peasant Agricultural Development Project (PADEP) was initiated to promote agricultural development in the dominant small holder sector. The program was designed on the basis of experiences gained from the past two MPPs. PADEP is basically a shift from nation wide to regional programmes based on the resource capability of the different regions. For the first time, the existences of regional differences were considered under this program. A regional approach to rural development was emphasized. Location specific, regionally demarcated projects were designed. PADEP was consisted of 8 separate “zonal development” projects, each projects being based upon specific resource potential, constraints and needs of a particular zone (Assefa Admassie, 1995).



The most important aspect of PADEP has been that of decentralization; in which zonal offices were given greater autonomy in planning and budgeting. The sponsoring agency, the MOA was also recognized and staff has been transferred to zonal offices. But, PADEP was operated in the potential areas of the country. Intensity of extension in non- potential areas was limited at the pace of the extension service as it was under MPP- II. Extension approach used in this strategy is a ‘modified’ Training and visit (T& V). Contact farmers are instrumental in technology transfer, where as the extension service is based at service cooperative level; which encompasses both peasant associations and producers cooperatives at the time where the cooperatives were at peak in the rural areas (Tesfaye Besha, 1996).

#### 1.1.3 The Current Agricultural Extension Approach of the Country

Drawing on lessons of past experience, the Federal Democratic Republic of Ethiopia (FDRE) has formulated an “Agricultural Development– Led Industrialization (ADLI)” Strategy, taking agriculture as the development base focusing on raising the productivity of the small scale farmers as key actors. Formulated with in ADLI is the new system of agricultural extension, termed “participatory Demonstration and Training Extension System (PADETES)”. As the name implies, the system is based on demonstrating and training farmers on proven technologies in participant manner. The system which had been developed after a critical evaluation of the past extension approaches has also given enough room to accommodate present changes in extension philosophy involving the utilizer subsystem i.e. research, education and extension as part of the knowledge system.

In contrast to the past extension system where focus was limited either to technology transfer or human resource development, PADETES gives equal emphasis to human resource development (organization, mobilization, empowerment) along with its effort in promoting appropriate technologies to users.

According to the new strategy, the responsibility of the Ministry of Agriculture at the federal level is to formulate agricultural policies, design packages, organize and conduct training activities to up grade the knowledge and skill of all partners in agricultural development, coordinate interregional activities, render policy advice and technical backstop. The planning, execution, monitoring and evaluation of extension programmes, however, fall within the power and duties of the regional agricultural bureaus.

The new system acknowledges package approach as a means for enhancing the desired change in agricultural development. The intervention strategy in this involves a package approach geared towards three different farming systems, namely: reliable moisture, moisture stress, and nomadic pastoralist areas. Distinction can also be made among areas being exposed for the first time to extension, where extension messages should be simple focusing improved cultural practices (crops, livestock); areas where there is already minimal extension and where improved agricultural practices combined with the use of purchased inputs can be allocated; and finally areas which are already involved in large-scale production, where moderate or high input technology may be appropriate. Supporting services and means of communication may also vary accordingly (MOA, 1998).

The system that has been developed after a critical assessment of past extension system, including the recent effort by the Sasakawa Global 2000 project has become operational since 1995. The assessment carried out enabled identifying the merit and demerit of each approach and as a result, the new extension system is benefiting from the strong extension management principle of the T& V system and is merged with the most practicable technology diffusion experience of the SG 2000 project approach. The training and visit extension system is well known for its fixed development agent to farmer ratio, scheduled visit to farmers plots, continuous training of staff, and strong research and extension linkage. Nevertheless, the Tand V system is also highly criticized for its top- down approach, poor use of group and mass communication methods and small-size adoption plots (Tesfaye Besha , 1996).

According to MOA (1998), the following are known to be the main objectives of PADETES:

- Improve the standard of living of the Society through improving productivity
- Empower farmers to actively participate in the development process.
- Increase the level of food self-sufficiency.
- Increase the supply of industrial and export crops.
- Ensure the rehabilitation and conservation of the natural resource base of agriculture.

In the Participatory Demonstration and Training Extension system, the media used to disseminate information to the intended target audience include, radio, printed materials, audiovisuals, person to person communication, agricultural fairs, seminars, workshops, training,

farm visits, field days, etc. Institutions like farmers' associations; traditional social organizations and youth clubs are also used as important channels of communication. Retired professionals, other volunteers and professional societies are encouraged to play an active role in rural development. Unlike the top – down extension method of the past, demonstration in PADETES is designed to ensure farmers participation. The farmers are involved at all stages of activities, from planning to evaluation. In the implementation of the extension program, the role of the government is to assist in: -

- Timely delivery of production inputs.
- The provision of credit.
- The delivery of extension and training services.
- Deploying development agents at the village level.
- Facilitating logistics (MOA, 1998).

## **1.2 Statement of the Problem**

Experiences from other countries reveal that extension approaches are changing from time to time. The popular extension approach being employed by many extension systems elsewhere is the agricultural extension participatory approach. In Ethiopia, the past experiences seemed to move from one approach to another with out thorough and systematic evaluation of the previous approaches (Tesfaye Besha, 1996).

According to the new strategy, execution of extension programs is entirely a regional affair. The national extension is responsible only for undertaking coordination of interregional policy

advice's and technical back up services. Though the national extension report indicated that the new approach is far better than the previous ones, it also admits the existence of some problems in the proper planning and implementation processes of the program with in the different regions of the country. For the various reasons, the report also further stated that the degree of these problems to be high in the so-called developing regions of the country (MOA, 1998). Benishangul Gumuz National Regional State is also one of those developing regions.

According to the report of the Benishangu Gumuz Agricultural Bureau, although there is a large expense of arable land, the agricultural production was no better than a means of subsistence. The yield obtained from both crops and animal is very low. Due to that, to achieve better agricultural productivity, the state adopted the new extension approach in 1996. Very in the beginning, the program was focused on only food crop packages. But now, the program is further expanded to livestock, coffee, and post harvest technology.

Thus, in order to evaluate the over all performance of the new extension approach, this research basically attempts to answer the following questions in relation to the main food crops (Maize, Sorghum, and Teff) of the study areas. These are: -

1. What does look like the general awareness of farmers about the current extension program?
2. How is the overall contribution of the program in increasing the productivity of the farmers?
3. Is there any change on food intake of the farmers?

4. What factors are affecting extension participation?
5. How is the involvement of farmers in demonstrations, field visits, and group discussions?
6. To what extent the decision-making power of the farmers is considered in the selection, testing, acceptance and/or rejection of different new technologies?
7. What are the main problems that have been challenging the over all planning and implementation processes of the program?

### **1.3 General and specific objectives**

#### **General Objective**

To assess the over all performance of the current extension approach in relation to the main food crop packages of both Assosa and Bambasi woredas of the Benishangul Gumuz National Regional State.

### **Specific Objectives**

1. To see the over all awareness of farmers about the current extension approach.
2. To evaluate the contribution of the approach in increasing the productivity and food intake of the farmers.
3. To evaluate the over all participation of farmers in relation to the planning and implementation processes of the current agricultural extension program.
4. To identify main problems that have been challenging the over all planning and implementation processes of the current extension program.

#### **1.4. Significance of the Study**

As different governmental reports approved, the new approach has been said to be effective in increasing the productivity of farmers. Coming to the Benishangul Gumuz National Regional State, the primary agenda of the region focuses up on the planing and implementation processes of the new extension approach. In relation to this case, though the regional agricultural bureau has annual reports on the progress of the program, their manner of organization is usually questionable or contradictory to one another. In the region, there is also a big problem of finding either a single formal research paper or standardized report document that can be used as a basic source of information about the program. On the other hand, farmers of the study area have strong interests for their problems to be clearly identified and studied by researchers, policy makers, planners and administrators. Administrators of the region are also highly willing and cooperative for the critical assessment of the program.

Due to such and other similar reasons, this study will hopefully be useful in understanding the over all performance of the current extension approach in relation to the main food crop packages of the areas. It also encourages further research to be done by other researchers. The study can also be used as a useful reference material for the administrators of the regional as well as policy makers of the country. Generally, planners, policy makers, researchers, administrators, farmers and other stakeholders can be the potential users of this study.

### **1.5. Scope and limitations of the study**

This study is considered the performance of the current agricultural extension approach in the case of Assosa and Bambasi Woredas of the Benishangul Gumuz National Regional State. Though there are different packages being implemented in the areas, the study focuses only on activities related to the main food crop packages such as maize, sorghum, and teff. The survey as the whole compared the cases of both participants and non-participants of the sample households.

Besides to the common problems of time and money, in the over all processes of this particular research, scattered type of settlements, unfavorable climate, and lack of road transportation were major problems that challenging the day to day activities and timely accomplishment of the study. In order to manage these problems, the researcher was forced to limit the sample size. In this case, though the sample size is limited, because of high homogeneity of the socio-economical characteristics with in the indigenous and settlers population of the study areas; the researcher is highly confident that increasing the sample size is never to bring any significant



changes on the results of the study. In addition to that, for comparison and detail discussions of the findings of this study, the absence of a single research paper or standardized document written on the study areas was a main problem. But, as much as possible, an attempt was made to critically examine available journals, reports and books that discuss up on the socio-economic characteristics of the region as the whole.

## **1.6. Key variables**

### **1.6.1. Conceptualization**

**Performance:** Refers to the different activities that are related to planning, implementation, and evaluation processes of the current agricultural extension program.

**Productivity:** Refers to both increases in production and net benefits gained from the sale of products.

**Involvement:** Refers to the extent of farmers' participation in the planning and implementation processes of the current extension program.

**Decision-making:** Refers to all considerations that play a role in making a choice from alternative action possibilities.

**Challenges:** Refers to either any kind of specific internal factors that are limiting the activities of farmers in the implementation processes of the current extension program and/or institutional factors that are mainly affecting the over all planning and implementation processes of the current extension program.

**Non food items:** Include all other items except any other kinds of crops that are directly used for consumption purposes.

**Average yield:** Refers to the quantities of out puts obtained in the specified production year.

**Gross benefits:** refers to the monetary value of an average yield obtained from per unit of hectare in the specified production year.

**Total variable costs:** Refer to the total money spend for producing different crops in a given production year (excluding labor costs).

**Net benefits:** refers to the excess of gross benefits over the total costs.

**Food intake:** refers to an average amount of food (in calory) that is consumed by a given household with out taking in to account (assuming as zero) the loaned, borrowed, reserved and loss amounts of seeds.

### **1.6.2. Operationalization.**

**Productivity:** In this paper the productivity of farmers is measured through changes in average yield, gross benefits, total variable costs and net benefits of the major food crops (maize, Sorghum, and Teff) of the study areas.

**Involvement:** The extent of farmers involvement is measured (assessed) through the different kinds of supports that are given to farmers so as to enhance or promote their active participation in activities related to demonstration, field visits, and group discussions.

**Decision-making:** The degree of the decision making power of farmers is measured through the recognition of the voices or ideas of farmers in the selection, testing, acceptance and/or rejection of the different types of new technologies that are delivered to them.

**Challenges:** These are directly measured through the different kinds of problems that are related to illiteracy, language, marginalization of women, declining in crop prices, lack of financial resources and access to credit services, problems of transportation, absence of input delivering agencies and research institutions.

**Non food items:** Basically operationalize through items related to shoes, clothes, fabric, kitchen equipment's, linens and furniture.

**Average yield:** Amounts of a particular crop obtained from a unit of hectare measured in units of quintals

**Gross benefits:**

$$GB = (A_Y) \cdot (P_C)$$

Where: GB=Gross benefits

$A_Y$ =Average yield obtained from per unit of hectare.

$P_C$ =Average market price of a particular crop.

**Total variable costs:**

Measured as the costs of fertilizer (DAP and Urea), Improved seeds, and local seeds (excluding the labor costs).

$$Tvc = D_{ac} + U_{rc} + I_{sc} + L_{sc}$$

Where: Tvc= Total variable costs

$D_{ac}$ =Costs of DAP

$I_{sc}$ = Costs of Improved seeds

$L_{sc}$ =Costs of Local seeds

$U_{rc}$ = Costs of Urea

**Net benefits:**

$$NB = GB - Tvc$$

Where: NB=Net benefits

GB=Gross benefits

Tvc = Total variable costs

**Food intake:**

$$F_i = (Y_p + P_a + B_a) - (L_a + S_a + Lo_a)$$

Where:  $F_i$ = Food intake

$Y_p$  = Yield produced

$P_a$  = Purchased amount

$B_a$  = Borrowed amount

$L_a$  = Loaned amount

$S_a$  = Sold amount

$Lo_a$  = Loss amount

| Variables                               | Indicators                                                                                                                                                                                                                                                                                                             | Variables                    | Indicators                                                                                                                                    |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Socio-economical characteristics</i> | <ul style="list-style-type: none"> <li>• Sex</li> <li>• Age</li> <li>• Family size</li> <li>• Marital status</li> <li>• Ethnicity</li> <li>• Religion</li> <li>• Educational status</li> <li>• Land holding size</li> <li>• Livestock</li> <li>• Expenditures</li> </ul>                                               | <i>Awareness</i>             | <ul style="list-style-type: none"> <li>• Information</li> <li>• Perceptions</li> </ul>                                                        |
| <i>Productivity</i>                     | <ul style="list-style-type: none"> <li>• Average yield</li> <li>• Gross benefits</li> <li>• Total variable costs</li> <li>• Net benefits</li> </ul>                                                                                                                                                                    | <i>Food intake</i>           | <ul style="list-style-type: none"> <li>• Amount produced</li> <li>• Amount purchased</li> <li>• Amount sold</li> <li>• Family size</li> </ul> |
| <i>Involvement</i>                      | <ul style="list-style-type: none"> <li>• Demonstration</li> <li>• Field visits</li> <li>• Group discussions</li> </ul>                                                                                                                                                                                                 | <i>Decision making power</i> | <ul style="list-style-type: none"> <li>• Selection</li> <li>• Testing</li> <li>• Acceptance/Rejection</li> </ul>                              |
| <i>Challenges</i>                       | <ul style="list-style-type: none"> <li>• Illiteracy rates</li> <li>• Language problems</li> <li>• Marginalization of women</li> <li>• Financial capacity</li> <li>• Access to credit</li> <li>• Crop prices</li> <li>• Input delivering agencies</li> <li>• Transportation</li> <li>• Research institutions</li> </ul> |                              |                                                                                                                                               |

## **1.7. Research Methodology**

### **1.7.1. Methods of Data Collection**

In this study, both primary and secondary materials were used as the basic sources of data collection. Basically, cross sectional survey method was employed for collecting the primary data. Under this method, interviews with the sample households, and group discussions with farmers, extension agents, agricultural experts and administrators of the region were administered. On the otherhand, reports, journals, and books, which assumed to be relevant to the objectives of the study were also used as supplementary materials.

### **1.7.2 Sampling Techniques**

Assosa and Bambasi woredas are relatively accessible and pioneers to introduce the current extension approach. They are also the only two woredas of the region in which both the Indigenous and settlers farmers are found together. Due to such and other similar reasons, they were purposely selected for the purpose of this particular study.

Generally, multi stage random sampling was employed for the household survey. In the first stage, the total PAs available in the in the two woredas (Assosa and Bambasi) were stratified as PAs of the indigenous and settler people. Following that, in the second stage of sampling, one indigenous and one settler PAs were randomly selected from each of the stratified groups of two woredas. In the third stage, households of the selected PAs were again stratified as participants

and non-participants of the current extension program. Finally, in the fourth stage of sampling, a total of 40 sample households were systematically selected from each of the stratified groups of the sample PAs, which resulted in a sample of 160 households.

### **1.7.3 Methods of Analysis**

This study basically followed a kind of comparative analysis among participants and non-participants of the sample households. In doing that, descriptive statistics such as mean, percentages, and standard of deviation were employed to analyze the gathered data. In addition to that, measures of statistical significance like chi-square tests ( $\chi^2$ ) and T-tests were also used to test the significance of each variable with respect to the participants and non-participants of the sample households. In addition to that, the logit model is used to analyze factors affecting extension participation. It is hypothesized that the willingness and ability of a farmer to participate in extension depends on his/her household characteristics, resource endowment and the socio-economic environment he/she is faced with (Ethiopian journal of Agricultural Economics, 2000). The variables were hypothesized to influence extension participation positively as denoted by (+), negatively (-), or the variable can have a positive or negative effect (+/-).



Following Gujarati (1988) the model is specified as:

$$\ln (P/(1-P)) = \beta_0 + \beta_1 X_1 + \dots + \beta_9 X_9 + e$$

Where: -

$X_1$  = AGEHH (Age of the household (-) )

$X_2$  = SEX (Sex of the household (+/-) )

$X_3$  = FAMSIZE (Family size (+/-) )

$X_4$  = SCHATTND (School attendance (+) )

$X_5$  = LANDSIZE (Land holding size (+) )

$X_6$  = ACCREDIT (Access to credit services (+) )

$X_7$  = VISITD (Visits made by development agents (+) )

$X_8$  = NUMOXEN (Number of oxen (+) )

$X_9$  = MSTATUS (Marital status (+/-) )

$X_{10}$  = SETTLDMY (Dummy variables for settlers )

$e$  = Error term

## **1.8 Organization of the paper**

This thesis has five chapters. The first chapter is the introduction part that consists of general background, statement of the problem, objectives of the research, significance of the study, scope, methods of data collection, sampling techniques, key variables and methods of analysis. The second chapter discusses relevant literature reviews regarding basic concepts of agricultural extension, historical roots and growth of agricultural extension, transfer of technology and various approaches of agricultural extension, and empirical findings. Chapter three presents description of the study areas in relation to natural conditions and resources, population and settlement structure, and economical characteristics. Chapter four describes and analyzes the result of the study supported by tables, chi-square tests, T-tests, and logistic regression analysis. Chapter five, which is the final part of the paper, presents conclusion and recommendations.

## **Chapter two    LITERATURE REVIEW**

### **2.1 Basic Concepts of Agricultural Extension**

#### **2.1.1    Meaning of Agricultural Extension**

Today, the issue of sustainability is more obvious and urgent than ever. A little over forty years ago as Alan Paron wrote, “the rich green hills break down... they grow red and bare, they can not hold the rain... the streams are dry... too many cattle feed up on the grass... the earth has torn like flesh... the soil can not keep them any more (Khan, 1989)”. For vast areas, this description remains true. Soil erosion, increasing urbanization, and salinity /alkalinity problems continue to make in roads on the existing cropland (Antholt, 1994).

Poverty, hunger, economic growth, food production, and natural resource degradation are all great challenge in today’s world. As the global population climbs to an expected 8,000million by 2025, to day at least 800 million people suffer from chronic hunger. Pervasive poverty will remain largely rural, even as urban populations triple in the same time period.

Ensuring a thriving agricultural economy is critical for reducing poverty, enabling food security, and managing natural resources in a sustainable fashion. Agriculture provides a livelihood for more than 60% of developing country populations, and in many countries, farm families make up 80% or more of the population (World Bank, 1990).

Until recently, most of the people in the developing countries are leading a relatively unchanging life, producing food similar to their ancestors. Their manners of production were usually well adapted to the local environment, involving maximum risk and guarantying enough food for their family in all but exceptional years. But, in last five decades, the relative equilibrium of traditional societies have been highly distorted.

The number of populations have increased rapidly due to decline of mortality and high birth rates, and this pressure of human numbers has caused to break down of the traditional systems. The growth of towns and the number of people involved in non-agricultural activities have led to an increasing demand for agricultural products. This has really placed an even greater pressure on soil and pasture resources that are being utilized rapidly, especially in semiarid areas.

In this regard, the most difficult problem is how to provide the basic materials for a rural people that have been increasing from time to time. In order to solve this problem, an intensive and productive use of land is the best solution. For that matter, millions of farmers must be given access to agricultural education, the necessary production supplies and markets (Adams, 1992).

The increased dependence on science – based agriculture, bolstered by the rapid agricultural technological advances in the last half-century, has placed greater importance and efficient transfer of these advanced knowledge to farmers. Farmers' decisions regarding technology choice and resource allocations are based on their stock of knowledge. Farmers and society in general will benefit from farmers access to and adoption of improved information because it is likely to result in increased productivity and possibly other benefits, such as improved nutrition.

Moreover, rapid advances achieved in the electronic and communication technology field have further accelerated and expanded the avenues for information transmission (Umali and Schwartz, 1994).

Any kind of advice and assistance given for farmers in order to improve their methods of production and marketing is called agricultural extension. However, agricultural extension should not be considered only in the context of increasing agricultural production. Extension is one of the instruments used to achieve a balanced social and economic development of rural areas. This is significance to maintain the increase in productive capacity (Adams, 1992).

According to Vanden Ban and Hawkins (1996) agricultural extension is not a simple term to be defined. Rather, it is open to a wide variety of interpretations. When we see it in order of time; we find that definitions of agricultural extension have changed in emphasis. Very in the beginning, definitions of agricultural extension were heavily directed to achievement of organizational goal and/ or governmental policies. Currently definitions of extension focus up on the achievement of the satisfaction of the needs of the target group. Since extension is organized in a variety of ways to accomplish different objectives, it is difficult to define it precisely. In relation to this, Ameer (1994) said, "Extension is definitely a topic that generates prolixity, controversy, and passion."

The term agricultural extension means different things to different people (Purcell and Anderson, 1997). Vanden Ban and Hawkins (1996) arrive at a concept of extension that seems to synthesize diverse perspectives in to five goals – transferring knowledge from researchers to farmers;

advising farmers in their decision making; educating farmers to be able to make similar decision in future; enabling farmers to clarify their own goals and possibilities and to realize them; and stimulating desirable agricultural developments. They note that development is the most common goal of extension directors.

Arnon (1988) stated that extension education is generally the main if not the only agent for farmer education in developing countries, and is specialized kind of the broader concept of adult education. FAO also defines agricultural extension as an informal out- of – school educational service for training and influencing farmers to adopt improved practices in crop and livestock production, management, conservation and marketing. Here the concern is not only with teaching and certaining adoption of a particular improved practice but also with changing the attitude of the farmer.

More simply, Kumar and Hansra (2000) tried to explain extension as a process where by the extension worker tries to encourage or motivate the clients in order to solve their acute problems. Due to that the clients would acquire a better understanding of their problems and also consider the alternative solutions available. He also said that extension is a process of working with farmers to improve the productivity of their agriculture.

In relation to the meanings of “extension”, there are still some words, which are used instead of extension to describe related processes. To mention some of them, the Dutch use the word *vorlichting*, meaning lighting the path way a head to help people to find their way. Following the Dutch example, Indonesia use the word *penyuluhan* to mean speaks of lighting the way a head

with a torch. The British and the Germans use talk of advisory work or *Berating*, which implies that an expert can give advice on the best way to reach your goal, but leaves you with the final responsibility for selecting the way. The Germans also use the word *Aufklarung* (enlightenment) to highlight the importance of learning the values and to stress the point that we must know clearly where we are going. Like US, they also speak of *Erziehung* (education) to stress that the goal of extension is to teach people to solve problems by themselves. Similar to the Korean term for rural guidance, the Austrians speak of *Forderung* (furthering) as to mean stimulating you to go in the direct direction. The French also speak of *Vulgarization* to highlight the need to make easy the message for the common man. The Spanish also use the word *capacitacion* to indicate improving of people's skills through training (Vanden Ban and Hawkins, 1996).

#### 2.1.2 Roles of Agricultural Extension

The importance of technical change on economic growth has been understood since Adam Smith (1776). Indeed, for agriculture, increasing factor productivity is a hallmark of agricultural development. The green revolution in Asian rice and wheat production is the best known contemporary example of the power of technological change (Antholt, 1994).

Almost every country in the world today has an agricultural extension service of one kind or another. Most of them operate depending upon the basic principles of "extension work" as originally developed in the United States of America. These ideas call for a program of informal adult education for rural populations, in agriculture, animal husbandry, home economics and related subjects. For the reason that not any country can afford to neglect its rural population,

agricultural extension work has been spread through out the modern world. With out a productive and stable agricultural base, it is obvious that all other efforts of social and economic development will be severely limited. For many years, experiment stations and research institutions have been busy in accumulating the basic scientific knowledge that makes improvements possible. For the reason that the information about new agricultural technology does not reach to rural people, there are still great many of them in the world who can not benefit from these ideas.

A major goal of the agricultural development policy in most countries is to increase food production at a similar rate to there at which the demand for food is increasing and at a cost, which is competitive on world markets. It is appreciated more and more that such development must be sustainable, and that often it must be done in different way than it was in the past. An effective agricultural extension organization is critically important in this situation, especially in less industrialized countries. The major role of extension in many countries in the past was seen to be transfer of new technologies from researchers to the farmers. Now it is seen more as a process of helping farmers to make their own decisions by increasing the range of options from which they can choose and by helping them to develop insight in to the consequences of each option (Vanden Ban & Hawkins, 1996).

According to Arnon (1988) it is generally agreed that in developing countries the objectives of extension education are not only to bring about an improvement in farming but also to promote the social, cultural, recreational, intellectual and spiritual life of the rural people. Extension programmes are therefore not only considered to take research results to the farmers but also to



substitute new values for old, make weak constraints caused by old traditions and stimulate the development of supporting services.

Agricultural extension is a necessary prerequisite to widespread and sustained agricultural development. Even in advanced countries, it is not possible to encourage farmers to adopt new technologies and practices based on continuously advancing research without farmers clearly understanding them. In order to bring research out comes and others new agricultural techniques to farmers, any one need to teach farmers how these practices should be employed and adopted under their own conditions. So an agricultural extension service is required to describe new technology to farmers and teach them how to adapt and adopt improved production practices goes to increase their production and income. Extension also has an important role in guarantying the agro-economic and social environment of farmers and the day-to-day production problems they face are appreciated by research. This feed back function of extension makes really simple the continuous reorientation of research towards the priority needs of farmers and the early resolution of important technological constraints. It is extension, however, that assists farmers take advantage of research findings and technological advances, quickly adjust to seasonal economic conditions, and effectively use support services to increase their production and income. Without extension's guidance, farmers often are unable completely to exploit the opportunities available to them (Benor, etal.1984).

Research findings do not immediately changes themselves in to agricultural practices; even in the best cases there is usually a considerable time lag between the development of a new technique and its application. As farmers in developed countries differ from developing

countries, the same is true for agricultural extension problems. In developed countries, the difficulty is how to communicate effectively the outcomes of research to a farmer who is mentally ready to accept new practices that will give him higher outcomes. Contrary to that, in the developing countries, the problem is not only how to communicate information but also how to initiate the farmer to accept technological changes (Arnon, 1988).

Research workers rarely have the time or opportunity to communicate directly with farmers. Even if they did, it is unlikely that the average farmer would understand their specialized language. The main purpose of rural extension work is therefore to bridge this gap. That is, to bring up -to-date and reliable information about farming method, home economics, community development and related subject. Extension work is with people. Extension worker's job begins and ends with human beings. Thus extension work has frequently been described as "helping people to help themselves" (Ameur, 1994). Arnon (1988) also said that, though much of the technological information required by farmers' come from the research organization, it is function of extension to select the appropriate ones.

Agricultural extension is being increasingly focused on women's needs, using women extension agents and contact points. The information needs for women and men often differ. This is due to the multiple roles of women in rural production and household maintenance systems and the consequent heavy demands on their time. Thus, women usually need advice focused on simple labor saving technology, food production as opposed to export crop messages, post harvest, food storage and processing messages. Simple labor saving devices for transport, water pumping, and crop husbandries are often popular with women because they save time. It is probably through

agricultural extension that the special role and needs of rural women can best be addressed (World Bank, 1993).

Extension work has now become part and parcel of rural development strategy in most nations of the world. The World Bank has also contributed significantly of late, towards strengthening extension organizations in less developed nations. There is tremendous faith in extension's potentials to work with rural people. Like it is said that Rome was built in order, it was not mastered minded by one individual at a place rather it evolved through hard work of several people around the world for over more than a century now (Kumar & Hansra, 2000).

## **2.2 Historical roots and Growth of Agricultural Extension**

### **2.2.1 Historical Roots of Agricultural Extension**

Agricultural extension work has generally a large and unrecorded history. It is really the most important force in agricultural change; which has been created and recreated, adapted and developed over centuries. Although its modern forms are largely a product of the past two centuries, its evolution extends over nearly four thousand years. Today, each of organizations and personnel engaged in agricultural extension focus to improve the abilities of farm people to adopt more appropriate and often new practices and to adjust to changing conditions and societal needs (Jones and Garforth, 1997).

History of extension work is intimately related with developments in technology. The need for extension work was felt acutely in Europe and North America during early 1700s, in the wake of industrial development. It was this urge to take advances of science and technology to the doorsteps of farmers that agricultural societies were formed. The first such society is said to be established in 1728. In Europe such societies came up to spread academic knowledge of agriculture through lectures and publications. Thus agricultural societies were first such bodies to undertake works which were later called extension (Kumar and Hansra, 2000).

In the beginning of 20<sup>th</sup> century, extension services were in their formative stage. That is, they were relatively small in scale and limited in their scope, and their organization was often somewhat with out order even though based on legislation. They were organized superiorly either by central or local governments, or by agricultural colleges. As the century has progressed, the organization has developed. Changes have often occurred in associations /organizations, government findings has become relatively more important, their objectives have become broader and the extension workers have become more trained and better professionals. In addition to that, different other types of organizations have also developed comparable work. That is, agricultural commodity marketing boards, agricultural development projects, and a variety of non-governmental organizations involved in agricultural and rural development.

When agricultural extension organizations have grown and changed, they are rather become more bureaucratic with distinct hierarchical structures. One or more levels of intermediary structure have created in between the field level agents and their head quarters. So that, the

management of extension activities has become a major task, and many organizations have been open to criticism of being top-down in their approach.

During the past quarter of 20<sup>th</sup> century, the work of extension services has become more diversified. Though the main focus of the less developed countries remain on agricultural (mainly food) production, there has been also a growing recognition of the need to reach, influence, and benefit the large numbers of small and resource poor farmers. In this direction, strong efforts have made through the training and visit system. As far as consider commercial farmers of the north, they are facing economic and policy pressures to restrict the problems related to surplus production. In addition to that, many issues and problems of environmental deterioration and livestock welfare have also arisen. Due to that, all those issues have become important aspects of extension work. This simply to mean that, it serves as socio economic guidance which focuses both on means by which farmers might keep their income levels form their resources and on ways of guarantying the longer term welfare of farmers and their families. As a result, agricultural extension services are adding a strong social dimension to their activities (Swanson, et al, 1997).

In developing countries, it was the emphasis of the early colonial on commodity programs that gave a way to expand multipurpose rural development efforts. For that matter, expatriate 'rural agents' were used to organize communities and serve as contact points for government authorities, input and credit suppliers, and buying agents. Their roles often extended in to human health, census taking, and tax collection. It was in 1950s that the formation of nation states and state led, planned development, and the institutionalization of many national extension services

occurred. Because of agricultural universities were weak or non-existent; agricultural extension was attached to ministries of agriculture that had weak links to research. At that time, it was the confidence in western technology that gave rise to the use of “diffusion model” as the main instrument of extension delivery (Axinn, 1988).

In the 1950s, there was really a high degree of confidence in the ability of western agricultural technology to solve the needs of the “hungry” poor and “ignorant” in the developing world (Britan, 1988). Consequently, the problem of developing agriculture was seen as one of accelerating the rate of growth of agricultural output and productivity via what came to be known as the “diffusion model” of agricultural development (Rogers, 1962). In that model, the process was conceived as a hierarchical, unidirectional process providing new technology, usually from the west to traditional agriculture’s, which then were delivered to farmers by departments of agriculture (Kearl, 1991).

From the results of village level research in the 1950s and early 1960s, which documented that peasant farmers were “poor but efficient” and were indeed “innovators” when it was in their interest to be, the above irrational paradigm concerning farmers in developing countries began to break down (Antholt, 1991).

The 1960s were the era of interpersonal communication, community development and the beginning of green revolution. During those times, the technology transfer orientation was still strong. In the early 1970s, there came about a better understanding of the importance of technological innovation in the process of agricultural development. At the same time there also

developed a sense that there was a backlog of technology yet to be moved to farmers. This perception stemmed in part from the desire to maintain the rapid progress in food grain production that was experienced in the first flush of the green revolution. Also, it stemmed in part from an over estimation of the robustness of existing technology under conditions faced by farmers, particularly small farmers in resource poor areas. The problem then was assumed to be one of passing the technology on to farmers. Most important, however, is the fact that this view was consistent with the linear, sequential, center periphery view of agricultural technology development and dissemination. It therefore followed that increasing the intervention capacity of extension through more staff, more training, more buildings, more motorcycles, etc was necessary (Rolling, 1991). In the mid of 1970s, public sector extension was limited to technical agricultural matters, mainly major annual food crops. In addition to that, the multipurpose agents were replaced by systems that targeted more closely on extension and its management. In relation to this, as FAO's 1989 survey results indicated about fifty percent of extension agencies became organized or reorganized from 1970 onward (Swanson, et al, 1990). The integrated rural development approach and the rise of the training and visit (T&V) extension systems were also the main features of the 1970s. Axinn (1988) also said that in 1970s the diffusion model of extension gave way to the 'get the technology right' model, where farm level constraints explained non-adoption of technology, with a prescription to ease the constraints through integrated packages of services.

In the 1960s and 1970s, donors largely through rural development and commodity projects financed extension in Africa. These projects had high failure rates. Extension systems were poorly managed, and technology was often not relevant to farmers. Technical messages

communicated to farmers were often of an extremely general type, purportedly applicable over diverse agro ecological conditions, but in fact applicable to only a few, if any (World Bank, 1993).

The transformative decade of the 1980s brought an increasing emphasis on participatory approaches. Along with attempted cost recovery and privatization schemes, there were also concerned about increasing the productivity of women and preserving ecosystems (World Bank, 1990).

#### 2.2.2. Currents trends of agricultural extension

Extension work is undergoing a phase of transition due to various factors such as technological innovations, developments in media, changes in organizations and perception about development itself. Thus, many new trends are emerging such as inclusion of new subject matter areas in the field of extension education, privatization, media use, participatory methods of extension work, farmers network, etc. The recent development in extension has been towards greater decentralization and the association of beneficiaries with the planning and implementation processes (Venkatesan & Kampen, 1998).

Nowadays, agricultural extension has been considered as an instrument for delivering information and advice's as an "input" for modern farming. Extension work has been reformed and strengthened with the help and support from the World Bank. New vistas of extension are opening-up broadening its application to different fields. Participatory approach to extension,



increasing use of media and privatization are some of the emerging aspects of extension. In this process of privatization, farmers are required to pay for services, which they had previously received free of charge (Swanson, et al, 1997).

It has been universally recognized that institutional pluralism in extension's development contributes to success. The consensus of opinion also holds that to achieve differing agricultural goals and serve diverse targets populations; a combination of public, private, and voluntary extension efforts is needed. Experience shows that diversity is the only way to address ever-changing conditions and various categories of users. Since users are more likely to seek advice from more competent sources, a natural selection process is likely to result in which only the best sources are retained

In view of the changing conditions facing agriculture today, a structural transformation of the agriculture extension system from exclusive public sector delivery to a multi-organizational extension system is increasingly essential. The public monopoly in agricultural extension provision is neither longer feasible nor sustainable in many countries and the joint efforts of other sectors-private, non-profit and non-governmental sectors-are vital if this task is to be effectively performed. Capitalizing on the comparative advantage of each of the different sectors will ensure the success of this endeavor.

Both the public and private sectors will continue to play major roles in extension. These respective roles need modifications, however, to allow the private sector to take on a larger share of extension responsibility, as governments can no longer afford to be in charge of every single

aspect of public life. It is also time for users to be in charge of services that in many instances have adopted flawed approaches, imposing uneconomical technical packages and addressing self-sustaining priorities instead of those of the intended beneficiaries. Going private should to some extent take the burden away from the public sector, cut down on expenses, improve management and staff professionalism, and make users' problems become main priorities. This is not to say that going private will solve every problem overnight. Setting up sufficient private entities to cover a reasonable spectrum of users will be difficult and time consuming. Not all users are of interest to the private sector, which is essentially driven by profit. The public sector will, therefore, have to ensure that all categories of users are reached in one way or another. Finally, there is no reason why an efficient public extension service can not continue to operate, provided there is a mechanism to recover at least some of the costs (Ameur, 1994).

In relation to the new trends of Agricultural extension delivery, significant developments in the electronic and communication technologies have also opened new channels for agricultural information delivery and generated economic incentives from increased private sector participation. Advances in computer technology and computer software development have tremendously facilitated data collection, sorting and analysis, and in turn have opened up opportunities for private firms to enter into the agricultural extension services market. Advances in satellite communications have facilitated information transmission over television and radio, while video technologies, computers and interactive video /computer systems have revolutionized teaching and training of clients and extension personnel. Provided that the information is closely attuned to the farmer's /customer's needs and conditions, these technologies have become a strong adjunct to, although a larger audience, thus permitting faster

dissemination of information. They allow for the reduction of travel and printing and mailing costs required of the print media (Baxter, 1987).

Today is also the era of alternatives where new approaches are being piloted. It is also the time that democratization has caused for a dramatic fall in public sector power and direct farm links are stressed between researchers and farmers. Those major trends & shifts of agricultural extension have induced by the changes of economic, political, technological, socio-cultural, and fiscal environments. Due to that, today the pace of change in the organization, functions, strategies and approaches of agricultural extension is clearly accelerating (Gustafson, 1991).

The recent developments in extension and research have been towards greater decentralization and the association of beneficiaries with the planning and implementation of programs. One of the major lessons that the recent developments offer is that coordination is seldom achieved from above. We now know that there are far greater chances of achieving coordination of the beneficiaries are effectively associated with the planning and implementation of the project (Venkatesan and kampen, 1998).

Increased participation is often called for to obtain more demand driven, client oriented research and extension services. Participation is cited as fundamental to the sustainability of extension systems (World Bank, 1990a). However, we need to remember that the bullocks pulling the farmer's plow are participating with the farmer... but only the farmer is in control (Axinn, 1990). It is not enough just "letting" or "allowing" farmers to participate. The bottom line is to empower farmers to they have meaningful roles in defining research agendas and extension programs, as

well as judging performance. This amounts to, in effect, a “sea change” in the incentive system facing research and extension staff and their respective institutions. Indeed, it is the difference between try to push a string and trying to pull one (Antholt, 1994).

Most recent literature on agricultural extension convincingly argues that extension systems need to be even more responsive to farmers needs than the government-managed systems. Farmers must be more actively encouraged to participate in message selection and testing, and in the identification of farm level problems to be addressed by research and extension systems (world Bank, 1993).

### **2.3 Transfer of Technology and Various Approaches of Agricultural Extension Work**

#### **2.3.1 Transfer of Technology in Agriculture**

Nowadays, there is an increasing use of the term transfer of Technology (TOT) by extension paractioners. But extension and transfer of technology are not synonymous as many people may assume (kumar & Hansra, 2000). Extension refers to the educational process in solving problems of farmers or ruralites in agriculture. Thus, it necessarily has a teaching function (Mishra, 1990). TOT includes additional function of input supply and agro- services. Extension also helps in developing organization and leadership. TOT is much wider term and includes process of technology development, adaptation, dissemination and integration in to farmers’ system. While TOT, when appropriate, is part of any extension services responsibility. TOT should not be concerned with only mechanically disseminating technologies to the rural clientele. It should

rather take into account the other accompaniments and preconditions necessary for integration of technologies into the social system (Kumar & Hansra, 2000).

Historically, transfers of technologies have occurred as a result of cultural contact and migration. Transfers of industrial technologies across nations have been the result of bilateral treaties between industrialized nation and the developing ones. However, transfers of agricultural technologies have been seen as the process of research, extension and farmers organization. The roles of each organization, extent of initiatives and interactions between each organization and tools and techniques of working have varied from time to time and place to place in view of the philosophical orientation about technologies and development. There are three major trends in the way TOT is carried out. The oldest and the most common approach is known by many names top-down model or conventional model. Next, there is some modification over the conventional one to consider farmers' reaction, known as feed back model. The third and recent approach is known as participatory model (Chamla&coughenour, 1987).

#### A. Conventional Model

This is the most prevalent model so far, ever since the beginning of agricultural research and extension. Technological innovations generated in the light of basic science researches, in the wake of industrialization, provided the basis for quantum leap in agricultural production. Thus, need for extending such technologies to farmers was felt so those farmers are motivated to adopt and diffuse (Walker, 1994). Some of the important features of this model are:

- Technology generation was the sole responsibility of the researchers. Interaction with farmers or extension personnel was not seen as relevant.
- Farmers were seen as passive recipient of technologies.
- There was little or no contact between farmers and scientists.
- Role of Extension was to persuade farmers to adopt new technologies.

Thus, this model suffered from feelings of superiority about scientists and technologies. Users' problems and views were not given consideration due for solving their problem. Such approach was evident in green revolution (Kumar&Hansra, 2000).

#### B. Feed back model

Disenchantment with green revolution agriculture based on excessive use of external input such as new crop varieties, inputs, irrigation, machines etc. called for new approach of TOT. Many International Agricultural Research Centers were interested involving farmers' orientation in agricultural research (Chambers, 1991). Thus, according to Rolling (1994) feed back model emerged with the following salient features: -

- Identification of target group, his problems and reaction is valued by researches.
- There is close interaction between research and extension systems as evident on farming system research and extension and training and visit extension systems.
- Researches are carried out both on research farms as well as farmers field to take into account resource and other variables at farmers' sites.

- Team of researchers included extension personnel as well as social scientists to have holistic understanding of the farmers' problems. Interrelatedness of various factors of farm and home were taken into account.

However, feed back model was still based on the initiatives of the scientists and farmers were consulted. The initiative, inquisitiveness and wisdom of farmers were still not utilized. It was through by many humanistically oriented researches that there is need to unleash the creativity and initiative of farmers as well (Kumar&Hansra, 2000).

#### C. Farmers Participatory models

There is recent need trend to strengthen farmers capacities for research and extension for enhancing sustainable development in rural areas. The new model is based on several observations about the research and extension initiatives in many areas of the world. Thus, new model had taken a stand that researches must be begin and end with farmers (Havercot, etal, 1991). According to Kumar&Hansra (2000), the key characteristics of such approach are: -

- Farmers are seen as active partner in research and Extension.
- Indigenous wisdom possessed by farmers are valued and considered.
- Research is seen as a joint endeavor involving farmers and researchers to solve problems being faced by farmers.
- Establishment of physical infrastructure and educational facilities for strengthening local experimentation is an essential aspect of participatory model.

- It emphasizes on the need for scientists to become more sensitive to understand, communicate and celebrate with farmers

This new model of TOT is farmer oriented and non-perspective. It does not underrate the value of either scientific agricultural research carried out by the academic institutions nor does it ignore the farmers' initiatives. In fact, emphasis is on encouraging farmers groups to organize themselves and network together for strengthening process of technology development. It is complementary, farmer focused and self-reliant. It sees the significance of indigenous channels of communication existing in rural areas in farmer-to-farmer extension. Thus, a new role of scientists, extension personnel, farmers and others is clearly evident in this model. As a result of the recent development in TOT approaches, classical image of researches as academicians in the secure environments of universities, colleges or research institution is no more valid. Agricultural researchers to be able to generate appropriate technologies must have sensitivity to the limitation of farmers and extension worker. They should be ready to live, work and learn from both farmers and extension worker. They should respect the knowledge available at the other side of the fence. Problem solving must necessarily begin with initiatives at the farmers' level. Thus extension has a new role to play (Walker, 1994).

To summarize, the linear, center-periphery, transfer of technology (TOT) model of technology generation and dissemination to the development of agricultural innovations is wide spread, deeply ingrained, and has been difficult to dislodge. Yet if that is not done, research and extension organizations will continue to be blind to the importance and power of a systems approach to identifying options for farmers, particularly those based on local knowledge



(Warren, 1991). Clearly there are times when seed based green revolution technologies come along. But innovations of this sort are rare and can often more or less sell themselves provided they are appropriate. In looking ahead, research and extension can be relevant and responsive to farmers needs only by being able to recognize and accept improvements and ideas from anywhere, including from farmers themselves (Antholt, 1994).

### 2.3.2 Various Approaches of Agricultural Extension Work

Agricultural extension-the transfer of agricultural techniques and knowledge to farmers-is undertaken in virtually every country in the world. The mechanisms of this transfer and the organization of extension vary from country to country. In some industrial countries there are private and public agricultural extension systems that complement one another. In the United States for example, the public sector supports county agricultural extension agents who provide advice on agricultural technology to farmers. At the same time, fertilizer, pesticide, and equipment suppliers provide highly specialized advice. Farmers who are members of cooperatives obtain advice through their cooperative organizations. Universities and research stations also provide advice directly to some farmers.

In the rapidly changing world of today, there is a need to look for less costly, more responsive, and more pluralistic extension approaches that can reach a wider clientele. There by, many farmers never will take advantage of government extension services, but they may be serviced by expanding NGOs extension systems, or they may obtain information through the media, publications, or advice from their neighbors (Antholt, 1994). Thus, the ingredients of a

sustainable approach tend to be inherently low cost and build relationships of mutual trust and reciprocity. From these relationships; commitment, political support, accountability, fiscal sustainability and effective interaction with knowledge generation develop (Fedder, et.al .1999).

Though the central idea is the same, various authors have followed various styles in discussing about this issue. According to Kumar and Hansra (2000), the following are identified as basic approaches of agricultural extension.

#### 1. Technology/Research centered extension approach

In this approach, extension work is considered as vehicle for distributing pre-decided research findings to the clientele. It gives emphasis for the findings that are available at the research center. The unique circumstance or constraints at the farmer's end are often ignored or not considered. This kind of approach is also some times known as Ministry based/ conventional extension approach. According to Nagel (1997), the approach used a uniform and nation wide organizational pattern to make easy the difficulty of information flow. The objective of this approach centers on increasing of national agricultural production including food crops, export crops, and animal production. Increasing of farm income and quality of the life of the rural people are also additional objectives of this approach.

## 2. Commodity focused approach

The original rationale of this approach was the generation of revenue as well as permanent supply of tropical products for the colonial authorities. Today, the goals are still profit oriented. Proponents of this approach generally argue that by introducing modern technologies and monetary incentives into traditional farming, to have a kind of cumulative effects in the overall of development (Moris , 1991).

This approach is quite popular in western Africa where sets of activities are geared to accelerate production of a single crop. Technical, administrative, and input requirements for such crops are managed by board or private company. Technical messages are systematically conveyed to the farmers. There is provision for inputs, marketing of outputs, prompt payment for out put price etc.

The advantages of this approach are largely defined from the perspectives of the commodity organization. Obviously, in situations where farming is not a mono culture, the approach does not fit as well because the narrow commodity focus tends to leave the rest of the agriculture sector and the extension system with many unaddressed needs (Nagel, 1997).

## 3. Community Development Approach

For better of agricultural development, it was early in 1970's that recognized the significance of coordination among institutional components. Due to that, this approach aim at influencing the

entire rural development process through increasing food or agricultural out put in the project areas.

This approach includes all aspects of rural life visa vise agriculture, family planning, health, education, illiteracy, etc. This broadens the responsibilities of extension workers. The wide-ranging set of duties results in low performance, lack of mobility and confused supervision. The knowledge and ability of farmers to contribute towards the generation or improvisation of technology is never appreciated.

Though the approach implemented in the form of large-scale and foreign funded projects, there were certain limitations in reaching the goal of mass poverty alleviation. Large numbers of the poor people were not reached by the project activities (Rauch, 1993).

#### 4. Extension as merely advisory function.

This approach assumed the role of extension worker is to advice clientele what to do or what not to do. Extension worker does not have any other involvement. This can also be matched to that of extension as a commercial service. The emergence of this kind of approach has influenced the debate on who should bear the costs of extension. Due to increasing of budget deficits, the idea of extension as a free public service has no longer been accepted. It is argued that those who can afford it should actually pay for advisory services. As a general trend, due to this approach, public extension seems to be under the pressure to introduce cost sharing or commercial advisory work. Though here privatization and cost sharing are largely motivated by financial constraints,

they are also propagated in the name of greater effectiveness and efficiency (Umali and schwaltz, 1994).

#### 5. Service or supply approach

The extension organization provides information on crops and livestock. Besides, it also arranges for supply of inputs like fertilizers and seeds. Many Asian countries follow such approach. Extension workers are over burdened with supply function. Due to lack of well-developed infrastructure such provisions work as incentive.

#### 6. Training and visit system

In the strict sense of speaking, T& V is not a new approach. It is rather a kind of an attempt to reform and improve the effectiveness of conventional /Ministry based extension approach. When first being introduce, the approach was seemed to be attractively original and promising. Rather than direct contacts with all farmers, the system concentrates on contact farmers. It also involves around intensive training and visit on fixed schedule known to farmers, supervisors, and technical staff. The system aims at reaching small and disadvantaged farmers with out neglecting the better off farmers (Nagel, 1997).

Though the approach seemed simple as the prescriptions, implementation proved to be difficult. After the T& V system has placed in number of countries and operating for many years, major criticisms were made refer to inadequacies in implementation, to the high recurrent costs of the

system and to the lack of feasibility in most less developing countries of applying the “single-function approach.” In practice, T&V has been a top- down approach, which leaves little chance for participation, both for farmers and village extension workers. Too little attention has been put on critical feedback (Benor & Harrison, 1997).

#### 7. Classical extension education approach

The classical extension education that evolved in U.S.A and was taken to different countries assumed that extension service could transform static rural economy into dynamic one. It used a variety of extension methods to convey for communication of information. Involvement of local leaders and participation of whole family was encouraged in this approach. There was considerable emphasis on training of women and youth as well. This approach can be matched to that of client based and client controlled extension approach.

Generally, depending upon the size of country, important farm products, type of farmers organizations, the structural of the agricultural branches of governments, the size of their budgets and the types of training in the agricultural schools; there are differences among extension systems adopted indifferent countries (Axinn, 1988)

## 2.4 Empirical findings

### 2.4.1 The current trends of World wide investment in agricultural extension

World wide, agricultural extension employs at least 800,000 extension workers and hundreds of thousands more farmer technicians or leader farmers, reaching about 1,200 million people. Currently, about 80% of the world's extension services are publicly funded and delivered by civil servants (World Bank, 1997). About 95% extension staff work in public agricultural extension systems (Umali and Schwartz, 1994), and 90% of extension workers in the world are located in developing countries, over 70% in Asia alone. Universities, parastatals, and non- government organizations deliver about 12% of services, and the private sectors another 5%.

Developing country governments invested heavily in agricultural extension, expecting increased agricultural production. Between 1959 and 1980, spending in real terms for extension grew more than six - fold in Latin America, tripled in Asia, and more than doubled in Africa (World Bank, 1990). FAO Surveyed the current status of agricultural extension in 113 countries, contacting 207 agricultural extension organizations that were considered to be generally representative of agricultural extension system through out the world (Swanson, et al, 1990). A ministry of agriculture or similar government agency funded 86% of these agencies. Based on this survey, FAO estimated that in 1988, \$ 6,000 Million was spent on public agricultural extension agencies world wide, representing an average expenditure per extension worker of \$8,522. Annual per farmer spending on extension Services ranged from \$ 2 to 3 in low income countries to \$65 in high- income countries.

The rate of public investment in agricultural extension as a percentage of overall MOA resources is directly related to the proportion of the labor force employed in agriculture in different countries. Where less than 20% of the population is employed in agriculture, extension receives about 2% of ministry resources, compared with slightly more than 20% of resources where more than 60% of the population is in agriculture.

Extension coverage (the ratio extension personnel to farmer population) by public extension services in developing countries varies from 1:1,800 to 1:3,000. Developed countries of Europe, North America, and Asia have ratios averaging about 1:400. (Fedder, et.al, 1999).

Although staff numbers are high in many developing countries, staff quality is often low. Fiscal constraints face managers of public extension systems, forcing them to hire staff with few skills to cut operational costs. FAO found 40% of extension personnel had only a secondary education, and another 33% with an intermediate diploma or certificate.

FAO reported that around 58% of extension resources were directed toward commercial farmers, including specialized producers of cash and export commodities. The vast majority of smaller, marginal farmers in the world receive slightly more than one third of all extension resources.

Not all extension is directly related to agricultural knowledge transfer. FAO found that extension personnel in developing countries spend about one quarter of their time on non- educational activities, representing about 140, 000 full time equivalent years of extension personnel time.



FAO regarded this as a major loss of educational resources, especially in developing countries where extension coverage is still grossly inadequate, both in quantitative and qualitative terms.

According to Nagel (1997), many public extension services are reaching only 10% of potential clientele, a minority of which is women. Magnitude interacts with quality of governance and adequate operating resources and technology to determine coverage and focus.

Agricultural technology and its transfer have been important characters of **Asian** agricultural progress for centuries. During the sung Dynasty, a thousand years ago, owners of large and progressive Chinese farms were publishing books on agricultural technology so that smaller farmers might improve their agricultural practices. It was in Asia during the 1970s that the World Bank initiated a major effort to provide better extension services using the training and visit system (Antholt, 1994).

Given the values and practices of many communities in Asia, male extension workers have great problems of communicating with rural women in agriculture. For example, in India, women do more than 70% of the farm work. Yet, the MOA reports that in 1988 only about .54% of all extension officers were women (Axinn, 1991). Gabriel (1987) reports that only .07 percent of Asian extension agents are women. This is not meant that men cannot communicate effectively with women farmers; rather, that is not easy and cannot be counted on. Neither can it be assumed that husbands will transfer new agricultural knowledge to their wives, and if they do, that they transfer it effectively (World Bank, 1991c). The long run answer lies in the recruitment, event if

must be at the expense of new male recruits, of more women extension professionals, and the sooner the better (Saito and Weideman, 1990).

For better and wide coverage of agricultural extension services; Radio and television have been more extensively utilized in most countries. The use of satellite, video, and computer technologies, however, has been largely confined to developed countries. Now a day's, the use of these technologies is gaining more and more popularity in developing countries. Television clubs or Groups in India, Ivory Coast and Brazil have been successful in transferring and speeding up the diffusion of information to farmers. In Peru, video tape was one of the three media used in the "Video-based training for Rural Development" Project aimed at mobilizing rural farmers for agrarian reform, 18 minute Videos were presented daily to farmers followed by discussion and a review of printed material. By 1981, 102,000 farmers had been reached and analysis of project performances found that video's audio-Visual quality overcame illiteracy constraints. Similar programs have also been replicated in Brazil, Honduras, Mexico and Paraguay (Wete, 1991). The Directorate of marketing in India produces documentary films and cinema slides and prepares exhibits and printed literature for the Various state marketing departments, which in turn use these materials to train their staff and their clients (Narayanan, 1992). Satellite systems are now used to transmit agricultural information in India (Satellite Instructional Television Experiment, INSAT), Peru (INTELSAT), Indonesia and the Philippines (PALAPA satellite System), and West Africa (AGRHMET). The use of mass communication technologies like satellite transmissions, radio, video and televisions, as expected, has generally been confined to the public sectors or non-profit organizations because of the public good character of the information conveyed and their high cost of operation (Wete, 1991).

About what to do with agricultural extension in Africa, one school of thought suggests that if the technology is profitable, farmers will not need extension to find about it and introduce it. But experience with limited successful technology transfer in Africa suggests this view to be wrong. Hybrid maize varieties in Kenya and Zimbabwe required strong extension efforts over a number of years. Even today, not all farmers in Kenya and Zimbabwe use hybrid maize in the environments where it is both appropriate and profitable, despite the fact that most neighbors use it. Every year, extension services convince more Kenyan and Zimbabwean farmers to use hybrid maize and to improve their crop husbandry. Recent surveys in Kenya and Burkina Faso indicate the high impact of extension on farmer adoption of improved technology. Extension played an important role in the dissemination of the CF DT Cotton packages in West Africa and still goes. British - American Tobacco has a private extension system as the cornerstone of its program with farmers in Africa. SAPIt, the Rubber Company in Coted Ivoire, has extension as its core service to out growers. Kenya's tea company (KTDA) has an excellent extension service, much appreciated by farmers according to the survey in Kenya. Extension appears to be the major element in introducing wide spread soil and water conservation technology in Burkina Faso, and in parts of Kenya. Extension educates and improves the quality of agricultural labor. This is a necessary ingredient of agricultural development (World Bank, 1993).

#### 2.4.2. Current experiences of some selected countries

In **Netherlands** there are two kinds of extension service; (i) the DLV or Dienst Landbouwwoorlichting which comes under the authority of the ministry of Agriculture, and (ii) the SEV, sociaal -Economische Voorlichting, which is geared to the socio -economic aspects of

agriculture and which belongs in part to the farmers. Private sector extension is provided by cooperatives, private firms, rural banks and consultants, most of who are former DLV agents.

Tacken (1996) reports a number of positive effects of privatization, including a 50% reduction in overhead client satisfaction jumped 40% on three years, attributed to improved client orientation, quality control, and more specialization of advice. Extension programs before privatization were closely related to national policy goals often conflicted with farmers' interests, had low impact, and led to conflicting roles, low morale and turn over of extension staff and lack of farmer confidence. The service was neither needs driven nor problem oriented, and over used mass media for delivery. After privatization, farmer interests became a priority as farmers became strongly represented on the DLV board and sectoral councils. Staff attitudes on efficiency, effectiveness and job satisfaction improved as DLV monitored individual performance.

Experiments in decentralizing public extension service have been carried out in several Latin American countries, building on major national decentralization initiatives that are common in the region (World Bank, 1997). Between 1989 and 1993, the government of **Colombia** decentralized extension to all but 10 of the country's 1,050 municipalities. Each was required to create its own extension office, United Municipal de Assistance Technical Agropecuaria (UMATA), which provides technical assistance to small farmers on a full range of issues. The 1,040 UMATAS employ 3,500 technical and professional staff, and provide 450,000 small farmers with free extension services. Thus far, almost all costs are sustained by the central government through a complex system of budget transfers to municipalities and matching grants.

To date, the Colombia decentralization has improved coverage and possibly responsiveness. The number of municipalities served is up over 300 percent, while beneficiaries are up over 250 percent, with the beneficiary/ technical staff ratio falling 17% to 129, and cost per farmer diminishing by 10 percent. Municipality staffs are reportedly more accessible to small farmers than staffs that were formerly under the MOA- directed Colombian Institute for Agriculture and Livestock (ICA) (Feder, et al, 1999).

Agricultural extension in **China** is traceable as far back in times as 3000 - 1,000 years ago, where as modern institutionalized extension services only developed at the beginning of the 20thC. The country currently has some 500,000 full- or part - time Farmers Technicians (FTs) at the grass roots level. There is, on average, about one FT per village covering some 9 to 10 demonstration households and about 420-farm house holds each. A National Agro- Technical Extension center is responsible for formulating national policy guidelines and for overall planning, coordinating, monitoring and evaluating china's extension operations. The basic extension strategy being perused includes a combination of farmer training with the dissemination of new technologies using a variety of low cost techniques.

Most interestingly, research institutions, agricultural colleges, and individual scientists and teachers in China may sign contracts with rural units or farmers to provide technical support on an annual or a continual basis. Many research institutions are not under the Ministry of Agriculture's authority are engaged in extension activities. To increase the utilization rate of research results, the government decided a few years ago to commercialize the national science and technology system. As a result, some research results are now directly sold in the market

place. At the same time, china is enforcing a patent law to protect proprietary rights to research results. What is quite remarkable in the case of China is the bold introduction of the extension contract system and the rapid shift of extension from the large agro- complexes to the many small households. Some argue that contract extension in China derives mainly from farmers interest in getting access to high quality inputs which are in short supply. While this may have some truth, as the professionalism of extension personnel improves, the contract extension approach should increasingly fly on its own merit (World Bank 1993).

Great strides have been made in the recovery of **Ugandan** agriculture over the past 15 years, driven largely by expansion in cultivated areas and liberalization of the economy. The country has regained its position as the largest coffee producer on the continent, the tea industry has been revitalized, a small export-oriented horticulture industry is emerging, and maize exports to Kenya continue to grow.

Concerned with sources of agricultural growth for the future, the government has developed a new plan based up on two strategic pillars - raising over all agricultural yields and productivity and diversifying small holder production patterns in a mix of higher - value, export oriented commodities, along with lower value food staples.

Developed by a broad constituency of stake holders- officials and politicians, farmers, NGOs, civil society, and the community of donors. The new plan places a high priority on agricultural research and extension, and especially on improving the process of technology generation and

transfer through the decentralization of activities, greater participation of potential users, and improved utilization of knowledge found in local communities.

A central component in this strategy is the new National Agricultural Advisory Services program (NAADS), launched in early 2001. The first phase will run for seven years, with an estimated cost of US \$ 107 million. The world Bank (IDA) and the International Fund for Agricultural Development (IFAD) will finance \$ 62.5 million and ten other donors will finance \$ 28.5 million, with the government (national, district and sub country levels) and farmers financing roughly \$ 16 million. The program is to be implemented by a newly created NAADS Secretariat. Major reforms of agricultural extension are planned under NAADS. These include further decentralization of extension responsibilities, from the district to the sub-country level, contracting extension services from a range of providers; involving farmers in program planning, evaluation, and decisions about extension providers. It also consists of establishing cost sharing between national and local governments and farmers; and the creation of more effective operational links between farmers, markets, extension workers, and agricultural researchers. Approximately 65% the NAADS resources will finance the contracting of extension services.

The new approach in Uganda stands in sharp contrast to past extension programs in a number of ways. It moves away from monolithic and service heavy structures by explicitly encouraging plurality in extension providers and methodology. Perhaps most importantly, the NAADS design is an attempt to make extension advisory services much more directly responsive to farmers 'Self-identified needs (Feeding the future, 2001).



In **Ethiopia**, the current national extension program, which was only limited to 7 regions and 35,000 farmers in the initial year, has been expanded to all regions and participant of 2.9 million farmers in 1998/99-production season.

In addition to expanding the number of participant farmers, additional packages are also formulated by the technical departments of MOA. These packages include packages for cereal crops pertinent to moisture- reliable and moisture stress areas, high economic value crops, post harvest technology and livestock development packages, etc. Although a substantial support is being made by the MOA in the areas of package formulation, in put delivery and training of staff, the entire management of the National extension Intervention program (NEIP) is executed by the regional governments.

The extension program has enabled the participating farmers to increase their production per hectare that has in turn showed a significant increment in the country's overall cereal and pulse production. The demonstration activities in crop production are utilized as an entry point for employing a step-wise approach to development. According to the MOA, the out comes of the program believed to relieve the country from its chronic food shortage, provided policy makers, researchers, extension agents and farmers work hand in hand (MOA, 1998).

As reports of MOA confirmed, the rapid transformation of our backward agriculture to modernity is unthinkable with out an efficient and wide spread application of improved agricultural inputs and related technologies. With out the intensification of the agricultural sector, it is also unthinkable to reach beyond food self-sufficiency and to base the sector as an engine of overall development. Improved agricultural practice includes the use of increased



chemical fertilizers, plant protection chemicals, genetically improved seeds and animals, farm tools and machinery and inputs for animal disease/ drugs, chemicals, equipment, etc.

The major types of fertilizer used in the country are DAP and Urea. Fertilizer is one of the inputs to which a relatively large number of farmers have access in the country. The consumption of fertilizers, in which the food crop producing smallholder farmer is the major consumer, has reached a level of 279, 685 tones in 1998. In the last five years (1994- 1998), the farmer's requirement of fertilizer has doubled from 150,000 tones to 300,000 tones. At present, the average fertilizer use is about 19kg/ha and approximately [2.8 million hectares] receives fertilizer. It is estimated that currently, only 20 % of the farmers in the country use fertilizers. It is also estimated that within the next 10 years the amount of fertilizer need would be tripled (which is expected to be roughly 9 million tones).

Another important input which is highly demanded by the farmers is improved seed. The demand for improved seeds for cereals, pulses and oil crops at national level is estimated to be 4.1 million quintal / annum. And yet the full production capacity of Ethiopian Seed Enterprise is 500,000 quintal /annum.

Various efforts have been made to strengthen the seed production capacity of the country. The Seed System Development Project (SSDP) is one of the manifestations of the efforts being made in this sector. The project, which is financed by IDA, IFAD and the Federal Democratic Republic of Ethiopia, has two components: -VISE. Seed Enterprise Development component

(farmer based seed production and marketing scheme), private sector and Ethiopian Seed Enterprise.

Agricultural pests are always a serious threat to crop production in Ethiopia. Although no systematic loss assessment studies have been done, the annual pre- and post- harvest losses are estimated to be as high as 30% or equivalent to two million tones of grain.

At present, chemical application is one of the available pest control mechanisms in the country. Pesticides required to control migratory pests like desert locust, quolla birds, armyworms, etc. is estimated at about 500, 000 liters or kilograms per year. The demand for pesticides to be used for non-migratory pests, sprayers and other safety equipment such as goggles, gloves, etc. is also high. By the same token, the country's demand for veterinary drugs and vaccines is big. It is estimated that annual demand of veterinary drugs and vaccines is worth 60 million us dollars. And it is only a very small percent of this demand is fulfilled.

Small- scale farmers are looking more into the use of small mechanically powered equipment for both crop production and post harvest activities. Further more, agricultural hand tools and traditional ploughs still constitute the major means of agricultural production of the Ethiopian farmers. Artisan production, the main supplier of hand tools and implements is showing a declining trend mainly due to shortage and rising cost of raw material. The current industrial production of these implements is believed to be far below the present and future needs of the farmers.

The use of modern tractors, combine harvesters and related heavy machinery is still very limited in Ethiopia. The Nazareth tractor factory with a limited capacity is the only organization that assembles tractors in the country. On the other hand, a rising trend in the import of tractors and harvesters is being observed as of recent due to the rise in demand for their services.

As a result of the agricultural intensification program there is a significant increase in production and productivity in some agricultural producers. However, the products has not been changed to saleable products due to lack of capital for installing agro-processing industries (MOA, 1998).

In the **Benishangul Gumuz National Regional State**, although there is a large expanse of arable land, the agricultural production was no better than a means of subsistence. The yield obtained from both crops and animal is very low. Due to that, to achieve better agricultural productivity, the state had adopted the extension intervention program in 1996. Very in the beginning, the program was focused on only food crop packages. But now, the program is further expanded to livestock, coffee, and post harvest technologies (Herald, 2000).

Out of the planned 15,476-extension demonstration sites, a total of 11,785 have been implemented in 2000. This has really said to be a good progress as compared to the implementation of only 6543 out of the planned 12,967 demonstration sites of year 1999. In addition to that, in the year 2000, 3,994 quintals of DAP, 3527.5 quintals of UREA and 730.95 quintals of improved seeds have been distributed to farmers.

Results have shown that out put increased by three - to forth fold. Farmers managed to produce 60 quintals of maize and 40 quintals of sorghum per hectare while they previously used to get 12 and 10 quintals, respectively (BOA, 2001).

On the other hand, in order to back up the extension program, seed multiplication centers have been set up in four woredas of the state with the support of the federal government in 1998 (Herald, 2001).

## CHAPTER THREE      **Description of the study area**

### 3.1 Natural conditions and resources

#### Location

The Benishangul Gumuz National regional state (BGNRS) is situated in West Ethiopia. It stretches along the Sudanese border between 09.17<sup>0</sup> and 12.06<sup>0</sup> N. The western and eastern limits are given by the longitudes 34.10<sup>0</sup> and 37.04<sup>0</sup>E, respectively. The neighboring region to the north and northeast is the Amhara region, to the south and south – east the oromia region. The total area of BGNRS amounts 50,380 km<sup>2</sup>. The Blue Nile divides the region into two parts. The Northern part – Metekel zone and Pawe – special Woreda comprises an area of 26,561 km<sup>2</sup>, the southern part – **Assosa Zone**, kamashi zone and Mao - Komo special Woreda – of 23,820km<sup>2</sup>.

#### Topography

The elevation ranges from 580m to 2,731m. above sea level . The highest peak is the Belaya plateau in Dangur woreda, the lowest where the Blue Nile crosses the Ethiopian Sudanese border. The major part of the region-about 75% is low lands (Kola, below 1500 m.a.s.l.). Twenty-four percent are mid lands (Woynadega, 500-2,500m), and only 1% are high lands (Dega, above 2,500m)

## Climate

The climate of the region is characterized by a mono modal rainfall pattern (i.e. a single rainfall maximum per year) It is characterized by a wet season from April /May to October /November. Beside the latitude, the altitude has considerable influence on the amount of precipitation, which increases with increasing altitude of 1,500m, has an average annual precipitation of 1,275 mm. The temperature reaches a daily maximum of 20<sup>0</sup>c – 25<sup>0</sup>c in the rainy season and rises to 35<sup>0</sup>c – 40<sup>0</sup>c in the dry season. The hottest period is from February to April. The minimum temperatures range from 12<sup>0</sup>c - 20<sup>0</sup>c, depending on season and altitude.

### **3.2. Population and settlement structure.**

#### Total population

The population of Benishengul-Gumuz is growing rapidly. According to the projections from the population and housing census 1994, a population of 543,627 was expected by the end of 2000. However, population census which was done in connection with the region wide house to house polio immunization campaign in December /January2000/01 showed that the actual population is even higher, amounting about 575, 000 people.

## Ethnic groups

The indigenous population of Benishangul Gumuz National Regional State consists of five ethnic groups namely known as Gumuz, **Berta**, shinasha ,Mao and Komo. After the great famines of 1973/74 and 1983/84 in the Northern and central part of Ethiopia, people from wello were settled in the region. Their immigration mainly took place in 1978/79 and 1984/85, respectively. Oromo have settled for a long time in Dibate, Wembera, Mao Komo and the Woredas of Kamashi Zone, which border on Oromia. But they have also immigrated in more recent years .Now a days, the largest Ethnic groups in the region are **Berta (26.7%)**, Gumuz (23.4 %), **Amhara (22.2%)**, Oromo (12.8%), and Shinasha (6.9%), while other ethnic groups constitute the remaining 8%. Those different ethnic groups are not evenly distributed in the region. Berta and Amhara are the main ethnic groups in Assosa zone, in Metekel zone; Gumuz, Amhara, shinasha and Agew dominate, where as the Kamashi zone is predominately settled by Gumuz.

## Religion

According to the census of 1999,the largest religious groups are **the Muslims (44.1%)**. They are followed by **orthodox Christians**, which account for 34.8%. Protestants and traditional religions comprise 5.8% and 13.1% respectively. Catholic Christians and other religions constitute 0.5% and 1.5 of the total population.

## Educational attainment

According to the census of 1994, of the total population aged 5 years and over, 11% of the males, 5% of the females and 8% of both sexes were attending school at various levels. Those who were attending school in urban areas constituted 29% while in rural areas it was only 6%. Similarly, 13% of the males, 6% of the females and 10% of both sexes aged 5 years and over reported as having attended school in the past. This percent varied between 32% in urban and 8% in rural areas. Of the total population of the region aged 10 years and above 25% of the males, 12% of the females and 18% of both sexes are found to be literate. The literacy rate for urban and rural area were found to be 61% and 14% respectively

## Settlement structure.

The vast majority of the population lives in rural areas often in remotes inaccessible places. To reach the remotest villages, up to 5-7 hours walking are necessary. These conditions make it very difficult, or impossible, to supply people with services and infrastructure.

## 3.3 Economy

### Agriculture

The livelihood of the majority of the population of Benishangul Gumuz is based on subsistence agriculture. Farming is the major source of food and cash income. Sorghum and maize are the



staple crops. The total area used for agricultural crop production amounts 142,223 ha. The cultivated land is not evenly distributed among Zones. The average size of land cultivated by a farmer is 0.8ha.

Farming practices vary among the different ethnic groups. They are still traditional; machinery, fertilizers and pesticides are usually not available. Amhara /Agew, shinasha and Oromo practice sedentary food crop production using oxen for plowing. Shifting cultivation is a common practice in areas where **Berta** and Gumuz people live (UNECA, 1998)

#### Income and expenditures

The house holds income level is low. Unfortunately, data for the whole region are not available. During August /September 2000,the Benishangul Rehabilitation and Development Association (BRDA) conducted a survey on livelihood, nutritional status and household food security in rural communities of Assosa zone (BRDA, 2000). The survey shows that the relatively rich households able to produce enough food, ninety percent of their food consumption is derived from own production, and 10% is purchased .The purchase mainly refers to meat, other livestock products and oil. Poor households, however, do not produce adequate amounts of food. Their own production accounts only for 40 – 50% of their intake. Thirty percent is purchased, and another 20-30% remains as food deficit. The deficit is partly alleviated by consumption of wild foods such as bamboo shoots, roots and wild animals. Several reasons are responsible for the food deficit, low agricultural production due to lack of adequate resources, pre-harvest losses of crops due to wild animals, plant diseases and insect pests, low livestock production.

The cash income sources are mainly sales of agricultural products. Sales of crops and livestock are the source of more than 80% of the cash income of relatively rich households. Sales of honey, gold, bamboo and eucalyptus trees as well as trading activities add another amount.

The major expenditure categories are food (30-50% of the cash income), coffee, sugar and salt (6-28%), clothes and soap (6-24%). Minor expenditure categories are health care (5-9%), fertilizers (3-5%), Education (2%) and taxes (1-2%) (Regional profile, 2002).

## **CHAPTER FOUR Results and Discussion of data**

Findings of this research generally focus up on the topics that are related to general socio-economic characteristics of the sample households, their awareness about the current extension program, the productivity of the program and its impact on food intake of the households, extent of farmers participation and some other problems that are challenging the over all performance of the program.

### **4.1 General socio- economic characteristics of the sample households**

In relation to the main objectives of this particular research; sex, age, marital status, ethnic composition, religion, and educational level are considered as the basic social characteristics of the sample households. Where as the land size, number of livestock, and the total amount of money spent for the purchase of non food items are also assumed to be the main indicators of the household economy.

#### **4.1.1. Social characteristics**

According to the 1994 census result, in the region of the study areas, there are about a total of 102,832 households with an average of 4.5 persons per household. Further the census result shows a total of 14,337 and 7186 households in Assosa and Bambasi woredas, respectively. According to this census report (see table 4.1.1.), a total of 1022 households are found in the

sample PAs (Ambea-13, Bare, Mender 44, Sonka), which are selected from both Assosa and Bambasi Woredas.

Table 4.1.1. Number of households in the selected Peasant Associations of the study areas

| Woreda    | Peasant Association | Total number of house holds |
|-----------|---------------------|-----------------------------|
| . Assosa  | Amba-13             | 288                         |
|           | Bare                | 304                         |
| . Bambasi | Mender – 44         | 286                         |
|           | Sonka               | 144                         |

Source : CSA (1994)

From the above four PAs, among randomly selected sample households, 92.4% and 7.6% are male and female headed, respectively. When we categorize the sex of those sample households’ as participants and non-Participants of the current extension program, 93.8 % of participants are male headed and the remaining 6.2% are female headed. Similarly, 91% of the non-participants are male headed and the rest 9% are female headed. In both cases, the numbers of male-headed households are larger than that of the female headed households. With respect to the sex of the of the sample households, as the chi square tests shows, there is no significance variation in between the participants and non participants of the sample households. The chi square result may also indirectly interpret as the absence of direct relation in between the sex of the sample households and extension participation.

Table 4.1.2. Sex of the sample households

| Sex of the household head | Participants |      | Non participants |     | $\chi^2$ | Total |      |
|---------------------------|--------------|------|------------------|-----|----------|-------|------|
|                           | No           | %    | No               | %   |          | No    | %    |
| Male                      | 75           | 93.8 | 71               | 91  | .418     | 146   | 92.4 |
| Female                    | 5            | 6.2  | 7                | 9.0 |          | 12    | 7.6  |
| Total                     | 80           | 100  | 78               | 100 |          | 158   | 100  |

Source: own survey (February 2002)

The average family size of the total sample households is 5.71 with SD of 1.72. With respect to their family size, the T- test shows significance differences in between the participants and non participants of the sample households (T=-2.887, P=1%). As indicated in table 4.1.3, the average family size of the participants is about 5.34 with SD of 1.41, while the non participants is 6.12 with SD of 1.93. As it can be seen from the value of SD, the average family size of the sample non participants is slightly greater than the mean value; which can directly indicates the presence of variation with the average family size of the sample participants.

Table 4.1.3. Family size of the sample households

| variable    | Participants |        | Non participants |        | T-value | Total  |        |
|-------------|--------------|--------|------------------|--------|---------|--------|--------|
|             | Mean         | SD     | Mean             | SD     |         | Mean   | SD     |
| Family size | 5.3375       | 1.4137 | 6.1154           | 1.9271 | -2.887* | 5.7063 | 1.7215 |

SD indicates standard deviation

\* Indicates significance levels at 1%

Source: Own surveys (February 2002)

As regards to the marital status of the rural people of the study areas as the whole, the census data of 1994 indicates that 38.3% are never married, 53.2% are currently married and 8.5% are widowed or divorced. Also the data reveals that, 45.5% of the males and 31.5% of the females are currently married, and 4.9 % of the males and 13.1 % of the females are widowed or divorced. As coming to the particular survey of this study, majorities of the sample households are found to be married. As indicated in table 4.1.4, from the total of sample households, 89.8% married, 3.2% unmarried, 3.2% divorced and 3.8% are widowed. In both groups of the survey (participants and non-participants), more or less the sample households have similarities in their marital status.

Table 4.1.4 Marital status of the sample house holds

| Marital status | Participants |      | Non-participants |      | Total |      |
|----------------|--------------|------|------------------|------|-------|------|
|                | No           | %    | No               | %    | No    | %    |
| Married        | 70           | 87.5 | 72               | 92.3 | 142   | 89.8 |
| Unmarried      | 5            | 6.2  | -                | -    | 5     | 3.2  |
| Divorced       | 1            | 1.3  | 4                | 5.1  | 5     | 3.2  |
| Widowed        | 4            | 5.0  | 2                | 2.6  | 6     | 3.8  |
| Total          | 80           | 100  | 78               | 100  | 158   | 100  |

Source: own survey (February 2002)

As far as consider the age of the sample households, as the survey result shows; there is no significant differences in between the participants and non-participants. The total sample households have an average age of 47.74 years. On the other hand, as indicated in table 4.1.5, the participants and non-participants have an average age of 44.60 and 51.29 years, respectively. In

another way, the T- value can also lead us to correctly predict or hypothesize the absence of direct relation in between the age of the sample households and extension participation.

Table 4.1.5. Age of the of the sample households

| Variable             | Participants |        | Non participants |         | T- value | Total   |         |
|----------------------|--------------|--------|------------------|---------|----------|---------|---------|
| Age of the household | Mean         | SD     | Mean             | SD      |          | Mean    | SD      |
|                      | 44.60000     | 9.1300 | 51.2949          | 39.1421 | -1.489   | 47.7438 | 28.2318 |

SD indicates standard deviation

Source: Own surveys (February 2002)

As the regional profile shows, the largest ethnic groups of the region are Berta, Gumuz, Amhara, Oromo, and Shinasha. These ethnic groups are not evenly distributed in the region. Berta and Amhara are the dominant ethnic groups in both Assosa and Bambasi woredas. As indicated on table 4.1.6, among the total sample households, 51.9% are Berta, 46.2% Amhara, 1.3- % Tigre, and 0.6 are Oromo. This survey also shows us the dominant of the two ethnic groups (Amhara and Berta) with in the study areas. In relation to ethnic composition, as the chi square test shows, there is no significant variation in between the participants and non-participants of the sample households. On the other hand, the chi square value also further gives us a clue to understand the absence of direct relation in between the ethnic composition of the sample households and extension participation.

Table 4.1. 6. Ethnic composition of the sample households

| Ethnicity | Participants |      | Non participants |      | $\chi^2$ | Total |      |
|-----------|--------------|------|------------------|------|----------|-------|------|
|           | No           | %    | No               | %    |          | No    | %    |
| Berta     | 40           | 50   | 42               | 53.8 | 1.147    | 82    | 51.9 |
| Amhara    | 38           | 47.5 | 35               | 44.9 |          | 73    | 46.2 |
| Oromo     | 1            | 1.3  | -                | -    |          | 1     | 0.6  |
| Tigre     | 1            | 1.3  | 1                | 1.3  |          | 2     | 1.3  |
| Total     | 80           | 100  | 78               | 100  |          | 158   | 100  |

Source: Own survey (February 2002)

Religion is one of the major socio –cultural characteristics of a population. According to the population and household census (CSA, 1999), in the study areas, the largest religious groups are the Muslims. They are followed by orthodox Christians, traditional religion and Protestants. In this particular study (see table 4.1.7), from the total of sample households,72.2% are Muslims, 27.2 % orthodox and the rest 0.6% are Protestants. Concerning religion of the sample households, as the chi square test shows, there is no significant variation in between the participants and non-participants. This again indirectly shows to us the absence of direct relation in between the religion of the sample households and extension participation.

Table 4.1.7. Religion of the sample households

| Region     | Participants |      | Non Participants |      | $\chi^2$ | Total |      |
|------------|--------------|------|------------------|------|----------|-------|------|
|            | No           | %    | No               | %    |          | No    | %    |
| Muslim     | 59           | 73.8 | 55               | 70.5 | 1.325    | 114   | 72.2 |
| Orthodox   | 20           | 25.0 | 23               | 29.5 |          | 43    | 27.2 |
| Protestant | 1            | 1.2  | -                | -    |          | 1     | 0.6  |
| Total      | 80           | 100  | 78               | 100  |          | 158   | 100  |

Source: own survey (February 2002)



According to the regional profile, the rural population has limited access to education. Illiteracy rates are higher, and the percentage of people obtaining grades above primary school is below 1%. During the census data of the year 1994, the literacy rates in the rural areas were found to be 14%. In addition to that, the BRDA survey during August / September 2000 found illiteracy rates of 45% among the Amhara settlers and 58% among the indigenous Berta peoples. As the survey result of this study shows (see table 4.1.8.), from the total of sample households, 68.8% of the households never attended any kind of formal education. Only 31.2% of the households reported as they attended and /or attending formal education. In relation to the over all educational status of the sample households, the chi square test result reveals the existence of significant variation in between the participants and non-participants ( $\chi^2 = 3.389$ ,  $P = 10\%$ ). As indicated on the table, about 38% of the sample participants are attended and/or attending formal education. Where as only 24.4% of the non-participants attended and/or attending formal education. Therefore, the literacy rate of the participants is slightly better than the non-participants.

Table. 4.1.8. Educational status of the sample households

| Educational status  | Participants |     | Non-participants |      | $\chi^2$ | Total |      |
|---------------------|--------------|-----|------------------|------|----------|-------|------|
|                     | No           | %   | No               | %    |          | No    | %    |
| Attended /Attending | 30           | 38  | 19               | 24.4 | 3.389*** | 49    | 31.2 |
| Never attended      | 49           | 62  | 59               | 75.6 |          | 108   | 68.8 |
| Total               | 79           | 100 | 78               | 100  |          | 157   | 100  |

\*\*\* Indicate significance levels at 10%

Source: own survey (February 2002)

#### 4.1.2 Economical characteristics

Since the economy of the study areas is mainly depending up on agriculture, land is considered as the basic asset. According to the survey result, 1.29ha is found to be an average land holding size of the total sample households. As the T- test shows, there is no significant variation on land holding size of the participants and non-participants of the sample households. As shown in table 4.1.9, the average land holding size of the participants and the non-participants are 1.36 and 1.22 hectare, respectively.

Table 4.1.9. Average land-holding size of the sample households.

| Variable             | Participants |        | Non participants |        | T-value | Total  |        |
|----------------------|--------------|--------|------------------|--------|---------|--------|--------|
| Land size<br>(in ha) | Mean         | SD     | Mean             | SD     |         | Mean   | SD     |
|                      | 1.3644       | 0.9472 | 1.2167           | 0.6095 | 1.162   | 1.2878 | 0.7951 |

SD indicates standard deviation

Source: own survey (February 2002)

In relation to the above issue, as different reports of the regional agricultural bureau confirm, the indigenous farmers have relatively larger land size than that of the settlers farmers of the areas. As the survey result shows, in Bare and Sonka peasant associations, the sample indigenous farmers of the areas have an average land holding size of 1.61 and 1.63 ha, respectively. Then, 1.61875 hectare is calculated to be an average land size of the two PAs (Bare and Sonka). On the other hand, in Amba-13 and Mender-44 Peasant Associations, the sample settler farmers of the areas have an average land holding size of 1.12 and 0.79 hectare, respectively. Similarly,

0.96 hectare is said to be an average land holding size of the two PAs (Amba-13 and Mender-44). These all results show us the existence of differences in land holding size of both the indigenous and the settlers' farmers of the areas. In general, the indigenous people have relatively larger land holding than the settlers.

Table 4.1.10. Average land-holding size of the sample indigenous and settler PAs of the study areas

| Indigenous |        |        |        | Settlers |        |           |        | Total  |        |
|------------|--------|--------|--------|----------|--------|-----------|--------|--------|--------|
| Bare       |        | Sonka  |        | Amba-13  |        | Mender-44 |        |        |        |
| Mean       | SD     | Mean   | SD     | Mean     | SD     | Mean      | SD     | Mean   | SD     |
| 1.6050     | 0.3755 | 1.6325 | 0.6502 | 1.1225   | 1.1827 | 0.7913    | 0.3301 | 1.2878 | 0.7951 |

SD indicates standard deviation

Source: Own survey (February, 2002)

As coming to the livestock population of the study areas, as this sample survey results reveals, on an average, a participant farmer has total numbers of 4 cattle, 4 small ruminants (sheep & goat), 1 equines (Donkeys and Mules) and 10 poultry. On the other hand, a non-participant farmer has on average 1 cattle, 4 small ruminants, 1 equine and 8 poultry. As far as consider the numbers of cattle and poultry, as the T-test shows, there is significance variation in between the participants and non-participants of the sample households. That is, the sample participants have relatively more numbers of cattle and poultry than the non- participants (see table 4.1.11). According to the reports made by the regional agricultural bureau; prevalence of animal diseases, unavailability of veterinary services, different knowledge and traditions of the different ethnic groups are identified to be the major reasons for unevenly distribution of livestock in the different parts of the region.

Table.4.1.11. Numbers of livestock possess by the sample households

| Livestock population                | Participants |        | Non Participants |        | T-Value | Total  |        |
|-------------------------------------|--------------|--------|------------------|--------|---------|--------|--------|
|                                     | Mean         | SD     | Mean             | SD     |         | Mean   | SD     |
| Cattle                              | 3.4667       | 1.9955 | 1.3333           | .6455  | 7.590*  | 2.6915 | 1.9346 |
| Small ruminants<br>(sheep and goat) | 3.9577       | 3.2664 | 3.8889           | 1.4970 | .162    | 3.9167 | 2.5185 |
| Equine (mule and donkey)            | 1.0968       | .3962  | 1.0588           | .2425  | .359    | 1.0833 | .33472 |
| Poultry                             | 9.6308       | 4.1253 | 7.7910           | 2.5616 | 3.067*  | 8.7761 | 3.5723 |

\* Indicate significance levels at 1%

SD indicates standard deviation

Source: own survey (February 2002)

According to the survey made in rural communities of Assosa zone (BRADA, 2000), foods are the major expenditure categories. Health care, fertilizers, education and taxes are minor expenditure categories. In relation to this, the sample survey result of this study also shows similar things. As the overall pictures of the study result indicates, farmers of the study areas spend only small amount of money for the purchase of non-food items such as clothes, shoes, sheets, towels furniture...etc. As indicated in table 4.1.12, in the year 1993 E.C, on an average, only Birr 55.92 and 41.83 spent for the purpose of purchasing non-food items by the participants and non-participants of the sample households, respectively. Concerning the amount money spend for the purchase of non food items, the T-test shows significant differences in between the participants and non participants. That is, in the specified year (1993E.C.), participants spent larger amount of money than the non-participants did.

As far as consider the over all comparisons of the settlers and indigenous people of the study areas, as the survey result shows there are certain differences in their soio-economical characteristics. As indicated in table 4.12, concerning land size and number of oxen, there are significant differences in between the settlers and indigenous people of the study areas. That is, the indigenous people have larger land size than the settlers. On the other hand, the settlers have more numbers of oxen than the indigenous ones.

Table 4.12 Compressions between settlers and indigenous people of the areas using a bivarite analysis

| Variable                  | Indigenous |         | Settlers |         | T-value |
|---------------------------|------------|---------|----------|---------|---------|
|                           | Mean       | SD      | Mean     | SD      |         |
| Age of the household head | 47.4625    | 11.0258 | 48.0250  | 38.5023 | -.126   |
| Family size               | 5.4875     | 1.6069  | 5.9250   | 1.8126  | -1.615  |
| Land size                 | 1.6188     | .5277   | .9569    | .8787   | 5.776*  |
| Number of oxen            | .3750      | .7693   | 1.2625   | .9775   | -6.382* |

SD indicates standard of deviation

\* indicates significance levels at 1% level.

Similar to the above issues, there is also a significant differences in their educational level (see table 4.13 ). The indigenous people are relatively more educated than the settlers. On the other hand there is any significant differences in their house types.

Table 4.13 Comparisons in between the settlers and indigenous farmers of the areas using dummy variables

| Variables         | Settlers |      | Indigenous |      | $\chi^2$ | Total |      |
|-------------------|----------|------|------------|------|----------|-------|------|
|                   | No.      | %    | No.        | %    |          | No.   | %    |
| Educational level |          |      |            |      | 9.125*   |       |      |
| . literate        | 34       | 42.5 | 16         | 20.3 |          | 50    | 31.4 |
| . Illiterate      | 46       | 57.5 | 63         | 79.7 |          | 109   | 68.6 |
| House types       |          |      |            |      | .405     |       |      |
| . Corrugated      | 4        | 5    | 2          | 2.5  |          | 6     | 3.8  |
| . Non-corrugated  | 76       | 95   | 78         | 97.5 |          | 154   | 96.3 |

\* Indicates significance levels at 1% level.

Source: Own survey (February, 2002)



Table 4.1.14. Average money spent by the sample households for the purchase of non-food items in the year of 1993 E.C.

| Variable                        | Participants |         | Non participants |         | T-value | Total   |         |
|---------------------------------|--------------|---------|------------------|---------|---------|---------|---------|
| Total expenditures<br>(in Birr) | Mean         | SD      | Mean             | SD      |         | Mean    | SD      |
|                                 | 55.9194      | 29.6766 | 41.8276          | 22.4580 | 2.507** | 50.9785 | 28.1042 |

\*\* Indicate significance levels at 5%

SD Indicate standard deviation

Source: own survey (February 2002)

#### 4.1.3. Major findings

Among the sample households:

- 92.4% are male headed
- 89.8% are married
- 48 years is an average age
- The dominant ethnic groups are Berta (51.9%) and Amhara (46.2%)
- 72.2% and 27.2% are Muslims and orthodox religion followers, respectively
- Majorities (68.8%) are never attended any kind of formal school
- 1.3 hectare is an average land holding size
- On an average, have a total of 2 cattle, 4 small ruminants (sheep and goat), 1 equine (horse and mule) and 9 poultry.
- In the year 1993 E.C. on average, only birr 51 spent for the purpose of purchasing the non-food items.

#### 4.2 General awareness and views about the current agricultural extension program

This part discuss up on the extent of understanding the sample households about the current extension program, their sources of information, initial perceptions and views for continuing to participate in the program.

#### 4.2.1. General information

Awareness creation is the first and the most important task in the planning and implementation processes of any kind of agricultural extension programs. Since agricultural extension works are always begins and ends up with human beings, awareness has considerable role for the sustainability as well as wide coverage of the program.

As coming to the general awareness of farmers of the study areas, all sample households reported that they have an information about the existence of the current agricultural extension program. From the total of sample households, 73.1 % of the respondents reported development agents of the areas as the main source of information. The remaining 26.9% of the sample households also primarily indicated their neighbors as a main source of this information.

Table 4.2.1. Main sources of information

| Main sources                    | Frequency | Percent | Cumulative percent |
|---------------------------------|-----------|---------|--------------------|
| Development agents of the areas | 117       | 73.1    | 73.1               |
| Neighbors                       | 43        | 26.9    | 100                |
| Total                           | 160       | 100     |                    |

Source: Own survey (February 2002)



#### 4.2.2. Perceptions

We always receive information through our senses of seeing, hearing, touching, testing, and smelling. However, each of us interprets our sensory perceptions indifferent ways, depending on previous experiences, our selective processes, mental sets and cognitive style, as well as the nature of stimuli themselves. Similarly, in the very beginning of the current extension program, farmers of the study areas had various perceptions. As the result of the sample survey shows (see table 4.2.2), out of the total sample households, 62.7% were not given their attention for the program, 31% were eager to be the primary users of the program, and the rest 6.3% were completely decided to be neutral till they see the impact on the majorities of their neighbors. In relation to the initial perceptions of the sample households, as the chi-square test shows, there is significant differences in between the participants and the non-participants ( $\chi^2 = 8.108, p=5\%$ ). In other words, concerning the program, the chi square value exactly shows us the presence of different perceptions among the participants and non-participants of the sample households.

Table 4.2.2. Initial perceptions of the sample households

| Initial perceptions of the program | Participants |      | Non-participants |      | $\chi^2$ | Total |      |
|------------------------------------|--------------|------|------------------|------|----------|-------|------|
|                                    | No           | %    | No               | %    |          | No    | %    |
| . No attention was given           | 44           | 55   | 55               | 70.5 | 8.108**  | 99    | 62.7 |
| . Eager to be the primary user     | 27           | 33.8 | 22               | 28.2 |          | 49    | 31   |
| . Decided to be neutral            | 9            | 11.2 | 1                | 1.3  |          | 10    | 6.3  |
| Total                              | 80           | 100  | 78               | 100  |          | 158   | 100  |

\*\* Indicate significance levels at 5%

Source: own survey

Now days, for main reasons related to high decline in the marker price of crops and high price of modern inputs, majorities of the sample households are not much interested for continuing to participate. As the survey result shows, 87.2% of non-participants and 78.5% of participants reported that they do not like continuing to participate in the extension program. Only 21.5% of the participants and 12.8% of the non-participants are interested for continuing to participate. As the result of group discussion shows, if solutions are available for the above basic problems, no single farmer is like to isolate himself/ herself from the program. Regard to this particular issue (see table 4.2.3), as the chi-square test shows, there is no significant variation in between the participants and non-participants of the sample households. In another words, more or less both the participants and non-participants of the sample households' have similar views on this particular issue.

Table 4.2.3. Views for continuing to participate in the current extension program

| Participation                       | Participants |      | Non-participants |      | $\chi^2$ | Total |      |
|-------------------------------------|--------------|------|------------------|------|----------|-------|------|
|                                     | No           | %    | No               | %    |          | No    | %    |
| .Like continuing to participate     | 17           | 21.5 | 10               | 12.8 | 2.085    | 27    | 17.2 |
| .Not like continuing to participate | 62           | 78.5 | 68               | 87.2 |          | 130   | 82.8 |
| Total                               | 79           | 100  | 78               | 100  |          | 157   | 100  |

Source: own survey (February 2002)

Generally, as the over all survey result shows, all participants and non-participants of the sample households are primarily underline the increase of yield per unit of hectare as an important feature of the program that strongly attracts their attention.

#### 4.2.3. Major findings

In the sample households:

- All have an information about the program.
- Development agents are considered as the main sources of information
- In the very beginning of the program, the majorities (62.7%) were not given their attention for the program.
- For main reasons related to declining in crop prices and increasing of modern input prices; the majorities are not much interested for continuing to participate.
- Increase in yield per unit of hectare is an important feature of the program that strongly attracts the attention of the farmers.

### **4.3 Productivity of the current agricultural extension program and its impact on food intake features of the households**

This section generally compare average yield, gross benefits, total variable costs and net benefits of both extension and non extension plots. It also covers the overall impact of the current extension program on food intake of the sample households.

#### 4.3.1. Productivity

We all need to remind that awareness is not knowledge. Knowledge requires awareness, experience, observation, and the critical ability to evaluate data and evidence. Knowledge leads to adoption, but adoption is not productivity. Productivity depends not only on the adoption of technically efficient practices, but of allocatively efficient practices as well. Productivity also depends on the infrastructure of the community and on market institutions.

In view of the above basic issue, this particular research survey was also attempted to see the over all productivity of the current extension program in reference to the production years of 1992 /93 E.C. There by, the study measured the average yield, total variable costs, gross benefits and net benefits of maize, sorghum and Teff on both extension and non-extension plots of the sample households.

As the survey result on crop yield clearly shows, from extension plots, it was measured to produce on an average 5020.06 kg of maize/ha, 3233.33kg of sorghum /ha, and 500.00kg of Teff /ha. On the other hand, from non-extension plots, obtained 2246.08 kg of maize /ha, 1439.48 kg of sorghum /ha, and 484.44 kg of Teff / ha. In relation to the average yield of maize and sorghum, the T-test shows significant differences in between extension and non extension plots of the sample households [Maize T= 15 .899,p = 1%, Sorghum T = 12.219, p=1%]. This in short to mean that, average yield of maize and sorghum that obtained from extension plots was significantly higher than non-extension plots.

Table 4.3.1. Average crop yield (kg/ha ) obtained from both extension and non-extension plots.

|         | Extension plots |        | Non extension plots |        | T-test  | Total     |           |
|---------|-----------------|--------|---------------------|--------|---------|-----------|-----------|
|         | Mean            | SD     | Mean                | SD     |         | Mean      | SD        |
| Maize   | 5020.0597       | 1206.7 | 2246.0751           | 746.52 | 15.899* | 3664.8306 | 1716.6454 |
| Sorghum | 3233.3333       | 433.45 | 1439.4801           | 485.00 | 12.219* | 1635.1732 | 737.5030  |
| Teff    | 500.0000        | 141.42 | 484.4444            | 157.08 | .138    | 485.0314  | 155.3059  |

\* Indicate significance levels at 1%

SD indicates standard deviation

Source: own survey (February: 2002)

Total variable costs are also other variables that usually used in the assessment of the productivity of any extension program .In this study, the over all result of the survey shows that the total variable costs of extension plots are higher than the non-extension plots .As indicated in table 4.3.2, for extension plots, the total variable costs are found to be 529.99 Birr /ha for maize, 562.89 Birr /ha for sorghum, and 575.17 Birr /ha for Teff. Contrary to that, for non-extension plots, these are measured to be 5.97 Birr /ha for maize, 13.51 Birr /ha for sorghum, and 78.15 Birr/ ha for Teff. For the total variable costs of maize, sorghum, and teff; as the T- test shows, there is significant difference in between extension and non-extension plots of the sample households [Maize T=65.110,p = 1%, Sorghum. T = 19.057,p=1% Teff. T = 21.086,p=1%]. Concerning these variable costs, the researcher believes that the higher price of modern inputs (fertilizer and improved seeds) and lower prices of the local seeds are to be the major factors for the existence of wider gaps in between the extension and non extension plots

Table 4.3.2.Total variable costs (Birr/ha ) of both extension and non-extension plots (excluding labor costs)

|         | Extension plot |         | Non –extension plot |         | T- test | Total    |          |
|---------|----------------|---------|---------------------|---------|---------|----------|----------|
|         | Mean           | SD      | Mean                | SD      |         | Mean     | SD       |
| Maize   | 529.9929       | 65.8513 | 5.9685              | 1.8464  | 65.110* | 273.9810 | 267.1056 |
| Sorghum | 562.8867       | 99.8485 | 13.5081             | 4.8130  | 19.057* | 73.4403  | 175.0127 |
| Teff    | 575.1700       | 000.000 | 78.1529             | 33.0250 | 21.086* | 96.9083  | 100.9514 |

\* Indicate significance levels at 1%

SD indicates standard deviation

Source: own survey (February 2002)

As the survey result shows, there are also variations on gross benefits of the different crops that are produced on extension and non-extension plots. As reported on table 4.3.3, for extension

plots, average gross benefits are measured to be 1004.01 Birr /ha for maize, 1293.33 Birr /ha for sorghum, and 900 Birr /ha for teff. Similarly, for non-extension plots, these are calculated to be 449.22 Birr /ha for maize, 575.79 Birr /ha for sorghum and 872.00 Birr /ha for teff. For gross benefits of maize and sorghum, as the T-test shows, there is significant variation in between the extension and non extension plots of the sample households [Maize T= 15.899,p=1%, Sorghum T = 12.219,p=1%]. These gross benefits are directly related to the average yield obtained from the extension and non extension plots (refer back to table 4.3.1.). If the yield is higher, so does for gross benefits.

Table 4.3.3 Average gross benefits (Birr/ha ) of both extension and non-extension plots

|         | Extension plots |        | Non-extension plots |        | T-test  | Total    |          |
|---------|-----------------|--------|---------------------|--------|---------|----------|----------|
|         | Mean            | SD     | Mean                | SD     |         | Mean     | SD       |
| Maize   | 1004.0119       | 241.34 | 449.2150            | 149.30 | 15.899* | 732.9661 | 343.3291 |
| Sorghum | 1293.3333       | 173.38 | 575.7920            | 194.00 | 12.219* | 654.0693 | 295.0012 |
| Teff    | 900.0000        | 254.56 | 872.0000            | 282.75 | .138    | 873.0566 | 279.5506 |

\* Indicate significance at 1%

SD indicates standard deviation

Source: own survey (February2002)

In understanding the overall productivity of the current extension program, the researcher would like to give more emphasis on the net benefits of different crops that produced on both extension and non extension plots. In this case, as the over all result of this study reveals, the net benefits derived from extension plots are said to be slightly better than non-extension plots .As shown on table 4.3.4, for extension plots, net benefits of maize is 474.02 Birr/ha, sorghum 730.45 Birr /ha, and teff 324.8300 Birr /ha. On the other hand, for non-extension plots, net benefits of maize is 443.2465 Birr /ha, sorghum 562.2840 Birr /ha, and teff 793.850 Birr/ha. In relation to the net

benefits of sorghum and teff, as the T- test shows, there is significant differences in between the extension and non extension plots of the sample households [Sorghum T=2.760, p=1%, Teff T=-2.329,p =5%]. Though the average yield and gross benefits of maize shows significant variations in between extension and the non extension plots (refer back to tables 4.3.1 and 4.3.3.), its net benefits is found to be non significant. As the researcher believes, the current local market price of maize is considered to be the main cause for the declining of its net benefits.

Table 4.3.4. Average net benefits (Birr/ha ) of both extension and non-extension plots

|         | Extension plots |        | Non Extension plots |        | T-test   | Total    |          |
|---------|-----------------|--------|---------------------|--------|----------|----------|----------|
|         | Mean            | SD     | Mean                | SD     |          | Mean     | SD       |
| Maize   | 474.0190        | 215.64 | 443.2465            | 149.25 | .953     | 458.9851 | 186.1230 |
| Sorghum | 730.4467        | 225.66 | 562.2840            | 196.00 | 2.760*   | 580.6290 | 205.1830 |
| Teff    | 324.8300        | 279.84 | 793.850             | 254.56 | -2.329** | 776.1483 | 291.0076 |

\*, \*\*, Indicate significance levels at 1% and 5%, respectively

SD indicates standard deviation

Source: own survey (February 2002)

Generally, from the reports made by the total sample households, only about 36.7% of participants and 9% of non-participants are happy with the overall net benefits they obtained from the production of the different crops (maize, sorghum and teff). The majorities, 63.3% of participants, and 91% of non- participants are not happy. In this case, the chi-square test also shows significance differences in-between the participants and non-participants of the sample households ( $\chi^2=17.083, p=1\%$ ). That is, the participants are relatively more happy than the non-participants. This does not really mean that the all participants are very much comfortable and happy with the overall benefits they derived from the extension plots. As findings of this survey



shows, those that produced sorghum on the extension plots were relatively more benefited than others who produced maize on the extension plots.

Table 4.3.5 Feeling of the sample house holds about the over all benefits of different crops

| Feeling about the net<br>benefits or different crops | Participants |      | Non –participants |     | $\chi^2$ | Total |      |
|------------------------------------------------------|--------------|------|-------------------|-----|----------|-------|------|
|                                                      | No           | %    | No                | %   |          | No    | %    |
| .Happy                                               | 29           | 36.7 | 7                 | 9   | 17.083*  | 36    | 22.9 |
| .Not happy                                           | 50           | 63.3 | 71                | 91  |          | 121   | 77.1 |
| Total                                                | 79           | 100  | 78                | 100 |          | 157   | 100  |

\* Indicate significance levels at 1%

SD indicates standard deviation

Source: own survey (February 2002)

4.3.2. Food intake.

From the very beginning, we discussed that the main objective of the current extension program is to secure sufficient foods at household levels. Therefore, in assessing the productivity of the program; discussing the issue of food intake is always essential. Other wise, production alone may not indicate the impact of the program on the consumption patterns of the sample households. In this case, more or less this survey was attempted to see the impact of the program on the consumption of the households. As the survey result shows, concerning the major food crops of the areas (maize and sorghum), on average 440525.97 and 227110.374 calory units per year were consumed by the participants and non-participants of the sample households, respectively. In relation to this case, as indicated in table 4.3.6, the T- test shows the existence of significance differences in between the participants and non-participants of the sample



households ( $T=-7.306$ ,  $p=1\%$ ). This really to mean that, in the specified year (1993E.C.), participants were relatively more consumed than the non-participants. In another words, family members of the participants were consumed on average about 1206.92049 calory units per person per day. Where as the members of the non-participants consumed only 622.22019 calory units per person per day. This indicated that both groups were consumed less than the minimum requirement (Less than 2100caloryunits per person per day). In a simplified way of explanation, the result shows the significant contribution of the program on the over all consumption of the sample participants.

Table 4.3.6. Total consumption of maize and sorghum by the sample households-for the year 1993 E.C.

| Amount consumed<br>( calory per person per day) | Participants |           | Non-participants |           | T-value | Total     |           |
|-------------------------------------------------|--------------|-----------|------------------|-----------|---------|-----------|-----------|
|                                                 | Mean         | SD        | Mean             | SD        |         | Mean      | SD        |
|                                                 | 1206.92049   | 2050.9071 | 622.22019        | 1219.2129 | -7.306* | 914.57034 | 1945.2692 |

\* Indicate significance levels at 1%

SD indicates standard deviation

Source: Own survey (February, 2002)

Notes: According to EFHSI .1kg of maize=3560calory units

.1kg of sorghum=3380 calory units

#### 4.3.3. Major findings

For the sample households:

- Average yields, gross benefits and net benefits of extension plots are found better than the non-extension plots.
- Total variable costs of extension plots are much higher than the non-extension plots.
- The average food intake or consumption (cal/person/day) of the participants is found better than the non-participants.

#### **4.4 Participation of Farmers**

This part tests the original variables that are hypothesized to affect extension participation. In addition to that, it also assess the overall involvement and decision making power of the farmers on the planning and implementation processes of the current extension program

##### **4.4.1 Factors affecting extension participation**

The variables hypothesized to affect farmers' decision to participate in the extension program were entered and tested by the logistic regression model.

- **Dependent variable**

PARTCPTE: Extension participation

- **Explanatory ( independent variables )**

AGEHH: Age of the household

SEX: Sex of the household

FAMSIZE: Family size of the household

SCHATTND: School attendance or educational level of the household

LANDSIZE: Land holding size (in hectare)

ACCREDIT: Access to credit services

VISITD: Number of visits made by the development agents

NUMOXEN: Number of oxen

MSTATUS: Marital status

Initially, all variables were checked for multi collinearity. In doing that, the continuos variables (AGEHH, FAMSIZE, LANDSIZE, VISITD, NUMOXEN) and dummy variables (SEX, SCHATTND, ACCREDIT, MSTATUS,SETTLDMY) tested by the bivariate analysis and contingency tables, respectively. As the result shows (look at table 4.4.1.and 4.4.2.), there is no any significant collinearity among the hypothesized variables. Therefore, all were included in the model.

Table 4.4.1 Bivariate correlation among continuos explanatory variables.

|          | AGEHH | FAMSIZE | LANDSIZE | VISITD | NUMOXEN |
|----------|-------|---------|----------|--------|---------|
| AGEHH    |       | .141    | -.016    | .039   | -.003   |
| FAMSIZE  |       |         | -.113    | .166   | -.035   |
| LANDSIZE |       |         |          | .102   | -.090   |
| VISITD   |       |         |          |        | -.049   |
| NUMOXEN  |       |         |          |        |         |

Table 4.4.2 Contingency coefficients among dummy variables

|          | SEX | SCHATTND | ACCREDIT | MSTATUS | SETTLDMY |
|----------|-----|----------|----------|---------|----------|
| SEX      |     | .141     | .053     | .571    | 0.047    |
| SCHATTND |     |          | .205     | .044    | -.240    |
| ACCREDIT |     |          |          | .077    | -.082    |
| MSTATUS  |     |          |          |         | .167     |
| SETTLDMY |     |          |          |         |          |

As indicated on table 4.4.3, out of the ten variables entered in to the analysis, three of them have found to have significance effect on extension participation.

Table.4.4.3. Parameter estimates of a logistic model for factors affecting extension participation

| Variable                            | B        | S. E.  | Wald     | Odds-ratio |
|-------------------------------------|----------|--------|----------|------------|
| AGEHH                               | -.0051   | .0208  | .0589    | .9950      |
| SEX                                 | 1.3642   | 2.1765 | .3929    | 3.9126     |
| FAMSIZE                             | -.2155   | .1963  | 1.2049   | .8061      |
| SCHATND                             | -.3117   | .7247  | .1850    | 1.3658     |
| LANDSIZE                            | -.0268   | .6608  | .0017    | .9735      |
| ACCREDIT                            | 3.8841   | .6757  | 33.0417* | 48.6227    |
| VISITD                              | .0065    | .3299  | .0004    | 1.0065     |
| NUMOXEN                             | 3.5960   | .6809  | 27.8930* | 36.4508    |
| MSTATUS                             | -1.4298  | 1.9875 | .5175    | .2394      |
| SETTLDMY                            | 4.1832   | 1.1027 | 14.3924* | 65.5771    |
| Constant                            | -4. 9741 | 2.0275 | 6.0188** | 4.1104**   |
| Model chi-square=139.256            |          |        |          |            |
| Over all correctly predicted=91.77% |          |        |          |            |
| Sample size=158                     |          |        |          |            |

\*, and \*\*, indicate significance levels at 1% and 5% respectively.

- NUMOXEN (Number of oxen) has positive signs and significance at 1%. This really supports the initial hypothesis that numbers of oxen is among the most important or basic inputs (assets) of rural farmers. With out them, farmers may not be able to run their farm activities very smoothly.
- ACCREDIT (Access to credit services) is also positively related to farmers decision to participate in the extension program. It is highly significant at 1-% level. Therefore, the result shows that credit enables farmers to buy costly modern inputs and thereby increases the adoption of improved practices.

- SETTLDMY or dummy variables for settlers have also a positive sign. It is statistically significance at 1% level.

Generally, as the model chi-square clearly shows, all the variable parameter estimates taken together are different from zero (significantly different from zero). This is to mean that the model is well explained the dependent variable. On the other hand, as the classification table shows (see table 4.4.4 ), the model correctly predicted 89.87% of the non-participants and 93.67% of the participants. Overall, the model correctly predicted 91.77% of the cases.

Table.4.4.4. Classification table for extension participation

|          |   | Predicted |     | Percent correct |
|----------|---|-----------|-----|-----------------|
|          |   | no        | yes |                 |
| Observed |   | n         | y   |                 |
| no       | n | 71        | 8   | 89.87%          |
| yes      | y | 5         | 74  | 93.67%          |
|          |   | Overall   |     | 91.77%          |

4.4.2. Involvement and decision making power of the farmers

Farmers’ participation in the planning, implementation and evaluation of extension programs is desirable because they have information, which can improve the program, because it increases their motivation to cooperate and because it improves opportunities for collective decision-making. It also increases farmers power to influence their own destine.

Generally, creating programs with the people implies abroad view of people's involvement. Participatory kind of extension program planning is not to be a linear, sequential activity. Rather it needs to give particular attention on describing and analyzing the situation, identifying needs, problems, and aspiration. As the overall pictures of the survey result reveals, these all things seem not to be well considered in the study areas .As we look in table 4.4.5, 93.6% of the respondents reported that they were not asked any thing about their problems, needs and interests during the planning processes of the different crop packages. Only about 6.4% of the house holds replied as they were asked to express their views .In this case, the chi-square test shows significance variation in between the participants and non participants of the sample households ( $\chi^2 = 10.545$ ,  $P=1\%$ ). As indicated in the table, besides to the poor involvement of the participants, the result also further shows the complete ignorance of the non-participants during the planning of the different crop packages.

Table 4.4.5. Involvement of farmers during the planning of the different crop packages

| Involvement of farmers | Participants |      | Non-Participants |     | $\chi^2$ | Total |      |
|------------------------|--------------|------|------------------|-----|----------|-------|------|
|                        | No           | %    | No               | %   |          | No    | %    |
| Involved               | 10           | 12.7 | -                | -   | 10.545*  | 10    | 6.4  |
| Not involved           | 69           | 87.3 | 78               | 100 |          | 147   | 93.6 |
| Total                  | 79           | 100  | 78               | 100 |          | 157   | 100  |

\* Indicate significance levels at 1%

Source: Own survey (February 2002)

In reality, for the sustainability and high coverage of any kind of extension program, the importance of farmers' involvement is undeniable. But, allowing farmers just to come to

meetings or letting a few representatives sit on committees is insufficient. As much as possible, each farmer needs to involve actively in activities like field visits, demonstrations and group discussions. Extension agents also must listen very carefully to different types of farmers of their areas. In relation to this issue, as the result of this survey shows, majorities of the sample households are not much happy with supports that have been given to them .As the report made in table 4.4.6 clearly shows, they need still very strong supports that enhance their real and truth participation in the planning and implementation processes of the current extension program. For the supports given to activities related to demonstrations and field visits, as the chi-square test shows, there is a significance difference in between participants and non-participants of the sample households.

Table 4.4.6 Supports given on demonstrations, field visits and group discussions

| Variable                 | Participants |      | Non –participants |      | $\chi^2$ | Total |      |
|--------------------------|--------------|------|-------------------|------|----------|-------|------|
|                          | No           | %    | No                | %    |          | No    | %    |
| <b>Demonstrations</b>    |              |      |                   |      | 22.423*  |       |      |
| Very strong              | 2            | 2.5  | -                 | -    |          | 2     | 1.3  |
| Strong                   | 14           | 17.7 | -                 | -    |          | 14    | 8.9  |
| Medium                   | 53           | 67.1 | 53                | 67.9 |          | 106   | 67.5 |
| Weak                     | 10           | 12.7 | 25                | 32.1 |          | 35    | 22.3 |
| Total                    | 79           | 100  | 78                | 100  |          | 157   | 100  |
| <b>Field visits</b>      |              |      |                   |      | 10.449*  |       |      |
| Strong                   | 9            | 11.4 | -                 | -    |          | 9     | 5.7  |
| Medium                   | 52           | 65.8 | 52                | 66.7 |          | 104   | 66.2 |
| Weak                     | 18           | 22.8 | 26                | 33.3 |          | 44    | 28   |
| Total                    | 79           | 100  | 78                | 100  |          | 157   | 100  |
| <b>Group discussions</b> |              |      |                   |      | 4.083    |       |      |
| Strong                   | 4            | 5.1  | -                 | -    |          | 4     | 2.5  |
| Medium                   | 49           | 62.0 | 52                | 66.7 |          | 101   | 64.3 |
| Weak                     | 26           | 32.9 | 26                | 33.3 |          | 52    | 33.1 |
| Total                    | 79           | 100  | 78                | 100  |          | 157   | 100  |

\* Indicate significance levels at 1%

Source: Own survey (February 2002)

We all need to remember that adoption is not a sudden event, but a process. The problem with modern agricultural science is that technologies are finalized before farmers get to see them. If new technologies are appropriate and fit to particular farmers' conditions or needs, then they stand a good chance of being adopted. But if they do not fit and if farmers are unable to make changes, they have only one choice. They have to adapt to the technology, or reject it entirely. In



participatory extension program, the technology development must involve farmers. Time should be given to farmers to think before making a decision. Time also should be given to farmers to select and test the innovations before they are making a decision. In this regard, as the overall result of this survey shows (see table 4.4.7), the decision making power of farmers on selection, testing, acceptance and /or rejection of different technologies is very low. As reported in the table, concerning their decision making power on selection of different technologies, 35.0% of the respondents said poor, 26.8% medium, 36.3% high and 1.3% very high. Concerning their decision making power on testing of different technologies, again 35.7% of the respondents answered poor, 30.6% medium, 33.1% high and 0.6% very high. On the other hand, concerning their decision making power on acceptance and /or rejection of different technologies, 33.1% of the respondents reported poor, 27.4% medium, 38.9% high and 0.6% very high. In all those cases (selection, testing, acceptance and /or rejection of different technologies), the chi-square tests shows significance variations in between participants and non-participants of the sample households (Selection  $\chi^2 = 40.63, p=1\%$ , Testing,  $\chi^2=28.078, p1\%$ , Acceptance / Rejection  $\chi^2 = 43.712, p = 1\%$ ). Though it is not much satisfactory, as the chi square value predicts, the decision making power of the participants is relatively better than the non-participants.

Table 4.4.7 Decision making power of farmers on selection, testing, and acceptance and /or rejection of different new technologies

| Variable                     | Participants |      | Non participants |      | $\chi^2$ | Total |      |
|------------------------------|--------------|------|------------------|------|----------|-------|------|
|                              | No           | %    | No               | %    |          | No    | %    |
| <b>Selection</b>             |              |      |                  |      | 40.635*  |       |      |
| Very high                    | 2            | 2.5  | -                | -    |          | 2     | 1.3  |
| High                         | 46           | 58.2 | 12               | 15.4 |          | 58    | 36.9 |
| Medium                       | 18           | 22.8 | 24               | 30.8 |          | 42    | 26.8 |
| Poor                         | 13           | 16.5 | 42               | 53.8 |          | 55    | 35.0 |
| Total                        | 79           | 100  | 78               | 100  |          | 157   | 100  |
| <b>Testing</b>               |              |      |                  |      | 28.712*  |       |      |
| Very high                    | 1            | 1.3  | -                | -    |          | 1     | 0.6  |
| High                         | 39           | 49.4 | 13               | 16.7 |          | 52    | 33.1 |
| Medium                       | 25           | 31.6 | 23               | 29.5 |          | 48    | 30.6 |
| Poor                         | 14           | 17.7 | 42               | 53.8 |          | 56    | 35.7 |
| Total                        | 79           | 100  | 78               | 100  |          | 157   | 100  |
| <b>Acceptance /Rejection</b> |              |      |                  |      | 43.712*  |       |      |
| Very high                    | 1            | 1.3  | -                | -    |          | 1     | .6   |
| High                         | 49           | 62   | 12               | 15.4 |          | 61    | 38.9 |
| Medium                       | 19           | 24.1 | 24               | 30.8 |          | 43    | 27.4 |
| Poor                         | 10           | 12.7 | 42               | 53.8 |          | 52    | 33.1 |
| Total                        | 79           | 100  | 78               | 100  |          | 157   | 100  |

\* Indicate significance levels at 1%

Source :own survey (February 2002)

#### 4.4.3. Major findings

In the sample survey:

- Number of oxen, access to credit services, and dummy variable for settlers are found to have a significance effect on extension participation.
- Lack of strong supports on activities related to field visits, demonstrations, and group discussions.
- Poor decision making power of farmers on selection, testing, and acceptance and/or rejection of different new technologies.

#### 4.5 Challenges of the current agricultural extension program

The final findings of this section identifies the main problems of the study areas that have been challenging the over all planning and implementation processes of the current extension program. As the survey result of this study shows, there are social, economical, institutional and infrastructural problems that have been challenging the overall performance of the current agricultural extension program .In this survey; the following are identified as the main problems of the study areas.

##### 4.5.1. Socio-economical problems

##### **Illiteracy**

As previously discussed, illiteracy rate of the study areas is very high. The rural population has limited access to education. As the result of the group discussion shows, most of time, illiterate farmers are much reluctant to abandon the old techniques. Concerning this illiteracy rate, as the survey result of this study indicates, there is an even significant difference in between the participants and non-participants of the sample households (Refer back to table 4.1.8). Therefore,

illiteracy is one of the basic social problems that have been challenging the over all performance of the current extension program.

### **Language**

Like illiteracy, language has also a great influence in the communication processes of any kind of extension program. As a principle, any development agents require to speak the language of native people of their working areas. Contrary to that, as the survey result of this study shows, no single development agent is able to speak the language the indigenous people of the areas (Berta) known as “Witawit”. Rather, the development agents of the areas are only speakers of Amharic and Oromifa. As a result of this language problem, there are always gaps in the communication process of development agents and the indigenous farmers of the areas. Therefore, the development agents of the areas are always looking for the assistance of translators. Due to that, in the study areas, language is one of the social problems that have been limiting the over all activities of the current extension program.

### **Gender**

It is now widely demonstrated that rural women, as well as men, through out the world are engage in a large productive activities essential to household welfare, agricultural productivity, and economic growth. Yet women’s substantial contribution continues to be systematically marginalized and under valued. As the survey result shows, agricultural extension services still do not attach much importance to recognizing women farmers or women on farm. Still the

program has not strongly penetrated to the society to bring some basic behavioral changes. As indicated in table 4.5.1, among the total sample households, it is only 47.9% of the male headed households are willing for the involvement of their wives in the current agricultural extension program. Among those male headed households, 62% and 34.2% of them are participants and non-participants, respectively. But, the remaining 52.1% of the male headed households are not willing their wives independently participate in the program. In connection to the involvement of those women farmers, as the chi-square test shows, there is significance variation in between the participants and non-participants of the sample households ( $\chi^2 = 11.086, P=1\%$ ). This is to mean that, the participants of male-headed households are relatively more willing for the involvement of women farmers than the non-participants.

Table 4.5.1 Involvement of women in the current extension program

| Willingness of the male headed house holds | Participants |     | Non-participants |      | $\chi^2$ | Total |      |
|--------------------------------------------|--------------|-----|------------------|------|----------|-------|------|
|                                            | No.          | %   | No.              | %    |          | No.   | %    |
| . Willing                                  | 44           | 62  | 25               | 34.2 | 11.086*  | 69    | 47.9 |
| . Not willing                              | 27           | 38  | 48               | 65.8 |          | 75    | 52.1 |
| Total                                      | 71           | 100 | 73               | 100  |          | 144   | 100  |

\* Indicate significance levels at 1%

Source: own survey (February 2002)

On the other hand, women are not also encouraged to express their views and to decide up on the program. The male headed households usually neglect the decision making power of women. According to this survey result, among the total sample households, only 27.8% of the male-headed households reported as they are equally decide with their wives. But the majorities of the

male-headed households (71.5%) replied as it is only their full right to decide upon the program. Again in relation to the decision making power of women, as the chi-square tests shows, there is significance differences in between the participants and non-participants of the sample households ( $\chi^2 = 8.680, p=1\%$ ) (see table 4.5.2.). That is, the participants of the sample households are relatively well considered the decision making power of women than the non-participants of the sample households. Due to such and other cases, gender issue is one of the main social problems of the areas that have been challenging the over all activities of the program.

Table 4.5.2 Decision making power of women

| Decision makers    | Participants |      | Non-participants |      | $\chi^2$ | Total |      |
|--------------------|--------------|------|------------------|------|----------|-------|------|
|                    | No           | %    | No               | %    |          | No    | %    |
| Only men           | 60           | 82.2 | 43               | 60.6 | 8.680*   | 103   | 71.5 |
| Only women         | -            |      | 1                | 1.4  |          | 1     | 0.7  |
| Both women and men | 13           | 17.8 | 27               | 38   |          | 40    | 27.8 |
| Total              | 73           | 100  | 71               | 100  |          | 144   | 100  |

Indicate significance levels at 1%

Source: own survey (February 2002)

## Capital

The financial capacity of farmers of the study areas is extremely below the expected levels .As the survey result shows, out of the total sample households, 92.4% of participants and 100% of non-participants reported that they do not have any financial resources for purchase modern in puts from market areas. It is only 7.6% of the sample participants replied as they have a purchasing power. In relation to this financial capacity, the chi -square tests indicate the

existence of significance differences in between participants and non-participants of the sample households (look at table 4.5.3). As shown in the table, as compared to the non-participants of the sample households, at least 7.6% of the participants have the financial capacity for the purchase of modern inputs. Therefore, the issue of financial capacity is one of the basic social problems that have been limiting the wide coverage of the program with in the study areas.

Table 4.5.3. Financial capacities of farmers

| Purchasing power       | Participants |      | Non-participants |     | $\chi^2$           | Total |      |
|------------------------|--------------|------|------------------|-----|--------------------|-------|------|
|                        | No           | %    | No               | %   |                    | No    | %    |
| . Able to purchase     | 6            | 7.6  | -                | -   | 6.159 <sup>+</sup> | 6     | 3.8  |
| . Not able to purchase | 73           | 92.4 | 78               | 100 |                    | 151   | 96.2 |
| Total                  | 79           | 100  | 78               | 100 |                    | 177   | 100  |

\* Indicate significance levels at 1%

Source: own survey (February 2002)

## Credit

Due to the absence of well-organized credit giving governmental or non-governmental institutions; for longer period of time, agricultural offices have remained as the only source of credit for the farmers of the areas. The Regional Micro finance Institution has become operational since 1993 E.C. In proportion to the total number of households live in the region, the institution has limited out reach. According to Wolday Amha (2001), the institution has covered only about a total of 425 rural households. As the survey result of this study shows, only 82.3% of participants and 18.2% of non-participants reported as they have an access to credit services only for the purpose of purchasing modern inputs. On the other hand, 17.7 % of participants and 81.8% of non-participants said that they do not have any access to credit

services. In relation to this issue, as the chi-square test shows, there is significance differences in between participants and non-participants of the sample households ( $\chi^2=64.091, p=1\%$ ). That is, as compare to the sample non participants, the participants have relatively good access to credit services. As a result of that, the involvement of the non-participants is highly restricted by the lack of access to credit services. Therefore, limited supply of credit is also one of the main economical problems that have been challenging the over all activities of the extension program of the study areas.

Table 4.5.4. Access to credit services

| Access to credit services | Participants |      | Non-participants |      | $\chi^2$ | Total |      |
|---------------------------|--------------|------|------------------|------|----------|-------|------|
|                           | No           | %    | No               | %    |          | No    | %    |
| . Have access             | 65           | 82.3 | 14               | 18.2 | 64.091*  | 79    | 50.6 |
| . Not have                | 14           | 17.7 | 63               | 81.8 |          | 77    | 49.4 |
| Total                     | 79           | 100  | 77               | 100  |          | 156   | 100  |

\* Indicate significance levels at 1%

Source: own survey (February 2002)

#### 4.5.2. Institutional and infratructural problems

##### Market

Currently, declining in the market price of crops has becoming the big challenge of the current extension program .In relation to this market issue, out of the total sample households, about 99.4% reported low prices of crops as a main problem. It is only 0.6 % of the sample households stated the lack of price information as a main market problem of the areas. As far as the market conditions, as the chi –square test shows, there is no significance differences in between the



participants and non-participants of the sample households (look table 4.5.5). This is to mean that, low prices of crops are the basic and common problem of both the participants and non-participants of the sample households. Therefore, the current market condition is the main problem, which is strongly challenging the net benefits derived from the program.

Table 4.5.5. Market problems on the different crops of the areas

| Market problems             | Participants |     | Non-participants |      | $\chi^2$ | Total |      |
|-----------------------------|--------------|-----|------------------|------|----------|-------|------|
|                             | No           | %   | No               | %    |          | No    | %    |
| . Low prices of crops       | 79           | 100 | 77               | 98.7 | 1.019    | 156   | 99.4 |
| . Lack of price information | -            | -   | 1                | 1.3  |          | 1     | 0.6  |
| Total                       | 79           | 100 | 78               | 100  |          | 157   | 100  |

Source: own survey (February 2002)

## Transportation

Transportation is also one of the basic problem of the region. Many of the areas cannot be reached by road, or transport vehicles are in short supply. As the sample survey shows, out of the total sample households, 76.4% used humans as a main mode of transport to travel to market areas. Where as, the remaining 23% and 0.6% of the sample households used animals and vehicles, respectively. Concerning mode of transportation, as the chi-square test shows, there is significant variation in between the participants and non-participants of the sample households ( $\chi^2 = 15.365, p=1\%$ ) (see table 4.5.6.). The mode of transportation, which used by the sample participants, is relatively better than the non-participants.

Table 4.5.6 Means of transportation used to travel to market areas

| Mean of transportation | Participants |      | Non-participants |      | $\chi^2$ | Total |      |
|------------------------|--------------|------|------------------|------|----------|-------|------|
|                        | No           | %    | No               | %    |          | No    | %    |
| Humans                 | 55           | 69.6 | 65               | 83.3 | 15.365*  | 120   | 76.4 |
| Animals                | 23           | 29.1 | 13               | 16.7 |          | 36    | 23.0 |
| Vehicle                | 1            | 1.3  | -                | -    |          | 1     | 0.6  |
| Total                  | 79           | 100  | 77               | 100  |          | 157   | 100  |

\* indicates significance levels at 1%.

Source: own survey (February2002)

### **In put delivery**

In the study areas, agricultural offices are the only sources of supply of modern inputs like fertilizer, improved seeds and chemicals. Till now, there is no any single private or governmental institution that supports the supply of those modern inputs directly to farmers. In relation to this, as the survey result shows, high price of fertilizers and improved seeds; and the shortage of supply of chemicals are also the main problems of farmers of the study areas.

### **Research institution**

As reported by the regional agricultural bureau, in the region as the whole, there is no any single research institution that closely supports the on going extension program of the study areas. As a result of that, the involvement of farmers in different research activities is completely limited or none at all.

#### 4.5.3. Major findings

In the study areas, the following are identified as the major challenges of the current extension program

- High illiteracy rates
- Language problems
- Marginalization of women
- Declining of crop prices
- Financial problems
- Lack of access to credit services
- Absence of input delivering agencies
- Poor transportation
- Lack of research institution





## **Chapter five Conclusion and Recommendations**

### **5.1 Conclusion**

In Ethiopia, agricultural extension is said to be operational since 1930s. However, a formal extension was started only after the establishment of the Alemaya College of Agriculture. Extension is under way in the country for over 70 years. Over this period, several development as well as extension approaches were employed side by side. Currently, Ethiopia is following a new system of agricultural extension termed "Participatory Demonstration and Training Extension System (PADETES)". As the name implies, the system is based on demonstrating and training farmers on proven technologies in participant manner. According to the new strategy, the responsibility of the Ministry of Agriculture at the federal level is to formulate agricultural policies, design packages, organize and conduct training activities to up grade the knowledge and skill of all partners in agricultural development. The ministry also assists to coordinate interregional activities, render policy advice and technical backstop. The planning, execution, monitoring and evaluation of extension programs, however, fall within the power and duties of the regional agricultural bureaus.

In the Benishangul Gumuz National Regional State (BGNRS), the current extension program was started in the year 1996. Very in the beginning, the program was focused on only food crop packages. But now, the program is further expanded to livestock, coffee, and post harvest technologies. But this study was mainly focused up on the performance of the current extension program in relation to the main food crop packages of the areas such as maize, sorghum and teff. Assosa and Bambasi woredas were purposely selected for this particular study.

As the over all results of this study shows, almost all the sample farmers at least have an information about the existence of the current extension program. In relation to this, both the sample participants and non-participants appreciate yield of extension plots as an important and attractive feature of the program.

Concerning the over all productivity of the current extension program, survey was also made to assess both extension and non-extension plots of the sample households. In the result, as findings of this survey reveals; average yield, gross benefits and net benefits of the extension plots are found better than the non-extension plots. On the other hand, due to additional costs of modern inputs (DAP, Urea, and improved seeds); extension plots have used up higher variable costs than the non-extension plots. In addition to that, as the result of the survey clearly shows, the program has brought a change on food intake of the participants. That is, in the specified year (1993 E.C), the participants were relatively more consumed than the non- participants.

As far as consider the extent of farmers' participation, there are lots to be done. As the survey result shows, majorities of farmers were not even asked to express their needs, interests and problems during the preparation of different crop packages of the areas. In addition to that, they do not also get strong supports that enhance their active involvement on activities related to field visits, demonstrations and group discussions. Their decisions making power on the selection, testing, acceptance and / or rejection of different new technologies is not also well considered in the over all planning and implementation processes of the program. In addition to that; number of oxen, access to credit services, and dummy variables for settlers are found to have a significant effect on extension participation.

In the study areas, as findings of this survey shows, there are major problems that have been challenging the over all planning and implementation processes of the current agricultural extension program. Illiteracy rates are very high in the rural areas. Extension agents of the areas do not speak the language of the indigenous people (Berta). Women farmers are not much encouraged by the majorities of their husbands to actively participate in the program. Problems of declining in market prices of the major food crops of the areas. Farmers of the areas do not have enough financial resources that used to purchase modern inputs (fertilizer, improved seeds and chemicals) from different market areas. Majorities of farmers do not have adequate access to credit services. There are no any governmental or non-governmental in put delivering agencies. There are also big problems of transportation with in and out side the areas. There is no also any research institution that closely supports the on going extension program of the areas. Therefore, attentions need to be given to all those identified problems. Other wise, many of the farmers will not be willing for continuing to actively participate in the program.

## **5.2 Recommendations**

In order to strengthen the over all performance of the current extension program of the study areas, the following are recommended based up on the major findings of this particular study.

### **Good extension program planning**

Agricultural extension program is not a simple thing that could be planned and implemented over a night. It needs sufficient time, money, skilled manpower, basic infrastructures and facilities,



well-organized administrations and institutions. In a region like Benishangul Gumuz, where those preconditions are not completely fulfilled, it could be very difficult to achieve all the designed objectives of the program. Good extension program planning is an intellectual activity since it usually involves a study and use of facts and principles. It requires knowledge, imagination and reasoning ability. It is a complex exercise as it involves people, their needs, their interests, useful technology, educational process, analyzing a situation and making decisions about what should be done, determining useful actions, projecting the desired shape of things in future and several other components which are rarely simple.

#### **Extension agents should work hard to bring desirable behavioral changes**

Though the findings of the survey shows that that majorities of farmers have at least an information about the existence of the program, that might not be considered as sufficient condition. Awareness does not necessarily mean that knowledge. Extension agents and agricultural experts of the areas need to closely evaluate the extent of understanding of the farmers. They should work hard to bring desirable behavioral changes among targeted groups. Extension workers must be familiar with the local farming system and have a thorough knowledge of, and sympathy with, decision-making problems of the small farmer, both theoretical and practical. They must also be capable of giving farmers practical field demonstrations of appropriate improved techniques, help them to locate farm supplies and equipment's, advice them on the sources of credit, and follow up their requests with the organizations involved.

### **The government needs to stabilize the market prices of crops and modern inputs**

Unfortunately, though extension plots are quite productive, crop prices are going down at alarming rate. On the other hand, prices of modern inputs such as fertilizer, improved seeds and chemicals are increasing from time to time. As a result, there are wide differences in the prices of crops and modern inputs. In order to solve this problem, by any means, the involvement of the government is highly recommended. As much as possible, the government needs to stabilize the market condition. In doing that, the government may play a great role in facilitating the movement of crops from excess to deficit areas.

### **Development of a formal and cooperative marketing systems**

Farmers should organize to create cooperative marketing system so that that the poor could have an access to the central market. The regional state should give a priority for the development of good infrastructures and marketing information, which supports a formal marketing system with in and out side the region.

### **True participation of farmers**

Coming to the extent of farmers' participation, there are still a lot and a lot to be done. Each farmer needs to be encouraged and fully supported to involve in the planning and implementation processes of the program. Farmers should definitely get the media to express their over all feelings about the program. They should have also given a full right to voice out their needs, wants, interests and problems. They need to be assisted to select their representatives

in a democratic manner. Farmers are also not simply been asked to adopt any kind of innovations. Rather, they must be informed a head of time get an access to test and select the appropriate ones.

### **Coordination among the stakeholders**

The federal government, regional administrators, policy makers, researchers and other stakeholders should device solutions for the major challenges of the program. In this case, strong linkages and cooperation among the stakeholders are highly recommended. As much as possible, right measures need to be taken on right times. Otherwise, any of these problems can impede or influence the flow of technology and information between farmer and extension. Therefore, attention should be given to the following ones:-

- The coverage of formal and informal education should be increased so as to increase the literacy rates of both the settlers and indigenous farmers of the areas.
- The selection criteria for the development agents of the areas need to be revised and clearly defined.
- The program needs to be more gender sensitive.
- The out reach of the regional microfinance institution must be strengthened.
- In order to attract investors, trade organizations, and others, priority should be given for the development of basic infrastructures such as road, light, and water.
- Establishing Regional Research Institution as soon as possible with out delaying the processes.

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Annexe-1 Questionnaire

Part one-*The main objective of this part is to look at the demographic and social characteristics of the household (1-14)*

1. Name of the household head \_\_\_\_\_

2. Age

3. Sex

1. Male

2. Female

4. Total household size

5. Have you ever-attended school?

1. Attended

2. Attending

3. Never attended

6. If currently attending, indicate your level of grade?

7. If attended formal school in the past, highest grade completed?

8. Religion

1. Muslim

2. Orthodox

3.. Protestant

4.. Catholic

5.. Others (specify) \_\_\_\_\_

9. Ethnicity

1. Berta

2. Amhara

3. Oromo

4. Tigray

5. Others (specify) \_\_\_\_\_

## 10. Marital status

1. Married  
2. Unmarried  
3. Divorced  
4. Widowed  
5. Have more than one spouse  
6. Other (specify)-----

|  |  |
|--|--|
|  |  |
|--|--|

## 11. Type of houses

1. Corrugated                      2. Non-corrugated

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12. Which period is the most important for your agricultural activities?

11

1. Meher                                  2. Belg  
3. Belg and Meher                  4. All year

13. Did the household purchase any of the following non-food items in the last year (1993 E.C.)?

| Item                                    | 1. Yes<br>2. No | If yes,<br>Total expenditure in Birr |
|-----------------------------------------|-----------------|--------------------------------------|
| 1. Clothes/shoes/fabric for women       |                 |                                      |
| 2. Clothes/shoes/fabric for men         |                 |                                      |
| 3. Clothes/shoes/fabric for boys        |                 |                                      |
| 4. Clothes/shoes/fabric for girls       |                 |                                      |
| 5.kitchen equipment (cooking pots etc.) |                 |                                      |
| 6.Linens ( sheets,towels,blankets)      |                 |                                      |
| 7.Furniture                             |                 |                                      |

14. Indicate which one of the following assets you have?

| Type of assets                      |              | 1. Yes<br>2. No | If yes,<br>Total number | Estimated total cost |
|-------------------------------------|--------------|-----------------|-------------------------|----------------------|
| Livestock                           | 1. Ox        |                 |                         |                      |
|                                     | 2. Camel     |                 |                         |                      |
|                                     | 3. Bull      |                 |                         |                      |
|                                     | 4. Cow       |                 |                         |                      |
|                                     | 5. Heifer    |                 |                         |                      |
|                                     | 6. Calves    |                 |                         |                      |
|                                     | 7. Sheep     |                 |                         |                      |
|                                     | 8. Goat      |                 |                         |                      |
|                                     | 9. Horse     |                 |                         |                      |
|                                     | 10. Donkey   |                 |                         |                      |
|                                     | 11. Mule     |                 |                         |                      |
|                                     | 12. Hen      |                 |                         |                      |
|                                     | 13. Bee      |                 |                         |                      |
| Furniture and household goods       | 14. Bed      |                 |                         |                      |
|                                     | 15. Chairs   |                 |                         |                      |
|                                     | 16. Shelf    |                 |                         |                      |
|                                     | 17. Fanos    |                 |                         |                      |
|                                     | 18. Pots     |                 |                         |                      |
|                                     | 19. Utensils |                 |                         |                      |
| Other durable                       | 20. Jewelry  |                 |                         |                      |
|                                     | 21. Radio    |                 |                         |                      |
|                                     | 22. Tape     |                 |                         |                      |
| Farm and other productive materials | 23. Doma     |                 |                         |                      |
|                                     | 24. Maresha  |                 |                         |                      |
|                                     | 25. Mofer    |                 |                         |                      |
|                                     | 26. Kenber   |                 |                         |                      |
|                                     | 27. Akafa    |                 |                         |                      |
|                                     | 28. Metrebia |                 |                         |                      |
|                                     | 29. Gegera   |                 |                         |                      |

**Part two-General information about the current agricultural extension program (15-26).** The main objective of this part is to look at the extent of awareness of each household about the current agricultural extension program

15. Do you know about the current agricultural extension program?

1. Yes
2. No

16. Who informs you about the program?

| Individuals/organization        | 1. Yes 2. No | Prioritize |
|---------------------------------|--------------|------------|
| 1. My neighbors                 |              |            |
| 2. Development agents           |              |            |
| 3. Keble administrators         |              |            |
| 4. Woreda administrators        |              |            |
| 5. Zonal administrators         |              |            |
| 6. Regional administrators      |              |            |
| 7. Woreda agricultural office   |              |            |
| 8. Zonal agricultural office    |              |            |
| 9. Regional agricultural bureau |              |            |
| 10. Others (specify)-----       |              |            |

17. Are you interested with the program?

1. Yes
2. No

18. What was your feeling in the very beginning of the program?

1. I did not give any attention for the program.
2. I was very much eager to be the primary user of the program.
3. Though I was surprised with the program, I was decided to be neutral till I see the impact on majorities of farmers.
4. Others (specify) \_\_\_\_\_

19. Are you participant of the current extension program?

☐

1. Yes

2. No

*If No, skip to question number 24.*

20. If yes, on which years have you participated?

| 1. yes<br>2. No |          |          |         |          |          |
|-----------------|----------|----------|---------|----------|----------|
| 1988 E.C        | 1989 E.C | 1990 E.C | 1991E.C | 1992 E.C | 1993 E.C |
|                 |          |          |         |          |          |

21. Are you happy being one of the participants of the current extension program?

☐

1. Yes

2. No

22. What features of the program strongly attracts your attention?

| Features of the program                | 1.Yes<br>No | 2. Prioritize |
|----------------------------------------|-------------|---------------|
| Increase in out put                    |             |               |
| High quality or taste of products      |             |               |
| Integrated supply of inputs            |             |               |
| An easy kind of management or practice |             |               |
| Others( specify) _____                 |             |               |

23. Have you ever-experienced changes in your lives as compare to your previous ways living?

☐

1. Yes

2. No

24. If you have not participated in the new extension program, indicate your reasons.

| Reasons                                    | 1.yes 2. No | Prioritize |
|--------------------------------------------|-------------|------------|
| 1.Shortage of land                         |             |            |
| 2.Shortage of cash for down payment        |             |            |
| 3.Lack of access to the extension services |             |            |
| 4. Lack of interest                        |             |            |
| 5. Others ( specify)-----                  |             |            |

25. Do you like to participate in the program?

1. Yes

2. No

26. Do you see differences in your living conditions as compared to some of your neighbors that are participating in the program?

1. Yes

2. No

### Part three - Productivity of the current extension program (27-39)

The main objective of this part is to compare efforts of the current extension program with that of traditional/ conventional means of production. It also looks at benefits gained from the program (27-39)

27. Land holding size (in ha.)

28. What about the yields you obtained in the last (1993 E.C) production year?

(If the household is non-participant, skip to the second table of this question ).



### For the extension plot

| Type of crops | Area<br>(in ha.) | Quantities of inputs used for each crops ( If not used write 0 ) |                  |                              |                           |                       |                       |                         | Yield<br>(in ha.) |
|---------------|------------------|------------------------------------------------------------------|------------------|------------------------------|---------------------------|-----------------------|-----------------------|-------------------------|-------------------|
|               |                  | Fertilizer                                                       |                  | Seeds                        |                           | Chemicals             |                       |                         |                   |
|               |                  | DAP<br>(in kg.)                                                  | Urea<br>(in kg.) | Improved<br>seed (in<br>kg.) | Local<br>seed (in<br>kg.) | Herbicide<br>(in lt.) | Fungicide<br>(in kg.) | Insecticide<br>(in kg.) |                   |
| 1. Maize      |                  |                                                                  |                  |                              |                           |                       |                       |                         |                   |
| 2. Sorghum    |                  |                                                                  |                  |                              |                           |                       |                       |                         |                   |
| 3. Teff       |                  |                                                                  |                  |                              |                           |                       |                       |                         |                   |

### For the non-extension plot

| Type of crops | Area<br>(in ha.) | Quantities of inputs used for each crops ( If not used write 0 ) |                  |                              |                           |                       |                       |                         | Yield<br>(in ha.) |
|---------------|------------------|------------------------------------------------------------------|------------------|------------------------------|---------------------------|-----------------------|-----------------------|-------------------------|-------------------|
|               |                  | Fertilizer                                                       |                  | Seeds                        |                           | Chemicals             |                       |                         |                   |
|               |                  | DAP<br>(in kg.)                                                  | Urea<br>(in kg.) | Improved<br>seed (in<br>kg.) | Local<br>seed (in<br>kg.) | Herbicide<br>(in lt.) | Fungicide<br>(in kg.) | Insecticide<br>(in kg.) |                   |
| 1. Maize      |                  |                                                                  |                  |                              |                           |                       |                       |                         |                   |
| 2. Sorghum    |                  |                                                                  |                  |                              |                           |                       |                       |                         |                   |
| 3. Teff       |                  |                                                                  |                  |                              |                           |                       |                       |                         |                   |

29. Is there any change in the outputs of those crops as compare to the current (1994 E.C.) Production year

1. Yes

2. No

30.If yes, how is the change?

1. Very high

2. Very low

3. Slightly higher

4. . Slightly lower

5. Others (specify) \_\_\_\_\_

If the household has not been used any kind of modern inputs such as fertilizer, improved seeds or chemicals; please skip to question number 36.

### 31. Source of purchase of those modern inputs?

| Source of purchase                     | 1. Yes 2. No  |            |            |             |           |           |
|----------------------------------------|---------------|------------|------------|-------------|-----------|-----------|
|                                        | Improved seed | Fertilizer | Local seed | Insecticide | Herbicide | Fungicide |
| 1.Agricultural offices                 |               |            |            |             |           |           |
| 2.Farmer organizations                 |               |            |            |             |           |           |
| 3.Dealers owned by regional government |               |            |            |             |           |           |
| 4. Private dealers                     |               |            |            |             |           |           |
| 5. NGOs                                |               |            |            |             |           |           |
| 6.Others (specify)----                 |               |            |            |             |           |           |

### 32. Who or what influenced your decision to use modern inputs?

| Factors                                                               | 1.Yes<br>2. No | Prioritize |
|-----------------------------------------------------------------------|----------------|------------|
| 1. Encouraged by development agents                                   |                |            |
| 2. Was encouraged by friends/neighbours/relatives                     |                |            |
| 3. Noticed profitability by observing earlier adopters in the village |                |            |
| 4. Noticed prices for out put were high at the market                 |                |            |
| 5. Noticed many others had already adopted                            |                |            |
| 6. NGOs                                                               |                |            |
| 7. Heard about input from radio                                       |                |            |
| 8. Other reason-----                                                  |                |            |

33. Who taught you the skills needed to use modern inputs?

| Sources of learning                 | 1. Yes<br>2. No | Prioritize |
|-------------------------------------|-----------------|------------|
| 1. Parents/Relatives/Friends/       |                 |            |
| 2. Extension/Development agents     |                 |            |
| 3. Learned it from observing others |                 |            |
| 4. No skills needed                 |                 |            |
| 5. Learned it at school             |                 |            |
| 6. Training course                  |                 |            |
| 7. Trader explained how to use      |                 |            |
| 8. Others ( specify)-----           |                 |            |

34. Did you discuss the use of those modern inputs with an extension agent?

1. Yes

2. No

☐

35. Which input would you like to continue using, if you have to buy everything on a cash basis?

| Inputs           | 1. Yes<br>2. No | Prioritize |
|------------------|-----------------|------------|
| 1. Fertilizer    |                 |            |
| 2. Improved seed |                 |            |
| 3. Local seed    |                 |            |
| 4. Pesticide     |                 |            |
| 5. Herbicide     |                 |            |
| 6. fungicide     |                 |            |

36. How was your last year (1993E.C.) expenditure and revenue pattern?

| Type of crops | Purchased          |      | Sold               |      |
|---------------|--------------------|------|--------------------|------|
|               | Amount<br>(in kg.) | Birr | Amount<br>(in kg.) | Birr |
| 1. Maize      |                    |      |                    |      |
| 2. Sorghum    |                    |      |                    |      |
| 3. Teff       |                    |      |                    |      |

37. What is the length of one working day (person day) in your village

38. Indicate the total labor used and time taken to accomplish the following agricultural practices for producing maize and sorghum in the year of 1993 E.C.

**A.For extension plot**

| Type of crops | Activities                                                            | Numbers of labor used and time taken |                |         |                  |
|---------------|-----------------------------------------------------------------------|--------------------------------------|----------------|---------|------------------|
|               |                                                                       | Male                                 |                | Female  |                  |
|               |                                                                       | Numbers                              | Time(in hours) | Numbers | Time ( in hours) |
| 1. Maize      | 1. Clearing(removing stubble)                                         |                                      |                |         |                  |
|               | 2.Land preparation ( including seed cover and fertilizer application) |                                      |                |         |                  |
|               | 2.1. First plowing                                                    |                                      |                |         |                  |
|               | 2.2 Second plowing                                                    |                                      |                |         |                  |
|               | 2.3 Third plowing                                                     |                                      |                |         |                  |
|               | 2.4 Fourth plowing                                                    |                                      |                |         |                  |
|               | 2.5 Fifth plowing                                                     |                                      |                |         |                  |
|               | 2.6 Sixth plowing                                                     |                                      |                |         |                  |
|               | 2.7 Planting ( sowing)                                                |                                      |                |         |                  |
|               | 3. Weeding                                                            |                                      |                |         |                  |
|               | 3.1 First weeding                                                     |                                      |                |         |                  |
|               | 3.2 Second weeding                                                    |                                      |                |         |                  |
|               | 4. Transporting to threshing site                                     |                                      |                |         |                  |
|               | 5.Threshing (shelling)                                                |                                      |                |         |                  |
|               | 6.Transporting to store                                               |                                      |                |         |                  |
| 2. Sorghum    | 1. Clearing(removing stubble)                                         |                                      |                |         |                  |
|               | 2.Land preparation ( including seed cover and fertilizer application) |                                      |                |         |                  |
|               | 2.1. First plowing                                                    |                                      |                |         |                  |
|               | 2.2 Second plowing                                                    |                                      |                |         |                  |
|               | 2.3 Third plowing                                                     |                                      |                |         |                  |
|               | 2.4 Fourth plowing                                                    |                                      |                |         |                  |
|               | 2.5 Fifth plowing                                                     |                                      |                |         |                  |
|               | 2.6 Sixth plowing                                                     |                                      |                |         |                  |
|               | 2.7 Planting ( sowing)                                                |                                      |                |         |                  |
|               | 3. Weeding                                                            |                                      |                |         |                  |
|               | 3.1 First weeding                                                     |                                      |                |         |                  |
|               | 3.2 Second weeding                                                    |                                      |                |         |                  |
|               | 4. Transporting to threshing site                                     |                                      |                |         |                  |
|               | 5.Threshing (shelling)                                                |                                      |                |         |                  |
|               | 6Transporting to store                                                |                                      |                |         |                  |

**B. For non-extension plot**

| Type of crops | Activities                                                            | Numbers of labor used and time taken |                |         |                  |
|---------------|-----------------------------------------------------------------------|--------------------------------------|----------------|---------|------------------|
|               |                                                                       | Male                                 |                | Female  |                  |
|               |                                                                       | Numbers                              | Time(in hours) | Numbers | Time ( in hours) |
| 1. Maize      | 1. Clearing(removing stubble)                                         |                                      |                |         |                  |
|               | 2.Land preparation ( including seed cover and fertilizer application) |                                      |                |         |                  |
|               | 2.1. First plowing                                                    |                                      |                |         |                  |
|               | 2.2 Second plowing                                                    |                                      |                |         |                  |
|               | 2.3 Third plowing                                                     |                                      |                |         |                  |
|               | 2.4 Fourth plowing                                                    |                                      |                |         |                  |
|               | 2.5 Fifth plowing                                                     |                                      |                |         |                  |
|               | 2.6 Sixth plowing                                                     |                                      |                |         |                  |
|               | 2.7 Planting ( sowing)                                                |                                      |                |         |                  |
|               | 3. Weeding                                                            |                                      |                |         |                  |
|               | 3.1 First weeding                                                     |                                      |                |         |                  |
|               | 3.2 Second weeding                                                    |                                      |                |         |                  |
|               | 4. Transporting to threshing site                                     |                                      |                |         |                  |
|               | 5.Threshing (shelling)                                                |                                      |                |         |                  |
|               | 6.Transporting to store                                               |                                      |                |         |                  |
| 2.Sorghum     | 1. Clearing(removing stubble)                                         |                                      |                |         |                  |
|               | 2.Land preparation ( including seed cover and fertilizer application) |                                      |                |         |                  |
|               | 2.1. First plowing                                                    |                                      |                |         |                  |
|               | 2.2 Second plowing                                                    |                                      |                |         |                  |
|               | 2.3 Third plowing                                                     |                                      |                |         |                  |
|               | 2.4 Fourth plowing                                                    |                                      |                |         |                  |
|               | 2.5 Fifth plowing                                                     |                                      |                |         |                  |
|               | 2.6 Sixth plowing                                                     |                                      |                |         |                  |
|               | 2.7 Planting ( sowing)                                                |                                      |                |         |                  |
|               | 3. Weeding                                                            |                                      |                |         |                  |
|               | 3.1 First weeding                                                     |                                      |                |         |                  |
|               | 3.2 Second weeding                                                    |                                      |                |         |                  |
|               | 4. Transporting to threshing site                                     |                                      |                |         |                  |
|               | 5.Threshing (shelling)                                                |                                      |                |         |                  |
|               | 6Transporting to store                                                |                                      |                |         |                  |

39. For the year 1993 E.C, what you feel with the over all of net benefits obtained from the production of crops?

- 1. I am happy
- 2. I am not happy
- 3. I do not know
- 4. Others (specify) \_\_\_\_\_

Part four- Participation of farmers (40-48)

The main objective of this part is to assess the overall efforts of farmers on the planning and implementation processes of the current extension program.

40. Is there any regular training given to you?

- 1. Yes
- 2. No

41. If the answer is yes, indicate the type or types of training you received in the last five years

| Types of training                    | 1.Yes<br>No | 2. | Prioritize according to its importance |
|--------------------------------------|-------------|----|----------------------------------------|
| 1. Fertilizer application            |             |    |                                        |
| 2. Chemical application              |             |    |                                        |
| 3. Credit and saving                 |             |    |                                        |
| 4.Associationof farmers/Cooperatives |             |    |                                        |
| 5. Nutrition                         |             |    |                                        |
| 6. Family planing                    |             |    |                                        |
| 7. Storage                           |             |    |                                        |
| 8. Harvesting                        |             |    |                                        |
| 9. Transportation of crops           |             |    |                                        |
| 10. Weeding                          |             |    |                                        |
| 11. Planting                         |             |    |                                        |
| 12. Irrigation                       |             |    |                                        |
| 13. Others ( specify )-----          |             |    |                                        |

42. Are you invited in different occasions like meeting, field visits and demonstrations?  
1. Yes 2. No ☐

43. In those different occasions (Mentioned in question 42); do you get a chance to express your views about the program? ☐

1. If I have any thing to say, I am always encouraged to express my view.  
2. If I have any thing to say, I am not always encouraged to express my view.  
3. Unless a chair man is willing , I am not allowed to say anything else  
4. Others (specify) \_\_\_\_\_

44. What was your role during the planning processes of the current extension program of the area? ☐

1. I was asked to explain my real problems, needs and interests related to the crop production  
2. I was not asked to explain my real problems, needs and interests related to the crop production  
3. I was one of the committee members  
4. Others (specify)-----

45. How many times did the development agent visit you during the last six months



46. Who frequently comes and discusses with you about the current extension program?

| Visitors                        | 1. Yes | 2. NO | Prioritize |
|---------------------------------|--------|-------|------------|
| 1. My neighbors                 |        |       |            |
| 2. Development agents           |        |       |            |
| 3. Keble administrators         |        |       |            |
| 4. Woreda administrators        |        |       |            |
| 5. Zonal administrators         |        |       |            |
| 6. Regional administrators      |        |       |            |
| 7. Woreda agricultural office   |        |       |            |
| 8. Zonal agricultural office    |        |       |            |
| 9. Regional agricultural bureau |        |       |            |
| 10. Others (specify)-----       |        |       |            |

47. How do you evaluate any kind of support given to you on the following activities:

**A. Demonstrations?**

1. Very Strong

2. Strong

3. Medium

4. Weak

5. Others (specify) \_\_\_\_\_

**B. Field Visits?**

1. Very Strong

2. Strong

3. Medium

4. Weak

5. Others (specify) \_\_\_\_\_

**C.. Group Discussions?**

1. Very Strong

2. Strong

3. Medium

4. Weak

5. Others (specify) \_\_\_\_\_

48. What about the extent of your participation to decide up on the selection, testing, acceptance and/or rejection of different technologies?

A. Selection?

1. Very high

2. High

3. Medium

4. Poor

5. Others (specify)...
- 

B. Testing?

1. Very high

2. High

3. Medium

4. Poor

5. Others (specify)...
- 

C. Acceptance / Rejection?

1. Very high

2. High

3. Medium

3. Poor

5. Others (Specify)...
- 

**Part five-** Challenges of the current extension program (49-64). The main objective of this part is to identify some of the factors that are limiting the over all performance of the current extension program of the study area

49. What are the most important activities of extension workers of this area?

| Activities                                             | 1.Yes<br>2. No | Prioritize |
|--------------------------------------------------------|----------------|------------|
| 1.Source of introduction about modern inputs           |                |            |
| 2. source of introduction about new cultural practices |                |            |
| 3. organize farmers for credit access                  |                |            |
| 4. organize farmers public workers                     |                |            |
| 5. Assist in credit repayment                          |                |            |
| 6. Assist in tax collection                            |                |            |

50. If the new extension program continued, would you like to participate?

☐

1. Yes
2. No

51. If yes, which would be your reasons according to importance?

| Reasons                                       | 1.Yes<br>2. No | Prioritize |
|-----------------------------------------------|----------------|------------|
| 1. To get fertilizer at right time            |                |            |
| 2.To get fertilizer at lower price            |                |            |
| 3. To get improved seeds                      |                |            |
| 4.To learn about new techniques of production |                |            |
| 5. Others (specify)-----                      |                |            |

52. If No, what would be your reasons?

| Reasons                                         | 1.Yes<br>2. No | Prioritize |
|-------------------------------------------------|----------------|------------|
| 1. Can not afford the cash for down payment     |                |            |
| 2.Do not believe the package is profitable      |                |            |
| 3. Do not have appropriate land for the package |                |            |
| 4. Do not have enough land for the package      |                |            |
| 5. Others ( specify)-----                       |                |            |

53. What are shortcomings of the present distribution system of modern inputs?

| Type of inputs   | Short comings           | 1. Yes<br>2. No | Prioritize |
|------------------|-------------------------|-----------------|------------|
| 1. Fertilizer    | 1. Late arrival         |                 |            |
|                  | 2. High price           |                 |            |
|                  | 3. Lack of credit       |                 |            |
|                  | 4. Shortage of supply   |                 |            |
|                  | 5. Others( specify)---- |                 |            |
| 2.Improved seeds | 1. Late arrival         |                 |            |
|                  | 2. High price           |                 |            |
|                  | 3. Lack of credit       |                 |            |
|                  | 4. Shortage of supply   |                 |            |
|                  | 5. Others( specify)---- |                 |            |
| 3. Chemicals     | 1. Late arrival         |                 |            |
|                  | 2. High price           |                 |            |
|                  | 3. Lack of credit       |                 |            |
|                  | 4. Shortage of supply   |                 |            |
|                  | 5. Others( specify)---- |                 |            |

54. What is your main problem related to market values of the different crops?

1. Low prices

2. High seasonal fluctuation

3. Lack of price information

4. Unfair marketing practices

5. Others (specify)-----

55. What is your mode of transport used for travelling to the market areas?

1. Vehicle

2. Animals

3. Humans

4. Others (specify)-----

56. How many hours does it take on average to travel to the nearest as well as distant market centers of the area?

- A. Time taken to travel to the nearest market center (in hours

B. Time taken to travel to the distance market center (in hours)



57. How many days per week do you go to the market areas?

58. Do you have the financial resources to purchase inputs to derive the benefits gained from the technology? ☐

1. Yes

2. No

59. Do you have an access to credit services?

1. Yes

2. No

60. If Yes, indicate the sources and reasons for credit?

| Sources                                                | 1.Yes<br>2. No |
|--------------------------------------------------------|----------------|
| 1.Agricultural office                                  |                |
| 2.Cooperative office                                   |                |
| 3.Formal bank                                          |                |
| 4. NGOs                                                |                |
| 5. The Benishangul Gumuz micro finance institute       |                |
| 6. Private money lenders                               |                |
| 7. Friends/relatives                                   |                |
| 8.Traditional organizations (such as ekub, edir, etc.) |                |

| Reasons                            | 1.Yes | 2. No |
|------------------------------------|-------|-------|
| 1. To buy inputs                   |       |       |
| 2. To buy farm or other implements |       |       |
| 3. To buy livestock                |       |       |
| 4. To pay for hired labor          |       |       |
| 5. To pay rent/taxes               |       |       |
| 6. To start an off farm business   |       |       |
| 7.To spend for consumption         |       |       |
| 8. Other ( specify)                |       |       |

(Question numbers 61 and 62 are only need to be answered by the male- headed Household. If the respondent is female-headed household, please skip to Question number 64).

61. Do you will your wife to participate on the current extension program? ☐
1. Yes 2. No
62. In your home, who has a right to decide up on the program? ☐
1. Only I have a right to decide up on the program
2. Only my wife has a right to decide up on the program
3. My wife and I have equal right to decide up on the program
4. Other ( specify)-----
63. Is there any research institution that supports and encourages you to actively participate in research activities? ☐
1. Yes 2. No
64. If yes, what is the name of this institution?
- \_\_\_\_\_

## Annex-2 Check lists

*The following questions are designed for group discussions with agricultural experts, development agents, and administrators of both Assosa and Bambasi woredas of the Benishangul Gumuz national Regional Sate.*

1. How do you see the coverage of the current extension program with in the region?
2. What are the basic techniques that have been always used for teaching farmers about the program?
3. What are the main internal and external problems that are challenging the planning and implementation processes of the program with in the region?
4. What do you do in promoting and strengthening the participation of farmers?
5. How do you see the over all participation the indigenous and settlers farmers of the area?

6. Are there any differences in feeding habits, dressing styles and living houses of those indigenous and settlers farmers of the area?
7. What are the basic behavioral changes that have been observed among farmers just after implementation processes of the program with in the region?
8. Is there a climate that simulates farmers to come forward with their ideas about the extension program, and perhaps to disagree with extension agents, researchers and policy maker's when this is in the best interests of successful agricultural development?
9. Do extension administrators know which information their field staff has learned from farmers that can be useful for planning, implementing and evaluating extension programs?
10. Do participants farmers are really benefiting from the program in relation to the following cases:
  - A. *Quality and quantity of their feeding habits?*
  - B. Types of their houses (corrugated or non- corrugated)?
  - C. Dressing styles (shoes, hand watch, and others urban styles of dressing)?
11. How do you see the living conditions of participant farmers as compare to non-participants?
12. How do you see the availability of the basic facilities (such as road, cars, vehicles, teaching materials, etc.) and skilled manpower in the proper planning and implementation processes of the current extension program with in the region?
13. Are there problems of communication with farmers of the area in relation to the planning and implementation processes of the program?
14. Do you have any thing to suggest or comment on the over all performances of the current extension program of the region?

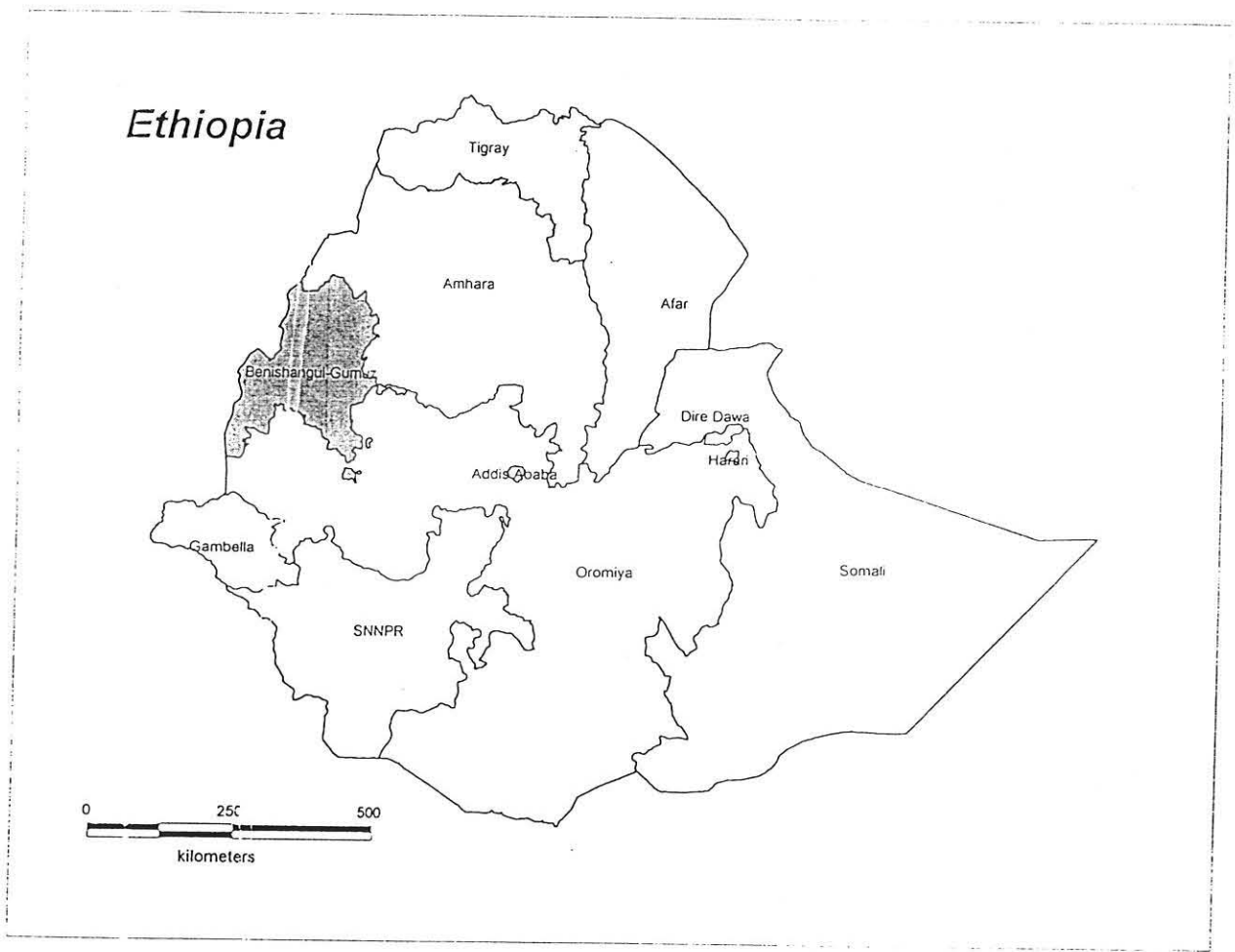
**Annex-3.** Cultivated land in Benishangul Gumuz according to zones /special woreds

| Zone /special Woreda | Cultivated land (ha) | Percentage of total area (%) | Cultivated land per capita (ha) |
|----------------------|----------------------|------------------------------|---------------------------------|
| Metekel              | 78,149               | 3.01                         | 0.43                            |
| Assosa               | 40,768               | 3.23                         | 0.19                            |
| Kamashi              | 10,921               | 1.22                         | 0.20                            |
| Pawe S.W.            | 9,235                | 16.24                        | 0.23                            |
| Mao-komo S.W.        | 3,151                | 1.64                         | 0.21                            |

Source: BOPED (1998)



Annex 4 Map of the region



Map 1: The geographic location of Benishangul-Gumuz within Ethiopia



## DECLARATION

I declare that this thesis is my original work and has not been presented for a degree in any University and all the sources of materials used for the thesis are duly acknowledged.

Name: Hailu Kasssaye

Signature: 

Date: June, 2002

Place: Addis Ababa University

This thesis has been submitted for examination with my approval as a university  
advisor

Mulat Demeke (Ph.D.)

