

Community Level Project Planning (CLPP) Assessment Report, Natural Resource Research Directorate, Worabe, Southern Ethiopia

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Abstract: Ethiopian economy is supported by its agricultural sector which is fundamental instrument for poverty alleviation, food security, and economic growth. One of the constraints in agricultural research is weak participatory project planning to alleviate agricultural problems. Any research activities carried out without baseline information were not targeted on root problems of the research area. Most of research activities carried out in the field was not considered constraints and opportunity of the study area. In other words, in agricultural research, poor problems identifications before field demonstration/experimentation may lead to reaching in to false finding. Therefore, this community level based project planning/CLPP/ assessment was aimed to identify agricultural constraints and opportunities of targeted Woredas of Silte, Gurage Zones and Yem Special woreda in 2008 E.C. The assessment was done from Silte Zone in (Alichio Weroro, Misrak Azernet Berbere and Mierab Azernet Berbere districts), from Gurage Zone (Geta, Enemor Ener, Gummer, Endigagn and Cheha Woredas) and Yem special woreda. Therefore, this paper highlights the CLPP (community level project planning) assessment was reported in tabular and listed. The aim of this assessment was to provide information to those who develop demand driven research activities. The assessment report mainly focused on Natural resource research constraint and opportunities of Worabe agricultural research center AGP-II thematic Woredas by selected representative kebeles from each Woreda in the project zones. All the collected constraints and opportunities of natural resource research directorate were listed down in tabular form and short bulleted discussion from each woredas' were written in precisely. In addition to this, major problems of the area were attempted to narrate below in the table shortly. The study shows there were different research constraint almost all in assessed woredas' which needs intervention of natural resource research work in different disciplines.

Keywords: Community Level Project Planning (CLPP), Agricultural Constraints, Demand Driven Research, Agricultural Growth Program (AGP-II), Natural Resource Research Directorate

1. Introduction

Ethiopia is the second most popular country in Africa next to Nigeria. Most of peoples' were living in high land areas with 85% of its population were in rural and dependent on agriculture [1]. Its economy is supported by its agricultural sector which is fundamental instrument for poverty alleviation, food security, and economic growth. The Federal

Ministry of Economic Development and Cooperation stated in [2] reported that agriculture contributes highly in terms of export, employment, and subsistence to the Ethiopian economy. It contributes 50 percent of GDP, 85 percent of employment (the rural population of Ethiopia), 90 percent of earnings from export, and 70 percent of raw material

requirements for large and medium industries that are agro-processing [2]. Agriculture is the mainstay of the Ethiopian economy, accounts for 90% of the total foreign exchange earning, 50% of the GDP, and provides employment for over 85% of the country's labour force. While this makes it the most important sector in the country, it has been characterized by poor and relatively declining performance since the late 1960s and early 1970s. The result of this has been progressively increasing grain imports and food aid. For instance, cereal production has been negative since 1972 with the exception of a few years [3].

Natural resource management (NRM) is becoming a relatively new and expanding thrust in policy research on African agriculture [4-8]. Many of these studies have concluded that if natural resources are to be protected against the risk of destruction, it is essential that governments devise a range of policy instruments that can influence behavior for the adoption of technology innovations and institutions that promote sustainable management of natural resources to alleviate poverty.

A number of factors may explain the low technology adoption rate in the face of significant efforts to promote sustainable land management (SLM) practices; Such as: poor extension service system, blanket promotion of technology to very diverse environments, top-down approach to technology promotion, late delivery of inputs, low return on investments, escalation of fertilizer prices, lack of access to seasonal credit, and production and consumption risks [9-11].

Available evidence shows that yields of major crops under farmers' management are still far lower than what can be obtained under research managed plots [12, 13]. Attaining sustainable agricultural development and potential, which can be able to feed steadily growing population and support emerging industrial development and overall transformation, is possible through, identifying agricultural production gap, promoting technology transfer and adoption, boosting demand driven commercial production, deepening agricultural markets, and improving infrastructure and setting agricultural policies and strategies. Agricultural extension services have indispensable role through provision of applicable information, knowledge and skills along with dissemination of demanded agricultural technologies [14, 15].

To develop a rational land use policy, to choose between alternative land uses or to direct investment where it will yield the greatest benefit, decision-makers need timely information about natural resources and the capability to make use of this information [16].

Problems based on natural resource have been influenced on agricultural productivity in specifically, and livelihood of the people in general. In addition to this the quality of environmental total ecosystem has been declining from time to time. However, different research activities and development intervention efforts have been made in different areas to alleviate ever increasing land related constraints, integrated work will be needed to solve emerging and existing natural resource management based problems in situation that variety of soil,

water, forests, climatic and management system.

One of the constraints in agricultural research is weak participatory project planning to alleviate agricultural problems. Any research activities carried out by lack of baseline information about study area were not targeted on root problems of the research area. Most of research activities carried out in the field were not considered background information of the study area. In other words, in agricultural research, poor problems identifications before field demonstration/experimentation may lead to reaching in to false finding. Therefore, this community level based project planning/CLPP/ assessment was aimed to identify agricultural constraints and opportunities of the Worabe Agricultural Research center all AGP-2 thematic Woredas by selected representative kebeles' from each Woreda in the project zones.

The CLPP (community level project planning) assessment discussed in this paper was to serve as a basic information to develop demand driven research activities preparing by AGP-II funding. The assessment report mainly focused on Natural resource research constraint and opportunities of Worabe agricultural research center AGP-II thematic Woredas by selected representative kebeles from each Woreda in the project area. All the collected data/constraints and opportunities/ of all natural resource research directorate were listed down in tabular form and short bulleted discussion from each woredas' were written in precisely. In addition to this, major problems of the area were attempted to narrate below in the table shortly.

The aim of this study is to assess the community level based project planning /CLPP/ to identify agricultural constraints and opportunities of targeted Woredas of Silte, Gurage Zones and Yem Special woreda. The assessment report mainly focused on Natural resource research constraint and opportunities of Worabe agricultural research center AGP-II thematic Woredas by selected representative kebeles from each Woreda in the project zones.

2. Methodology

The assessment report mainly focused on Natural resource research constraint and opportunities of Worabe agricultural research center AGP-II thematic Woredas by selected representative kebeles from each Woreda in the project area. The study was conducted using qualitative survey methods by participatory research approach/PRA/ tools including (farmers, youth association, different genders groups, kebele key informant, DAs, focus group discussion/FRD/. Other primary information was collected from zone staff, woreda agricultural office. The data was collected by collaboration of different field of professional specialization teams. All the collected data / information about all natural resource management constraints and opportunities were listed down in tabular form and short bulleted discussion from each woredas' were written in precisely. In addition to this, major problems of the area were attempted to narrate below in the table shortly.

Description of Study Areas

1) Siltie Zone

Location, area, and administrative division

Siltie zone is one of the 14 zones that forms SNNPRS (southern nation nationality and people regional state) covering an area of 3047.83 square kilometer. It was established soon after referendum that had been taken by Silte nationality in 1993 E.C. It has 8 woredas namely Dalocha, Silte, Lanforo, Alichu, Sankura, West Azernet, East Azernet Berbere, Hulbarag and one reform town, Worabe. Worabe, the Zone's capital town is located on the main road from Addis Ababa to Hossana just 172 km apart from Addis Ababa.

Siltie is one of the central zones of the region with large plain land, mountainous area, plateaus. Concerning the climate of the zone it has three different agro-climatic conditions, high and mid-land and consisting 37% and 63% respectively. The average temperature range from 12 to 26°C and the average annual rainfall ranges from 780 to 1818 mm. 95.5% of the population engaged in agriculture.

Climate

Climate is a long period average weather condition of a defined geographical area. It is determined by altitude, latitude, prevailing winds, cloud cover, pressure and wind belts. Altitude is by far determinant factor for the spatial variation of weather and climate. Among the elements of Weather and Climate, temperature and rainfall are important elements in determining the pattern of population settlement, the range of crops and vegetation that can be grown, soil formation Processes and biodiversity and agro ecology of a given area.

Rainfall

The amount, duration and intensity of rainfall in this zone decreases from west and northwest to south-eastwards. The main dry season is shorter in southern Ethiopia and the main rain season is larger in south west and in south. The past three decades rainfall data show that the lowest annual rainfall is 801mm and highest Annual rainfall is 1200mm. Relying on the reliability of rainfall for crop Production and duration of growing periods, the three seasonal patterns of rainfall in this zone experienced Bega (Dec., Jan. Feb.) Provide rain for limited part of the region, Belg (little rain season), (March, April) the amount of rainfall received is relatively lower than the summer rainfall that occurred in June, July, August. However, in each of the seasons the rain may Begin earlier/late and lasts before the usual time. This has impact on growing period and reliability of rainfall.

Temperature

Temperature is the quantity that tells us how hot or cold something is relative to some set standard moisture content and the humidity of the atmosphere. The mean annual temperature of this zone is 10.1°C. However, temperatures are generally high with little variations among seasons. The meteorological data of 2007 G. C indicate that the mean annual maximum temperature of this zone 22.5°C & 11°C in the highlands of Siltie zone.

Agro-ecology

Siltie zone has a diverse agro ecological conditions ranging from hot arid and semi-arid climate (high land & mid land type) in the southern most parts such as (high land and partially cold) type in the high lands of the North and Northwest. Intermediate between these extremes the climate is defined to be Tropical sub humid type (high land) 34% of the region that is moderately suitable for settlement and crop production. Most part of the zone, about 79.5% lies under mid land type of agro-ecology while high land and high cold conditions constitute 8.6% of the region. The varied agro climatic conditions made these zones be endowed with the production of different commercial and food crops.

Agriculture Sector of the Silte Zone at a glimpse

Agricultural sector is the predominant economic activity there by making the largest contribution of Silte Zone Gross Domestic Product, and main livelihood for about 90% of population which are engaged in mixed farming system. However, due to extreme dependence on rain fed agricultural, the production is still at subsistence. Silte Zone Agricultural land holding is very small and highly fragmented. This fragmented and small holding per household is mainly attributed to high population density in the region. Silte Zone has different agro-ecological namely, Dega, 20.5% and Woina Dega, 79.5% which are found between 1500 up to 3700 masl. These and others factors have highly influenced and contributed to the existing varieties of fauna and floras. Barly, maize, sorghum, Enset & vegetables are the major crops grown in the zone. Livestocks reared are cattle, sheep, goat, poultry and equines.

The sector is being geared by the large number of extension workers who have been trained at diploma level and above to provide technical support to the farming communities, agricultural input and extension services for farmers to adapt a modern technology.

2) Gurage Zone

Gurage zone has a land size of about 5932 square kilometers and consists 15 woredas. Namely, Abeshegae, Qebena, Ezia, Kokir-Gedebano, Sodo, Meskan, Mareko, Gumer, Cheha, Enemore and Enere, Muhur-Aklile and Endegagn. Topographically the zone lies within an elevation ranging from 1000 to 3600 meters above sea level. The zone has three agro- ecological zones high land (35%) mid land (62%) and low land (3%). The annual average temperature of the zone ranges from 13 to 30°C and the mean annual rainfall ranges from 600-1600 mm. Considering the land utilization, 52% of the total area is a cultivated land, 13.4% is a grazing land, 9.9% is a natural and man-made forest land, 7.3% unproductive land and the remaining 17.6% is covered by others. The zone has resource potential exploitable for the development of agriculture, such as floriculture, high land fruits and for establishing agro based industries, such as chip wood and fiber processing factories from 'Enset'. In view of the fact that the high land dwellers of the zone are acquainted with the growing of Enset crops that could be a potential raw material source for fiber processing factory. Wolkite town is the administrative and trading center of the zone. The town is located at a distance of 158 km south -west of Addis Ababa.

The annual average temperature of the town is 32°C and favors high land climatic condition. The Gurage zone live a sedentary life based on agriculture, involving a complex system of crop rotation and transplanting. Ensete is the main staple food, but other cash crops are grown, which include coffee and Khat, both traditional stimulants. Animal husbandry is practiced, but mainly for milk supply and dung. Other foods consumed include green cabbage, cheese, butter, and roasted grains, with meat consumption being very limited (also used in rituals or ceremonies).

The principal crop of the Gurage is Enset (also Enset, "false banana plant"). This has a massive stem that grows underground and is involved in every aspect of Gurage life. It has a place in everyday interactions among community members as well as specific roles in rituals. Enset is also exchanged as part of a variety of social interactions, and used as a recompense for services rendered. Ensete is totally involved in every aspect of the daily social and ritual life of the Gurage, who, with several others tribes in Southwest Ethiopia, form what has been termed the *Enset Culture Complex* area. the life of the Gurage is enmeshed with various uses of Enset, not the least of which is nutritional.

Enset can be prepared in a variety of ways. A normal Gurage diet consists primarily of kocho; thick bread made from Enset, and is supplemented by cabbage, cheese, butter and grains. Meat is not consumed on a regular basis, but usually eaten when an animal is sacrificed during a ritual or ceremonial event. The Gurage pound the root of the Enset to extract the edible substance, and then place it in deep pits between the rows of Enset plants in the field. It ferments in the pit, which makes it more palatable. It can be stored for up to several years in this fashion, and the Gurage typically retain large surpluses of Enset as a protection against famine. In addition to Enset, a few cash crops are maintained (notably coffee and khat) and livestock is raised (mainly for milk and fertilizer). Some Gurage also plant Teff and eat Injera (which the Gurage also call Injera). Different species of Enset are also eaten to alleviate illness. It is considered polite to leave at least some Ensete bread even after a very small portion is passed around. Mixed farming (crop production and the rearing of livestock) is widely practiced. Crops grown include cereals (Teff, wheat, maize and barley), horticultural crops (Enset, Irish potato) and pulses (Faba bean, field pea). The main biophysical constraints facing the zone are declining soil fertility, deforestation, and low yielding varieties that are also prone to disease. However, there are examples of soil and water conservation measures aimed at addressing these problems include Agro forestry and composting.

3) Yem Special Woreda

Yem special woreda is one of the eight special woredas of the Southern Nations, Nationalities and People's Regional States (SNNPRS). Yem Special Woreda is situated in the north western apex of the region and is located between 7° 57' N to 8° 02' N latitude and 37° 40' E to 37° 61' E longitude. It is bordered by Hadiya and Gurage Administrative Zones of SNNPR to the east and south, and

by Jima zone (in Oromiya Region) to the north and west. The Gibe River marks the border between Yem and Hadiya. It has a total area of 724.5 square kilometers, which accounts for around 0.65% of the total area of the SNNPRS. The landscape varies considerably from one part of the woreda to another, but is mostly hilly. The topography of the Special Woreda is characterized by rolling mountains, long gorgeous land, steeply sloppy areas and flat to undulating plateaus. The highest peak within the special woreda is mount Bora (2940 m). The area is divided into three agro ecological zones, namely, "Dega" (highlands with altitude of 2300-2500 masl) which is central parts, "mid land" (moist warm land with an altitude of 1500-2300 masl) covers the central apex and western part, and "Kolla" (with altitude less than 1500 masl) and found in eastern zone of the woreda. The area coverage in terms of agro ecological zone shows that the Dega covers 49.3% while the mid land and low land part shares 26.9 and 23.8 percent, respectively. Temperature is inversely related with altitude, with mean annual temperature between 20-30°C in the lowlands (kolla), 16°C -20°C in the mid land and 12°C - 16°C in the highlands (dega) areas of the woreda. The rainfall in the woreda is basically bimodal with short rainy season or "Belg" and long rainy season or "Meher". The short rainy season usually appears during the months of Mid of February/April while the long rainy season is in the months of June/September. The rainfall pattern can also sometimes be considered as one and overlapping long rainy season with rainfall duration of 7-8 months per annum with a short dry period. The area in general receives adequate precipitation of mean monthly maximum and minimum rainfall of 2200 mm and 800 mm respectively. Moisture related with agro ecological zone is depicted as the high land zone estimated to receive rainfall ranging between 1200-2200 mm while the mid land and low land zones estimated to receive 900–1200 mm and less than 900 mm, respectively.

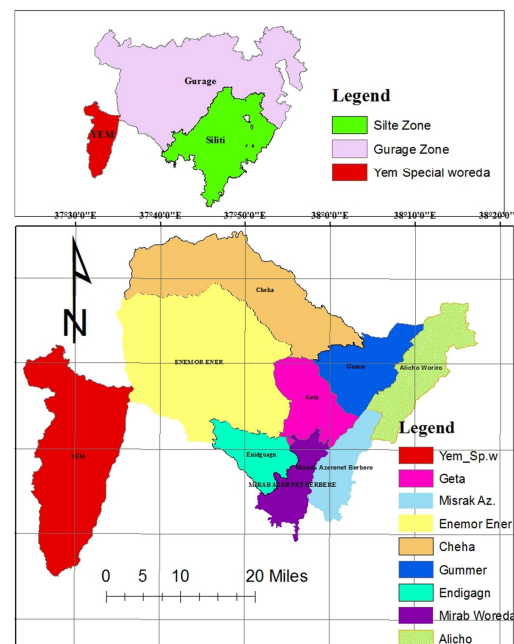


Figure 1. Map of study areas.

3. Major Agricultural Constraints of Natural Resource Management in the Study Area

Table 1. Endegagn Woreda/Gurage Zone/.

| Kebele: Bacha | | | | | | |
|--|--|--|---|---|---|--|
| Resources | Soil characteristics | Inherent Soil fertility Problems | Soil Management | Use of Fertilizers | Soil erosion | Soil conservation techniques |
| <p>Technology Constraints: For high acidic soil management there was no supplying lime, potassium fertilizer access low Knowledge gap: Lack of Soil bund stabilization Integrated soil fertility management gaps (bio-fertilizer uses, compost, animal manure... using) Institution Gap: Awareness creation and capacity building gaps among farmer how to use bio fertilizer, No research on soil fertility management so far</p> | <p>Soil Type: Red colored clay loam soil Major Physical characteristics: Loose and dry soil Easy to plough Major Chemical Characteristics: Highly acidic</p> | <p>Soil Physical infertility: Easy to plough and loose grain size but not productive without fertilizer</p> | <p>Soil Physical Management: Tillage frequency: 3-4 times plough for any crops Soil Chemical management: No soil chemical management practice Soil Biological Mgmt: Planting multipurpose trees species such as desho grass and crop rotation to prevent soil acidity</p> | <p>Inorganic Fertilizer: DAP and urea NPS, NPSB and Zn Organic Fertilizer: Organic fertilizer use was not practiced</p> | <p>Erosion Types: Splash, medium Gully and sheet erosion Major causes for soil erosion: Slopy Topography High rain fall, lack of d/t conservation structures</p> | <p>Structural/Physical: Terracing, stone bund for slope areas, fannagu, trench, cut-off drain, diversion ditches, ibrobas n for rehabilitation Biological: different types grass and trees planting to bund stabilizing</p> |
| <p>Water Resources: Technology Constraints: Pond lining plastic shortage Water pump buying capacity/low income Knowledge gap: Rain Water harvesting technology gap Institution Gap: Capacity building on Water harvesting technologies</p> | <p>Available water resources: Seasonal rivers, springs, ponds Ground water: Deep ground water</p> | <p>Irrigation Access: Yes but not in modern canal</p> | <p>Modern Irrigation Scheme: No modern schemes</p> | <p>Traditional Irrigation Scheme: Water pumping, rope and washer, hand fetching</p> | <p>Irrigation water management: What is the method of irrigation: Furrow irrigation Is there fixed irrigation scheduling? No but used from Sept- to Jan Is there irrigation water amount based on water requirement? No Drainage techniques for excess moisture: Cut off drain, erosion diversion</p> | <p>Water harvesting techniques/Moisture management: Types of waterharvesting techniques: Diverting surface water, ground water pumping Fetching from source by donkey Rain water harvesting in pond in rainy season and using it for irrigation in dry season Problems with water harvesting techniques: High Leakage of water from pond Water scarcity For water pump, even if the pump ocured it is impossible to pump below $\geq 30m$</p> |
| <p>Land Resources: Technology Constraints: lack of seedlings Knowledge gap: cutting before maturity Institution Gap: Seedling constraint for indigenous tree species Lack of plastic container for seedlings, environmental inadaptable seed dissemination which is no resisting disease</p> | <p>Land Use/cover Forest Natural (% or area): 16ha Plantation (% or area): 6ha Communal Grazing land (% or area): 71ha Areaclosure (% or area): 22ha Cultivated land: 532ha Cultivable land: 610ha</p> | <p>Forest Management Multipurpose trees species (MPTS) production: Species names: Wanza, korch, giraar, tsid (ye abasha), koso, zigiba Area of production (or in %): 7.5ha Management problems of MPTS: Cutting of trees before maturity, Cattle grazing</p> | <p>Management Current management of multipurpose tree production: fencing, weedi g, pruning</p> | <p>Rain water harvesting in pond</p> | | |

Table 2. Geta Woreda/Gurage Zone/.

| Kebele: koante (ጽጌ) | | | | | | |
|---|--|---|---|--|---|---|
| Resources | Soil characteristics | Inherent Soil fertility Problems | Soil Management | Use of Fertilizers | Soil erosion | Soil conservation techniques |
| Soil Resources Technology Constraints: Multipurpose tree planting for Soil and water conservation Low acidic soil management practice Narrow land Knowledge gap: New technology taking gaps Awareness gap (ignorance of new technology) Institution Gap: Late gain of fertilizer from extension Capacity building and Awareness creation gap different species of nursery and grass s supplying gaps | Soil Type: Black and red Major Physical characteristics: Loam soil Major Chemical Characteristics: Black soil character soil is changed to red and become hard grain size, soil fertility decreases time to time based on weather condition | Soil physical infertility: High Acidic soil, medium grain size, production decreases time to time | Soil physical management: Watershed management practice (drainage ditch and trench preparing), mulching in some amount, fallowing and crop rotation Soil chemical management: High need or use of urea and DAP/NPS, lime using but supply is not enough Soil biological management: Desho and elephant grass planting Tillage frequency: For inset 3 time ploughing once a month, 5 time for potato, 4-5 time for barley once at 15 day interval | Organic fertilizers:- Animal dag and compost using Bio fertilizer use: Animal dag use Inorganic fertilizers:- 2:2 ratio of DAP and Urea (2 kuntal urea and 2 kuntal dap) Gaps in use of fertilizers: No gaps because of farmers are well informed how to use it | Erosion Types: Splash, sheet and Medium Gully erosion types Major causes for soil erosion: High rain fall and slope topography | Structural/Physical : bund stabilizing, ditch and chick dam providing counter ploughing Biological: different types grass and trees planting to soil bund stabilizing |
| Water | Available water resources | Name of Irrigation scheme | Modern Irrigation Scheme | Traditional Irrigation Scheme | Irrigation water management | Water harvesting techniques/Moisture management |
| Other water sources:- Ground and rain water sources | Yes | Haram | no | no | Method of irrigation water: Furrow | Types of water harvesting techniques: Communal Pond preparing and pumping from surface water |
| Land Resources | Land Use/cover | Is there fixed irrigation schedule:- no | Management | | | |
| Technology Constraints: Knowledge gap: Knowledge gap in mixed plantation in home garden area Rain water harvesting techniques gap, awareness gaps Institution Gap: Awareness creation gaps/capacity building/ modeling gaps in FTC for different technology transmission Different grass and nursery species providing gaps | Forest Natural (% or area): no Plantation (% or area): 0.375ha Communal Grazing land (% or area): 18ha Area closure/Closed areas (% or area): 13ha Cultivated land: 429ha (mehr-143ha and belg-286ha) Cultivable land: 145ha | Forest Management Multipurpose trees species (MPTS) production: Species names: Eculaptus, Gravilia, tid, corch, bamboo, suspania Area of production (or in %): 0.02ha Management problems of Multi-Purpose Tree Species: Improperly management to handle Multipurpose trees species | Current mgmt. of multipurpose tree production: High because of high farmer needs | Rain water harvesting in pond | No such much irrigation structures, there is water potentials but far from farm land | Problems with water harvesting techniques:- Business capacity gaps, modern/lined canal construction gaps, awareness gaps to Rain water harvesting Moisture mgnt for moisture stress areas:- moisture conserving structures preparing in field (small drainage ditch preparing) |

Table 3. Cheha Woreda/Gurage Zone/.

| Resources | Soil characteristics | Inherent Soil fertility Problems | Soil Management | Use of Fertilizers | Soil erosion | Soil conservation techniques |
|--|---|---|---|---|--|--|
| Technology Constraints: low Multipurpose tree planting for Soil and water conservation practices Low acidic soil management Knowledge gap: Lack of Soil bund stabilization Integrated soil fertility management gaps Institution Gap: No further research on soil fertility management Late gain of fertilizer from extension Awareness creation gap d/t species of nursery and grass s supplying gaps disease solution giving gap on crop in watershed community participation gap | Soil Type: Black and red Major Physical characteristics: Loam soil Major Chemical Characteristics: Black soil character soil is changed to red and become hard grain size, soil fertility decreases time to time based on weather condition | Soil physical infertility: Because of acidic soil, production decreases time to time | Soil physical management: Drainage ditch and trench preparing, mulching in some amount, fallowing and crop rotation Soil chemical management: High need or use of urea and DAP, lime used but supply is not enough Soil biological management:- Desho and elephant grass planting Tillage frequency:- Five time ploughing up to sowing, once at 15 day interval for barely and potato and 3 time in one month for inset | Organic fertilizers: Animal dag and compost using Bio fertilizer use: Animal dag use Inorganic fertilizers:- 2:2 ratio of DAP and Urea (2 kuntal urea and 2 kuntal dap) Gaps in use of fertilizers:- No gaps | Erosion Types: Split, sheet and Medium Gully erosion types Major causes for soil erosion: High rain fall and slope topography | Structural/Phys ical: Drainage ditch and bund preparing, across slope ploughing Chick dam preparing Biological: Different types grass and trees planting to soil bund stabilizing |
| Water | Available water resources | Name of Irrigation scheme | Modern Irrigation Scheme | Traditional Irrigation Scheme | Irrigation water management | Water harvesting techniques/Moisture management |
| Other water sources:- Ground and rain water sources | Yes | haram | no | no | Furrow using | Pond preparing and pumping from surface water |
| Land Resources | | Is there fixed irrigation schedule:- no | Forest Management | Management | | |
| Technology Constraints: Knowledge gap: Rain water harvesting techniques gap Irrigation practice gap New technology adopting gaps Institution Gap: Awareness creation gaps, fertilizer and new varieties on time proving gaps modeling gaps in FTC different grass species providing gaps | | Multipurpose trees species (MPTS) production: Species names: Eucalyptus, junipers and coarch | Current mgmt. of multipurpos e tree production:- High because of high farmer needs | No such much irrigation structures, there is water potentials but far from farm land | | Rain water harvesting in pond in rainy season and using it for irrigation in dry season Problems with water harvesting techniques:- Business capacity gaps, modern canal const/n gaps, awareness gaps to Rain water harvesting Moisture management for moisture stress areas:- Drainage ditch providing, moisture conserving structures preparing |

Table 4. Gummer Woreda/Gurage Zone/.

| Resources | Soil characteristics | Inherent Soil fertility Problems | Soil Management | Use of Fertilizers | Soil erosion | Soil conservation techniques |
|--|---|--|---|--|--|---|
| Technology Constraints: Multipurpose tree planting for Soil and water conservation Low acidic soil management Knowledge gap: Lack of Soil bund stabilization Integrated soil fertility management gaps Institution Gap: No further research on soil fertility management Late gain of fertilizer from extension | Soil Type: Black and red Major Physical characteristics: Loam soil Major Chemical Characteristics: Black soil character soil is changed to red and become hard grain size, soil fertility decreases time to time based on weather condition | Soil physical infertility: Because of acidic soil, production decreases time to time | Soil physical management: Drainage ditch and trench preparing, mulching in some amount, fallowing and crop rotation Soil chemical management:- High need or use of urea and DAP, lime use but supply is not enough Soil biological management:- Desho and elephant | Organic fertilizers:- Animal dag and compost using Bio fertilizer use: Animal dag use Inorganic fertilizers: 2:2 ratio of DAP and Urea (2 kuntal urea and 2 kuntal dap) Gaps in use of fertilizers:- No gaps | Erosion Types: Split, sheet and Medium Gully erosion types Major causes for soil erosion: High rain fall and slope topography | Structural/Physical: Drainage ditch and bund preparing, across slope ploughing Chick dam preparing Biological: Different types grass and trees planting to soil bund stabilizing |

| Resources | Soil characteristics | Inherent Soil fertility Problems | Soil Management | Use of Fertilizers | Soil erosion | Soil conservation techniques |
|--|--|--|---|-------------------------------|---|--|
| Awareness creation gap d/t species of nursery and grass s supplying gaps disease solution giving gap on crop in watershed community participation gap | | | grass planting Tillage frequency: Fife time ploughing up to sowing, once at 15 day interval for barely and potato and 3 time in one month for inset | | | |
| Water | Available water resources | Name of Irrigation scheme | Modern Irrigation Scheme | Traditional Irrigation Scheme | Irrigation water management | Water harvesting techniques/Moisture management Pond preparing and pumping from surface water |
| Other water sources: Ground and rain water sources | yes | haram | no | no | Furrow using | |
| | Land Use/cover | Is there fixed irrigation schedule:- no Forest Management | Management | | | |
| Land Resources Technology Constraints: Knowledge gap: Rain water harvesting techniques gap Irrigation practice gap New technology adopting gaps Institution Gap: Awareness creation gaps, fertilizer and new varieties on time proving gaps modeling gaps in FTC different grass species providing gaps | Forest: Natural (% or area): no Plantation (% or area): no Communal Grazing land (% or area): no | Multipurpose trees species production: Species names: Eucalyptus, junipers, coarch | Current management of multipurpose tree production: High because of high farmer needs | Rain water harvesting in pond | No such much irrigationstructures, there is water potentials but far from farm land | Rain water harvesting in pond in rainy season and using it for irrigation in dry season Problems with water harvesting techniques:- Business capacity gaps, modern canal construction gaps, awareness gaps to Rain water harvesting Moisture management for moisture stress areas:- Dich providing, moisture conserving structures preparing |

Table 5. Enamor inner Woreda/Gurage Zone/.

| Resources | Soil characteristics | Inherent Soil fertility Problems | Soil Management | Use of Fertilizers | Soil erosion | Soil conservation techniques |
|---|--|--|---|--|--|---|
| Technology Constraints: Multipurpose tree planting for Soil and water conservation Low acidic soil management Knowledge gap: Lack of Soil bund stabilization Integrated soil fertility management gaps Institution Gap: No further research on soil fertility management Late gain of fertilizer from extension Awareness creation gap d/t species of nursery and grass s supplying gaps disease solution giving gap on crop in watershed community participation gap | Soil Type: Black and red Major Physical characteristics: Loam soil Major Chemical Characteristics: Black soil character soil is changed to red and become hard grain size, soil fertility decreases time to time based on weather condition | Soil physical infertility:- Because of acidic soil, production decreases time to time Tillage frequency:- Fife time ploughing up to sowing, once at 15 day interval for barely and potato and 3 time in one month for inset | Soil physical management:- Drainage dich and trench preparing, mulching in some amount, fallowing and crop rotation Soil chemical management:- High need or use of urea and DAP, lime used but supply is not enough Soil biological management:- Desho and elephant grass planting | Organic fertilizers:- Animal dag and compost using Bio fertilizer use: Animal dag use Inorganic fertilizers: 2:2 ratio of DAP and Urea (2 kuntal urea and 2 kuntal dap) Gaps in use of fertilizers: No gaps | Erosion Types:- Split, sheet and Medium Gully erosion types Major causes for soil erosion: High rain fall and slope topography | Structural/Physical: Drainage dich and bund preparing, across slope ploughing Chick dam preparing Biological: Different types grass and trees planting to soil bund stabilizing |

| Resources | Soil characteristics | Inherent Soil fertility Problems | Soil Management | Use of Fertilizers | Soil erosion | Soil conservation techniques |
|--|---------------------------|---|---|-------------------------------|--|---|
| Water | Available water resources | Name of Irrigation scheme | Modern Irrigation Scheme | Traditional Irrigation Scheme | Irrigation water management | Water harvesting techniques/Moisture management |
| Other water sources:- Ground and rain water sources | yes | Haram | no | no | Furrow using | Pond preparing and pumping from surface water |
| Land Technology Constraints: Knowledge gap: Rain water harvesting techniques gap Irrigation practice gap New technology adopting gaps Institution Gap: Awareness creation gaps, fertilizer and new varieties on time proving gaps modeling gaps in FTC Different grass species providing gaps | Land Use/cover | Is there fixed irrigation schedule:-no Forest Management | Management | | | Rain water harvesting in pond in rainy season and using it for irrigation in dry season Problems with water harvesting techniques:- Business capacity gaps, modern canal const/n gaps, awareness gaps to Rain water harvesting Moisture management for moisture stress areas:- Drainage ditch providing, moisture conserving structures preparing |
| | | Multipurpose trees species (MPTS) production: Species names: Eucalyptus, junipers, corch | Current mgmt. of multipurpose tree production: High because of high farmer needs | Rain water harvesting in pond | No such much irrigation structures, there is water potentials but far from farm land | |

Table 6. Mierabazernet Woreda/Silte Zone/.

| Resources | Soil characteristics | Inherent Soil fertility Problems | Soil Management | Use of Fertilizers | Soil erosion | Soil conservation techniques |
|--|---|--|--|---|---|--|
| Technology Constraints: No biogas Lack of new agricultural technology gaps Knowledge gap: DAP and Use practice is not in specified amount stabilization Watershed community participation gap/all community were no responsibility Knowhow about SWC techniques Institution Gap: Research on soil fertility management was not done so far Late gain of fertilizer from extension Awareness creation gap Different species of nursery and grass s supplying gaps disease solution giving gap on different crop in watershed community participation gap | Soil Type: Black soil Sandy loam Major Physical characteristics: Black soil and red downward to soil and yellow below 5m-10m Major Chemical Characteristics: Black soil character soil is changed to red and become hard grain size, soil fertility decreases time to time based on weather condition | Soil physical infertility:- Acidic, its color changed from black to red, mist (local name) attacks in guarded vegetables Soil chemical infertility: Soil color changed to Red and Acidity comes | Soil physical mgmt:- fallowing and crop rotation method is used Soil chemical management:- High need or use of urea and DAP, lime use Soil biological management: Desho and elephant grass planting Tillage frequency:- 5 time ploughing up to sowing, once at 15 day interval, Modern Irrigation Scheme | Organic fertilizers:- Animal dag and some compost using Bio fertilizer use:- Animal dag use Inorganic fertilizers:- Urea, DAP, NPS, (2:3 ratio of DAP and Urea) Gaps in use of fertilizers:- Awareness problem among farmer to use specified amount DAP and Urea Traditional Irrigation Scheme | Erosion Types:- Splash, sheet and Medium Gully erosion types Major causes for soil erosion: High rain fall, lack of d/t conservation structures maintenances, watershed practice is not on time Irrigation water management | Structural/Physical: Drainage ditch and soil bund preparing, across slope ploughing Biological: Different types grass and trees planting to soil bund stabilizing (desho, elephant for animal feed but not such much use for SWC practice.) Water harvesting techniques/Moisture management Rain water harvesting in pond in rainy season and using it for irrigation in dry season Problems with water harvesting techniques: |
| Water Resources: River/surface water sources No regular or perennial rivers Ground water source: No ground water Other water sources: Surface water but not perennial and | Available water resources No sources | Irrigation Access No irrigation practices | no | no | no | |

| Resources | Soil characteristics | Inherent Soil fertility Problems | Soil Management | Use of Fertilizers | Soil erosion | Soil conservation techniques |
|--|---|--|--|-------------------------------|--|---|
| rain water Knowledge gap: Rain water harvesting techniques gap Institutional gaps: Spring rehabilitation gaps | | | | | | Topography, awareness to pond preparation Moisture management for moisture stress: No soil moisture management methods Drainage techniques for excess moisture: No water logging at all |
| Land Technology Constraints: Knowledge gap: Responsibility problems of each farmers Institution Gap: Awareness creation, information, capacity building and d/t tree and grass species supplying gap and modeling gaps in FTC | Land Use/cover Forest Natural (%): no | Forest Management Multipurpose trees species production: Species names: Eucalyptus, junipers, corch, bamboo | Management Current mgmt. of multipurpose tree production: High because of high farmer needs | Rain water harvesting in pond | No such much irrigation structures, there is water potentials but far from farm land | |

Table 7. Alichu Wirero Woreda/Siltie Zone/.

| Kekele: Edo | | | | | | |
|---|--|---|--|--|--|--|
| Resources | Soil characteristics | Inherent Soil fertility Problems | Soil Management | Use of Fertilizers | Soil erosion | Soil conservation techniques |
| Technology Constraints: Multipurpose tree planting for Soil and water conservation Low acidic soil management Low lime supply Knowledge gap: Lack of Soil bund stabilization Integrated soil fertility management gaps Institution Gap: Awareness creation gap Different species of nursery and grass s supplying gaps technology model showing gaps for water harvesting | Soil Type: Black soil Sandy loam Major Physical characteristics: Black soil and red downward to soil and yellow below 5m-10m Not smooth Hard grain size Major Chemical Characteristics: Black character soil is changed to red and become hard grain size, low fertility due to soil acidity | Soil physical infertility: Because of acidic soil, production decreases time to time with continuous ploughing | Soil physical management: Drainage ditch and trench preparing, fallowing and crop rotation method is used Soil chemical management:- K, urea, DAP and lime use Soil biological management:- Pulse sowing rather than wheat and barley to soil fertility maintain Tillage frequency:- In 15 days interval one time ploughing, up to sowing 5 times, | Organic fertilizers:- Animal dag/manure and compost using Bio fertilizer use: no Inorganic fertilizers:- Urea, DAP, NPS (new) Gaps in use of fertilizers:- specified amount of DAP and Urea use | Erosion Types: Splash, sheet and Medium Gully erosion types Major causes for soil erosion: High rain fall, lack of different conservation structures maintenances, poor forest development, watershed practice is not on time | Structural/Physical: Drainage ditch and soil bund preparing, mulching Biological: Different types grass and trees planting to soil bund stabilizing |
| Water Resources: | Available water resources | Irrigation Access | Modern Irrigation Scheme | Traditional Irrigation Scheme | Irrigation water management | Water harvesting techniques/Moisture management |
| | No sources | No irrigation practices | no | Rain water harvesting in pond | No such much irrigation structures, there is water potentials but far from farm land | Rain water harvesting in pond in rainy season and using it for irrigation in dry season |
| Land Technology Constraints: Knowledge gap: Rain water harvesting techniques gap Spring rehabilitation gaps | Land Use/cover | Forest Management Multipurpose trees species (MPTS) production: Species names: Eucalyptus, junipers, corch | Management Current management. of multipurpose tree production: High because of high farmer needs | | | |

| Kekele: Edo | | | | | | |
|---|----------------------|----------------------------------|-----------------|--------------------|--------------|------------------------------|
| Resources | Soil characteristics | Inherent Soil fertility Problems | Soil Management | Use of Fertilizers | Soil erosion | Soil conservation techniques |
| Responsibility gaps Institution Gap: Awareness creation, information, capacity building and different tree and grass species supplying gap and modeling gaps in FTC | | | | | | |

Table 8. Misrak Azernet Berbere Woreda/Siltie Zone/.

| Kebele: Adazer | | | | | | |
|---|---|--|--|---|--|--|
| Resources | Soil characteristics | Inherent Soil fertility Problems | Soil Management | Use of Fertilizers | Soil erosion | Soil conservation techniques |
| Technology Constraints: Multipurpose tree planting for Soil and water conservation Low acidic soil management Knowledge gap: Lack of Soil bund stabilization Integrated soil fertility management gaps Institution Gap: No further research on soil fertility management Late gain of fertilizer from extension Awareness creation gap d/t species of nursery and grass s supplying gaps disease solution giving gap on crop in watershed community participation gap | Soil Type: Black and red and medium acidic Major Physical characteristics: Loam soil Major Chemical Characteristics: Black soil character soil is changed to red and become hard grain size, soil fertility decreases time to time based on weather condition | Soil physical infertility:- Because of acidic soil, production decreases time to time | Soil physical management:- Drainage ditch and trench preparing, mulching in some amount, fallowing and crop rotation Soil chemical management:- High need or use of urea and DAP, lime used but supply is not enough Soil biological management:- Desho and elephant grass planting Tillage frequency:- Fife time ploughing up to sowing, once at 15 day interval for barely and potato and 3 time in one month for inset | Organic fertilizers:- Animal dag and compost using Bio fertilizer use:- Animal dag use Inorganic fertilizers:- 2:2 ratio of DAP and Urea (2 kuntal urea and 2 kuntal dap) Gaps in use of fertilizers:- No gaps | Erosion Types: Split, sheet and Medium Gully erosion types Major causes for soil erosion: High rain fall and slope topography | Structural/Physical: Drainage ditch and bund preparing, across slope ploughing Chick dam preparing Biological: Different types grass and trees planting to soil bund stabilizing |
| Water Resources: | Available water resources | Name of Irrigation scheme | Modern Irrigation Scheme | Traditional Irrigation Scheme | Irrigation water management | Water harvesting techniques/Moisture management |
| Other water sources:- Ground, surface water, konke and rain water sources | Yes | adazerabicho, wera, andguracha Is there fixed irrigation schedule:- no | no | no | Furrow using | Pond preparing and pumping from surface water |
| Land resources Technology Constraints: Knowledge gap: Rain water harvesting techniques gap Irrigation practice gap New technology adopting gaps Institution Gap: Awareness creation gaps, fertilizer and new varieties on time proving gaps modeling gaps in FTC different grass species providing gaps | Land Use/cover Forest Natural (% or area): Greater than 500ha Plantation (% or area): 350ha Communal Grazing land (% or area): 1644ha Area closure/Closed areas (% or area): 5220ha | Forest Management Multipurpose trees species (MPTS) production: Species names: Zigba (local name), juniperus, Coso (local name), Abogado & mango Eucalyptus, tid (local name), coarch | Management Current mgmt. of multipurpose tree production:- High because of high farmer needs | Rain water harvesting in pond | No such much irrigation structures, there is water potentials but far from farm land | Rain water harvesting in pond in rainy season and using it for irrigation in dry season Problems with water harvesting techniques:- Business capacity gaps, modern canal construction gaps, awareness gaps to Rain water harvesting Moisture management for moisture stress areas:- Drainage ditch providing, moisture conserving structures preparing |

Table 9. Yem Special Woreda.

| Kebele: Ediya | | | | | | |
|--|---|--|--|--|--|---|
| Resources | Soil characteristics | Inherent Soil fertility Problems | Soil Management | Use of Fertilizers | Soil erosion | Soil conservation techniques |
| Technology Constraints: Multipurpose tree planting for Soil and water conservation Low acidic soil management Knowledge gap: Lack of Soil bund stabilization Integrated soil fertility management gaps Institution Gap: No further research on soil fertility management Late gain of fertilizer from extension Awareness creation gap d/t species of nursery and grass s supplying gaps disease solution giving gap on crop in watershed community participation gap | Soil Type: Loam (Black in lowland and red in highland) Major Physical characteristics: Fast drying of the soil which leads easily loose its moisture Cracking Moisture season compacted Major Chemical Characteristics: Acidity problem Black soil is changed to red and becomes hard grain size, soil fertility decreases time to time based on weather condition | Soil physical infertility: Because of acidic soil, production decreases time to time Soil chemical infertility: Because of soil acidity stunted plant growth and yellow leaf | Soil physical management: Drainage ditch and trench preparing, mulching in some amount, fallowing and crop rotation Soil chemical management:- High need or use of urea and DAP, lime used but supply is not enough Wood ash application for acidic soil amelioration Soil biological management:- Desho, elephant grass and suspania planting for soil bund stabilizing Tillage frequency:- 4 to 5 time ploughing up to sowing, once at 15 day interval for barely and potato and 3 time in one month for inset | Organic fertilizers:- Animal dag, green manuring and compost using Bio fertilizer use: P and N source using Inorganic fertilizers:- 2:2 ratio of DAP (NPS) and Urea (2kuntal urea and 2 kuntal NPS) Gaps in use of fertilizers:- No gaps | Erosion Types:- Splash, sheet and Medium Gully erosion types Major causes for soil erosion: High rain fall and slope topography | Physical Structural: Drainage ditch and soil bund preparing, across slope ploughing, Chick dam preparing Biological: Different types grass and trees planting to soil bund stabilizing (desho and suspania) |
| Water Resources: | Available water resources | Name of Irrigation scheme | Modern Irrigation Scheme | Traditional Irrigation Scheme | Irrigation water management | Water harvesting techniques/Moisture management |
| | yes | No more, some functional (haram) | Name of scheme: No | Communal Pond and reservoir (rotto for roof topwater harvesting) | What is the method of irrigation: Furrow using and fetching by labour power | Communal Pond preparing, rooftop water collecting and pumping from surface water sources |
| River/surface water spring water rivers Ground water sources: bono/for drinking Other water sources: Rain water source | | Is there fixed irrigation schedule:- No modern irrigation schemes | What is the area of the command area: no | What is the area command? Is very small only 3.67ha | Is there fixed irrigation scheduling? December to may irrigation practice | Problems with water harvesting techniques:- Labor constraint Business capacity gaps (buy generator to pump water from the source), modern canal const/n constraints, awareness gaps among the farmers to Rain water harvesting |
| Land Resources Technology Constraints: Knowledge gap: Rain water harvesting techniques gap Irrigation practice gap New technology adopting gaps Institution Gap: D/t types of Seed source supplying gaps Cutting trees before maturity | Land Use/cover Forest Natural (% or area): 113.9ha (8.89%) Plantation (% or area): 16ha (1.24%) Communal Grazing land (% or area): 269.4ha Area closure/Closed | Forest Management Multipurpose trees species (MPTS) production: Species names: Albizialabag, azandaricaindica, graviliarobosta, juniper procera, acacia saligna, susbaniasusban, | Management Current mgmt. of multipurpose tree production:- High because of high farmer needs (protecting from cutting and animals, fencing, tinning, pruning | | No such much irrigation structures, there is water potentials but far from farm land | Moisture management for moisture stress areas:- bund providing, moisture conserving structures preparing Drainage techniques for |

| Kebele: Ediya | | | | | | |
|--|---|---|-----------------|--------------------|--------------|--|
| Resources | Soil characteristics | Inherent Soil fertility Problems | Soil Management | Use of Fertilizers | Soil erosion | Soil conservation techniques |
| without permission and Market chain or linkage gap | areas (% or area): 10.5ha Cultivated land: 196ha Cultivable land: 269ha professional supported Capacity building gaps Budget constraints | Eucalyptus, corch Area of production (or in %): 3ha Management problems of MPTS: Root disease on tid Animal grazing | | | | excess moistures: Small Drainage canal providing to remove excess water from the farmer field |

3.1. Major Finding from Gurage Zone Woreda's

Major problems identified in Enamor Iner woreda on Soil Fertility constraints were: Low acidic soil management, integrated soil fertility management gaps, No further research on soil fertility management and late gain of fertilizer from extension. For Soil and Water Conservation and water shed management constraints were:-Lack of Soil bund stabilization, Multipurpose tree planting for Soil and water conservation, Awareness creation gap and watershed community participation gap. For Agro-forestry and plantation based constraints were:-Different species of nursery and grass s supplying gaps and Different grass species provide gaps. For Irrigation water management based issues were: - Rain water harvesting techniques gap, Low Irrigation practice practices and Technologies modeling gaps in FTC.

Major problems identified in Endegagn woreda On Soil Fertility based constraints were:- For high acidic soil management there were no supplying lime and potassium source fertilizer access/low/, Integrated soil fertility management gaps (combination of organic and inorganic fertilizer use, bio-fertilizer uses, animal manure etc) and No research actions were taken to solve soil fertility management so far. Irrigation Water Management constraints:- When water harvesting Pond is prepared there is high water leakage (lining plastic shortage), Water scarcity, Water pump buying capacity gap/financially/even if the pump occurs it is no able to pump below 30m, Rain Water harvesting technology gap and Capacity building on Water harvesting technology and modeling gap. On Agro-forestry And Plantation research based issues: -lack of different species/varieties of nursery seed sources, Seedling constraint for indigenous tree species, Lack of plastic container for seedlings, Environmental inadaptable seed dissemination which is not resisting disease. On SWC and Water Shed Management based constraints were: Lack of Soil bund stabilization technology gap and the main cause for high erosion occurrences is, Steep Topography, sometime High rain fall, lack of different conservation structures.

Major problems identified in Geta woreda On Soil Fertility research based problems were:- Multipurpose tree planting for Soil and water conservation and Low acidic soil

management practice. On Agro-Forestry and Plantation based constraints were: -Narrow land, Different species of nursery and grass s supplying gaps and Knowledge gap in mixed plantation in home garden area. On Irrigation Water Management constraints were: - Rain water harvesting techniques gap, awareness gaps and Modeling gaps in FTC for different technology transmission.

Major Problems Identified in Cheha Woreda on Soil Fertility research based problems were: -Low acidic soil management, No further research on soil fertility management, integrated soil fertility management gaps and Awareness creation, fertilizer and new varieties providing gaps. On SWC and Water Shed Management constraints:- Late gain of fertilizer from extension, multipurpose tree planting for Soil and water conservation and Soil bund stabilization, different species of nursery and grass s supplying gaps and watershed low community participation gap. On Irrigation Water Management based problems were:-Rain water harvesting techniques gap, Irrigation practice gap, new technology adopting gaps, Rain water harvesting techniques gap, Irrigation practice gap, new technology adopting gaps, Rain water harvesting techniques gap and low Irrigation practice. Agro forestry and plantation based problems: - Awareness creation gaps, and new varieties on time proving gaps modeling gaps in FTC different grass species providing gaps and new technology adoption gaps.

Major Problems Identified In Gummer Woreda on Soil Fertility research based problems:- Low acidic soil management, research was not done on soil fertility management, Late gain of fertilizer from extension, Lack of Soil bund stabilization, Integrated soil fertility management gaps and New technology adopting gaps. On Agro Forestry and Plantation practice problems: - different species of nursery and grass s supplying gaps and multipurpose tree planting for Soil and water conservation. On SWC and Water Shed Management practices:- In watershed community participation gap, Awareness creation gaps, fertilizer and new varieties on time proving gaps, modeling gaps in FTC for different grass species providing gaps. On Irrigation Water Shed Management constraints: Rain water harvesting techniques gap, Irrigation practice gap, Rain water harvesting technology gap, Low Irrigation practice gap and new technology adopting gaps.

3.2. Major Finding from Siltie Zone Woreda's

Major Problems Identified in Mierab Azernet Woreda on Soil Fertility research problems were:-Lack of new agricultural technologies/No biogas, Researches on soil fertility management were not done so far, late gain of fertilizer from extension, For high acidic soil management. There were no supplying lime, potassium fertilizer access is low and DAP and urea Use practice is not in specified amount/rate. On SWC and watershed management based problems:- Watershed community participation gap/all community were no responsibility, watershed management mass movement of the community participation low/GAP, Lack of Soil bund stabilization technologies, Knowledge gap on Knowhow about Soil and water conservation techniques. On Agro Forestry and Plantation based constraints:- Different species of nursery and grass supplying gap. On Irrigation Water Use based issues: - No regular or perennial rivers and No ground water, Rain water harvesting techniques gap and Spring rehabilitation technology gaps.

Major Problems Identified in Alichu Woreda on Soil Fertility research based issues: - Low acidic soil management practices, integrated soil fertility management gaps (combination of organic and inorganic fertilizer) and Low lime supply and rate of application. On SWC and Water Shed Management based constraints: - Lack of Soil bund stabilization. On Agro-Forestry and Plantation issues:- Multipurpose tree planting for Soil and water conservation gaps and Different species of nursery and grass s supplying gaps. On Irrigation Water Management based problems: Technology model showing gaps for water harvesting.

Major problems Assessed in Misrak Azernet Berbere woreda On Soil Fertility Management based problems:-Low acidic soil management, Integrated soil fertility management gap (combination of organic and inorganic fertilizer), No further research on soil fertility management and others and Late gain of fertilizer from extension. On SWC and water shed management based constraints: - Multipurpose tree planting for Soil and water conservation, in watershed community participation gap, Lack of Soil bund stabilization and Integrated soil fertility management gags. On Agro forestry and plantation problems: - Different species of nursery and grass s supplying gaps. On irrigation water management problems: - Rain water harvesting techniques gap, Irrigation practice gap, and new technology adopting gaps and Modeling gaps in FTC.

3.3. Major Finding in Yem Special Woreda

On Soil Fertility research based problems were:- Low acidic soil management practices, Lack of Soil bund stabilization practices, integrated soil fertility management gaps, shortage of inorganic fertilizers sources such as potassium chloride to acidic soil management, No research on soil fertility management and Late gain of fertilizer from extension/fertilizer was given on time. On Agro-Forestry based issues: - Multipurpose tree planting for Soil and water conservation. On SWC and Water Shed Management practice

problems: - In watershed community participation gap, Lack of lime to amend acidic soil, Cracking & compactness of the soil, no access to bio-fertilizers, Low awareness creation to farmers in terms of how to use fertilizer (DAP and Urea), High water leakage in to subsurface soil (below plant root zone) and Intense cultivation & poor soil management. On Irrigation Water Management practice issues:- Rain water harvesting technology gap, Low Irrigation practice gap, new technology adoption gaps and Market chain or linkage gap.

4. Conclusions

In this CLPP (community level project planning) assessment reported, major constraints for each area were discussed in detail for all natural resource research disciplines. The constraints were listed table deeply and narrated in precisely. The aim of assessment was to provide information from different stockholders to those who develop demand driven research activities in the future. The assessment report mainly focused on Natural resource research constraint and opportunities of worabe agricultural research center and supported by AGP-II (agricultural growth program two) project. The Assesment was conducted on AGP-II thematic Woredas by selected representative kebeles from each Woreda in the project zones'. The study shows that there were different research constraints almost all in assessed woredas' which needs research intervention of natural resource research work considering different disciplines (Soil fertility, Soil and water conservation, Irrigation and Agroforestry) issues.

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References

- [1] Awulachew SB, Yilma AD, Loulseged M, Loiskandl W, Ayana M and Alamirew T. (2007). *Water Resources and Irrigation Development in Ethiopia*. Colombo, Sri Lanka: International Water Management Institute. 78p. (Working Paper 123).
- [2] MEDIC. 1999. Survey of the Ethiopian Economy: Review of Post Reform Developments 1992/3-1997/8. Ministry of Economic Development and Cooperation, Addis Ababa.
- [3] Alemayehu L. (1986). *Food Aid and Its Impact on the Ethiopian Agriculture*, Institute of Development Research (IDR), Addis Ababa University.

- [4] Omamo, S. W. (2003). Policy Research on African Agriculture: Trends, Gaps, Challenges. The Hague: ISNAR Research Report. 21.
- [5] Scherr, S. G. Bergeron, J. pender and B. Brabier. (1996). Policies for sustainable Development in fragile lands: Methodology overview. International Food Policy Research institute, Washington, DC.
- [6] Shiferaw, B and Holden, S. T. (2000). Policy instruments for sustainable land management: the case of highland smallholders in Ethiopia. *Agricultural Economics* 22: 217-232.
- [7] Egulu, B. and Ebanyat, P. (2000). Policy processes in Uganda and their impact on soil fertility. *Managing Africa's Soils* No 16, IIED, London.
- [8] Raussen T., Ebong G. and Musiime J., (2001). More effective natural resource management through democratically elected, decentralised government structures in Uganda. *Development practice* 11 (4).
- [9] Bongor, T., Ayele G., and Kumsa T. (2004). Agricultural Extension, Adoption, and Diffusion in Ethiopia. Ethiopian Development Research Institute (EDRI) Research Report, no. 1. Addis Ababa, Ethiopia: EDRI.
- [10] Kassa, B. (2003). Agricultural Extension in Ethiopia: The Case of Participatory Demonstration and Training Extension System. *Journal of Social Development in Africa* 18 (1): 49–83.
- [11] Dercon, S. and Christiaensen L. (2007). Consumption Risk, Technology Adoption, and Poverty Traps: Evidence from Ethiopia. Policy Research Working Paper, no. 4527. Washington, DC: World Bank.
- [12] Abate, T. (2006). Focusing Agricultural Research to Address Development Needs: the Way I See It. In: Abate, T. (Ed.), *Successes with Value Chain, Proceedings of Scaling up and Scaling out Agricultural Technologies in Ethiopia: an International Conference*, 9-11 May 2006, Addis Ababa, Ethiopia, pp. 1-20.
- [13] EIAR (Ethiopian Institute of Agricultural Research) (2007). *The Contribution of Agricultural Research in the Eve of the Ethiopian Millennium* (in Amharic), Mimeograph, Addis Ababa.
- [14] Federal Democratic Republic of Ethiopia (FDRE) (2014). *National Strategies for Ethiopia Agricultural Extension Systems: Visions, Bottlenecks and Systemic Interventions*. Addis Ababa, Ethiopia.
- [15] United Nations Development Program (2013). *Promoting ICT based agricultural knowledge management to increase production and productivity of smallholder farmers in Ethiopia*. UNDP Ethiopia, No. 1/2013.
- [16] D. B. Dalal-Clayton, D. L. Dent (1993). *Environmental Planning Group International Institute for Environment and Development* (IIED) 3 Endsleigh Street, London WC1H 0DD, London, England, UK.