# Community Survey and On-farm trials for Conservation Agriculture to enhance adoption and its impact, SNNPR, Ethiopia

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**Abstract**

This survey provides primary information for the study area/SIMLISA project with the objectives of, the community survey was designed to guide the baseline survey in terms of first approximation of socioeconomic profile of the communities within each target zone developed to identify and target hot spots. Secondly, designed various on-farm trials in conservation agriculture and recommend the most profitable once for scale up in order to improve production and productivity. Descriptive and inferential statics were used to analyze and present the data using statistical package of SPSS version 17.

The results were identified and analyzed the farming systems of the study area, livelihoods risks and strategies, constraints as well as the impacts of conservation agriculture based on-farm trials.

The report also recommended the fact that there are many constraints and opportunities in the target areas and beyond suggests that policy makers, researchers and other development partners harmonize their efforts and work together to bring smallholder poor farmers out of their current circumstances. There is a need to improve the accessibility of improved maize seed and widely adapted haricot bean technologies, improved livestock and agricultural development services. However, all may be made successful if improvement of the capacity of the farmers to take up and continue with the technologies can be ensured.

**Index Terms-** Survey, On-farm, Conservation agriculture, Adoption and its impact, livelihood risks and strategies, constraints and recommendations.



## 1. INTRODUCTION

Sustainable intensification of maize-legume farming systems for food security in Eastern and Southern Africa (SIMLESA) project was launched in Ethiopia in March 2010 with the objective of improving the livelihood and echo-system of maize-bean growing smallholder farmers. To this effect the first of the five objectives of the project deals with characterization of maize-legume production and input and output value chain systems and impact pathways, and identify broad systemic constraints and options for field testing.

Hence, the community survey was designed to understand the generalities of the farming communities engaged in the project. This study provides primary information regarding the farming systems of the community in the two project areas, Borecha and Lockabaya in Sidama Zone, SNNPR.

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## 2. Objectives

- The community survey was designed to guide the baseline survey in terms of first approximation of socioeconomic profile of the communities within each target zone developed to identify and target hot spots.

- To design on farm trials for conservation agriculture and recommend the most profitable for scale up to improve and productivity.

## 3. METHODOLOGY

The study area districts selected for SIMLESA project were Borecha and Lockabaya in Sidama Zone. Identification of villages and key informants for group discussion. The total communities identified in the two districts were ten and in each district one community includes one nucleus Keble and each community consists of 627 households on average.

### 3.1 Data collection

Group discussion was used as an approach to get information by making use of community/village level questionnaire. At each community level, and depending on the availability of the various strata members composed of elders, youngsters and male and female farmers on general topics and the Bureaus of agriculture and PA administration, eight to eleven key informants were identified as sources of information on demography and socio-economic and institutional characteristics in place.

### 3.2 Data analysis

Descriptive and inferential statics were used to analyze and present the data with the help of SPSS version 17 statistical package.

## 4. RESULTS

### 4.1 Community characteristics

#### 4.1.1 Characteristics of the key informants

A total of 104 key informants were involved in providing information for the 10 communities or peasant associations identified earlier. The number of key informants in each community ranged between 8 and 11. The key informants were constituted from different age and sex groups. They were composed of 23% females and 77% males (Table 1). The number of females ranged between 1 and 3 in each village with mode of two. The key informants thus selected were interviewed for their ownership of mobile or telephone line, age, education status, and number of years living in the particular area. Results indicate that 54 (52 % of the total) key informants had one mobile phone each.

The age of key informants was on average 36.03 years with standard deviation of 10. They had an average educational level of 6.8 years (Std. dev=4.5) with a minimum of zero and maximum of 13 years. Most of the key informants have lived most of their age in the area. On the average each farmer lived around 31 years in their respective village/PA.

**Table 1. Some characteristics of key informants by sex**

| Characteristics | Sex | N | Mean | Stand Deviation |
|---|---|---|---|---|
| **Age** | Male | 80 | 35.12 | 10.210 |
| | Female | 24 | 36.93 | 10.512 |
| | Total | 104 | 36.03 | 10.361 |
| **Education** | Male | 80 | 8.7 | 3.975 |
| | Female | 24 | 5.0 | 5.137 |
| | Total | 104 | 6.85 | 4.556 |
| **Years lived** | Male | 80 | 30.04 | 16.51 |
| | Female | 24 | 32.68 | 14.84 |
| | Total | 104 | 31.36 | 15.67 |

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#### 4.1.2 Village demographic and land holding profile

The study communities had a total of 6706 households with mean of 671 and standard deviation of 237, indicating the existence of wide variability among the communities in terms of household size. The average family size in a given village ranged between 4 and 15 with an average of 7 persons. There were a total of 551 female headed households in the 10 communities considered (Table-2). Female households range from 2 up to 37 in a village with an average of 55 and standard deviation of 30.30.

Considering a list of two major and two minor ethnic groups, a total of 5 ethnic groups that were defined according to their vernacular and farmers' perception were identified (Appendix Table 1).The mean level distributions of demographic characteristics are presented in Table 2.

Table 2. Demographic characteristics of the communities/ districts

| District | Average number of households | Household size (People per households) | Average number of female households |
|---|---|---|---|
| Borecha (N=5) | 735.4 | 7.0 | 58.6 |
| Lockabaya (N=5) | 605.8 | 5.4 | 51.6 |
| Mean<br>Total (N = 10)<br>SD | 670.6<br>237.3 | 6.2<br>1.06 | 55.1<br>30.3 |

N=Number of villages or peasant associations considered

The total land area of the PA was about 1599 hectares. The farmers had an average land area of 2.35 hectares which is close to the land area under cultivation and most farmers do not use fallowing of land which exacerbates the soil fertility problem. Though, conservation agriculture is imperative in such situations to improve production and productivity with appropriate technological recommendation. There were about 216 (32%) households owning less than average land area. The average cultivated land was 2.35 hectares. About 26 (0.02%) households were landless in each village/community (Table 3).

**Table 3. Land holding profile of the community's or districts**

| **Average land holding (ha) household** | **Cultivated land (ha) per household** | **Average number of households owning less than average** | **Average number of households that are landless** |
|---|---|---|---|
| Borecha (N=5) | 2.3 | 230 | 25 |
| Lockabaya (N=5) | 2.4 | 202 | 1 |
| Mean<br>Total (N = 10)<br>SD | 2.35<br>108.6 | 216<br>30.25 | 13<br>22.9 |

**N=Number of villages or peasant associations considered**

**1 timad = 0.25 ha**

The livelihood risks in Borecha district as pinpointed by the community were climate change/ rainfall (30%), moisture stress (20%), livestock disease (15%) and market (10%) while for Lockabaya district, climate change/rainfall (20%), livestock disease (20%), moisture stress (15%), as well as pest/disease, shortage of grazing land each (10%) accordingly ranked (Table 4).

The coping strategies of livelihood risks were also indicated respectively in Table 5.

**Table 4. Livelihood risks and copping strategies**

| **I. Livelihood risks** | **Borecha (N=5)** | **Lockabaya (N=5)** |
|---|---|---|
| | **Percent of farmers** | **Percent of farmers** |
| 1. Climate change/rainfall | 30 | 20 |
| 2. Moisture stress | 20 | 15 |
| 3. Low soil fertility | 5 | 5 |
| 4. Livestock disease | 15 | 20 |
| 5. Pest /disease | 5 | 10 |
| 6. Shortage of grazing land | 5 | 10 |
| 7. Higher price of input | 5 | 5 |
| 8. Market | 10 | 10 |
| 9. Others | 5 | 5 |
| **II. Coping strategies before occurrence** | | |
| 1. Water harvesting/pond use | 30 | 30 |
| 2. Crop choice/using early maturing varieties | 20 | 20 |
| 3. Conservation agriculture | 25 | 5 |
| 4. Tree planting | 5 | 5 |
| 5. Vaccination | 10 | 20 |
| 6. Use of improved forages and crop residue | 5 | 10 |
| 7. Report to agricultural office pest incidence | 5 | 10 |
| **III. Coping strategies after occurrence** | | |
| 1. Fetching water from river/pond | 10 | 5 |
| 2. Food security/safety net | 10 | 15 |
| 3. Conservation agriculture | 30 | 30 |
| 4. Crop choice/using early maturing varieties | 30 | 20 |
| 5. Report to agricultural office, the incidence of pest | 20 | 30 |

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### 4.1.3 Market

There were a limited number of market days in a week. On average there were less than one market days in each village whereas there was one market day at a peasant association level in a week. The interviewed key informants said that there has been good market access for maize grain and for common bean product whereas market access for other crops has been substandard (Table 6).

**Table 6. Status of market access for different crop grain and seeds in the target area (%)**

| **Particulars** | **Market access** | | | | |
|---|---|---|---|---|---|
| | **Very good** | **Good** | **Average** | **Bad** | **Very bad** |
| Maize grain | 20 | 70 | 10 | - | - |

| | | | | | |
|---|---|---|---|---|---|
| (N=10) | | | | | |
| Maize seed (N=10) | 20 | 30 | 30 | 20 | - |
| Bean grain (N =10) | 20 | 40 | 40 | - | - |
| Bean seed (N= 8) | 20 | 10 | 40 | 30 | |
| Market access to fodder (N=10) | 25 | 50 | - | 25 | - |
| Market access to forage seeds/seedlings | 25 | 50 | | 25 | - |

#### 4.1.4 Credit

The credit demand and its purpose were indicated in Table 7. Fattening of animals (25%) and pity trade (30%) were equally important priorities in using the credit. Purchase of inputs (25%) for Borecha and purchase of cross breeds dairy cows (16%) were also the second priority.

**Table 7. Credit demand and purpose of use**

| Characteristics | Borecha (N=5) | Lockabaya (N=5) |
|---|---|---|
| | Percent of farmers | Percent of farmers |
| 1. Fattening of animals | 25 | 30 |
| 2. Pity trade | 25 | 30 |
| 3. Purchase of inputs | 25 | 8 |
| 4. Purchase of cross breeds dairy cows | 12.5 | 16 |
| 5. Modern beekeeping | 12.5 | - |
| 6. Purchase of oxen | - | 8 |

#### 4.1.5 Agricultural and other services

Descriptive analysis of the information obtained from key informants shows that agricultural and related services were irregularly distributed in the selected villages of the target districts (Table 8). None of Borecha district had fertilizer dealers, other farm input dealers, other farm output buyers /traders, grain processors/millers dealers, cooperatives and secondary schools. While for Lockabaya, none of the districts had seed dealers, other farm output buyers/traders and etc. Despite shortages of credit institutions, key informants unanimously pointed out the need for credit for various activities in their respective villages.

**Table 9. Availability (number) of different services in the selected communities**

| Service | Borecha (N=5) | Lockabaya ( N = 5) |
|---|---|---|
| All weather road | 11 | 4 |
| Seed dealers | 1 | - |
| Fertilizer dealers | - | 1 |
| Other farm input dealers | - | 1 |
| Farm grain buyers/traders | 8 | 17 |
| Grain processers/millers | - | 1 |
| Super market | 5 | - |
| Farm machinery/supplement | 5 | 1 |
| Agricultural extension office | 5 | 5 |
| Cooperative office | - | 1 |
| Other group offices | 1 | 1 |
| Microfinance institutions | 1 | 1 |
| AI service | 1 | 1 |
| Veterinary service providers | 1 | 1 |
| Primary school | 1 | 1 |
| Health center | 1 | - |
| Village markets | 1 | 1 |
| Main markets | 1 | 1 |
| Major water sources | 17 | 2 |
| Peasant association offices | 5 | 5 |

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#### 4.1.6 Cropping systems

Common maize varieties/cultivars are grown by the target districts (Table 9). It is interesting to note that most of the varieties are improved varieties and the key informants were able to identify them by name. It is also to be observed that improved varieties have wider distribution in districts, BH540 and rarely use pioneer since the seed price is triple

to BH. Common beans improved varieties also used by farmers and few farmers use improved forage varieties.

**Table 9. Type and distribution of maize, common bean and forage varieties/cultivars grown in the selected districts**

| Crop /forage type | Borecha District | Lockabaya District |
|---|---|---|
| 1. Maize | BH 540 | BH 540 |
| | Pioner | Pioner |
| | | |
| 2. common beans | Red wolayita | - |
| | Hawassa dume | Hawassa dume |
| | Ibado | Ibado |
| | Awash 1 | Awash 1 |
| | - | Naser |
| 3. forage | Elephant grass | Elephant grass |
| | Rhodes | Sessbania |
| | Sessbania | Lablab |
| | Lablab | luccena |
| | Desho | |

### 4.1.7 Crop productivity

Table 10 shows that less than 73 percent of the farmers were using fertilizer on cereal crops whereas, higher number of farmers was using fertilizer on vegetable crops. Most (88%) of the households were growing improved varieties of Maize , 49% of common bean, 60% tef and 95% sweet potato. Improved varieties with fertilizer were high yielders than the local varieties with fertilizer.

**Table 10. Summary of major crop production**

| **Crop** | **% households** | | **Mean yield without fertilizer (kg/ha)** | | **Mean yield with fertilizer (kg/ha)** | |
|---|---|---|---|---|---|---|
| | **Using fertilizer on this variety** | **Planting improved varieties** | **Local varieties** | **Improved varieties** | **Local varieties** | **Improved varieties** |
| Improved Maize hybrid | 89 | 88 | - | - | - | 4550 |
| Common Bean | 100 | 48.5 | - | - | 950 | 2250 |
| Tef | 57.5 | 60.4 | - | - | 4.5 | 6.5 |
| Irish potato | 100 | - | 80 | - | - | - |
| Sweet potato | 75 | 95 | - | - | 97 | 288 |

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### 4.1.8 Crop production constraints

Table 11 indicates the crop production constraints reported by the community were, lack of improved management practices, shortage of improved seed, lack of credit, less access to inputs and pest infestation equally important priority constraints each 20% for Borecha district. Whilst, for Lockabaya these priority is different pattern as shown in the table underneath.

**Table 11. Crop production constraints**

| **Characteristics** | **Borecha (N=5)** | **Lockabaya (N=5)** |
|---|---|---|
| | **% of farmers** | **% of farmers** |
| 1. Lack of improved management practices | 20 | 9 |
| 2. Shortage of improved seed | 20 | 19 |
| 3. Lack of credit | 20 | 9 |
| 4. Less access to inputs | 20 | 9 |
| 5. Pest infestation | 20 | 27 |
| 6. Higher price of inputs | 1 | 27 |
| 7. Shortage of oxen | 1 | - |

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### 4.1.9 Livestock ownership

**Livestock numbers**

Results from Table 12 shows that the number of livestock varied by district and by type. Horses and crossbred cattle were unavailable in few districts. In spite of their distribution into all of the villages, mules were found in small number. Also, the number of improved cattle and horses found in the villages was very much limited. The fact that, indigenous animals and beehives are found in

great numbers in each district may indicate the need as well as the opportunity for improving farmers' scenario.

**Table 12. Livestock ownership at each village in each district**

| Type | Borecha Woreda | | Lockabaya | |
|---|---|---|---|---|
| | Mean | Standard deviation | Mean | Standard deviation |
| **Cattle** | | | | |
| Indigenous milking cows | 625 | 553.96 | 514.00 | 336.07 |
| Cross breed milking cows | 1 | - | - | - |
| Non milking indigenous cows | 829 | 170.00 | 787.39 | 197.95 |
| Trained oxen for ploughing | 667 | 525.00 | 264 | 195.00 |
| Indigenous bulls | 857 | 893.9 | 159.8 | 55.8 |
| Cross breeds bulls | - | - | 1 | - |
| Indigenous heifers | 1043.4 | 901.5 | 308.2 | 118.4 |
| Indigenous calves | 1206 | 1153.2 | 507.6 | 287.2 |
| **Goat** | | | | |
| Mature milking goats | 158.2 | 191.8 | 200 | - |
| Other matured female goats | 335.4 | 398.7 | 430.6 | 299.6 |
| Mature male goats | 235.2 | 280.4 | 248.4 | 215.8 |
| Young female goats | 271.6 | 410.4 | 182.2 | 77.3 |
| Young male goats | 259.2 | 416.9 | 101.8 | 57.5 |
| **Sheep** | | | | |
| Mature female sheep | 397.4 | 434.9 | 389.4 | 623.9 |
| Mature male sheep | 280.4 | 353.7 | 282.8 | 413.8 |
| Young female sheep (lamb) | 646.4 | 865.1 | 178.0 | 215.8 |
| Young male l sheep (Ram) | 578 | 832.4 | 140.3 | 138.2 |
| Mature trained donkeys | 187.4 | 292.5 | 82.2 | 26.9 |
| Young male donkeys | 37 | 39.3 | 16 | 20.5 |
| Young female donkeys | 24.4 | 16.3 | 6.0 | 5.6 |
| Horses | 29.2 | 35.2 | 100 | - |
| Mules | 3.3 | 2.1 | 10 | - |
| Mature chicken | 1766 | 1490 | 2066.4 | 1046 |
| Local bee hive | 200.2 | 137.1 | 157.2 | 117.5 |
| Modern bee hive | 20.3 | 10.7 | 19.2 | 27.5 |

#### 4.1.10 Livestock and livestock products prices

Analysis of livestock and livestock product prices during the wet (Table 13) and dry seasons (Table 14) shows that wet season prices were generally much higher than dry season prices. The reason could be that farmers tend to sell their animals during dry periods where shortage of agricultural produce is mostly encountered and money is required for purchasing of agricultural inputs needed for the impending cropping season. Thus, decreased prices due to more supply.

**Table 13. Average selling price of livestock and livestock products during**

**Wet season at each district (Birr/unit)**

| Livestock Type | Selling price during the wet season | | | |
|---|---|---|---|---|
| | Borecha | | Lockabaya | |
| | N | Price | N | price |
| Milking cows (improved) | - | - | - | - |
| Milking cows (local) | 5 | 3880 | 5 | 4620 |
| Non milking cows (improved) | 5 | 1880 | 5 | 172o |
| Bull ( local) | 5 | 1920 | 5 | 3000 |
| Oxen | 5 | 3150 | 5 | 4960 |
| Calves (improved) | - | - | - | - |
| Calves (local) | 5 | 740 | 5 | 580 |
| Mature male goats | 5 | 1120 | 5 | 1280 |
| Mature female goats | 5 | 810 | 5 | 600 |
| Young goats | 5 | 470 | 5 | 430 |
| Mature male sheep | 5 | 1060 | 5 | 1280 |
| Mature female sheep | 5 | 740 | 5 | 670 |
| Young sheep | 5 | 440 | 5 | 340 |
| Adult donkeys | 5 | 1760 | 5 | 1980 |
| Young donkeys | 5 | 1100 | 5 | 1000 |
| Adult horses | 4 | 2950 | 3 | 3050 |

| | | | | |
|---|---|---|---|---|
| Young horses | 3 | 1333 | 3 | 2033 |
| Adult mules | 3 | 3833 | 3 | 8000 |
| Young mules | 2 | 1700 | 3 | 5667 |
| Mature chicken | 5 | 66 | 5 | 56 |
| Local beehives | 4 | 40 | 1 | 20 |
| Modern beehives | 4 | 322.5 | 5 | 366 |
| Milk | 4 | 9.62 | 3 | 5.23 |
| Eggs | 5 | 1.60 | 5 | 1.40 |
| Hides | 5 | 43 | 5 | 14 |
| Skins | 5 | 46 | 5 | 38 |
| Honey | 5 | 43 | 5 | 42 |
| Butter | 2 | 85 | - | - |

**Table 14. Average price of livestock and products during dry season at each district**

| **Livestock Type** | **Selling price during the dry season** | | | |
|---|---|---|---|---|
| | **Borecha** | | **Lockabaya** | |
| | **N** | **Price** | **N** | **price** |
| Milking cows (improved) | - | - | - | - |
| Milking cows (local) | 5 | 3020 | 5 | 3440 |
| Non milking cows (improved) | 5 | 2400 | 5 | 2580 |
| Bull ( local) | 5 | 1360 | 5 | 2360 |
| Oxen | 5 | 3770 | 5 | 6800 |
| Calves (improved) | 5 | 1180 | 5 | 860 |
| Calves (local) | 5 | 1660 | 5 | 1540 |
| Mature male goats | 5 | 620 | 5 | 570 |
| Mature female goats | 5 | 1080 | 5 | 860 |
| Young goats | 5 | 620 | 5 | 570 |
| Mature male sheep | 5 | 1430 | 5 | 1660 |
| Mature female sheep | 5 | 1000 | 5 | 1350 |
| Young sheep | 5 | 650 | 5 | 430 |
| Adult donkeys | 5 | 2420 | 5 | 2220 |
| Young donkeys | 5 | 1450 | 5 | 1220 |
| Adult horses | 4 | 3363 | 3 | 4117 |
| Young horses | 3 | 1800 | 3 | 2433 |
| Adult mules | 3 | 4633 | 3 | 8000 |
| Young mules | 2 | 2600 | 3 | 6667 |
| Mature chicken | 5 | 104 | 5 | 90 |
| Local beehives | 4 | 58.75 | 1 | 35.00 |
| Modern beehives | 4 | 322.50 | 5 | 370 |
| Milk | 4 | 12 | 3 | 6.70 |
| Eggs | 5 | 1.9 | 5 | 1.8 |
| Hides | 5 | 38 | 5 | 25 |
| Skins | 5 | 72 | 5 | 68 |
| Honey | 5 | 43.6 | 5 | 42 |
| Butter | 2 | 120 | - | - |

Note: N = total number of villages

#### 4.1.11 Livestock feed sources and its contribution

The various feed sources were identified during this survey. Maize crop residue is one of the most important once according to 83% and 73% of the respondents in Borecha and Lockabaya by own production and purchase 28.3% and 34.8% respectively. The second feed source is cereal residues in both district followed by grain legume residues as indicated in Table 15.

The crop residues were used primarily for livestock feed as of 58% and 60% of the respondents in Borecha and Lockabaya accordingly followed by fuel wood and construction.

The family labor utilization as pick period were April to June according to 43% and 48% of the community and more work load followed by June to September.

**Table 15. Livestock feed sources and its purpose**

| | **Borecha (N=5)** | | **Lockabaya (N=5)** | |
|---|---|---|---|---|
| | **Own production (%)** | **Purchase (%)** | **Own production (%)** | **Purchase (%)** |
| **Feed sources** | | | | |
| Maize crop residue | 83.0 | 28.3 | 73.0 | 34.8 |
| Other cereal residues | 60.0 | 60.0 | 73.3 | 10.0 |
| Grain legume residues | 100 | - | 100.0 | - |
| Improved forage (grass + legume) products | 20.0 | - | - | - |

| | | | | |
|---|---|---|---|---|
| Weeds | 100.0 | - | 100.0 | - |
| Commercial feed | - | 10.0 | 20 | 100.0 |
| **Crop residue utilization (%) Purpose** | | | | |
| Livestock feed | 58 | - | 60 | - |
| Fuel wood | 20 | - | 17 | - |
| Left on the plot | 7 | - | 11 | - |
| Construction | 17 | - | 18.3 | - |
| Sell | 5 | - | 5 | - |
| **Family labor utilization pattern (%)** | | Workload | | Workload |
| April-June | High (43) | More workload | High (48) | More workload |
| July-September | High (28) | More workload | High (24) | More workload |
| Oct-Dec | Low (19) | Less workload | Low (20) | Less workload |
| January-March | Low (11) | Less workload | Low (9) | Less workload |

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#### 4.1.12 Livestock production constraints

The very most important priority for livestock production and productivity constraint was shortage of feed and supplementary feeds for both districts according to the farmers reported (25%). Livestock management problem (20%) and disease (15%) also reported as second priority specific to Borecha. For Lockabaya, disease and cash shortage equally important (20%) as pinpointed in Table 16..

**Table 16. Livestock production constraints**

| **Characteristics** | **Borecha (N=5)** | **Lockabaya (N=5)** |
|---|---|---|
| | **Percent of farmers** | **Percent of farmers** |
| 1. Shortage of feed & supplementary feed | 25 | 25 |
| 2. Disease | 15 | 20 |
| 3. Shortage of vet clinic | 10 | 10 |
| 4. Less access to water | 10 | 5 |
| 5. LS management problem | 20 | 5 |
| 6. Lack of credit | 5 | 5 |
| 7. Cash shortage | 10 | 20 |
| 8. Shortage of AI for cross breeding | 5 | 10 |

## 5. Analysis of the Impacts of conservation agriculture

5.1 Partial budget analysis of conservation agriculture in intercropping (Maize-bean-bean) vs. conventional agriculture (maize-bean-bean). Conservation agriculture are able to increase both maize and bean production improved the farmers' income when farmers adopt them. In assessing the impacts of conservation agriculture technologies, it is important to estimate the extent to which conservation agriculture technologies have been adopted and estimate the resulting productivity gains. Farmers are concerned with the benefits and costs of particular technologies. The partial budgeting method is used to assess the impacts of conservation agriculture technologies adopted by farmers.

Table 17 shows the partial budget analysis for conservation agriculture technologies and the conventional one. The conservation agriculture obtained net benefit of 16,457.00 birr/ha and the conventional obtained 9555.00 birr/ha. The conservation agriculture has gained additional net benefit of 6902.00 birr/ha which is 42% over the conventional once.

**Table 17. Partial budget for conservation agriculture (CA) and conventional, Borecha and Lockabaya, 2012**

| **Operations** | **CA/Maize-b-b** | **Conventional Maize-b-b** |
|---|---|---|
| Yield kg/ha - Maize/bean | 3530.4, ( 1221.2) | 2661.4, (925.1) |
| Gross benefit Birr/ha | 18,507.00 | 13, 955.00 |
| 1. Plowing cost-5 times | | |

| | | | |
|---|---|---|---|
| 2. | Pair of oxen /herbicide | 450.00 | 1200.00 |
| 3. | Labor | 400.00 | 800.00 |
| 4. | Planting of maize | 400.00 | 400.00 |
| 5. | **Cultivation** of maize | | |
| | -1st hand weeding<br>-2nd hand weeding<br>-3rd hand weeding | 800.00<br>-<br>- | 800.00<br>560.00<br>400.00 |
| 6. | Gross cost Birr/ha | 2050.00 | 4400.00 |
| 7. | **Net benefit** | **16,457.00** | **9,555.00** |

**Source: Own manipulation**

## 6. CONCLUSIONS AND RECOMMENDATIONS

### 6.1 Summary and conclusions

This study provides primary information regarding community survey to achieve the intended objective and identified PAs and villages to conduct SIMILESA trials regarding conservation agriculture vs. conventional agriculture. The communities own immense resources to undertake their agricultural activities for livelihood sustenance. However, the performance of farmers in the community in terms of crop and livestock production and the use of improved technologies have been substandard. Notwithstanding the maize hybrids, the type and distribution of crop and livestock were mainly local and they face a number of problems to access public and private amenities such as credit, road, electricity, communication and improved health centers.

### 6.2 Recommendations

The fact that there are many constraints and opportunities in the target areas and beyond suggests that policy makers, researchers and other development partners harmonize their efforts and work together to bring smallholder poor farmers out of their current circumstances. There is a need to improve the accessibility of improved maize seed and widely adapted haricot bean technologies, improved livestock and agricultural development services. However, all may be made successful if improvement of the capacity of the farmers to take up and continue with the technologies can be ensured.

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