



**Adami Tulu Agricultural Research Center**

**Annual activity Report  
For 2022/2023, Ethiopian Fiscal Year**

**July, 2023  
Adami Tulu, Oromia Regional State**

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## **1. Introduction**

Adami Tulu Agricultural Research Center (ATARC) was established in 1968 as testing site of Holeta Agricultural Research Center on 40 ha of land with 50 indigenous cattle to evaluate meat & milk production potential of indigenous cattle breed types. In 1974, a crossbreeding program was initiated (exotic x local) i.e Holstein Frisian, Jersey and Simmental sires were crossed to the indigenous dam line (Borana and Barka) to improve the milk production performance of the local animals. ATARC was designated to be National Beef research project coordinator in 1997. In 2001, Oromia Agricultural Research Institute (OARI) was established as an independent Research Institute that ATARC currently operating under it by engaging in full-time research activities on Livestock, Crop, Crop protection, Natural Resource management, Soil and Water Engineering and socio-economics and Agricultural-extension research and one technology multiplication team. ATARC coordinated the national beef research.

In 2015EC plan, the center conduct various research and routine activities with from IQQO and Non-IQQO budget sources. Adami Tulu Agricultural Research Center (ATARC) has been implementing different research activities under the execution of Oromia Agricultural Research Institute. ATARC has six research processes *vis-vis* livestock Research, Natural Resource Management Research process, Crop research, Crop protection research, soil and water engineering, Socio-Economics and Agricultural Research Extension processes, with two supportive processes and one technology multiplication.

### **1.1. Vision**

To see food secured and market oriented surplus Producers and livelihood improved community in Oromia

### **1.2. Mission**

Improve the production and productivity of livestock and crops on sustainable basis through generating, adapting and disseminating compatible technologies for target stakeholders while considering the conservation and management of the natural resource base of the mandate area.

### **1.3. Services we provide (Mandate)**

- Generating, adapting and demonstrating improved livestock and crop technologies
- Provide need-based training and advisory services on livestock and crop technologies
- Coordinate national beef research
- Develop livestock and crop research strategy and policy guideline and
- Technical support for all stakeholders

## **2. Annual performance of the Center**

### **2.1. Leadership activities and roles**

The center has its own management committee to conduct meetings throughout the course of the plan year to evaluate how planned activities were carried out, offer support, and guide the different teams toward the center's and Institute's goals. Management meetings were monthly undertaken according the planned schedule and successfully carrying out their objectives because they made decisions to address any shortcomings. The leadership also had a significant role in setting up the anti-Corruption Prevention Council, which met per months with the aim of strengthening the work and administration of property in various areas where weaknesses are seen and to carry out rigorous monitoring. the problems with property use and protection processes have totally improved, according to the early June review on corruption prevention. Instructions were given to concentrate on upcoming events in front of members of the management committee and members of various teams. Additionally, the staff received awareness training on professionalism and work ethics two times. Although group discussions among the various team members should be held once a week, the center management assessed the situation and decided to hold discussions once a month due to the nature of our work, which prevents us from evaluating results on a weekly basis. As a result, every employee is now familiar with the responsibilities of their jobs and has developed their own monthly, quarterly and annual work plans in compliance with the minimal service delivery standard. The employees' performance this year was assessed once every six months in addition to making preparations for the evaluation procedure for the next year.

## 2.2. Center Develop Activities Performed in this Plan Year

In ATARC two compound fences has been under construction. The construction of one fence (bargoat site fences) was already completed and provisionally accepted. Automatic greenhouse which is used for banana tissue culture seedling acclimatization was maintained. Our center also maintains road in the compound and established water storage for biotechnology and animal feed laboratories for the facilitation of research activities.

## 3. Number of research activities planned and executed in the year

**Table 1. By Government budget**

Research team	Number of total activities planned to be executed for the year		# of Completed in the year (c)	# of Discontinued in the year *(d)	# Passed to next year (e=b-c-d)	New proposal approved for next year (f)	Total to be executed in next fiscal year (g=e+f)
	(as per GTP-III)(a)	Actual (b)					
Soil fertility (SFI)	15	10	3	1( merged)	6	1	7
Agroforestry	6	10	4	0	6	2	8
SWC	2	2	0	0	2	3	5
Irrigation engineering	5	4	3	0	1	3	4
Socio-Economics	4	7	4	0	3	2+1*	5+1*
Agr.-Extension	8	4	0	0	3	6	9
Plant pathology	5	3	2	0	0	6	7
Entomology	2	2	0	0	1	4	5
Weed science	1	1	0	0	1	1	2
Dairy	7	6	2	1	3	2	5
Meat	8	8	3	0	5	2	7
Poultry	3	3	1	0	2	3	5
Apiculture	9	9	2	0	7	3	10
Animal feeds	9	9	6	0	3	7	10
Total	84	78	30	1	43	34	60

### \*Reason for discontinued activities

Research team: Dairy

Number of activities: 1

Title of activities:



1. On farm Evaluation of feeding Fodder Oat, fodder beet, Vetch and Alfalfa on milk yield and milk composition of crossbred dairy cows in West Arsi zone'

**Details of reason:** due to the absence of fodder beat variety

### 3.1. By Non-Government budget

**Table 2. Collaborative Activities**

Research team	Number of total activities planned to be executed for the year		# of Completed in the year (c)	# of Discontinued in the year *(d)	# Passed to next year (e=b-c-d)	New proposal approved for next year (f)	Total to be executed in next fiscal year (g= e+f)
	(as per GTP-II)(a)	Actual (b)					
SFI	9	9	3	0	6	2	8
Agroforestry	7	7	0	0	7	0	7
SWC	8	8	1	1	6	.0	6
Irrigation Engin.	3	7	1	0	6	0	6
Socio-economics	2	4	2	0	2		2
Agri.-Extension	5	5	1	0	3	1	4
Plant pathology	2	2	2	0	0	0	2
Cereal Team	8	15	10	0	5	15	20
Pulse and Oil	7	2	2	0	0	5	5
Horticulture	8	3	1	0	2	3	5
Cereal Team	5	5	5	0	0	4	4
Dairy	5	3	0	0	3	0	3
Meat	3	3	2	0	1	3	4
Poultry	1	1	0	0	1	0	1
Apiculture	2	3	1	0	2	2	4
Animal feeds	1	2	1	0	1	0	1
<b>Total</b>	<b>76</b>	<b>79</b>	<b>32</b>	<b>1</b>	<b>45</b>	<b>33</b>	<b>82</b>

**\*Reason for discontinued/suspended activities**

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#### 4. Technologies/ information generation in the year (from research activities completed in the year)

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**Table 3.** Number planed and achieved

No	Research team	# of technologies/ information planned to be generated in the year (as per GTP-II plan)	Technologies/ information generated		Reason for under performance, if any
			Number	As % of annual plan	
1	SFI	2	4	200	
2	Agroforestry	2	2	100	
3	SWC	1	1	100	
4	Irrigation Engine	4	4	100	
5	Socio-economics	2	4	200	
6	Agricultural extension	3			Activity will be performed this rainy season
7	Plant pathology	2	2	100	
8	Cereal Team	3	3	100	
9	Pulse and Oil	4	2	50	Shortage of human power to handle more activities
10	Horticulture	4	1	25	The accepted proposal at regional review was less than the planed activity due to this the implemented activity was below the plan.
11	Dairy	3	2	66.67	One activity was discontinued due to absence of fodder beat variety
12	Meat	3	2	66.67	One activity was discontinued due to absence of budget
13	Poultry	1	1	100	
14	Apiculture	2	2	100	
15	Animal feeds	3	6	200	

#### 4.1. Cereal Research Team

##### 4.1.1. Bread Wheat Variety Verification Trial (BWVVT-2022)

The experiment was conducted at: Adami Tulu (2), Dugda (2) & Lume (2) a total of 6 locations on 10mx10m area. Using two candidate varieties the Standard. Check: Adola-1 variety. From

two candidate variety one candidate was officially released after the evaluation of national variety releasing technical committee.



#### **4.1.2. Adaptation of Finger millet (*Eleusine coracana* (L). Gaertn.) Varieties in Low moisture areas in MRV of Oromia.**

The study was conducted at Adami Tulu and Dugda using 14 Finger Millet varieties were used in the Study. From overall study Diga-01 and Boneya varieties had higher yielder and stable varieties across the studied locations and were recommended for the study area and similar agro ecology's.

**Table 4. grain yield performance of Finger millet varieties**

<b>Over year and across location mean performance of grain yield (Qt/ha) of Finger Millet varieties</b>							
<b>No</b>	<b>Varieties</b>	<b>ATARC</b>		<b>Dugda</b>		<b>Mean</b>	<b>Rank</b>
		<b>2021</b>	<b>2022</b>	<b>2021</b>	<b>2022</b>		
<b>1</b>	<b>Diga-01</b>	<b>28.77</b>	<b>25.75</b>	<b>25.50</b>	<b>31.33</b>	<b>27.84</b>	<b>1</b>
<b>2</b>	<b>Boneya</b>	<b>26.87</b>	<b>29.25</b>	<b>27.90</b>	<b>22.58</b>	<b>26.65</b>	<b>2</b>
3	Axum	31.60	37.42	5.57	20.58	23.79	3
4	Tesema	34.57	34.33	4.90	21.25	23.76	4
5	Bako-09	33.57	25.58	13.83	19.33	23.08	5
6	Addis-01	33.27	30.42	5.47	21.83	22.75	6
7	Wama	21.40	37.75	6.37	25.00	22.63	7
8	Meba	42.90	17.83	9.07	13.33	20.78	8
9	Gute	12.43	22.17	5.83	25.08	16.38	9
10	Gudetu	26.43	20.42	8.40	9.25	16.13	10
11	Tadesse	22.50	15.75	2.57	21.00	15.45	11
12	Diga-2	4.67	26.08	10.00	20.58	15.33	12
13	Bareda	8.40	23.75	3.83	21.50	14.37	13
14	Urji	4.13	19.08	3.17	14.08	10.12	14
	<b>Mean</b>	<b>26.54</b>	<b>26.11</b>	<b>9.46</b>	<b>20.48</b>	<b>20.65</b>	
	<b>LSD 0.05</b>	<b>14.08</b>	<b>17.71</b>	<b>8.34</b>	<b>8.32</b>	<b>6.21</b>	
	<b>CV (%)</b>	<b>8.11</b>	<b>8.71</b>	<b>6.30</b>	<b>2.90</b>	<b>4.40</b>	



#### **4.1.3. Six Row Food Barley Regional Variety Trial (6FBRVT-2021)**

The study was conducted at Adami Tulu, Dugda Lume using **14** food barley varieties. The study was conducted for two consecutive years. From the tested genotypes two promising candidate varieties were identified for possible release.

Combined Mean agronomic performance and disease reactions of 14 food barley genotypes tested in food barley regional variety trial at Adami Tulu, Dugda and Lume, during 2021-2022

### Field Performance



## 4.2. Pulse and Oil Research Team

### 4.2.1. Dessi-type Chickpea (*Cicer arietinum* L.) Preliminary Yield Trial in Adami Tullu Agricultural Research Center

#### Brief status

- The seed of 46 genotypes along with three (3) standard checks were sowed ATARC on station by using simple lattice design arrangement.
- Important follow-up and management were performed for the activity.
- The seed was harvested and data were recorded.
- The recorded data were analyzed.
- 12 genotypes were promoted to the next breeding stage (RVT) along with 2 standard checks.



#### 4.2.2. Adaptation Study of Linseed (*Linum usitatissimum* L.) Varieties in West Arsi Zone, Oromia Region, Ethiopia

##### Brief status

- The seed of five (5) linseed varieties were sowed at three locations using Randomized Complete Block Design (RCBD) arrangement with three (3) replications
- List of varieties: Dibanne, Furtu, Kuma, Tole and Yadenno
- Location(s): Keraru (Negelle Arsi), Turge Gallo (Negelle Arsi) and Koma Afamo (Kofele)
- Important follow-up and management are being performed for the activity
- Important data were recorded
- The recorded data were analyzed.
- As a result, the variety Kuma was found to be the best performing variety.



#### 4.3. Horticulture and Spice Crops Research Team

##### 4.3.1. Adaptation of Improved Garlic (*Allium sativum* L.) Varieties at West Arsi Zone

The experiment was conducted at West Arsi using three garlic varieties. The analysis of variance showed that there were no significant differences amongst the varieties at Turge Gallo, the variety Holeta (G-HL) was found to have the largest bulb yield at all locations (Table 5).

**Table 5.** The 1<sup>st</sup> year mean bulb yield (ton/ha) of three garlic varieties tested at each location

Varieties	Testing Environments			EM
	Keraru	Turge Gallo	Kofele (Koma Afamo)	
Kuriftu	6.473 <sup>a</sup>	6.177 <sup>a</sup>	6.383 <sup>a</sup>	6.344

Holeta (G-HL)	7.277 <sup>b</sup>	6.760 <sup>a</sup>	7.057 <sup>b</sup>	7.031
Tseday	6.413 <sup>a</sup>	6.227 <sup>a</sup>	6.540 <sup>a</sup>	6.393
GM	6.72	6.39	6.66	6.590
MSE	0.071	0.080	0.031	0.061
SE (d)	0.218	0.231	0.145	0.198
LSD	0.605	0.641	0.402	0.549
CV (%)	4.0	4.4	2.7	3.7

**Key:** GM = Grand mean; EM = Environmental means; MSE = Mean Square of Error; SE (d) = Standard Error of Difference; LSD = Least Significant Difference and CV = Coefficient of Variation. Values with the same letters in a column mean to ‘not statistically significantly different’.

The variety Holeta (G-HL) was found to have the largest seed yield (7.031 tonha<sup>-1</sup>) over the locations as compared to the other tested varieties (Table 6).

**Table 6.** The combined analysis of variances for three garlic varieties over the locations

Varieties	NLP <sup>-1</sup>	PH (cm)	NCB <sup>-1</sup>	SD (mm)	BD (mm)	SCW (g)	SBW (g)	TBY (tonha <sup>-1</sup> )
Kuriftu	7.333 <sup>b</sup>	37.96 <sup>a</sup>	11.22 <sup>b</sup>	7.10 <sup>a</sup>	35.90 <sup>a</sup>	4.337 <sup>a</sup>	48.65 <sup>a</sup>	6.344 <sup>a</sup>
Holeta (G-HL)	7.667 <sup>b</sup>	39.80 <sup>b</sup>	10.33 <sup>c</sup>	7.51 <sup>b</sup>	41.12 <sup>c</sup>	5.077 <sup>c</sup>	60.93 <sup>b</sup>	7.031 <sup>b</sup>
Tseday	6.444 <sup>a</sup>	37.76 <sup>a</sup>	10.33 <sup>a</sup>	7.00 <sup>a</sup>	38.27 <sup>b</sup>	4.640 <sup>b</sup>	47.95 <sup>a</sup>	6.393 <sup>a</sup>
GM	7.15	38.50	11.19	7.20	38.43	4.68	52.51	6.59
MSE	0.343	1.131	0.634	0.047	2.997	0.029	11.15	0.056
SE (d)	0.478	0.868	0.650	0.177	1.413	0.140	2.727	0.193
LSD	1.013	1.841	1.378	0.375	2.996	0.297	5.780	0.409
CV (%)	8.2	2.8	7.1	3.0	4.5	3.7	6.4	3.6

**Key:** GM = Grand means; EM = Environmental means; MSE = Mean Square of Error; SE (d) = Standard Error of Difference; LSD = Least Significant Difference and CV = Coefficient of Variation. Values with the same letters in a column mean to ‘not statistically significantly different’.

## 5. Soil Fertility Improvement Research Team

### 5.1. Evaluation of integrated application of compost and inorganic fertilizer on yield and yield components of bread wheat in Negele Arsi district

Grain yield response, total biomass and harvest index were not significant different ( $p < 0.05$ ). It was found that integrated application of 50% equivalent compost and inorganic fertilizer

produced maximum grain yield 4499.58 kg/ha (table7). This indicated that compost can supply N-requirement of the crop by substituting the inorganic nitrogen fertilizer. On the other hand, mean grain yield was not significantly affected by the interaction effect of treatment and cropping season (table1). However, main effect of year significantly affects the grain yield. The summary of mean gain yield, total biomass and harvest index across the cropping season were indicated in table3. Maximum mean grain yield was also obtained from application of 50%eqv. compost+50%R. N +46kg P2O5 in 2022 cropping season.

**Table 7.** integrated application of Compost and Inorganic fertilizer on yield and yield components of bread wheat in Negele Arsi district

No	Treatments	Grain yield Kg/ha	Total Biomass Kg/ha	Harvest index (%)
1	Recommended NPS	4401.67	5649.07	51.87
2	100%eqv.compost+46kg P2O5	4257.50	5818.98	52.37
3	75% eqv.compost+25%R.N +46kg P2O5	4095.00	5511.76	54.62
4	50%eqv.compost+50%R.N +46kg P2O5	4499.58	5706.85	54.79
5	25%eqv.compost+75%R.N +46kg P2O5	4325.42	5893.06	52.33

**Figure 1.** photos taken in Negele Arsi district at on-farm

## **5.2. Determination of the Application Rates of NPS Fertilizer for Better Yield and Yield Components of Bread Wheat (*Triticumaestivum* L.) in Dugda District, East Shoa zone, Oromia**



Grain yield response, total biomass and harvest index were significant different ( $p < 0.05$ ). Maximum grain yield (3904.07 kg/ha) and biomass (7060.74 kg/ha) were observed at treatment 5 where 100% PC was applied. On the other hand, minimum grain yield (1536.017kg/ha) and biomass (4121.85kg/ha) were obtained from the control treatment (table 8). In addition, mean grain yield was not significantly affected by the treatments and year interaction. However, both main effect treatment and year significantly affect the grain yield. The summary of mean gain yield, total biomass and harvest index across the cropping season were indicated in table3. Maximum mean grain yield was also obtained from application of 100%PC in 2022 cropping season.

**Table 8.** Comparison of Combined means of Grain yield and yield components of bread wheat

Treatments	Grain yield kg/ha	Biomass Kg/ha	Harvest index (%)
control	1536.07d	4121.85b	27.47c
25%pc	2731.48c	6448.52a	30.39b
50%pc	3255.56bc	6518.15a	31.95b
75%pc	3419.63ab	7503.33a	31.40b
<b>100%pc</b>	<b>3904.07a</b>	<b>7060.74a</b>	<b>36.53a</b>
CV (%)	20.66	24.35	9.64
LSD(0.05)	662.48	1588.68	2.23
P-value	0.00053	0.00085	0.00091



**Figure 2.** while monitoring and data collection

### 5.3. Validation of Integrated application of Vermicompost and Inorganic fertilizer on yield and yield components of Bread Wheat in Shashemene District of West Arsi Zone, Ethiopia

For sustainable land management, implementation of Integrated Soil fertility management (SFI) is very important. Organic fertilizers maintain soil health, improves soil nutrient and increase

crop yield. Wheat grain yield was significantly higher at treatments where vermicomposting was applied integrated with chemical fertilizer as compared with sole application of vermi compost and chemical fertilizer. Implementation of ISFM significantly increased major soil nutrients except total total nitrogen which showed a decreasing trend due rapid mineralization of vermicomposting and lower C: N ratio. In conclusion, It was identified that 8ton/ha vermicompost plus 50% recommended chemical fertilizer gave maximum grain yield but treatment 2 where 50% recommended chemical fertilizer plus 4ton/ha vermi-compost economically gain maximum net benefit. Therefore, treatment 2 that gained the highest net benefit (148,678.25 ETB) is economically feasible and recommended for an extension in Shashemene district



**Figure 3.** Farmers field visit and monitoring

#### **5.4. Verification of Determined Soil test based phosphorous critical and Requirement factor for Bread wheat in Shashemene district**

##### ***Abstract***

*Verification of P-critical value, P-requirement factor and optimum level of nitrogen fertilizer for bread wheat were conducted in Shashemene district during 2021 growing season. The verification activity was under taken at 10 farmer's fields. It had three treatments that include calibrated phosphorus (critical concentration) with recommended optimum N fertilizer for the area, existing NP fertilizer recommendation (blanket recommendation) and one control plot without NP application. The treatments were applied 10m by 10m plot area that was replicated over the farmers. The yield was harvested and means comparison of grain yield was computed at ( $\alpha < 0.05$ ). The grain yield response was highly significantly different ( $P < 0.05$ ). Plots treated with soil test based fertilizer recommendation gave the highest grain yield (4312kg/ha) followed by the blanket recommendation that gave 3175kg/ha. The minimum grain yield was obtained from the negative control (1600kg/ha). In addition, maximum total biomass (10500kg/ha) and*

harvest index (41%) were also obtained from the plots treated with soil test based fertilizer recommendations. The partial budget analysis also indicated that the maximum net benefit of (103370.00ETB) and highest MRR (143%) were obtained from application of soil test based recommendation. Therefore, soil test based fertilizer application was recommended and selected for further pre scaling up of demonstration activities.

**Keywords** – P-critical, P-requirement factor, Verification.

**6. Indicate the title of activities completed, whether write up is completed or not, major findings obtained and recommendations made (in abstract form) for each team**

- Effect of Deficit Irrigation at Different Growth Stages on the Yield and Water Productivity of Tomato at Adami Tulu Agricultural Research Center
- Participatory Evaluation and Demonstration of Alternate Furrow Irrigation for better water management technologies on onion at Dugda district
- Estimation and on farm determination of Crop Water Requirement and Irrigation Scheduling for Wheat irrigation in Dugda, N/Arsi and Shashemene districts
- Demonstration of Alternative Irrigation Method at Cheleleka Denbel Irrigation Scheme, Dugda district.

In livestock research process, all activities are based on laboratory works of which the work schedule includes June and July. Therefore, it is not possible to completely present in abstract form.

**Table 9.** Activity completed

S. N.	Team	Activity title	Intermediate result	Remark
		Effect of feeding energy and protein level during transition period on production performance of Arsi cows and birth weight of their crossbred calves		Write up is underway

1	Dairy Research	Efficacy of Major Ethno veterinary plants against Selected Livestock Diseases		Laboratory work is underway
2	Meat research team	Identification and Molecular Characterization of Tick-Borne Diseases in Selected districts of East Shewa and West Arsi Zones		Laboratory work is underway
		Substitution of Cowpea Hay for Concentrate Mix on Growth Performance of Arsi- Bale Sheep		Write up is underway
		Evaluation of different crop residues based densified total mixed ration for fattening Arsi-Bale sheep		Casting mold evaluation is underway
3	Animal Feeds and Rangelands Management	Land use land cover change and Trend Analysis of Fantalle Range land, East Shewa District, Oromia Regional state, Ethiopia		Write up is underway
		seed proportion on forage yield of Greenleaf desmodium ( <i>Desmodium intortum</i> ) and Guinea grass ( <i>Panicum maximum</i> ) mixture at ATARC		Write up is underway
		Evaluations of improved forage legume potential for pasture land improvement in low land and mid land areas of East Shewa and West Arsi Zone		Write up is underway
		Effects of sowing date on agronomic, forage yield and nutritive quality of oat at Kofele and Dodola districts of West Arsi Zone		Write up is underway
		harvesting time on Herbage Yield and Quality of Desho Grass ( <i>Pennisetum pedicellatum</i> ) Under Irrigation at Adami Tulu Agricultural Research Center		Write up is underway
		Adaptation trial of Alfalfa ( <i>Medicago sativa</i> ) cultivars in highland areas of West Arsi Zone		Write up is underway
4	Apiculture	Assessment of Stingless bee species diversity and ecology in west Arsi and East shewa		Write up is underway
		Performance evaluation of potential and best shrubs for beekeeping development in mid rift valley of Ethiopia		Write up is underway
5	Poultry	Evaluation of the production performance of commercial hybrid layer chicken using different feeding managements under ATARC		Write up is underway

**6.1. Indicate the title of activities completed, whether write up is completed or not, major findings obtained and recommendations made (in abstract form) for each team**

S.N.	Team	Activity title	Intermediate result	Remark
1	Socio-Economics	Analysis of Wheat seed supply system in the Wheat-dominated smallholder farming system in west Arsi and East Showa zones, Oromia National Regional State.	Activity completed and full write also finished.	

		Cost Benefit Analysis of OPV versus hybrid processing tomato varieties in East Shewa Zone, Ethiopia	Activity completed and full write also finished	
		Enhancing Bread Wheat productivity through community based local seed wheat business group establishment West Arsi and East shoa zones of Oromia (WLSBG	139qt yeild of seed obtained at Dugda custer and 220 qt seed from Negale Arsi cluster. A total of 359 quintals of certified seed was harvested and sold for unions by creating market linkage	
		Enhancing OPV Tomato Productivity through Community based local seed/Seedling tomato business group establishment in East Shoa zone (OPV TLSBG)	5kg of OPV Tomato seed was extracted and distributed for farmers	
		Determinants of Smallholder Farmers' commercialization of Major crops in East Shewa Zone, Oromia Regional State, Ethiopia	Data management and analysis under way Write up not completed	
		Value chain analysis Haricot bean in East Shewa Zone, Oromia Regional State, Ethiopia	Data management and analysis under way Write up not completed	
		Economic Efficiency of Peri-Urban and Urban Dairy Farmers in East Shewa and West Arsi Zones, Oromia Region, Ethiopia	Data management and analysis under way Write up not completed	
		Economic analysis of smallholder crop production under condition of risk: the case of West Arsi and East Shewa zones of Oromia	Data management and analysis under way Write up not completed	
	AE	<i>Cluster based Large Scale demonstration of Bread wheat variety at Dugda District</i> Write up on progress.	Write up completed	

### **A. Agricultural Extension Research Team**

Title : *Cluster based Large Scale demonstration of Bread wheat variety at Dugda District*

#### ***Abstract***

*The activity was done with the objectives of promoting farmers preferred bread wheat variety Kingbird and kekeba in a large-scale cluster approach. A total of 60 farmers contributed a total of 40ha for the activity. The farmers were organized using cluster approach into three clusters, each with 15, 9, and 16ha of land. Before planting, class room trainings and stakeholder workshop were conducted to all involved parties on the overall activity implementation approach as well as bread wheat production and management. Furthermore, field day was conducted and*

*a total of 163 participants attended the event. The varieties were sown and proper agronomic management practices were applied by the farmers. Yield data was collected and the result indicated that a mean yield of 36.5 and 41qt/ha was gained at the time of harvesting. Thus, further promotion and wider extension works are recommended on this variety at Dugda and similar agro ecologies.*

## **B. Socio-economics Research Team**

*Analysis of Wheat seed supply system in the Wheat-dominated smallholder farming system in west Arsi and East Showa zones, Oromia National Regional State*

### **Abstract**

*In Ethiopia, lower productivity of wheat production has been one of the significant contributors to food insecurity. Considerable efforts have been made by the government, NGOs and researchers in generating, introducing and disseminating appropriate wheat technologies to boost the production and productivity of wheat. The objective of this study was to identify the status and performance of wheat seed supply and factors that determine wheat seed supply system in West Arsi and East Shewa zones. A multi-stage random sampling procedure was used to select 240 sample wheat producers from both zones using probability proportional to size. Secondary data were also collected from different sources including CSA, ZOANR, DOANR, and from published and unpublished sources to supplement primary data. Descriptive statistics and econometric model were used to analyze data. Descriptive statistics and econometric model were used to analyze data. In both zones formal, informal, and alternative wheat seed systems co-exist which accounts for 18.955, 31.791 and 49.25%, respectively. Access to market and market information and credit service plays an important role in accessing of improved wheat seed supply system by smallholders' farmers. Therefore, any interventions that make farmers access to above mentioned service of the households have better enhances farmer's access to wheat seed in the area. Total land cultivated and farm experiences effect farmer's access to wheat seed supply system. Therefore, total land allocated for wheat production and farm experience have a positive effect on farmers access to wheat seed supply system. Therefore, total land cultivated should be increased by using rent-in and shared-in land to enhance access of wheat seed supply systems and farm experience have to be increased by providing different training. Based on the results obtained, the study suggests that the government and stakeholders should focus on*

*strengthening the provision of formal and informal training, arranging experience sharing program, enhancing farmer's resource endowment in order to increase access to wheat seed supply in the study area. It is, therefore, expected that the seed producers should be capacitated through accessing credit and logistics, farm machineries, seed processing plant, store and capability (motivated and competent human resource) of seed producers to supply quality seed that could meet the zonal seed demand. Incentive mechanisms need to be devised and implemented to increase participation of cooperative unions, primary seed producer cooperatives, agents/agro-dealers and private sectors in the seed industry. Moreover, there is a need to provide training on the part of government to seed producers and agents/agro dealers on seed marketing mix.*

**Title: Cost Benefit Analysis of OPV versus hybrid processing tomato varieties in East Shewa Zone, Ethiopia**

***Abstract***

*Tomato (Solanum lycopersicum Mill.) is the major horticultural crop with an estimated global production of 164 million metric tons from 4.73 million hectare of land. In Ethiopia, it is an important food ingredient in daily diet of people in almost all regions. The crop is an important cash-generating crop to small-scale farmers and provides employment in the production and processing industries. Despite its importance the productivity of tomato is very low in Ethiopia as compared to other countries. This is due to lack of adaptability study, dissemination of improved varieties to all parts of the country and due to different biotic and abiotic factors. The objective of this study was to identify the Cost Benefit Analysis of OPV versus hybrid processing tomato varieties and to identify opportunity and constraints of tomato production in East Shoa Zone, Ethiopia. A multi-stage random sampling procedure was used to select 120 sample tomato producers from Dugda and ATJK districts. Both primary and secondary sources were used for data collection. The primary data was collected through interviewing from 120 sample households using semi-structured questionnaires. Qualitative data were also collected through focus group discussions, and key informants' interviews using checklists. STATA version 15 Software was used for data analyzing. To conduct the cost-benefit analysis for these study the most common variety produced were selected (Gelila from hybrid and Gelilema from OPV). As*

*the survey result and experiment conducted for two years indicate that, on average 533.10qt and 484.75qt/ha was produced from hybrid Gelila and OPV Gelilema respectively. As the study result indicate that, the Average gross return was 5,158,093.25birr per hectare for hybrid varieties whereas its 3,835,512.5 birr/ha for OPV tomato varieties suggesting hybrid tomato varieties was superior by 1,333,000 birr/ha than OPV tomato varieties. In the meantime, the AVC is 172,906.75 birr/ha for hybrid tomato variety wherer as its 42,487.5 birr/ha for OPV. Eventhough net return was higher for hybrid tomato variety, its benefit-cost ratio is lower than OPV tomato variety which is 29.83 for hybrid and 90.27 for OPV tomato variety suggesting better benefit gain from cost incurred for OPV tomato production. The major challenges identified in the study area were shortage of improved seed, high input costs, high production costs, disease and pests; perish ability nature of the products, broker's interferences, inadequate market information, price fluctuation, high competition from unlicensed traders, and shortage of capital and poor product quality. Therefore, any intervention that addresses the above mentioned challenges are recommended to solve the problems in the study areas. The farmers get more benefit when they use hybrid variety but benefit-cost ration is high when they use OPV tomato variety suggesting better gain from cost incurred for production. Therefore, an intervention or any extension service through training and field visit should be given for farmers to increase their awareness on profitability of OPV tomato variety.*

**7. Major intermediate results/outputs (if any) obtained from ongoing research activities  
(doesn't include pre-extension demonstration and pre-scaling up activities)**

**7.1. Soil fertility improvement**

No.	Ongoing activities	Major activities performed	Intermediate results (if ready)
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1.	Characterization and Mapping of Soil Salinity status at small-scale irrigation farm: the Case of Fantale Irrigation Project Sites	<ul style="list-style-type: none"> <li>➤ Preliminary survey was conducted</li> <li>➤ Three irrigation schemes were selected for detail soil and water sampling</li> <li>➤ Soil (0-120cm) at different interval and water sample collections were done during the dry season</li> <li>➤ Soil and water analysis are underway at Batu soil research Lab</li> </ul>	➤ Data analysis is underway
2.	Determination of the Application Rates of NPS Fertilizer rate for Better Yield and Yield Components of Maize at A/T/J/K District, East Shoa Zone, Oromia	<ul style="list-style-type: none"> <li>➤ Material preparation, Sites selection land preparation was done</li> <li>➤ and planting were not performed due to delay of main rainy seasons for maize in this year</li> </ul>	➤ Commented to be reported as completed due to change in national fertilizer type)
3.	Determination the Application Rate of NPS Fertilizer for Better Yield and Yield Components of Bread Wheat ( <i>Triticum aestivum</i> L.) in Shashamne District of West Arsi Zone (New)	<ul style="list-style-type: none"> <li>➤ Site selection, land preparation and treatment application were done</li> </ul>	➤ Commented to be reported as completed due to change in national fertilizer type
4	Soil Test Based Crop Response Phosphorus Calibration Study on Maize in Negele Arsi district	<ul style="list-style-type: none"> <li>➤ Material preparation, Sites selection, land preparation and planting were done</li> <li>➤ 21 day soil sample collection was done</li> <li>➤ Site management, monitoring and lab. analysis are underway</li> </ul>	➤ Data collection and entering are underway
5	Effect of Integrated application of Vermi compost and Inorganic fertilizer on yield and yield component of Teff in Lume districts of East Shoa Zone, Oromia, Ethiopia	<ul style="list-style-type: none"> <li>➤ Harvesting and yield data collections were done</li> <li>➤ Material preparation, Sites selection, land preparation and plating was done</li> <li>➤ Site management and monitoring under way</li> </ul>	➤ Data collection and entering are underway
6	Determination of the Application rate of Vermicompost integrated with chemical Fertilizer on yield and yield components of Maize in Adami Tulu/J/K District of East Shoa Zone, Oromia	<ul style="list-style-type: none"> <li>➤ Material preparation, Sites selection, land preparation and planting were performed</li> <li>➤ Site management is underway</li> </ul>	➤ Data collection and entering are underway
7	Soil Test Crop Response Based Phosphorus Calibration Study for Maize in Shalla District of Western Arsi Zone of Oromia	<ul style="list-style-type: none"> <li>➤ Material preparation, Sites selection, land preparation and treatments application were done</li> <li>➤ Weeding and chemical spray was done</li> <li>➤ Monitoring and site management was underway</li> </ul>	➤ Data collection and monitoring are underway
8	Soil Test Crop Response Based Phosphorus Calibration Study for Wheat in A/T/J/K District of East Showa Zone of Oromia	<ul style="list-style-type: none"> <li>➤ Site selection, land preparation and treatments application were done</li> <li>➤ Monitoring and site management are underway</li> </ul>	➤ Data collection and monitoring are underway

9	Maintenance for multiplication and distribution of vermi worms and Vermi compost in ATARC	<ul style="list-style-type: none"> <li>➤ Vermocompost was prepared for different on-going activities</li> <li>➤ Vermi compost and worm multiplications are underway</li> </ul>	➤ Data collection and monitoring are underway
<b>Non –IQQO Funded Projects</b>			
1	Evaluation of NP fertilizers on yield and yield components of bread wheat, Maize and tef (AECFR)-	<ul style="list-style-type: none"> <li>➤ Site was selected</li> <li>➤ Planting was done for Maize</li> <li>➤ Site management is underway</li> </ul>	➤ Data collection and monitoring are underway
2.	Demonstration of Small-scale Vermiculture and production of Vermi compost at Smallholder Farmers in Gara Mullata sub- watershed, Shashemene district (CALM)	<ul style="list-style-type: none"> <li>➤ Material preparation, Sites selection was done</li> <li>➤ Training was given for different bodies</li> <li>➤ Vermiculture construction was done</li> </ul>	➤ Data collection and monitoring are underway
3.	Participatory Evaluation and demonstration of integrated use of Organic and inorganic fertilizers for Potato ( <i>Solanum tuberosum l.</i> ) production in Ebicha sub- watershed, Shashemene (CALM)	<ul style="list-style-type: none"> <li>➤ Material preparation, Sites selection and planting were done</li> <li>➤ Training was given</li> <li>➤ Harvesting was done</li> </ul>	➤ Data entering is underway
4.	Participatory Evaluation and Demonstration of Vermi Compost integrated with Chemical fertilizer on yield of Bread wheat ( <i>Triticumaestivum L.</i> ) In Gara Mullata sub-water sheds in Shashemene district (CALM)	<ul style="list-style-type: none"> <li>➤ Material preparation, and Sites selection were done</li> <li>➤ Trainings was given</li> <li>➤ Planting will be done in july,2023 done</li> </ul>	➤ Data collection and monitoring are underway
5.	Participatory Evaluation and demonstration of integrated use of organic and inorganic fertilizers for Maize production in Gara mulata Sub-watershed, in Shashemene District (CALM)	<ul style="list-style-type: none"> <li>➤ Material preparation, and Sites selection were done</li> <li>➤ Trainings was given</li> <li>➤ Planting was done due</li> </ul>	➤ Data collection and monitoring are underway
6.	Participatory Evaluation and demonstration of selected haricot bean variety intercropping with maize on grain yield production and soil fertility improvement in Gara mulata Sub-watershed, in Shashemene District(CALM)	<ul style="list-style-type: none"> <li>➤ Material preparation, and Sites selection were done</li> <li>➤ Trainings was given</li> <li>➤ Planting was completed</li> </ul>	➤ Data collection and monitoring are underway
7.	Establishment and Demonstration of Small-scale Vermiculture and production of Vermi compost at Smallholder Farmers at Warja Community Watershed in Adami Tulu District, East Shoa zone, Oromia	<ul style="list-style-type: none"> <li>➤ Material purchased</li> <li>➤ Farmers selected</li> </ul>	On going

8..	Effect of Integrated application of Vermi compost and Inorganic fertilizer on yield and yield component of Teff in Dugda districts of East Shoa Zone, Oromia, Ethiopia (FSRP)	➤ Site was selected	-
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## 7.2. Agroforestry team

### 7.2.1. Growth Performance of *Moringa Stenopetala* Provenances at Adami Tulu Jido Kombolcha District, East Shoa Zone

The four provenance data were collected for three consecutive years and analyzed as result, there is significant difference in survival rate ( $p < 0.05$ ) among the provinces. Bale and Konso provenance had high survival percentage compared to Arbamich and Wolayta provenances. As survival rate and other growth parameters are the criteria to be measured for adaptability of the different provenances, the two provenances namely Bale and Konso were more performed in the study site according to the result.

**Table 10.** Mean survival rate of provenance in %

Provenances	Survival rate %
Bale	85.19 <sup>a</sup>
Konso	81.48 <sup>a</sup>
A/Minch	62.96 <sup>b</sup>
wolayta	62.96 <sup>b</sup>
LSD <sub>(0.05)</sub>	14.68
CV (%)	11.60
P - value	*

**Table 11.** Mean of growth performance of provenances

Provenances	Mean Height in centimeter	Mean RCD in centimeter	Mean canopy width in centimeter
Konso	77.37	33.44	63.29
Bale	64.47	39.13	61.67
A/Minch	57.33	28.55	59.8
wolayta	63.53	33.17	57.93
LSD <sub>(0.05)</sub>	26.85	14.02	16.9
CV (%)	20.50	20.90	13.9
P - value	ns	ns	ns

## 7.2.2. Adaptation Trial of Bamboo Species in west Arsi Zone

### Brief status

- Growth parameters of 3-year-old clumps were counted and presented for each species.
- Average number of culms, height, RCD, number of nodes, and inter node length for each species were measured for the three consecutive years
- Culm Height, Diameter and internode length

The length and RCD of the culm was varying among the seven species planted at both N/Arsi and Kofale district. According to analysis of variance ( $p < 0.05$ ) *D. asper*, *D. dainnensiss*, *D. Fuminesis* and *D. yonuness* were significantly deferent from the rest three species in height, RCD, and internode lengths at both sites (table 6). While logternod, Barbatus and local shows the lowest culm height, RCD and internode length with compare to the rest.

Regarding with the number of Node/culm there is no significant variation among the species at kofale site and number of Node/culm were significantly varying at N/Arsi with high number of Node/culm recorded for *D. Fuminesis*, *D. dainnensiss*, *D. asper* and *D. yonuness*

**Table 12.** Mean of growth performance of 2012 at N/ Arsi

Species	RCD mm	Height cm	NoND	No cul/p	IntrNL in cm
<i>Dandrocalamus asper</i>	22.12a	267.78a	10.22	6.22	23.24ab
<i>Dandrocalamus Fuminesis</i>	19.25a	270.22a	9.89	7.78	24.74a
<i>Dandrocalamus Yunnanese</i>	19.25a	241.44a	9.89	6.22	21.93ab
<i>Dandrocalamus dainnensiss</i>	18.15ab	187.67ab	9.67	6.79	19.37abc
<i>Dandrocalamus Barbatus</i>	11.92bc	125.67b	7.22	6.89	13.81c
<i>Dandrocalamus longinternode</i>	10.49c	131.67b	7.00	7.66	15.61bc
<i>Yushania alpina</i>	8.08c	131b	8.44	4.89	12.9c
LSD (0.05)	6.39	83.85	3.15	2.85	8.07
CV (%)	23.38	24.73	20.19	24.55	24.50
P - value	**	**	ns	ns	*

**Table 13.** mean of growth performance in 2012 at Kofale district, West Arsi Zone

Species	RCD mm	Height cm	NoND	No cul/p	IntrNL in cm
<i>Dandrocalamus asper</i>	15.03ab	164.33ab	8.89a	8.00a	18.03ab
<i>Dandrocalamus Fuminesis</i>	17.26a	217.67a	9.33a	8.67a	21.48a
<i>Dandrocalamus Yunnanese</i>	16.01a	150.49b	9.22a	7.72ab	19.55a
<i>Dandrocalamus dainnensiss</i>	17.32a	163.11ab	8.44a	8.00a	19.18a
<i>Dandrocalamus Barbatus</i>	5.67c	45.11c	5.33c	6.00bc	8.40c
<i>Dandrocalamus longinternode</i>	6.19c	42.44c	3.56c	5.11c	7.59c
<i>Yushania alpina</i>	10.54bc	142.78b	11.89a	9.44a	13.66b

LSD <sub>(0.05)</sub>	5.40	56.35	2.36	1.88	4.50
CV (%)	24.53	24.33	16.67	14.16	16.67
P - value	**	**	**	**	**

**Table 14.** mean of growth performance of 2013 at N/Arsi

Species	RCD mm	Height cm	$N_{\underline{0}ND}$	$N_{\underline{0}cul/p}$	IntrNL in cm
<i>Dandrocalamus asper</i>	31.71a	386.44ab	13.44bc	10.00	27.11a
<i>Dandrocalamus Fuminesis</i>	28.86ab	352.22b	12.78bcd	10.78	24.78a
<i>Dandrocalamus Yunnanese</i>	29.73ab	362.78ab	13.44bc	8.33	24.22a
<i>Dandrocalamus dainnensiss</i>	31.61a	443.11a	14.11ab	10.22	27.44a
<i>Dandrocalamus Barbatus</i>	22.39bc	229.44c	10.22cd	13.56	25.56a
<i>Dandrocalamus longinternode</i>	22.67bc	235.22c	10.11d	12.67	23.17a
<i>Yushania alpina</i>	17.568c	242.78c	16.83a	11.67	16.92b
LSD <sub>(0.05)</sub>	8.66	90.735	3.2855	5.61	5.61
CV (%)	18.76	16.11	14.44	29.05	13.25
P - value	*	**	**	ns	*

**Table 15.** mean of growth performance of 2013 at Kofale

Species	RCD mm	Height cm	$N_{\underline{0}ND}$	$N_{\underline{0}cul/p}$	IntrNL in cm
<i>Dandrocalamus asper</i>	20.10ab	307.22a	12.00b	12.33	25.684a
<i>Dandrocalamus Fuminesis</i>	22.20a	315.89a	13.00b	12.44	25.148a
<i>Dandrocalamus Yunnanese</i>	21.97a	245.00ab	11.00b	10.00	21.481a
<i>Dandrocalamus dainnensiss</i>	20.91ab	275.00ab	12.00b	9.67	20.519a
<i>Dandrocalamus Barbatus</i>	6.178c	35.44c	4.00c	14.22	8.778b
<i>Dandrocalamus longinternode</i>	4.74c	30.33c	3.00c	13.11	8.37b
<i>Yushania alpina</i>	14.62b	205.67b	15.00a	14.00	12.946b
LSD <sub>(0.05)</sub>	7.28	95.35	1.97	5.39	6.10
CV (%)	26.30	26.95	11.28	24.98	19.82

P - value	**	**	**	ns	**
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**Table 16.** Mean of growth performance of 2014 at N/Arsi

Species	RCD mm	Height cm	NoND	No cul/p	IntrNL in cm
<i>Dandrocalamus asper</i>	39.27	582.2abc	17.33ab	7.11	26.81ab
<i>Dandrocalamus Fuminesis</i>	34.78	624.4ab	19.22a	9.72	29.13ab
<i>Dandrocalamus Yunnanesis</i>	35.02	582.2abc	17.83ab	8.44	27.98ab
<i>Dandrocalamus dainnensiss</i>	38.52	818.9a	18.78a	10.56	32.01a
<i>Dandrocalamus Barbatus</i>	22.47	408.9bcd	12.83c	10.00	24.22b
<i>Dandrocalamus longinternode</i>	22.16	350.00cd	13.89bc	11.22	25.96b
<i>Yushania alpina</i>	24.04	281.10d	13.78bc	9.89	14.37c
LSD <sub>(0.05)</sub>	22.34	240.04	4.3646	7.65	5.44
CV (%)	40.18	26.30	15.35	45.68	12.06
P - value	ns	**	*	ns	**

**Table 17.** mean of growth performance of 2014 at Kofale district

Species	RCD mm	Height cm	NoND	No cul/p	IntrNL in cm
<i>Dandrocalamus asper</i>	27.294bc	391.11	15.00	11.00	27.15a
<i>Dandrocalamus Fuminesis</i>	31.608ab	460.00	15.00	11.00	28.67a
<i>Dandrocalamus Yunnanesis</i>	38.481a	432.22	15.00	11.00	25.52a
<i>Dandrocalamus dainnensiss</i>	35.64ab	384.44	14.00	10.00	28.02a
<i>Yushania alpina</i>	18.624c	290.00	14.00	19.00	18.42b
LSD <sub>(0.05)</sub>	11.065	141.05	3.54	7.68	4.36
CV (%)	20.05	19.80	12.95	33.65	9.38
P - value	**	ns	ns	ns	**

### 7.2.3. Assessment of Woody Biomass energy utilization and existing Conservation enforcements in Adami Tullu and Negelle Arsi Districts, East Shewa Zone, Oromia

**Table 18.** Annual biomass of wood used as fuel wood in Districts

Districts	Fuel wood Market Outlets	Annual Average Volume of Fuel wood	Mean ± SE In cubic meter
ATJK	Tulu Market Aluto Outlet	314.5	167.1 ± 64.5
	Tulu Market Wayiso Suro Outlet	28.7	
	Bulbula Oitu Outlet	229.9	
	Batu market (Abine Germama & Bocesa Outlet)	95.5	
Negelle Arsi	Abijata Shala Outlet	1402.2	

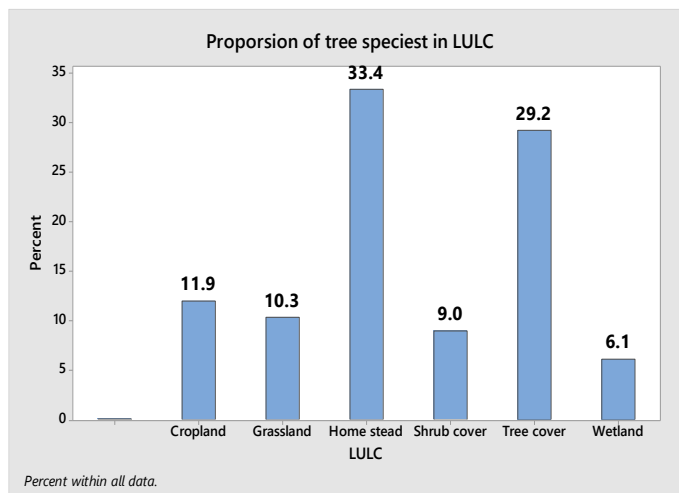
Major gaps of wood resources utilization and conservation status based on discussion with Key informants (team of experts at both districts, 2015); was:

- ✓ Politicization of natural resource development activities particularly mass planting of trees,
- ✓ Institutional gap: two structure of office working on the development and conservation of tree resources.
- ✓ This brought un identified work mandate as one blame other.
- ✓ Low enforcements of existing laws/proclamations and by laws by police officers

#### 7.2.4. Assessment of Woody species diversity and Carbon sequestration potential in Major Land Use Types of East Shewa Zone, Oromia, Ethiopia

Vegetation Assessment & Soil sampling were done at ATJK,Bora, Liban ,Gimbichu. But not done at Boset and Fentale due to security problem.

LULC	Count
Home stead	38
Cropland	28
Tree cover	18
Shrub cover	15
Grassland	14
Wetland	6
<b>Total spp N</b>	<b>119</b>



#### Remaining activity

Estimating Total Carbon Stocks in Different Carbon Pools

- Above Ground Biomass (AGB)
- Below Ground Biomass (BGB)
- Soil Organic Carbon (SOCs) → waiting for Lab result

**Table 19.** ongoing activities of Agroforestry

No	Ongoing activities	Major activities performed	Intermediate results (if ready)
.			

1.	Effect of Integration of Multipurpose Trees and Soil and Water Conservation Structures on Degraded Warja Sub Watershed East Shewa, Ethiopia	<ul style="list-style-type: none"> <li>➤ Data collection for tree species and grass biomass was collected</li> <li>➤ Fence maintenance was done</li> <li>➤ Pond clearing and silt trap maintenance was done</li> <li>➤ Sit monitoring was done regularly</li> <li>➤ Seedling watering was done during dry season</li> <li>➤ Soil sample was collected and data analysis was completed</li> </ul>	
2.	Screening and growth performance evaluation of potential multipurpose trees for agro-ecologies of East Sheo, Oromia	<ul style="list-style-type: none"> <li>➤ The trials were started at two sites N/arsi and on station</li> <li>➤ Four species was planted at each site</li> <li>➤ Data collection for tree species was collected</li> <li>➤ Fence maintenance was done</li> <li>➤ Weeding was done regularly</li> </ul>	
3.	Growth Performance Evaluation of Indigenous Multipurpose Trees In Major Agro-ecologies of East Shewa and West Arsi Zones of Oromia	<ul style="list-style-type: none"> <li>➤ The trials were started at three sites N/arsi, Kofale and on station</li> <li>➤ Four indigenous species was planted at each site</li> <li>➤ Data collection for tree species was collected</li> <li>➤ Fence maintenance was done</li> <li>➤ Weeding was done regularly</li> </ul>	
4.	Assessment, Characterisation and Mapping of Natural Forests in East Shoa, West Arsi and Arsi Zones of Oromia National Regional State, Ethiopia	<ul style="list-style-type: none"> <li>➤ Image analysis was done for Munessa natural forest while for nensabo was not done</li> <li>➤ Due to security ground verification was not done yet</li> </ul>	
5.	Characterization of Trees and Shrubs Species Diversity in Forests of east Shoa, West Arsi and Arsi Zones of Oromia National Regional State	<ul style="list-style-type: none"> <li>➤ Diversity data was not collected for security problem</li> </ul>	
6.	Establishment of Homestead Farms for Household Income Generation and Micro Climate Amelioration in East Shoa Zone of Oromia, Ethiopia	<ul style="list-style-type: none"> <li>➤ Home goarden was established on station and on one farmer field at golba kebele</li> <li>➤ Different fruity trees and vegetables was planted</li> <li>➤ First year Data was collected</li> <li>➤ Weeding was done regularly</li> <li>➤ Fence was maintained</li> <li>➤ Enrichment planting was done</li> <li>➤ On farmer field chilly was planted and harvested</li> </ul>	
<b>Non –IQQO Funded Projects</b>			
1.	Demonstration and promotion of Home garden Agroforestry design in Gara Muleta Community Watershed, West Arsi, Oromia, Ethiopia	<ul style="list-style-type: none"> <li>➤ Homegarde was established on three additional farmers at gara mulata</li> <li>➤ The newly established homegarden at gara mulata was integrated with maize according to farmers preference</li> <li>➤ Enset, Mango, Avocado, Zeytune, and lomen was purchased and planted in homegarden</li> </ul>	



		<ul style="list-style-type: none"> <li>➤ Pit preparation for coffee is underway</li> <li>➤ Two farmers was selected at worja kebele for home garden establishment</li> <li>➤ Water continuer (rotto) purchease is under way</li> <li>➤ Training was given for farmer at gara mulata</li> </ul>	
2.	Participatory Evaluation and Demonstration of Cajanus cajan Maize Alley Cropping in Gara Muleta Community Watewrshed, West Arsi Zone, Oromia	<ul style="list-style-type: none"> <li>➤ The experiment was established on three farmers at gara mulata</li> <li>➤ Maize was planted and pigeon pea was established as ally</li> <li>➤ Weeding and chemical spray was done for maize to control arm worm</li> </ul>	
3.	Restoration and Conservation of Indigenous woody species in Gara Muleta Community Watershed	<ul style="list-style-type: none"> <li>➤ Agreement on experimental site was signed with Oromia forest enterprise and ATARC</li> <li>➤ Seedlings of four species is under management on nursery</li> <li>➤ Pit preparation is underway</li> </ul>	
4.	Participatory Evaluation and Demonstration of Maize-Pigeon Pea Improved Fallow Agroforestry System	<ul style="list-style-type: none"> <li>➤ The activity was established on three farmers at gara mulata and on three farmers at worja kebeles</li> <li>➤ Top dressing was don for all experiment</li> <li>➤ Pigeon pea was established for all experiments and chemical spray was done to control pest</li> </ul>	
5.	Multiplication and Distribution of different tree and shrub species seedlings for plantation in the community	<ul style="list-style-type: none"> <li>➤ Four species was under management on nursery for plantation under way</li> </ul>	
6.	Participatory Evaluation and Demonstration of Improved Beekeeping Technology	<ul style="list-style-type: none"> <li>➤ Discussion was made with district</li> <li>➤ Sites were selected</li> <li>➤ bee forage sowed at each apiary site</li> <li>➤ Farmers selected</li> <li>➤ Hive stands were constructed</li> <li>➤ Modern and transitional hives were distributed for farmers</li> <li>➤ Training was given for farmers</li> <li>➤ Honey bee colonies were transferred to modern and transitional bee hives</li> </ul>	
7.	Demonstration and promotion of Home garden Agroforestry design in Gara Muleta Community Watershed, West Arsi, Oromia, Ethiopia	<ul style="list-style-type: none"> <li>➤ Homegarde was established on three additional farmers at gara mulata</li> <li>➤ The newly established homegarden at gara mulata was integrated with maize according to farmers' preference</li> <li>➤ Enset, Mango, Avocado, Zeytune, and lomen was purchased and planted in homegarden</li> <li>➤ Pit preparation for coffee is underway</li> <li>➤ Two farmers were selected at worja kebele for home garden establishment</li> <li>➤ Water continuer (rotto) purchase is under way</li> </ul>	

		➤ Training was given for farmer at gara mulata	
8.	Participatory Evaluation and Demonstration of Improved Beekeeping Technology	<ul style="list-style-type: none"> <li>➤ Discussion was made with district</li> <li>➤ Sites were selected</li> <li>➤ bee forage sowed at each apiary site</li> <li>➤ Farmers selected</li> <li>➤ Hive stands were constructed</li> <li>➤ Modern and transitional hives were distributed for farmers</li> <li>➤ Training was given for farmers</li> </ul> <p>Honey bee colonies were transferred to modern and transitional bee hives</p>	

### **7.3. Soil and water conservation and watershed management**

#### **7.3.1. Socio-Economic and Biophysical Characterization, Identification and Prioritization of Major Constraints and Potentials of Garamulata Community Watershed**

A watershed is the landscape that contributes surface water to a single location. Watersheds provide a range of ecosystem services that are valued by the community. Conducting baseline study before implementing any project in the watershed is crucial to evaluate and monitor the impacts of project intervention on socioeconomic status of the beneficiaries of the project. This study was designed to characterize the socio economic condition of Garamulata community watershed in Shashamane district thereby identify and document the current status, potentials, and constraints of the watershed and provide baseline data and information for further project monitor and evaluation of the intervention. We used systematic and simple random sampling method to select 113 sample households. Descriptive statistics method of data analysis was employed to analyze the primary data collected. The study found that about 99% of household respondents had an average of 0.58ha of land for annual crops, which indicates that there is highly shortage of land in the watershed. The study showed that constraints hindering the development of community in the watershed were soil erosion, shortage of land, soil fertility declination, deforestation, lack of agricultural input, poor road access, shortage livestock feed and fodder and population density. The result of the evaluation also showed that the watershed is poorly contained both physical and biological soil and water conservation structures. Despite these watershed constraints, there exist also opportunities like suitable agro-ecology, labor force, school and informal institutions have to be capitalize in the watershed of the study area.

Therefore, efforts to change lives around the watershed need to focus on addressing these constraints related to access to improved technologies.

**Table 20. SWC ongoing activities**

No.	Ongoing activities	Major activities performed	Intermediate results (if ready)
1.	Effects of tillage and fertility management on selected soil physical properties and Maize yield in Shashemene district West Arsi Zone, Oromia	<ul style="list-style-type: none"> <li>➤ Site was selected</li> <li>➤ Land preparation, and planting were done at Shashamane district</li> <li>➤ Soil and yield data were collected for first year trial</li> </ul>	
2	Pre extension and Demonstration of Integrated In-Situ Soil Moisture Conservation Measures and Inorganic and Organic Fertilizer on Maize in A/T/J/K District East Shewa Oromia	<ul style="list-style-type: none"> <li>➤ Site was selected</li> <li>➤ Land preparation, and planting were done at ATJK district</li> </ul>	
<b>Non –IQOO Funded Projects</b>			
1.	Participatory evaluation and demonstration of integrated biophysical measures for gully rehabilitation at Gara Mullata Community Watershed in Shashemene District, West Arsi zone, Oromia	<ul style="list-style-type: none"> <li>➤ Newly implementation of physical gully conservation measures was done</li> <li>➤ The previously rehabilitated gully also maintained by additional sachets</li> <li>➤ the physically conserved area was supported by biological</li> <li>➤ Site monitoring and management was done as done</li> </ul>	
2.	Participatory evaluation and demonstration of integrated physical and biological soil and water conservation measures for degraded area rehabilitations at Gara mullata Community Watershed in Shashemene District, West Arsi zone, Oromia	<ul style="list-style-type: none"> <li>➤ The previously constructed bund was maintained</li> <li>➤ Newly about 240m of graded soil bunds were constructed</li> <li>➤ Dasho grass also planted on the constructed embankments of bund</li> <li>➤ Site monitoring and management was done</li> </ul>	
3.	Participatory evaluation and demonstration of integrated physical and biological soil and water conservation measures on bread wheat production and soil physicochemical properties at Gara Mullata Community Watershed in Shashemene District, West Arsi zone, Oromia	<ul style="list-style-type: none"> <li>➤ Newly 150m of SWC bund was constructed and supported by Dasho grass</li> <li>➤ Farmers were using Dasho grass by cut &amp; carry as fourth round in the autumn</li> <li>➤ Purpose of bund stabilization and use for livestock feed was obtained by sediment accumulation Dasho as feed source on</li> </ul>	

		<ul style="list-style-type: none"> <li>➤ site.</li> <li>➤ Land was preparing for wheat sowing</li> <li>➤ Field monitoring and evaluation was done with ATARC and IQQO natural resource director.</li> </ul>	
4.	Participatory evaluation and Demonstration of In-Situ Soil Moisture Conservation Measures and Integrated Inorganic and Organic Fertilizer on Maize at Gara Mullata Community Watershed in Shashemene District, West Arsi zone, Oromia	<ul style="list-style-type: none"> <li>➤ Site was selected</li> <li>➤ Land were prepared at 3 farmers' land</li> <li>➤ Planting/sowing of maize was done at 3 farmers' land</li> <li>➤ Maize top dressing and tied ridge implementation were done</li> <li>➤ Site management and tied ridge maintenance and cultivation were done</li> <li>➤ Insecticide was sprayed for stalk borer control</li> </ul>	
5.	Participatory Evaluation and Demonstration of integrated physical and biological SWC measures for rehabilitation of degraded area and economic benefits.	<ul style="list-style-type: none"> <li>➤ Site was identified/selected</li> <li>➤ About 880m of level bund was constructed to the standard on more than 7200m<sup>2</sup> with 12m between the bunds, and</li> <li>➤ Between the bunds /interior area/ half-moon and seedling pits preparation underway</li> </ul>	
6.	Participatory evaluation and demonstration of integrated biophysical measures for gully rehabilitation	<ul style="list-style-type: none"> <li>➤ Gully morphology characterization</li> <li>➤ Gully rehabilitation with physical measures was done</li> </ul>	

## 8. Socio-Economics and Agricultural Extension Research Process

### 8.1. Major activities performed in the year with intermediate results of Socio-Economics

**Table 21.** Summary of the intermediate results/outputs obtained in the year

1	Socio-economics	Enhancing Bread Wheat productivity through community based local seed wheat business group establishment West Arsi and East shoa zones of Oromia (WLSBG)	139qt yeild of seed obtained at Dugda cluster and 220 qt seed from Negale Arsi cluster. A total of 359 quintals of certified seed was harvested and sold for unions by creating market linkage
		Enhancing OPV Tomato Productivity through Community based local seed/Seedling tomato business group establishment in East Shewa zone (OPV TLSBG)	5kg of OPV Tomato seed was extracted and distributed for farmers



**Table 22.** Summary of the intermediate results/outputs obtained in the year of Agr. Extension

No	Title of the activity	Name of the technologies demonstrated	Location (district, PAs and FTCs)	Plot size (ha) per farmer used for the trial	Quantity/amount of the technology distributed	Number of participant farmers/pastoralists					Benefits obtained (productivity/income gain)
						Adult men	Adult women	Young men	Young women	Total	
01	PED of combined application of Gypsum (CaSO <sub>4</sub> ) and compost for soil salinity management at small-scale irrigation farms in Dugda districts	01	Dugda District	200m <sup>2</sup>	Onion seedling and 50kg of gypsum	12	3			15	245qt/ha (9.3 % yield advantage)
02	PED of Haricot bean technologies in potential districts of East Shewa	03	Dugda (	0.25ha	25kg	22	5	7		27	30-35qt/ha
03	PED of AI Timing in selected districts of East Shewa zone	01	Adami Tulu district	-	20	21				41	Under implementation
05	PED of Bread wheat Varieties	02	Dugda (Tephoroqe	1Ha	1.5qt	13	2			15	35-40qt/ha
06	PED of Durum Wheat Varieties	03	Dugda (Tephoroqe and GirabaKorkeAdi	600m <sup>2</sup>	10kg	13	2			15	37-42qt/ha

## 9. Crop process

### 9.1. Cereal Research Team

No	Ongoing activities	Major activities performed	Intermediate results (if ready)
1.	Bread Wheat Regional Variety Trial for Low Moisture Areas (BWRVT-2022)	<ul style="list-style-type: none"> <li>➤ The experiment was conducted on three location ATARC, Dugda and Lume.</li> <li>➤ All data was collected on location.</li> </ul>	Data analysis is underway

2.	Six Row Food Barley Regional Variety Trial	<ul style="list-style-type: none"> <li>➤ The experiment was conducted on three location ATARC, Dugda and Lume.</li> <li>➤ All data was collected on location.</li> </ul>	Data analysis is underway
3	Two Row Food Barley Regional Variety Trial	<ul style="list-style-type: none"> <li>➤ The experiment was conducted on three location ATARC, Dugda and Lume.</li> <li>➤ All data was collected on location.</li> </ul>	Data analysis is underway
4	Improving Bread Wheat Genotypes that Suits for Low Moisture Areas for Yield and Major Desirable Agronomic Traits via Hybridization	<ul style="list-style-type: none"> <li>➤ 248 Spike heads were pollinated</li> <li>➤ 1182 F1 seeds were harvested</li> </ul>	Crossing F1 Lines Selecting Superior Lines at F2
5	Improving Bread Wheat Genotypes that Suits for Highland Areas for Yield and Major Desirable Agronomic traits via hybridization	<ul style="list-style-type: none"> <li>➤ 304 Spike heads were pollinated</li> <li>➤ 1760 F1 seeds were harvested</li> </ul>	Crossing F1 Lines Selecting Superior Lines at F2

## 9.2. Horticulture and Spice Crops Research Team

No	Ongoing activities	Major activities performed	Intermediate results (if ready)
1.	Effect of different level of NPS fertilizer rates with foliar application of Ca, B and Zn on Tomato ( <i>Solanum esculentum</i> ) yield, quality and post harvest shelf life	<ul style="list-style-type: none"> <li>➤ The experiment was conducted by irrigation.</li> <li>➤ All data was collected on location.</li> </ul>	Data analysis is underway
2.	Extended Activity: Effect of NPS Fertilizer Rates supplemented with N on Growth, Yield and Quality of Water Melon	<ul style="list-style-type: none"> <li>➤ The data of the experiment has not been collected last year due to the poor germination performance of the crop.</li> </ul>	Since the extended activity no intermediate result this year

## 10. Pre-extension demonstration activities performed in the year (support with pictures)

No	Title of the activity	Name of the technologies demonstrated	Location (district, PAs and FTCs)	Plot size (ha) per farmer used for the trial	Quantity /amount of the technology distributed	Number of participant farmers/pastoralists					Benefits obtained (productivity/income gain)
						Adult men	Adult women	Young men	Young women	Total	
		Water management	Dugda ( Bekele l)	0.0121 ha for first activity & 0.33h	2	18	2	-	-	20	

				a for the second activity							
--	--	--	--	------------------------------------	--	--	--	--	--	--	--

- Pre-extension demonstration of Alternate Furrow Irrigation for better water management technologies at Dugda District
- Demonstration of Alternative Irrigation Method at Cheleleka Denbel Irrigation Scheme at Dugda district



**Figure 4.** Demonstrated technologies at different stage (Haricoat bean, wheat and durum wheat



### 11. Pre-scaling up activities performed in the year (support with pictures)

No	Title of the activity	Name of the technologies scaled up/out	Location (district and PAs)	Plot size (ha) per farmer used for the trial	Quantity/amount of the technology distributed	Number of participant farmers/pastoralists					Benefits obtained (productivity/income gain)
						Adult men	Adult women	Young men	Young women	Total	
1	Cluster based LSD of bread wheat varieties	02	Dugda	40ha	60qt	51				51	35-50qt/ha
2	Pre scaling up of durum wheat varieties	01	Dugda district	5ha	7.5qt	4	5			9	30-35qt/ha



**Figure 5.** LSD of bread wheat and Field day conducted at Dugda district

### 12. Basic technology multiplication

Res. team	Type/name of technologies planned to be multiplied in the year (as per given in GTP=II) plan	Unit	Amount planned to be multiplied(as per GTP=II) plan	Amount multiplied	Performance as % of annual plan	Reason for under performance, if any
T/Multiplication	Rhode Grass	Qun	1.5	1.5	100	
	Lablab		20	20	100	
	Cow pea		11	11	100	
	Haricot bean		48	30	62.5	
	Mung bean (Maashoo)		6	8	133	
	Snap bean(Fosoliya)		4	8	200	
	Wheat (king Bird)		400	207	51.7	

	Qamadii jallisii(Qaqqabaa)		40	42	105	
	Maize (for silage making)		125 ton	100	80	
Dairy	Improved bulls and heifers	No.	2	2	100	
Meat	Improved selected rams	No.	1	1	100	
Apiculture	Bee forages	Type	6	6	100	
Animal feeds and RLM	Animal feed forages	Varies (in kg)	2	2	100	

### 13. Technology multiplication by Farm management

#### 13.1. Forage seed multiplication

Res. team	Type/Name of forage variety	size of land planned to be cultivated(as per GTP=II) plan	Land actually cultivate (ha)	Amount of seed yield planned to be obtained	Amount actually obtained (qt)	yield performance as % of annual plan
Technology Multiplucation	Rhode Grass	15	15	1.5	1.5	100
	Lablab	6	7	20	20	100
	Cow pea	2	2	11	11	100
	Haricot bean	4	4	48	30	62.5
	Mung bean (Maashoo)	1	2	6	8	133
	Snap bean (Fosoliya)	0.5	0.5	4	8	200

- Indicate Reason for under performance, if any \_\_\_\_\_

- Indicate how many of these are distributed and to whom, disaggregating by gender \_\_\_\_\_

#### 13.2. Other technologies multiplied (improved heifers, bulls, bucks, fingerlings, etc)

Res. team	Type/Name of technology	unit	Annual plan (as per GTP-II plan)	Annual performance	Performance as % of annual plan	Reason for under performance, if any
Soil fertility improvement	Vermi compost	kg	10000	10000	100	

### 14. Trainings given for SMS, DAs and farmers in the year

#### 14.1. Farmers training

No	Research team	Training topic	Location (where the training is)	Duration (for how)	Number of participants					Remark
					Adult Men	Adult Wom	You ng	Young wome	Tot al	

			given)	long)		en	men	n		
1	Agri.Extension	Production and management of bread wheat, durum wheat and hariccoat bean,	Dugda district, Mekibatu union meeting hall	3 days	65	19			84	
2	SE	Wheat seed production	Negele Arsi	2days	13	6			19	
3	Dairy	Improved dairy cattle management	Adami Tulu Jido kombolcha	4	50	4	12	0	66	
4	Meat Research Team	CBBP of small ruminant	Adami Tulu Jido kombolcha, kofale, Kore	2	79	81	29	443	244	
		Goat breeding	Adami Tulu Jido Kombolcha	3	23	21	5	97	48	
5	Animal feeds and Rangelands management	Effects of sowing date on agronomic, forage yield and nutritive quality of oat at Kofele and Dodola districts of West Arsi Zone	Kofale and Dodola	3	9	2	0	43	32	
6	Apiculture	Honey bee health and Management, Hive construction	Kofale	9	13	0	0	<b>52</b>	39	
7	Poultry	Characterization of egg quality and carcass parameter of indigenous chicken	Adami Tulu Jido Kombolcha	3	8	9	0	0	25	
8	Agroforestry	Bamboo management and its importance in economic growth	Kofale and Arsi Negelle	5	18	16	9	7	50	
9	IDWH	Water management	Dugda and Siraro	Two days	68	32			100	



**Figure 6.** Training given at Dugda district in 2023(2015 E.C)

#### 14.2. SMS and DA's training

No	Research team	Training topic	Location (where the training is given)	Duration (for how long)	Number of SMS trained			Number of DAs trained			Remark
					Male	Female	Total	Male	Female	Total	
1	Agricultural Extension	Production and management of bread wheat, durum wheat and haricoat bean,	Dugda district, Mekibatu union meeting hall	3days	7	1	8	3	3	6	
2	SE	Wheat seed production	Negele Arsi	2 days	2	0	2	4	2	6	
3	Dairy	Improved dairy cattle management	Adami Tulu Jido kombolcha	4	23	4	27	12	3	15	
4	Q/H/Foonii	CBBP of small ruminant	Adami Tulu Jido kombolcha, kofale, Kore	2	11	3	14	6	3	9	
		Goat breeding	Adami Tulu Jido Kombolcha	3	7	1	8	2	1	3	
5	Animal feeds and rangelands management	Effects of sowing date on agronomic, forage yield	Kofale and Dodola	3	2	0	2	6	1	7	

		and nutritive quality of oat at Kofele and Dodola districts									
6	Apiculture	Honey bee health and Management, Hive construction	Kofale	9	3	0	3	4	0	4	
7	Poultry	Characterization of egg quality and carcass parameter of indigenous chicken	Adami Tulu Jido Kombolcha	3	5	4	9	1	0	1	
8	Agroforestry	Bamboo management and its importance in economic growth	Kofale and Arsi Negelle	5	3	2	5	2	1	3	
	IDWH	Water management	Dugda & Siraro	Two days	3	-	3	3	-	3	



**Figure 7.** Training provided by Agricultural Research team

### 14.3. Field days organized in the year

No	Technologies/research activity	Location (district and PAs)	Number of participants								
			Farmers/pastoralists					Extension workers	Other stakeholders	Total	
			Adult Men	Adult Women	Young men	Young women	Total				
1	LSD of bread	Dugda	98	6				104	18	41	163

	wheat varieties	(Giraba)								
2	Bread wheat seed production	N/ Arsi Wataraa Kebele & Dudga G Korkee	106	8			114	20	61	195
3	Awareness creation on vermi culture and others in CALM project	Shashamane	20	5	5	0	30	5	0	35
	-	Dugda ditrict( Bekele Girisa kebele)	18	2	-	-	20	1	2	3



**Figure 8.** While CALM mini field visit



**Figure 9.** field day at Dugda district in 2023(2015 E.C)

#### 14.4. FRGs established/strengthened in the year

No	Research activity for which FRG was established/strengthened	Number of FRGs established /strengthened		Location (District & PAs)	Number of members				
		Newly established	Strengthened		Adult Men	Adult Women	Young men	Young women	Total
Agricultural Extension	Pre-extension Demonstration of Haricot bean varieties	2	-	Dugda (Tepho and KorkeAdi)	28	6	-	-	34
	Pre-extension Demonstration of Bread wheat Varieties	1	-	Dugda (Tepho)	20	-	-	-	20

	Pre-extension demonstration Durum Wheat Varieties	1	-	Dugda	20	-	-	-	20
	Cluster based LSD of Bread wheat	1	-	Dugda (Tepho)	51	-	-	-	51
	scaling up of bread wheat varieties	1	-	Dugda (Tepho)	4	5	-	-	9
	PED of combined application of Gypsum (CaSO4) and compost for soil salinity management at small-scale irrigation farms	1	-	Dugda (KorkeAdi)	15	5			20
	PED of AI Timing in selected districts of East Shewa zone	1	-	Adami Tulu	20	21			41
SE	Cluster based LSD of Bread wheat	1		Dugda			6	2	8
	Cluster based LSD of Bread wheat	1		Negele Arsi			7	2	9
	Cluster based LSD of OPV Tomato	1		Dugda			8	2	10
Apiculture	Beehives	2	4	Kofale	9	6	0	60	45
	CALM	-	3	Shashaman	22	10	10	3	45
	Water management	5	-	Dugda ( B. Girisa )	68	32			100

#### 14.5. Extension materials produced and distributed in the year

#### 14.6. Articles published in the year by research team

No	Research team	Title of the article	Journal site	Name of the author(s)
1	SE	Impact of Soil and Water Conservation on Household Income in West Arsi Zone of Oromia. Journal of Biology, Agriculture and Healthcare, Vol.12, No.18, 2022 ISSN 2224-3208	Journal	Beriso Bati
		Economic Efficiency of Tomato Production in East Shewa Zone, Oromia Region, Ethiopia. Journal of Business and Economic Development; 7(2): 38-45	Journal	Asfaw Negesse, Yasin Esmael, Shimalis Gizachew & Bariso Bati
		Determinants of Farmers' Potato Marketing in Kofale District, West Arsi Zone, Oromia Regional State, Ethiopia. International Journal of Business and Economics Research; 11(3): 140-149	Journal	Asfaw Negesse



		Impact of Soil and Water Conservation on Household Income in East Shoa Zone of Oromia. <i>Journal of Food Industry</i> , Vol.6, No.1, ISSN 1948-545X	Journal	Bariso Bati & Yasin Esmael
		Economic Efficiency of Onion Production in East Shewa Zone, Oromia Region, Ethiopia. <i>Asian Journal of Agricultural Extension, Economics &amp; Sociology</i> . Volume 41, Issue 1, Page 39-52	Journal	Yasin Esmael , Asfaw Negesse, Bariso Bati & Shimalis Gizachew
		Analysis of Potato Seed Supply System in the Potato-Dominated Smallholder Farming System in West Arsi Zone, Oromia National Regional State. <i>Journal of Food Industry</i> , ISSN 1948-545X	Journal	Beriso Bati
		Comparative Analysis of the Productivity and Efficiency of Cluster and Individual Farming in East Shewa Zones of Oromia. <i>Journal of Economics and Sustainable Development</i> , Vol.14, No.11.	Journal	Beriso Bati, Asfaw Negesse, Yasin Esma'el & Shimalis Gizachew
		Adoption and impact of F1 crossbred cows on smallholders' income in East Shewa and West Arsi Zones of Oromia region Ethiopia. Proceeding of review workshop on completed research activities socio-economics and agricultural extension research directorate held at Batu fisheries and other aquatic life research center, Batu Ethiopia.	Proceeding	
		Impact of climate change on maize production and adaptation strategies in East Shewa zone, Oromia region, Ethiopia. Proceeding of review workshop on completed research activities socio-economics and agricultural extension research directorate held at Batu fisheries and other aquatic life research center, Batu Ethiopia	Proceeding	
2	AE	Pre Extension Demonstration and Evaluation of Chickpea Varieties ( <i>Cicerarietinum L.</i> ) at Adami Tulu Jido Kombolcha District, Central Rift Valley of Oromia, Ethiopia. <i>International Journal of Applied Agricultural Sciences</i> . Vol. 9, No. 1, 2023, pp. 7-11.	Journal	Tesfaye Gemechu, Fiseha Tadesse, & Hikma Sultan
		Analysis of Women Empowerment in Agriculture in East Shewa and West Arsi zones of Oromia, Ethiopia, <i>European Journal of Business and Management</i> , Vol.15, No.3, 2023	Journal	Abdi Etefa and Tesfaye Gemechu
		Participatory Evaluations of Mung Bean ( <i>Vigna Radiata L. Wilczek</i> ) Varieties in Selected Districts of East Shewa Zone, Oromia, Ethiopia. <i>Advances in Crop Science and Technology</i> 11: 563.	Journal	Tesfaye Gemechu
3	SFI	Determination of the Application Rate of Conventional Compost Integrated with Chemical Fertilizer on Maize ( <i>Zia Maize</i> ) Yield in Dugda District of East Shoa Zone, Oromia. <i>Biochemistry and Molecular Biology</i> . Vol. 7, No. 2, 2022, pp. 41-46.	Journal	Kasahun Kitila, Abay Chala, Mekonnen Workina.

		<a href="http://www.sciencepublishinggroup.com/j/bmb">http://www.sciencepublishinggroup.com/j/bmb</a>		
4		Verification of Determined Soil Test Based Phosphorous Critical and Requirement Factor for Bread Wheat in Shashemene District	Journal	Abay Chala , Kasahun Kitila & Mekonnen Workina.
5		Determination of Economically Optimum Nitrogen Fertilizer for Bread Wheat in Shashemene District, West Arsi Zone of Oromia, Ethiopia. Sustainability in Environment ISSN 2470-637X (Print) ISSN 2470-6388 (Online) Vol. 8, No. 2, 2023 URL: <a href="http://dx.doi.org/10.22158/se.v8n2p47">http://dx.doi.org/10.22158/se.v8n2p47</a>	Journal	Kasahun Kitila , Mekonnen Workina & Abay Chala

### 15. Current manpower status of the center

Research /support staff	Number													
	PhD		MSc/MVSc/MA		DVM		BSc/BA		Dip		Others		Total	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Research process	1		32	1	1	1	3	1	4	4			57	8
Support process			1				9	2	36	13	124	6	170	21
<b>Total</b>	<b>1</b>		<b>33</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>12</b>	<b>3</b>	<b>40</b>	<b>17</b>	<b>124</b>	<b>6</b>	<b>227</b>	<b>29</b>

#### 15.1. Total number of employees on study leave during this plan year

Research team	Level of education pursued (MSc/PhD)	Those started in 2015EC		Those started in 2014EC		Those started in 2013EC		Over all Total
		M	F	M	F	M	F	
Livestock Process	PhD			2		2		4
	MSc			1				1
Crop r/process	PhD					1		1
Agricultural & socio E	MSc			1				1
	PhD	1			1			2
<b>Total</b>	MSc				1			1
		<b>1</b>		<b>4</b>	<b>2</b>	<b>3</b>		<b>10</b>

## 16. Capital budget allocation and utilization

### 16.1. IQQO funded

No	Research team	Annual Plan & utilization budget		
		Planned/allocated for the year (Birr)	Utilized	
			(Birr)	Percent (%)
1	Cereal	995,200	986,439.74	99.1
2	Pulse & Oil	132,900	129,823	97.7
3	Horticulture	268,700	268,100	99.7
4	Bay/tekno	6530,100	6,497,303.30	99.5
5	Protection	386,900	384,455.19	99.4
6	Soil Fertility (SFI)	1,057,000	1,043,900	98.7
7	Agro Forestry	603,900	571,748.30	94.6
8	Soil & Water Engineering	453,200	446,996.40	98.6
9	Dairy	1,085,000	1,080,302.69	99.6
10	Meat	1,060,000	1040,731.44	98.2
11	Animal Feeds	720,000	606,517.07	81.9
12	Poultry	1,470,400	1,460,068.44	99.3
13	Apiculture	741,000	728,987.96	98.4
14	Socio Economics	614,900	602,033.04	97.9
15	Agricultural extension	231,700	224,561.03	96.9
16	Technology Multiplication	2,200,000	1,997,492.00	90.7
17	Composite Breed Imp.	2116,400	1,981,067.17	93.6
19	Meat (CBBP of small ruminant)	1161,200	1,265,502.00	99.1
	<b>Total</b>	<b>21,828,500</b>	<b>21,316,028.77</b>	<b>97.6</b>

- Give reason for any under utilization \_\_\_\_\_

### 16.2. Funded by other organizations

No	Research team	Annual Plan & utilization		
		Planned/allocated (Birr)	Utilized*	
			(Birr)	% of allocated
1	Protection R/Team	110,000	154,800	103.2
2	Soil R/Team(SFI)	20,728	59,434	99.8
3	Cereal R/Team	300,590	300,590	100
4	Cereal R/Team	93,559	93,559	100
5	Soil R/Team	254,830	55,990	100
6	Bay /Technology(Banana)	3,014,526	2,917,726.94	96.7
7	Agro Forestry	164,709	162,850	98.8
8	ATARC(FAO)	1,200,100	746,765.41	62.2
	<b>Total</b>	<b>5,159,042</b>	<b>4,491,715.35</b>	<b>87</b>

17. **Mention any other technical and administrative activities conducted in the year** (eg. Workshops conducted, panel discussions organized, technical advisory services given, hosting apprenticeship students, experience sharing to other institutions, forming institutional collaborations with other institutions etc.)

- Technical advisory services were given to Oromia Bureau of Agriculture
- Our center has contributed in developing White legacy (*'Maaddii Guutuu'*) initiation document with Oromia Bureau of Agriculture
- The livestock process participated in the writing of the livestock part of 'integrated agriculture development in Wonchi-Dendi ecotourism project'
- Technical training was given to agricultural bankers from Cooperative Bank of Oromia on livestock production and productivity

**18. Technical and administrative challenges and problems encountered and measures taken in the year**

No	Problems encountered	Measures taken	Solutions suggested
	Laboratory problem, vehicle and poor finance management	Reporting the problem	Having our own lab at center, improving financial management
1	Laboratory problem, vehicle and Sub site	Doing experiment on farmer's land by buying the lands. By doing lab experiment taking to other organization	Having our own lab and sub site
2	Laboratory problem	With high cost taking it to some other else lab	Having our own lab at center
3	Shortage of budget (major problems)	Budget borrow from the other project	Budget should be release based on weight of activities not based on the number of activities
4	Budget shortage	-	Let the budget be allocated according the depth and weight of the researches
5	Peace instability problem		Resuming data collection and experimentation after stability of peace
6	Use of external laboratory for advanced sample analysis	Payment based approaches for on time laboratory work	IQQO have to have one central laboratory

Prepared by \_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_

Approved by \_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_