

Asella Agricultural Engineering Research Center



Annual Research Report of (2014/2015 E.C) Budget Year

**July, 2023
Asella, Oromia**

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1. Introduction (Over View of the Center)

Asella agricultural engineering research center was among the oldest center established during ARDU/CADU period under rural development branch of government division with the main mission of modification, provision of training for farmers and other stakeholders and promotion of rural technologies named as “Asella Rural Technology Promotion Center” in 1964. Later, in 2001 the center, re-structured under Oromia agricultural research institute as Asella Rural Technology Research Center and later on it was re-structured as “agricultural mechanization research center” in 2007. But currently (since 2015) the center is re-structured and named as “Asella Agricultural Engineering Research Center” and has two core research processes: Agricultural Engineering Research Process and Socioeconomics and Agricultural research extension processes. The center is undertaking its research activities under six research teams which are Agricultural Machineries and Farm Power engineering, Renewable Energy engineering, Post-harvest and Agricultural Product Processing engineering, Irrigation, Water Harvesting and Drainage engineering, socio-economics and agricultural extension research teams. The center has also two workshops (metalwork and woodwork workshops). There are also three supporting staffs

In total the center planned 25 activities according to (KIB) and executed 34 research activities which 1 was PhD Dissertation and 1 was non OARI budgeted activity. Regarding technology multiplication the center planned to multiply 315 different technologies and executed 308 technologies this was due to human power shortage the plan was not achieved. On technology distribution the center planned 300 and executed about 177 and due to untimely multiplied technologies plan of distribution was below. All these activities were planned and performed by 74 permanent employees (59 men and 15 women) with the involvement of various levels of education and professions during this year. But there were about 5 men and 1 woman turnover and about 2 men and 1 woman were employed.

This report includes data on the success of research trials, technology multiplication and center development activities, trainings, human resource development, ethical prompting activities and corruption initiatives. The report also covers work on cross-cutting issues, strengthening implementation and research capacity, budget utilization, and other aspects. Overall, the report covers the performance from July 2022 to June 2023 and includes the activities planned and carried out on average during this fiscal year.

1.1.Vision

To bring about fundamental change at small holder farmers level by supplying improved technology that can sustain production and productivity of farmers' income.

1.2.Mission

Improving knowledge and innovation capacity and supply agricultural engineering/mechanization technologies that can able to boost Agricultural production and productivity and industrial inputs there by the livelihood of Oromia people will be improved in a sustainable way

1.3.Values

- Innovativeness
- Accountability
- Transparency
- Quality product and Service
- Team spirit
- Participatory
- Readiness for Change
- Commitment.

1.4.Service Provided

The services provided by our center is:

- Agricultural Engineering/mechanization Technology generation
- Agricultural Engineering/mechanizationTechnology adaptation
- Agricultural Engineering/mechanizationTechnology modification
- Agricultural Engineering/mechanizationTechnology demonstration
- Agricultural Engineering/mechanization technology multiplication and distribution
- Provide need based training and advisory survices.

2. Annual Performance of the Center

2.1. Leadership Activities and Roles

The center planned to convene 12 regular management committee 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. About 9 regular management meetings and more than 12 irregular management meetings were take place and they were successful in carrying out their objectives because they made decisions to address any shortcomings. One of the shortcomings found was that the workers and different teams did not periodically examine the work plans. This was successfully fixed as a result of the management and evaluation committee of the center's intervention. For instance, the slow service delivery was fixed, and diligent work has been done to ensure that the service operation meets somewhat the basic criteria. The staff received awareness training on professionalism and work ethics two times as well as once on service delivery standards. There was group discussions among the various team members as a result, every employee is now familiar with the responsibilities of their jobs and has developed their own weekly, monthly, quarterly and annual work plans in compliance with the minimal service delivery standard. The employees' performance this year was assessed twice every six months.

2.2.Center develop activities performed in this plan year

There were some center developmental activities performed in this budget year. Some of them were:

- Center beatifying was done in order to refresh workers mind during work and rest.
- Car maintenance was done at different time for giving full service.
- Work shop machines about ten (10) of them has serviced and electric line of the compound was done.



Figure 1. Shows the work of beautifying the center

2.3. Implementation of Planned works through the year

Asella Agricultural Engineering Research Center has a number of research, demonstration, scaling-up, and training activities in our mandated areas. This year the center has run about 34 actual research activities and out of them sixteen (16) was completed and currently undergoing data analysis and final write up. The center has also run one non IQQO funded activity by irrigation, water harvesting and drainage research team.

AAERC is making a lot of efforts to address agricultural mechanization technologies to communities in our region with the already developed and proven technologies. Therefore, the outcomes of all experiments, trainings, demonstrations, and scaling-up that the center carried out throughout this fiscal year, as well as the financial utilization and advisory services provided, are compiled and presented in this report.

Table 1. Plan and implementation of IQQO budgeted activities (according to KIB)

No .	Team	Annual plan	Annual implementation	% of annual implementation	Completed activities		% of plan implementation
					Annual plan	Annual implementation	
1	Agricultural Machinery and Farm Power	7	10	142	2	5	250
2	Renewable Energy	3	5	167	1	2	200
3	Post-harvest and Agricultural Product Processing	5	4	80	2	2	100
4	Irrigation, Water Harvesting and Drainage	4	8	200	-	4	-
5	Socio-economics	2	2	250	2	2	100
6	Agricultural Extension and Gender	4	4	100	1	1	100
Total		25	33	132	8	16	200

Remark: the reason why the number of activities of Post-Harvest and Agricultural Product Processing team is under perform is that the actual number of activity is lower than the plan of KIB.

Table 2. Plan and implementation of non-IQOO budgeted activity

No .	Team	Annual plan	Annual implementation	% of annual implementation	Completed activities		% of plan implementation
					Annual plan	Annual implementation	
4	Irrigation , Water Harvesting and Drainage	1	1	100	1	0	0
Total		1	1	100	1	0	0

Remark: Due to high and long season rain fall the data was not collected correctly and the activity was extended to the coming year.

3. Brief Summary of Ongoing Activities Performed by Teams

3.1. Name of Team: Agricultural Machinery and Farm Power Research Team Annual Report

3.1.1. Activity: On Farm Evaluation and Verification of Tractor Drawn Potato Planter

Objectives

- To evaluate performance of tractor drawn potato planter under farmers field condition

Activities done so far

- ◆ Prototype of the machine was prepared for field evaluation
- ◆ Seed metering device was modified to have proper seed spacing on the ground



Fig.2. Prototype of potato planter and cup metering device

Activities to be done in the rest of time:-

- ◆ Functional test of the machine will be conducted at the center
- ◆ Calibration of the machine will be carried out according to agronomic potato planting requirement
- ◆ Site and farmer selection will be conducted at Munessa district of Arsi zone.
- ◆ Field tests will be conducted and necessary data's will be collected as per standard performance test of precision planter.
- ◆ Data analysis and full write up writing will be done

3.1.2. Activity: Development of Tractor Drawn Combined Tillage Implement

Objectives

- ◆ To develop and evaluate performance of combined primarily and secondary tillage implement

Activities done so far

- ◆ Parts of the implement has been produced at the center
- ◆ Assembling of different parts of the implement has been conducted



Fig.3. Parts of combined tillage implements

Activities to be done in the rest of time:-

- ◆ Functional test of the implement will be conducted at Tiyo district
- ◆ Site and farmer selection will be conducted at of Arsi zone.
- ◆ Field tests will be conducted and necessary data's will be collected as per standard performance test of tillage implements.
- ◆ Data analysis and full write up writing will be done

3.1.3. Activity: On-Farm Evaluation & Verification of Tractor Drawn Ridger for Potato Hiller

Objectives

- To verify and evaluate the performance of tractor drawn ridger for potato hiller

Activities done so far:-

- ◆ Prototype of the implement was prepared for field evaluation



Fig.4. Prototype of potato Hiller

Activities to be done in the rest of time:-

- ◆ Site and farmer selection will be conducted at Munessa district of Arsi zone.
- ◆ Field tests will be conducted and necessary data's will be collected as per standard performance test of precision planter.
- ◆ Data analysis and full write up writing will be done

3.1.4. Activity: Development and Performance Evaluation of Tractor Drawn Raised Bed Wheat Row Planter

Objectives

- ◆ To develop tractor drawn row planter for irrigated wheat
- ◆ To evaluate the performance of developed irrigated wheat row planter

Activities done so far

- ◆ Prototype of the Wheat seed drill was produced test at the center
- ◆ Functional test and track test was conducted to observe whether there are any defects on moving parts of the machine or not.
- ◆ Then, seeds and fertilizers were calibrated to 150- 162kg/ha based on wheat agronomic requirements for furrow irrigated wheat row planting
- ◆ Site and farmer selection was conducted at Tiyo district, Golja Kebele.
- ◆ Field field tests were conducted (Ogolcho wheat seed variety was sown at predetermined row spacing, seed rate and fertilizer rate of application) and necessary data's were collected as per standard performance test of row seed drill.



Fig.5. Prototype and field evaluation of raised bed wheat row planter

Activities to be done in the rest of time:-

- ◆ Site and farmer selection will be conducted at of Arsi zone.
- ◆ Field tests will be conducted and necessary data's will be collected as per standard performance test of seed drill.
- ◆ Data analysis and full write up writing will be done

3.1.5. Activity: Adaptation & Performance Evaluation of Bako Faba Bean Thresher to PTO Driven

Objectives

- ◆ To adapt and evaluate the performance of engine-driven Bako Faba Bean thresher to PTO driven

Activities done so far

- ◆ Necessary prototype construction materials was purchased
- ◆ Working drawing was prepared
- ◆ Parts of the faba-bean thresher has been produced at the center



Fig.6. Parts of PTO driven faba-bean thresher

Activities to be done in the rest of time:-

- ◆ Assembling of parts will be conducted.
- ◆ Functional test will be conducted to observe whether there are any defects on moving parts of the machine or not.
- ◆ Site and farmer selection will be conducted at of Arsi zone.
- ◆ Field tests will be conducted and necessary data's will be collected as per standard performance test of seed drill.
- ◆ Data analysis and full write up writing will be done

3.2. Name of Team: Renewable Energy Research Case Team Annual Research Report 2014

The team has executed a total of 5 activities and all are IQQO budgeted activities. Out of the 5 activities 2 are completed this budget year.

3.2.1. Activity: Adaptation and Performance Evaluation of Forced Type Green House Solar Dryer

Objectives

- To adapt forced type greenhouse solar dryer for coffee and hot pepper
- To evaluate performance of the technology on coffee and hot pepper drying

Major Activity performed

- Raw material purchasing request was done
- Design preparation was done
- Starting prototype solar dryer skeleton part (wood production part) has been done
- Preparing cover of solar dryer (plastic cover) as per design was done
- Prototype production of solar dryer was done



Figure 7:- Shows produced prototype of Forced type solar dryer

3.2.2. Activity 2: Adaptation and performance evaluation of BAERC Bread Baking

Oven

Objective

- To adapt bread baking oven for rural community
- To evaluate performance of the oven for baking purpose

Major Activity performed

- Raw material purchasing request was done
- Technology preparation from BAERC to AAERC for prototype production
- prototype production of BAERC Bread Baking Oven was done



Figure 8:- prototype BAERC type bread baking oven

**3.3.Name of Team: Postharvest and Agricultural Product Processing Research Team
Annual Report**

The team has executed a total of 4 activities and all are IQQO budgeted activities. Out of 4 activities 2 are completed this budget year.

3.3.1. Activity: Adaptation and performance evaluation of drum type MARC potato grader

Objective

- To adapt and evaluate the potato grader at farmers level

Activities done so far

- ❖ Technology was brought from MARC and tested in order to identify modify parts
- ❖ And Production of prototype was finalized and functional and preliminary test was done



Figure 9. Produced prototype, functional and preliminary test

Remaining work

- ❖ Site & farmers selection
- ❖ Field evaluation and data collection
- ❖ Data analyzing and Full write up
- ❖ Progress report writing

3.3.2. Activity: Development of Integrated Cassava Processing Technology

Objective

- ❖ To develop and evaluate integrated cassava processing machine.

Activities done so far

- Secondary data was collected
- Raw Materials was prepared
- And Production of prototype was done



Figure 10. Shows produced prototype

Remaining Work

- ❖ Functional and Preliminary test
- ❖ Site & farmers selection
- ❖ Field evaluation and data collection
- ❖ Data analyzing and Full write up
- ❖ Progress report writing

3.4. Name of Team: Irrigation, Water Harvesting and Drainage Engineering Case Team Annually Report

The team has executed a total of 9 activities which 8 of them are IQQO budgeted activities and 1 of them is non IQQO (FAO) budgeted activity. Out of the 9 activities 4 are completed in this budget year.

3.4.1. Activity: Effect of Different Irrigation Schedules on Water Use and Yield of Wheat at Tibla irrigation scheme

Objectives

- To determine different irrigation schedule on water use and yield of wheat

Major Activity

- Site was selected (From Kater irrigation scheme instated of Tibla irrigation scheme)
- Design Layout was prepared

- Wheat crop was planted
- Irrigation schedule was prepared and watered as schedule
- Water applied, yield and yield data component were collected and analyzed

3.4.2. Activity: Effect of Water Levels at different Growth Stages on Yield and Water Productivity of Potato at Ketar Genet scheme

Objectives

- To evaluate water Levels on yield and water productivity of potato at different growth stages

Major Activities

- Site was selected (From Kater irrigation scheme instated of Tibla irrigation scheme)
- Design Layout was prepared
- Wheat crop was planted
- Irrigation schedule was prepared and watered as schedule
- Water applied, yield and yield data component were collected and analyzed

Table 3. first season data

GS	Trts	NTPPH	PWPH (kg)	DPT (cm)	MY (t/ha)	TY (t/ha)	WP (kg/m ³)
	Irr.level						
I	100% ETc	16.66a	1.8133a	16.663a	27.56ab	36.28ab	8.23de
	80% ETc	14.66b	1.4933bc	14.66b	25.99bcd	35.18abc	10.01b
	60% ETc	13.11bc	1.3300de	13.11bc	24.46bcd	33.56 cd	12.80a
D	100% ETc	16.89a	1.6033b	16.89a	30.35a	37.40a	8.45de
	80% ETc	12.89bc	1.4300cd	12.89bc	23.05cde	30.16def	8.75cd
	60% ETc	8.44d	1.0333g	8.44d	18.80f	25.68g	10.17b
TF	100% ETc	17.56a	1.6133b	17.56a	26.11bc	33.37bcd	7.64e
	80% ETc	13.89bc	1.3467de	13.890bc	22.14cdef	29.12efg	8.49de
	60% ETc	10.00d	1.1500fg	10.00d	19.89ef	26.59fg	10.47b
L	100% ETc	16.67a	1.7867a	16.67a	25.19bcd	35.40abc	8.05de
	80% ETc	13.78bc	1.4433cd	13.78bc	24.070bcde	34.42abc	9.82bc
	60% ETc	12.33c	1.2367ef	12.33c	21.81def	32.60cde	12.48a
CV		7.66	5.49	1.85	10.38	6.6	6.78
LSD(5%)		1.8	0.13	1.81	4.24	3.63	1.1

3.4.3. Activity: Development and Evaluation of Waterwheel to Elevate Water for Irrigation on irrigation scheme, Arsi, Ethiopia

Objectives

- To develop and fabricate water wheel which elevate and distribute water to agricultural fields for irrigation
- To evaluate water wheel as water lifting method from running water for irrigation

Status of the activity

- Material was purchased
- Deriving flow discharge was measured at selected scheme
- Design of prototype was prepared
- Prototype production was producing



Fig 11. Water wheel prototype production at work shop

3.4.4. Activity: Adaptation of Affordable Low Cost Drip Irrigation System for Small Scale Farmers

Objectives

- To adapt and afford low cost drip irrigation system for small scale farmers
- To determine the net return of low cost drip irrigation system

Status of the activity

- Material was purchased
- Design layout was prepared
- Prototype preparation was started

A. Non IQQO Funded Activity (FAO)

3.4.5. Activity: Capacity Building Support Services on Improved on-Farm Water and Crop Management Technologies and Practices through Demonstrating in Selected SSI Scheme of Oromia Region ”

Objective

- **Output 1:** Deficit irrigation demonstrated at for two crops per irrigation scheme.
- **Output 2:** Irrigation performances at irrigation scheme level assessed in SSIS
- **Output 3:** Capacity of extension staff in improved irrigation management enhanced.

Major activity

Study was conducted on two worada L/Bilbilo and D/Tijo. From this worada two scheme, which are, Chemeri and Amirach were selected. The study consists of two mojar activitys which are deficit irrigation demonstrated and demonstration site establishment.

Skill gap assement

- The skill gap assessment data of the two scheme were collected from Worada expert,Irrigation water use Assosation and House hold user.
- The data were analysed and reporded for FAO focal person at IQQO level and also presented at FAO review foram.
- Training was given on skill gap of worada expert

3.5.Name of Team: Agricultural Extension and Gender Research Case Team

3.5.1. Activity: Pre-extension Demonstration of Tractor Drawn Wheat Seed Drill Machine in Arsi zone

Objective

- To demonstrate and evaluate tractor drawn wheat seed drill technology under farmers’ management
- To create awareness on the importance of the technology
- To collect farmers’ and other stakeholders’ feedbacks for further technology development/improvement.

Summary of the Activity

- Technology preparation was undertaken
- Site and farmers were selected.
- 4 FRG were established from two districts (Munessa and Hetosa) and 2FRG were selected from each district.
- Training was given to experts, ADs and farmers
- Demonstration was conducted

- First year data was collected from farmers, DAs and experts

Participant feedback towards technology

The participant stakeholders forwarded their perspectives as technology was very interesting in terms of its

- Time reduction
- Cost minimizing
- Portability of technology
- Affordability and
- Easy of operation

Table 4. Training for farmers and stakeholders on tractor drawn wheat seed drill technology

No	Participant category	Male	Female	Total
1	Experts	4	-	4
2	Development Agents	4	-	4
3	Farmers	45	15	60
Total		53	15	68

Work plan for next year (2022/2023)

- Preparation of technology
- Site and farmers selection
- Scaling up of technology
- Transfer technology by training micro enterprise
- Data collection
- Data analysis and full write up

3.5.2. Activity: Pre-extension demonstration of engine driven coffee de-huller in selected districts of Arsi and west Arsi zones

Objective

- ✓ To demonstrate and evaluate Coffee De-huller under farmers' condition
- ✓ To create awareness on the importance of the technology
- ✓ To collect farmers' and other stakeholders' feedbacks for further technology development /improvement

Summary of the Activity

- ✓ Technology preparation was undertaken.
- ✓ Site and farmers were selected.
- ✓ 6 FRG were established from three districts (Chole, Gololcha and Nensebo) and 2FRG were selected from each district.

- ✓ Training was given to experts, ADs and farmers.
- ✓ Coffee de-huller demonstration was conducted.
- ✓ First year data was collected from farmers, DAs and experts

Participant feedback towards technology

The participant stakeholders forwarded their perspectives as technology was very interesting in terms of its

- ✓ Time reduction
- ✓ Cost minimizing
- ✓ Portability of technology
- ✓ Affordability and
- ✓ Easy of operation

Table 5. Training has given for farmers and stakeholders on powered grain de-huller technology

No	Participant category	Male	Female	Total
1	Experts	6	0	6
2	Development Agents	4	1	5
3	Farmers	60	30	90
Total		70	31	101

Work plan for next year (2023/2024)

- ✓ Preparation of technology
- ✓ Site and farmers selection
- ✓ Demonstration of technology
- ✓ Training stakeholders
- ✓ Data collection
- ✓ Data analysis and full write up

3.6. Name of Team: Socio economics Research Team

3.6.1. Activity: Adoptions of Asella Animal drawn Spike Tooth Harrow in Arsi and West Arsi Zones, Oromia Region, Ethiopia.

Objectives of the study

- To quantify adoption rate of Asella animal drawn spike tooth harrow in the study area
- To identify the determinant that affects the adoption of Asella animal drawn spike tooth harrows

Current Status of the activity

As per the action plan for 2014/15 budget year, the following activities were undertaken:

- Secondary data collected from zones agricultural offices
- Checklists and questionnaire were developed
- Four districts (2 from Arsi 2 from w/Arsi zone) selected
- Site and sample selection
- Preliminary Survey were conducted

Remaining work for this year

- Checklists and questionnaire modification
- Conducting formal survey
- Conducting FGD and KII
- Data cleaning, coding and entering
- Data analysis and Full write up

3.6.2. Activity: Farm Mechanization Impacts on Farm Economic Efficiency, Inputs Use intensity and Household Income in Central and Southern Oromia, Ethiopia

Objectives of the study

- To estimate level of farm mechanization in the study area
- To estimate impact of farm mechanization on Farm Economic Efficiency, Inputs Use intensity and Household Income
- To analyze determinant of level of farm mechanization

Current Status of the activity

As per the action plan for 2014/15 budget year, the following activities were undertaken:

1. Site and farmer's selection:
2. Checklists and questionnaires development:
3. Conducting preliminary survey:
4. Pre-testing questionnaire:
5. Training enumerators:

Remaining work for this year

- Conducting formal survey
- Conducting FGD and KII
- Data analysis and Full write up

3.6.3. Activity: Determinants of Crop Commercialization in Central and Southern Oromia, Ethiopia

Objectives of the study

- To estimate level of crop output commercialization in central and southern Oromia
- To analyze determinants of level of crop output commercialization in the study area

Current Status of the activity

As per the action plan for 2014/15 budget year, the following activities were undertaken:

1. Site and farmer's selection:
2. Checklists and questionnaires development:
3. Conducting preliminary survey:
4. Pre-testing questionnaire:
5. Training enumerators:

Remaining work for this year

- Conducting formal survey
- Conducting FGD and KII
- Data analysis and Full write up

4.1. Description of Technologies and Information Released by this Year

As mentioned in the introduction section Asella Agricultural Engineering Research Center has plan to release 8 technologies and information according to (KIB) and the actual released technologies and information was 16 and which is above the plan one.

Table 6. Technology and Information released this year from the activities conducted by the IQQO Budget

No	Team	Annual plan according to (KIB)	Annual implementation	percentage of implementation from yearly plan (% I/P)
1	Agricultural Machinery and Farm Power Engineering	2	5	>100
2	Renewable Energy	1	2	>100
3	Post-harvest and Agricultural Product Processing	2	2	100
4	Irrigation, Water Harvesting and Drainage	-	4	>100
5	Socio-economics	1	1	100
6	Extension and Gender	2	2	100
Total		8	16	>100

4.1.1. Name of Team: Agricultural Machinery and Farm Power Engineering

4.1.1.1. Completed Activity: Modification and performance Evaluation of AAERC's Tractor Drawn Wheat Seed Drill

Objectives

- ◆ To modify the developed tractor drawn wheat seed drill
- ◆ To evaluate the performance of the modified machine

Summary of the Activities

Modified Wheat seed drill was prepared for field test at the center and functional test and track test was conducted to observe whether there are any defects on moving parts of the machine or not. Then, seeds and fertilizers were calibrated to 126.77 and 147.83kg/ha respectively based on agronomic requirements and actually it is adjustable to the recommended rate. Site and farmer selection was conducted at Hetosa district, Boru Lencha Kebele. Field tests were conducted (DKA wheat seed variety was sown at predetermined row spacing, seed rate and fertilizer rate of application) and necessary data's were collected as per standard performance test of row seed drill. Based on tractor speed (3, 4 and 5 Km/hr) field efficiency of 90.92, 89.14 and 87.11 % was recorded respectively and with the same speed field capacity of 0.44, 0.57 and 0.70 hectare of land was covered per hour respectively. The remaining activity will be data analysis and full writing up.



Fig.12. Tractor drawn seed drill performance test at the field

4.1.1.2. Completed Activity: Development and Performance Evaluation of Tractor Drawn Faba Bean Row Planter

Objectives

- ◆ To develop tractor drawn faba bean row planter
- ◆ To evaluate the performance of the developed machine

Summary of the Activities

The prototype was prepared at the center workshop and functional test and track test was conducted to observe whether there is any defect on moving parts of the machine or not. Then, seeds and fertilizers were calibrated to 150kg/ha based on faba-bean agronomic requirements. Site and farmer selection was conducted at Hetosa district of Arsi zone, Dabaya Adare kebele. Field tests were conducted using Tumsa faba bean seed variety by fixing seed and fertilizer rate to 120 and 126 Kg/ha range respectively based on agronomist recommendation and necessary data's were collected as per standard performance test of precision planters. From the row data it was observed that based on tractor speed of 3, 4 and 5 Km/hr the field efficiency of 87.82, 83.86 and 82.48 % was recorded respectively. The obtained capacity of the planter was 0.42, 0.54 and 0.60 ha/hr using the same tractor speed respectively. Germination count was conducted to check whether the machine has distributed the seed uniformly along and across the row or not. The remaining work will be data analysis and full write up.





Fig.13. Tractor drawn faba-bean planter field evaluation

4.1.1.3. Completed Activity: Development of Tractor Drawn Potato Digger Objectives

- ◆ To developed and evaluate the performance of the tractor drawn potato digger

Summary of the Activities done so far:-

Tractor drawn potato digger Prototype was developed for field test at the center. Site selection was conducted at Tiyo districts, Duna Kebele. Filed test and data collection were carried out on selected farmers land. From the row data it was observed that the efficiency of the digger was 86.42%, 84.13% and 82.95% at tractor forward speed of 2.5, 3 and 3.5 Km/hr respectively. Digger field capacity was recorded as 0.13, 0.16 and 0.19 ha/hr on tractor forward speed of 2.5, 3 and 3.5 Km/hr respectively and has exposure percentage of 97.95. The remaining work will be data analysis and full write up.





Fig.14. Field evaluation of tractor drawn potato digger

4.1.1.4. Completed Activity: Modification and Evaluation of Asella Teff Thresher for Multi Crop Threshing

Objectives

- ◆ To modify Asella teff thresher to multi crop thresher
- ◆ To evaluate the performance of the developed multi crop thresher

Summary of the Activity

The redesigned thresher was fabricated using locally available materials. Its performance was evaluated under farmer's condition for major cereals, wheat, barley, teff, sorghum and black cumin. Test result of the modified thresher indicate an average throughput capacity, threshing efficiency, cleaning efficiency and grain damages values for wheat were found to be 318 kg/hr., 99.68%, 93.48% and 0.31%; for barley were found to be 302 kg/hr., 99.77%, 98.18% and 0.44%; that of sorghum were 906kg/hr., 98.86%, 91.57%, and 1.44%; respectively for the modified thresher. The throughput capacity, threshing efficiency and cleaning efficiency of teff were found to be 227 kg/hr., 100%, and 95.80%; while for black cumin the corresponding values were obtained as follows; 242 kg/hr., 99.22%, and 90.73% respectively affirming an improvement over the existing modified teff thresher.



Fig.15. Multi-crop thresher prototype evaluation

4.1.1.5. Completed Activity: Adaptation and Performance Evaluation of Engine Driven Asella Wheat and Barley Thresher to PTO Driven

Objectives

- ◆ To adapt and evaluate performance of engine driven Asella Wheat and Barley thresher to PTO driven

Summary of the Activities done so far

Asella engine driven wheat and barley thresher was adapted to PTO driven and performance test was carryout at farmers' field condition. From collected data machine threshing capacity was 2.5 to 4 kunt/hr and 2.5 to 3 kunt/hr for wheat and barley crops respectively at grain straw ratio of 1:1.2 and 1:1.25. This indicates that the yield of crop is very low and that is why the capacity of thresher becomes lower. The thresher has threshing efficiency of greater than 97% and cleaning efficiency of greater than 96% for both crops. The reaming work will be Data analysis and full write up writing.



Fig.16. Functional test of the wheat and barley thresher and field evaluation

4.1.2. Name of Team: Renewable Energy Engineering

4.1.2.1. Completed Activity: Adaptation and Performance Evaluation of Cooking stove at House Hold Level

Objectives

- To adapt Cooking stove for house hold level
- To evaluate performance of the stove on household fuel consumption

Major Activity performed

- Prototypes of stove was produced
- Check List & questionnaire preparation was done
- Site selection was done with type of stove produced
- Data collection has been done at Lemu-bilbilo woreda of Ulule-kara kebele

Kitchen Performance Test (KPT) was applied for technical field testing methods to explore questions about adaption and fuel efficiency for improved cook stove

The main goals of the KPT:

To compare the performance of improved stove(s) to the common or traditional stoves or to other improved stoves as they are used in the kitchens of real families and to identify qualitative aspects of stove performance through a simple survey

Summary Result of Activity

Data were collected on the given stove in standard manner and a quantity of 16 was given to the farmer. The efficiency of this stove is very good (28.25% as ES 6085 minimum requirement =20%), energy saves, Retain the natural traditional cooking taste, easy to use: no need of blowing, time saving of 25% etc. are the results of the experiment.



Figure 17:- Discussion with community and Quantitative Fuel Consumption Measuring

4.1.2.2. Completed Activity: Technical Assessments of Existing Irrigation schemes for Micro Hydro Power Generation potential in Arsi and East Shewa

Objectives

To conduct technical and economic feasibility assessments of generating hydro-electric and hydro mechanical power from existing irrigation schemes

Major Activity performed

- Secondary data has been done (literature, secondary data)
- Check List preparation was done
- Preparation of criteria for site selection was done
- Site selection was done for five Woreda of Arsi and one Woreda East Shewa
- Data collection was done for last two year

The technical as well as the socio economic assessment includes the collection of primary and secondary data through:- Direct observation and measurement was such as

- Head Measurement
- Flow rate measurement
- Climate of the Study Area
- Temperature
- Rainfall
- Land Use Pattern
- Topographic feature of the catchment

Summary Result of Activity

The trial was conducted in 4 districts and 10 schemes were implemented. Based on the objectives of this experiment, 4 schemes was developed for height level of water, depth of water, velocity of water, distance from local community, etc 'ums are suitable for the landscape. This means that the economic visibility of the type of turbines for these schemes includes the livelihoods of the local people.





Figure 18:- Land scape of area and when measuring schemes

4.1.3. Name of Team: Post-Harvest and Agricultural Product Processing Engineering

4.1.3.1. Completed Activity: On Farm Evaluation of Ground Nut Decorticator.

Objectives

- To adapt and evaluate the decorticator at farmers level

Summary of the Activity

Preliminary test was done in center, based on the result some modification was made on sieve. The old sieve was produced in center by connecting of two round hole 10mm dia together to make slotted sieve. Due to sharpness and lack of accuracy it leads to higher Percentage of breakage 15 to 26.5 % as speed of drum increases from 220 to 300 rpm. So in order to decrease the percentage of breakage new slotted sieve was designed and could be produced in factory rather than in shop. Then performance evaluation of the machine was taken on farm. The result indicates that input capacity was increased from 2.5 to 4.41qnt/hr as RPM of drum increases from 220 to 300. Maximum decorticating efficiency recorded as 90 % at 250 rpm. So in order to decrease the percentage of breakage new slotted sieve was designed and could be produced in factory rather than in shop. Then performance evaluation of the machine was taken on farm (groundnut\Data Sheet for Groundnut.docx). The result indicates that input capacity was increased from 2.5 to 4.41 qnt/hr as RPM of drum increases from 220 to 300. Maximum decorticating efficiency recorded as 90 % at 250 rpm.



Figure 19. Performance evaluation and data collection

4.1.3.2. Completed Activity: On Farm Evaluation of Bako integrated Inset processing technology

Objective

- To adapt and evaluate integrated Inset processing machine

Summary of the Activity

After finalizing the prototype production functional test was done. Based on functional test some modification was done on parts for better and evaluated on scrapping and gratings. Scrapping efficiency was recorded as 90% and 95% respectively. Based on result obtained weight loss and machine capacity have direct relationship with speed (RPM). Weight loss increases 6.52 to 14.39 as speed increases from 750 to 850. Scrapping capacity of the machine was recorded as 249, 339.67 and 372.33 kg/hr at 750, 800 and 850 RPM. The grating capacity was 326.40, 438.45 and 489.57 at RPM of 1150, 1250 and 1350 respectively. Percentage of loss increased from 5.61 to 7.89 % as speed increase 1150 to 1350.



Figure 20. Photo which shows during evaluation and data collection

4.1.4. Name of Team: Irrigation, Water Harvesting and Drainage Engineering

4.1.4.1. Completed Activity: Design, Construction and Evaluation of Runoff Water Harvesting for supplementary Irrigation at small holder farm

Objective

- ✓ To design, construction and evaluate runoff water harvesting structure
- ✓ On farm evaluation of water harvested at different water levels

Major activity done

- The experiment was conducted to evaluate supplementary irrigation on potato crop at D/Tijo worada of Burkitu Kebele.
- The three water level were used as treatments to irrigate the crop as crop schedule.
- 2'' water pump was used to lift water and Parshall flume used to measure discharge of water to plot

Table 7:- Effect of Seasonal supplemented water on yield and water productivity of potato crop at Burkitu site

Treat.	UMY	MY	TY	WP
100% SW	12.367 ^a	286.67 ^a	297.77 ^a	1.0800 ^c
75% SW	12.000 ^a	258.67 ^a	270.67 ^a	1.3067 ^b
50% SW	12.367 ^a	256.67 ^a	269.03 ^a	1.9500 ^a
S.Em±	0.2037	10.899	10.811	0.0448
CV	2.98	7.06	6.71	5.37
LSD (5 %)	2.8	15.6	15.02	0.06

UMY= unmarketable yield, MY= marketable yield, TY= Total yield, WP= Water productivity

- From table 1 the three water levels on yield was not significant difference but it was significant difference on water productivity

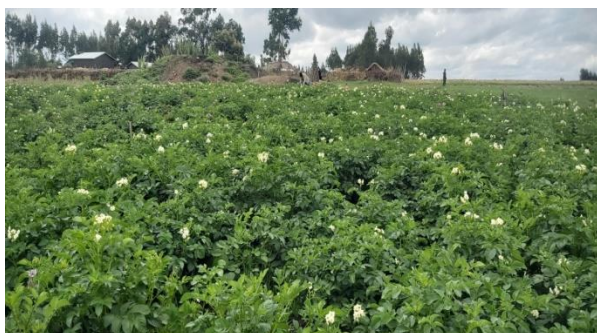


Fig 21. Potato crop on site observation

4.1.4.2. Completed Activity: Determination of bed width of Furrow Irrigation under wheat at Tibla and Golja Irrigation Scheme of Arsi Zone, Middle Ethiopia

Objectives

- ❖ To evaluate the raised-bed and conventional irrigation systems on yield and water productivity of wheat in Tibla scheme.
- ❖ To determine the appropriate bed width of wheat on raised-bed irrigation technique in the scheme

Summary of the activity

The experiment was conducted using four bed width of treatment (40 cm, 60 cm, 80cm and 100cm). Crop management and necessary data collection like discharge measurement depending on irrigation schedule, yield data was smoothly taken. From table 2, grain yield obtained at 80cm Bed-width was maximum (6.23t/ha).

Table 8. Effect of bed-width on grain yield and yield components of wheat

Bed-width incm	PH(cm)	NT	S/S	SL(cm)	BMV (ton/h)	GY(t/h)	TKW
40	89.53 ^{abc}	6.27 ^c	47.87 ^c	7.71 ^b	13.7 ^{bc}	5.37 ^{bc}	38.03 ^a
60	91.27 ^a	6.53 ^c	53.27 ^{ab}	7.94 ^{ab}	13.9 ^{bc}	5.92 ^{abc}	37.97 ^{abc}
80	90.10 ^{ab}	8.13 ^{ab}	55.36 ^a	8.31 ^a	14.3 ^{ab}	6.23 ^a	37.82 ^{abc}
100	87.92 ^{bc}	8.27 ^a	49.93 ^{bc}	7.75 ^{ab}	15.2a	5.61 ^{bc}	37.52 ^{abc}
CV	5.42	19.20	6.52	3.41	10.2	1.43	5.42
Mean	89.71	7.30	51.61	7.93	14.3	5.77	37.81
LSD(0.05)	3.15	1.14	5.32	0.58	0.72	0.58	ns

S/S= Number of seed per spikes , NT = number of tillers and TKW = thousand kernel weight, PH(cm)=Plant height, SL=Spike length, BMV=Biomass yield and GY=Grain yield



Fig 22: shows status and during data collection

4.1.4.3. Completed Activity: Adaptation and Evaluation of Micro Rain Pipe for small Scale Irrigation

Objective

- To adapt and evaluate rain pipe for small scale irrigation

Summary of the Activity

Design layouts of prototype were prepared and prototype was produced and tested. Three distance between hole (10, 20 and 30 cm) were used to determine discharge, width coverage and DU. From result output maximum discharge and DU was observed at 10 cm between hole but low width coverage. The maximum width coverage was obtained at 20 cm.

Table 9. Discharge capacity, width coverage and DU rain pipe at different between the holes

Distance between hole in cm	Number of hole per pipe	Average discharge in l/hr	Total discharge in l/hr	Width coverage (m)	DU in %
10	180	22.8	4104	3.1	91
20	90	24.9	2241	3.9	88.8
30	60	26.6	1596	4.4	78.7



Fig 23. During discharge data collection

4.1.4.4. Completed Activity: Assessment and Performance Evaluation of Existing Water Lifting Pump System in Semi-Arid Areas of Arsi and East showa Zone

Objective

- ✓ To assess and evaluate pumped irrigation systems used by smallholder farmers

Expected output/s

- ✓ To identify the gap of related to water pump

Major Activity

- ✓ The highly potentials area of pump of three worada were selected
- ✓ Questioners were organized and questioner's data was collected
- ✓ Data was finding in SPSS software for analysis



Fig 24:- Some problem observation on unfitting of delivery water pipe during data collection

4.1.5. Name of Team: Agricultural Extension and Gender

4.1.5.1. Completed Activity: Pre-scale up of Animal feed chopper in selected districts of West Arsi and East shewa Zones

Summary of the activity

This activity was conducted at Adami Tulu Jedo Kombolcha and Negele Arsi districts of West Arsi and East shoa zones with the objective of creating wider demand on animal feed chopper technology, improving farmer's knowledge and skill on using the technology and strengthening stakeholders linkage for the future scaling up of the technology. With these objectives, the comparison of the technology was done in comparison of traditional way chopping animal feed. It also replicated over four research sites. Data was collected from farmers, DAs, and woreda expertise. Data collected from different stakeholders and data collected during the accomplishment of the research revealed that; the technology had chopping capacity of about 800%. In addition to this, the technology has many advantages over traditional practice in terms labor saving, time saving and cost minimization. Two micro interposes were selected from two woredas and practical and theoretical training was given to them. Finally, linkage between different stakeholders was made for farther scaling up of the technology

4.1.5.2. Completed Activity: - Pre-extension demonstration of grain de-huller in selected districts of Ars and west Arsi zones.

Summary of the Activity

This activity was conducted at Munessa, Lemu and Bilbilo districts of Arsi zone and Adaba district of West Arsi zone with the objective of demonstrating and evaluating grain de-huller under farmers' condition, creating awareness on the importance of the technology and collecting farmers' and other stakeholders' feed backs for further technology development/improvement. With these objectives, the comparison of the technology was done in comparison of traditional way grain de-hulling. It also replicated over six research sites. Data was collected from farmers, DAs, and woreda expertise. Data collected from different stakeholders and data collected during the accomplishment of the research revealed that; the technology had de-hulling capacity of about 4 quintals/hr for barley and 3 quintals/hr for wheat. In addition to this, the technology has many advantages over traditional practice in terms of labor saving, time saving and cost minimization.

4.1.6. Name of Team: Socio-Economics

4.1.6.1. Completed Activity: Adoption of ARDU Moldboard Plough in Arsi and West Arsi

Zones, Oromia Regional State, Ethiopia

Objectives of the study

- To quantify adoption rate of ARDU moldboard plough in the study area.
- To identify the determinant that affects the adoption of ARDU plough

Current status of the activity

- Data collected by using checklists and questionnaires and FGD with farmers and KII with experts at different level were conducted
- Data collected from 192 farmers from 4 districts (2 from Arsi and 2 from w/Arsi) and 2 kebeles from each District
- All collected data from individual farmers were coded, edited and entered to computer
- Data analysis and full write up

Summary of the activity

This study was conducted with the objectives of: Quantifying adoption rate and Identifying the determinant that affects the adoption of ARDU plough in Arsi and west Arsi Zones. The data were collected from a sample of 192 farm households (90 adopter and 102 non-adopters). Both qualitative and quantitative data were collected from primary and secondary sources. Adopter farming experience is higher than non-adopter households that are significantly different at 1% while combined mean for the total sample is around 24 years implying that adopters of ARDU moldboard plough has more experienced than non-adopters. The Response from adopters indicted that, ARDU moldboard plough: save time, has sharped edge, reduced repetition of plough, turnover furrow slices, buried weeds, served for a long period of time. Availability, portability and easiness for Oxen to pull were ranked as adoption constraints of ARDU moldboard plough. A binary logistics regression model was used to identify the determinants of ARDU moldboard plough adoption and the results indicate that the adoption of ARDU moldboard plough was influenced by: distance from main market, distance from extension services, and access to credit services had a significant negative relationship with households' decision to adopt ARDU moldboard plough while total cultivated land, total livestock holdings (TLU) and Access to ARDU moldboard plough services had significant and positive associations with households' adoption decisions of ARDU moldboard plough. Since ARDU moldboard plough has several advantages, promotion and pre-scaling up of the technology should be carried by Asella Agricultural engineering research center. Availability, Portability and easiness for Oxen to pull ARDU moldboard plough is ranked as adoption constraints, providing training to micro

enterprises and individual firms for production and working to reduce weight of ARDU moldboard plough expected from Asella Agricultural engineering research center concerned research team/s.

5. Pre-extension Demonstration Activities

Table 10. Number of technologies demonstrated, FRGs established, FTCs worked on and farms/farmers involved (for all demonstration trials) according to KIB

No.	Title of the work	Annual plan	Annual implementation	% plan implementation	Reason for high or low implementation
1	Number of technologies demonstrated	2	3	>100	Actual number of PED activities are more than KIB plan
1.1	Agricultural engineering technologies	2	3	>100	
2	Number of FRGs established	4	16	>100	
3	Number of farmers/beekeepers involved	80	240	>100	
4	Number of FTC on which work has done	1	3	>100	

Table 11. Type of technologies demonstrated, workplace and farmers perception

No.	Title of experiment's demonstrated Technologies	Name of technology/s demonstrated	Annual plan adult		Annual plan youth		Implementation Adult		Implementation Youth	
			M	F	M	F	M	F	M	F
1	Pre-extension Demonstration of powered grain de-huller	Grain de-huller	12	25	-	3	15	65	-	10
2	Pre-extension Demonstration of Coffee de-huller	Coffee De-huller	30	5	5	-	50	20	10	10
3	Pre-Extension Demonstration of Tractor Drawn Wheat Seed Drill Machine	Wheat seed drill	-	-	-	-	40	10	5	5

6. Pre-Scaling up Technology Activities

Table 12. Number of technologies scaled up, FRGs established, and beekeepers involved according to prosperity plan

No.	Title of the work	Annual plan	Annual implementation	% plan implementation	Reason for high or low implementation
1	Number of technologies scaled up	2	1	50	Number of technologies to be scaled up according to KIB is one more than the actual number of technology pre scaled up
1.1	Agricultural engineering technologies	2	1	50	
2	Number of FRGs established	1	4	>100	
3	Number of farmers involved	40	60	>100	

Table 13. Type of technologies pre-scaled up, workplace and farmers perception

No.	Title of experiment's Pre scaled up Technologies	Name of technology/s scaled up	Annual plan adult		Annual plan youth		Implementation Adult		Implementation Youth	
			M	F	M	F	M	F	M	F
1	Pre-scaling up of animal feed chopper	Animal feed chopper	26	6	8	-	40	10	5	5

7. Technology Multiplication Activities

Table 14 a. Plan and technology multiplication implementation (as per the prosperity plan for technology multiplication)

Team	Technology	Unit	Annual plan	Annual Implementation	% of plan implementation
Technology Multiplication	ARDU plough	No	50	50	100
	Modern bee hive	No	165	165	100
	Animal drawn Wheat row planter	No	8	4	50
	Tractor drawn wheat row planter	No	2	0	0
	Wheat and barley thresher	No	8	8	100
	Teff thresher	No	2	0	0
	Spike tooth harrow	No	50	50	100
	Potato digger	No	20	20	100
	Milk churner	No	10	10	100
	Top hammer miller	No	-	1	-
	Parshal flume	No	-	-	-
	Ring infiltro Meter	No	-	-	-
Total			315	308	97.7

Remark: The reason why not achieving the plan is due to technicians turn over, lately purchased materials and shortage of budget.



Fig. 25: shows few multiplied technologies

7.1b. Types of basic (prototype) technologies multiplied

Table 15. Multiplied prototypes by teams

No.	Team	Name of prototype multiplied	Remark
1	Agricultural Machinery and FP	Tractor Drawn Wheat Seed Drill	
		Tractor Drawn Faba Bean Row Planter	
		Multi Crop Thresher	
		PTO driven wheat and barley thresher	
		Tractor drawn potato digger	
		Irrigated wheat planter	
		Tractor drawn onion harvester	thesis
		Combined tillage	
		Tractor drawn faba bean thresher	
2	Renewable Energy	Bread baking oven	
		Solar dryer	
		House hold cooking stove	
3	Post-Harvest and Agricultural PP	Integrated inset processing machine	
		Potato grading machine	
		Ground nut decorticator	
		Cassava processing machine	
4	Irrigation, water harvesting & drainage	Water wheel to elevate water	

a. Technology Distribution

From the table below the achievements of some technologies were above the plan. That was indicate that there was previously multiplied.

Table 16. plan and achievements of technology distribution

No.	Multiplied technology	Unit	Annual Plan	Number multiplied	Number of technologies distributed	Additional explanation if any
1	ARDU plough	No	50	50	0	
2	Modern bee hive	No	165	165	80	Due to absence of construction materials multiplying and distributing on time was not done
3	Animal drawn Wheat row planter	No	8	4	0	
4	Tractor drawn wheat row planter	No	2	0	0	
5	Wheat and barley thresher	No	8	8	1	Construction materials are not purchased timely and that is why the season is passed
6	Teff thresher	No	2	0	1	From last year multiplied
7	Spike tooth harrow	No	50	50	19	
8	Potato digger	No	20	20	40	From last year multiplied

9	Milk churner	No	10	10	16	From last year multiplied
10	Top hammer miller	No	-	1	1	From farmer question came from Borena
11	Parshal flume	No	-	-	2	From last year multiplied
12	Ringii filter Meter	No	-	-	1	From last year multiplied
	Total		315	308	177	

Remark: the number of technologies planned to distribute were 300 but during the plan types and quantity was not listed.

8. Training Provided to Different Community Groups this year

8.1 Training provide to the technology users and stakeholders

Table 17. training given to technology users and stakeholders bye different teams

No.	Process/Team	Plan and execution		
		Plan	achievement	Achievement in %
1	Extension and Gender	120	300	>100
		4 IMX	2 IMX	The rest 2 IMX was not participated
2	Agri. Machinery and Farm Power	-	30	
3	Post-harvest and Agri. Product processing	-	1IMX	

Remark:

- Training was given for two IMX on how to multiply animal feed chopper
- Training was given for one (1) IMX on how to multiply Modern Bee Hive
- Training was given for farmers on how to use animal drawn potato digger



Figure 26. Shows practical training given on animal drawn potato digger



Figure 27. Shows practical training given on modern bee hive multiplication



Figure 28. Shows training given to IMX on how to multiply animal feed chopper

8.2. Provided training and topics

Table 18. Trovided trainings and topics on different technologies

Team	Topic of the training	Training days	Participants (SMS)			DAs			Farmers			Over all
			M	F	Total	M	F	Total	M	F	Total	
Extension and gender	Pre-extension Demonstration of powered grain de-huller	15	4	2	6	4	2	6	60	30	90	102
	Pre-extension Demonstration of Coffee de-huller	15	5	0	5	5	1	6	15	75	90	101
	Pre-Extension Demonstration of Tractor Drawn Wheat Seed Drill Machine	15	3	1	4	3	1	4	45	15	60	68

Fig. 37: Shows during training of trainer given at Adama on water saving methods by Irrigation team

8.3. Number of FRG established and members participated on Technology promotion

Table 19. Number of FRG established and members participated on technology promotion

Team	Title of the activity	Number of FRG			Total number of FRG members				
		Existing	New	Total	Adult (M)	Adult (F)	Youth (M)	Youth (F)	Total
Extension and Gender	Pre-extension Demonstration of powered grain de-huller	-	6	6	25	55	-	10	90
	Pre-extension Demonstration of Coffee de-huller	-	6	6	20	55	5	10	90
	Pre-Extension Demonstration of Tractor Drawn Wheat Seed Drill Machine	-	6	6	65	15	10-	-	90
	Pre-scaling up of animal feed chopper	-	-	4	40	15	5	-	60
Total		4	18	22	110	140	20	20	330

9. Field Day Executed

Mini field day was held by Irrigation, water harvesting and Drainage on irrigated wheat bed width furrow determination, effect of water levels on potato and effect of different irrigation schedule at Golja site.



Fig. 29. Shows mini field day organized at Golja location

10. Articles Published in this Plan Year by different teams

Table 20 articles published by different teams

No.	Team	Published article and its full citation	Type of the article
1	Renewable Energy	Getachew Hailu wondimagegn ^{1*} & Shemsedin Abubeker Edao ² , Adaptation and Evaluation of Pellet Press Briquette Machine, Volume 7, Issue 1, Pages 75-82, January-March 2023 , DOI: https://doi.org/10.46759/IJJSR.2023.7111 ISSN: 2582-3981	Journal
		Getachew Hailu Wondimagegn ^{1*} , Kamil Ahmed ² & Shemsedin Abubeker Edao ³ Developing and Performance Evaluation of Metal Sand Pan stove for Baking, Volume 7, Issue 1, Pages 53-63, January-March 2023, DOI: https://doi.org/10.46759/IJJSR.2023.7109 ISSN: 2582-3981	Journal
2	Socio-Economics	<i>Ibsa Dawid Mume, Jema Haji Mohammed and Mohammed Aman Determinants of adoption of small-scale irrigation practices as adaptation strategies to climate change stresses in Kersa District, Eastern Oromia, Ethiopia</i>	MSc thesis

Remark: The proceedings published at IQQO level is not return to our center

11. Produced Extension materials, manuals, leaflet, production guidelines, posters etc. and distributed to the users

Table 22 produced extension leaflets for users

Team	Type of Material	Total prepared	Total Distributed		Total
			Farmers/	Other stakeholders	
Extension and Gender	Leaflet (4)	350	300	50	350
Grand Total					350

Note: the leaflets were prepared on animal feed chopping machine, grain de-hulling machine, coffee de-hulling machine and tractor drawn wheat seed drill.

12. Human Resource and Center Development Works

It is essential for an organization to enhance the capability of its workforce in order to fully carry-out plans and targets towards achieving its goals and objectives. After all, the most important asset of any organization is its human resource. Like any organization, our center performed the following major activities under human resource development and capacity building:

12.1. Long Term Training

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

Table 23 total number of employees on study leave during this plan year

No.	Team	Education level	Started education in 2015 EC		Started education in 2014 EC		Started education before 2 years (2013)		Started education before 3 years (2012)		Total	
			M	F	M	F	M	F	M	F	M	F
1	Agri. Machinery and FP	MSc	-	-	-	-	-	-	-	-	-	-
		PHD	-	-	-	-	-	-	-	-	-	-
2	Post-Harvest and APP	MSc	1	-	-	-	-	-	-	-	1	-
		PHD	-	-	-	-	-	-	-	-	-	-
3	Irrigation, water harvesting and drainage	MSc	-	-	-	-	1	-	-	-	1	-
		PHD	-	-	-	-	-	-	-	-	-	-
4	Socio-economics	MSc	-	-	-	-	1	-	-	-	1	-
		PHD	-	-	-	-	-	-	1	-	1	-
5	Renewable energy	MSc	1	-	-	-	1	-	-	-	2	-
		PHD	-	-	-	-	1	-	-	-	1	-
		Total	2	-		-	4	-	1	-	7	-

12.2. Short Term Training

B. Number of staff Participated on short term training in 2014 EC.

No.	Team	Topic of the training	Number of participants			Number of training days	Place of training	Remark
			M	F	Total			
1	Agricultural Machinery & FP	Design software	1	-	1	4	Adama	
		Digital Agriculture	1	-	1	2	Adama	
2	Post-Harvest & APP	Design software	1	-	1	4	Adama	
3	Extension and Gender	Digital Agriculture	1	-	1	2	Adama	
4	Irrigation, water harvesting and drainage	Water productivity and water accounting using WaPor Model 1:- Introduction and Usage	1	-	1	3	Adama	
		Digital Agriculture	1	-	1	2	Adama	FAO

12.3. Total human resource of the center on job by gender and level of education

Ta r	Team	PhD		MSc/M A		MVS C		DV M		BSc/B A		Diploma /level		Certific ate		Other		Total	
		M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
1	Research	-	-	13	-	-	-	-	-	2	-	1	-	-	-	1	-	17	-
2	Support staff	-	-	1	-	-	-	-	-	11	4	16	8	6	1	8	2	43	15
	Total	-	-	14	-	-	-	-	-	13	4	17	8	6	1	9	2	59	15
Grand Total																		74	

Remark: - those who are on long term training were not included within this.

12.4. Other activities carried out related to human resource development

- Adequate explanation was given to the monitoring and evaluation team from OARI on the work
- Participate on ATO cluster meeting at different stages and plan our activities and evaluation was done.
- For promotion of researchers, required data compiled and reviewed by researcher promotion committee and evidence of 4 researchers sent to OARI being done by the Development and Human Resource Management Team in the center

12.5. Center develop activities performed in this plan year

- Continuous services of field vehicles were done.
- Wood and metal workshop machines were serviced and the problem was slightly solved

13. Community Service Activities carried out by the Different Teams and Individuals of the Center

Community service activities performed in this plan year were:

- Technology maintenance was performed for those who asked the center.
- Explanation was given on technologies multiplied by the center for different stake holders.
- Training was given to farmers on potato digger
- Assessments of pump, scheme and wears was done in West Arsi zone of Wendogenet, Kofele and Adaba woredas.
- Pump maintenance was done in kofele woreda.



Figure 30. Shows pump and scheme maintenance team



Figure 31. Shows assessment of Pump maintenance at Wendogenet, Kofele and Adaba kebeles



Figure 32. Shows during pump maintenance takes place



Figure 33. Shows during Assessment of schemes and diversion weirs

14. Budget plan and its utilization

14.1. Plan and Utilization of OARI capital budget '000'

No.	Team	Annual plan	Annual utilization	% of plan utilization
1	Agri. Machinery and FP	1,135	1,133	99.8
2	Renewable energy	583.8	578.9	99.2
3	Post-Harvest and APP	507	504.8	99.6
4	Irrigation, water harvesting and drainage	806.3	800.2	99.2
5	Technology multiplication	2000.1	1981.8	99.1
6	Agri. Extension and Gender	346.4	345.3	99.7
7	Socio-economics	439.2	432.2	98.4
Total		5,817.8	5,776.3	99.3

14.2. Plan and Utilization of non-OARI (FAO) capital budget '000'

No.	Team	Annual plan	Annual utilization	% of plan utilization
1	Irrigation, Water Harvesting and Drainage	829.7	716.82	86.4
Total		242.2	235.6	97.3

14.3. Plan and Utilization of non-OARI (Irrigation wheat) capital budget '000'

No.	Team	Annual plan	Annual utilization	% of plan utilization
1	Irrigated wheat	390	334.39	85.74
Total		390	334.39	85.74

Remark: The reason of underutilization was that budget was allocated on one code which is difficult to use it by our center.

14.4. Plan and Utilization of OARI Regular budget '000'

No.	Team	Annual plan	Annual utilization	% of plan utilization
1	Employees' salary	9351.2	8,361.3	89.4
2	Running costs	2667.9	2,640.4	99
Total		12,019.1	11,001.6	91.5

Remark: the reason why the Employees' salary is below 100% is that there is an overturn.

15. Internal Revenue Collection

Annual Plan (ETB)	Annual collection(ETB)	% of plan collection	Reason for under collection of the internal revenue
600,000	546,527.05	91.10	Some technologies were not produced and distributed as plan because of shortage of technicians and materials not purchased on time

16. Cross Cutting Issues

16.1. Implementation of the public service transformation tool package, leadership roles and activities, and manifestations of good governance

No.	Work planned	Unit	Annual plan	Annual implementation	% plan implementation
1	Regular Management meeting	No	12	9	75
2	Regular Monitoring and Evaluation meeting	No	4	3	75
3	Regular Workers/employees meeting	No	4	3	75

16.3. Ethical Promotion Activities

16.3.1 Key activities during the plan year regarding ethical promotion activities

- ◆ Monitoring and auditing of assets and finances have been done in order to ensure that the government budget is only used for the job at hand and that it can produce the desired results. In cases where there is a financial shortage in some teams, the teams which have budget cover the problem by sharing allocated budget.

Table 15.3.1. Performance of Ethical Promotion Activities of the Center

No.	Main activities planned	Unit	Annual plan	Annual implementation	% plan implementation
1	Collect customer feedback on our services and analyze public satisfaction levels	Quarter	4	4	100
2	Monitoring the use of the government's budget to ensure that it is put to good use and produces the desired outcomes	Quarter	4	4	100
3	Observing how center staff use government equipment and materials to ensure that they are solely used for office tasks	Quarter	4	4	100
4	Assess any potential ethical dilemmas or difficulties at work, and respond right away if they arise	Quarter	4	4	100
5	Support the ethics and anti-corruption councils of the centers; establish a schedule for debating any ethical issues and processes for resolving them if they arise	Quarter	4	4	100
6	Monitor presence and application of important laws, rules, and regulations	Quarter	4	4	100
7	Conduct studies on practices that leave room for fraud and misconduct	No	As presented	0	0
8	Collaborate with various groups to encourage moral conduct and a sense of responsibility at all levels in the center.	Quarter	4	4	100
9	If any corruption offense has been committed, is suspected of having been committed, or if any third-party complaints have been received, they will be registered and submitted to the center's director and OARI	Monthly	No of corruption Offense or Complain is	0	0

10	Property registration from top management to lower employee	Quarter	As got	82	80
11	Employee ethics, those who set an example at work, those whose disciplinary infractions have been advised and who have received disciplinary punishment	Good model	As got	0	0
		Advised	As got	0	0
		Punished		0	0
12	Keep track of and make corrections to internal and external audit reports	Quarter	Reported audit	0	0
13	Review ethical progress and remain vigilant on activities at various levels	Quarter	4	4	100
14	Receive and give feedback	Quarter	4	4	100

16.3. Job creation activities for unemployed community groups

There is about five temporary job created on daily laborers

17. Different Volunteering Works performed

Our center provides benefits to our organization as it is an instrumental force in promoting positive and sustainable growth within communities, while increasing our social connections with the service seekers. Some of the volunteer services we provided based on the request from our customers were listed as follow

Table 16. Some volunteer services provided by Asella Agricultural Engineering research center and their estimated values in this year

No.	External Body that requested services	Service requested	Service provided
1	Farmers those who have low incomes and to some organization like a church	Crop threshing and technical support	For about 8 farmers and one church more than 200 kuntals of different variety crops were threshed which costs about 72,000.00 ETB
2	Green legacy/planting trees	Tree plant hole digging (250 holes), planting (912) and raring (more than 1000)	More than 20,000.00 ETB
3	Oromia Irrigation Biro of Agriculture	To assess status of irrigation scheme	Two researchers assigned to south west of Oromia (Jima and Ilubabor zone) and south east of Oromia (Arsi, Bale and West Arsi zones) at different time and completed data collection and submitted to the respective body

18. Major Problems Encountered During the Year

No.	difficulties encountered	Efforts made to address the problems	Recommended solutions
1	Timely material cost incremental and lately purchased	Do with available materials until purchased	The way of material procurement must be modified
2	Shortage of field and service vehicle	Maintaining and used it through	IQQO must be asked for purchase new vehicle
3	Shortage of human power especially workshop technicians and Guards/security	Perform with existing human power by focusing on important tax	IQQO must be filled the vacant place through negotiation with regional government
4	Problem of getting lumber for bee hive construction/multiplication	We have tried to write letter repeatedly to Oromia forestry and livestock organization to get the lumber and beside of that we try to work another job	IQQO must be facilitate the way we can purchased easily
5	Shortage of regular budget especially 6211, 6217, 6223, 6231, 6241, 6244 and the like	As much as possible we try to focus on the major problem and transferred budget to it	IQQO should allocate appropriate budget to highly required codes
6	Increment of materials from time to time and this hinder us from timely availing for work	We try to adjust purchasing committee for collecting Performa and immediately purchased	If possible IQQO may arrange all engineering centers and purchased all together

19. Summary of Main scheduled Activities for the upcoming fiscal year

- Prepare the 2015/16 center activities work plan
- For ongoing research activities, different data collection and recording will continue as per the project plan. For new activities/projects experimental set ups and starting data collection and recording will be started based on the budget situations
- Conduct both metal and wood workshop machine maintenance and repairs field vehicles
- Encourage and support all employees to take part in various discussion workshops, have team meetings, and meticulously record and document all work and progress data.
- Hold a series of meetings at the center management level to discuss the planned activities status and any issues that have been found and encourage M &T team to actively participate in the monitoring and evaluation of the planned annual works of the center.
- Even if budget is not allocated we have plan to maintain office and store
- We continuously done Greene ring the center