



AGRICULTURAL GROWTH PROGRAM (AGP II) (P148591)

SUB COMPONENT 2.4

CAPACITY DEVELOPMENT (2016-2021)

JULY, 2021



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CAPACITY DEVELOPMENT (SUB-COMPONENT 2.4)

EXECUTIVE SUMMARY

Capacity development focused on supplementing the observed physical and skill gaps in achieving the pre-determined project objectives were implemented across research institutions/centres. Prior to operation, need assessment was conducted across implementing research centres. The need assessment was focused on bridging physical and skill gaps enabling the research component to deliver the required demand-driven agricultural technologies demonstrate demanded technology to end users & supply the required quality & quantity of source technologies. Until todate, several research facilities & physical capacities were supplied to Oromia Agricultural Research Institute (IQOO) with the financial support of Agricultural Growth Program (AGP-II). Those includes 17 field vehicles, 7 farm tractors, necessary laboratories facilities were procured with about 81,786,182.80 **birr** & supplied to different research laboratories, and poultry research & multiplication farm were constructed at two centres (Bako and Adami Tullu ARC). Besides, offices, research laboratories, meeting hall, syndicate rooms, resource centers, stores, fish multiplication pond & irrigation water reservoir pond were also renovated/constructed for the different implementing research centres. Establishment of irrigation infrastructure at two centres are in progress. Research activities of 37 graduate students (7 PhD & 30 MSc) were also supported. Completed research activities supported by AGP-II were published in workshop proceedings annually. Accordingly, 9 workshop proceedings were published. Publications of about 5 user's manual (mainly livestock directorate) were also supported by this project. The detailed list of infrastructures & facilities acquired & the costs invested are given below.

1. PHYSICAL CAPACITY DEVELOPMENT

The investments made on strengthening research capacity by AGP II project has played considerable role in releasing pipeline technologies, generating demand driven agricultural technologies, demonstrating and popularizing proven technologies & production of source technologies to the required quality & quantity. The investment on physical research capacity was based on a thorough assessment of the existing resources of the research centres, particularly lab facilities, farm machineries, transport facilities and other research infrastructures. Exhaustive inventory was also made for the supports received through Government or other projects/programs or for those in pipeline to avoid overlap.

1.1 STRENGTHENING LABORATORY FACILITIES

Prior to processing procurement of lab facilities, the existing facility gaps were assessed across all IQQO AGP-II implementing research centres. Procurement of lab facilities were managed by EIAR AGP-II coordination unit and distributed through UNOPs essentially based on the availability of the facilities advertised through international competitive bidding (ICB). Very few lab facilities are expected to be delivered in near future. Selection of beneficiary research centre was based on the following guiding principles;

1. The potential of the centre to contribute for research & development planned by AGP-II
2. The capacity of the centre to serve other centres and stakeholders at large
3. The availability of constructed lab infrastructure
4. Availability of technically capable manpower
5. To what extent the facility can solve prevailing production constraints in the area
6. Number of beneficiary AGP II districts in the mandate area
7. Regional and national importance of major commodities for which the facility is required in addressing the government's GTP-II plan. Based on these basic criteria, IQQO management approved and unanimously decided allocation of lab facilities to pertinent beneficiary centre as indicated in the table below.

Table 1. Laboratory and other research facilities to be supported by AGP-II and the final allocation decisions

S/n	Laboratory facility gap analysis	Target centre	Proposed budget (birr)	Actual budget (birr)	Proposed beneficiary Centre
1	Plant protection lab	1	2,791,667	10,110,938.83	Bako ARC
2	Soil lab	1	4,291,667	13,948,023.29	Bedele soil RC
3	Biotechnology lab (molecular)	1	236,593.04	13,269,835.79	IQQO HQ
4	Biotechnology lab (Tissue culture)	1	2,000,000	3,667,176.36	Adami Tulu
	Fishery research lab	1	3,799,434.64	9,968,070.45	Batu Fishery Resource RC
5	Food science lab	1	1,916,667	5,463,238.14	IQQO HQ food science lab
6	Seed cleaning and grading lab	1	2,916,667	243,142.10	Bako ARC
7	Seed laboratory equipment and supply	1	1,500,000	1176405.7	Fedis ARC
8	Agricultural engineering lab	1	6,453,042.17	9,538,695.85	Asela Agri. Eng. RC
9	Animal health lab	1	3,833,333	3,695,514.58	Adami Tulu ARC
10	Animal nutrition lab	1	2,916,667	1,263,925.43	Adami Tulu ARC
11	Agronomy/physiology lab	1	2,916,667	2,426,216.21	Sinana ARC
12	Computational facilities	15	1,916,667	1,811,708.95	IQQO HQ IT & implementing centers
13	Office furniture & facilities	1	0	2,201,245.76	IQQO HQ
14	Vehicle repair facilities	1	0	281,059.73	IQQO HQ
15	Generator, ppc & electric cable	3	0	1,650,550.00	BARC, Batu Fishery, ATARC
16	Poultry house facilities	2	0	1,070,435.63	BARC & ATARC (in progress)

17	Cold stores Facilities	3	1,458,333	0	BARC/SARC/FARC (IN ORDER)
18	Forage seed cleaning and grading lab	1	2,375,000	0	Adami Tulu ARC
19	Irrigation facilities	2	2,000,000	0	5 research centres (activity in progress at two centres)
	Total		43,322,404.85	81,786,182.8	

NB: The mandate for construction of irrigation infrastructure was given to the then Oromia Irrigation Development Authority (OIDA). Feasibility study & design work was completed before years. Surface water source was proposed for Adami Tullu & Bako Agricultural Research Centre. Winner contractors started earth work. Ground water was proposed for Sinana, Haro Sabu & Mechara ARC & none of them are implemented to date. The selected sub site of Bedele research centre for irrigation was taken for industry village purpose & thus terminated.

1.1.1 Plant Protection Lab (Bako Agricultural Research Centre)

Bako Agricultural Research Centre, with more than 50 years research and development record, contributed significantly in boosting agricultural productivity in the country. Bako and its mandate agro-ecologies are the hot spots for major crop pests such as Maize GLS and TLB, Sorghum anthracnose and mold, Wheat rusts, Fusarium wilt of hot pepper, Barley scald, blast disease, Potato wilt and late blight, common beans anthracnose & Common Bacterial Blight, Sesame bacterial blight and so on. In addition, the newly emerging disease such as Maize Lethal Necrotic Disease (MLND), Faba Bean Gall, Soya Bean Rust and Mango white scale insect are also commonly reported in most parts of western Oromia. Limited efforts were made to identify the real biology of those pests that helps to develop economically and ecologically sound, cheaper and safer pest management recommendations. The following laboratory facilities were procured with the financial support of AGP-II (Table 2) for plant protection process of Bako ARC.

Table 2. List of Laboratory facilities procured for plant protection Laboratory of Bako ARC

No	ITB/Lot/ Item No	Item	Qty	Unit price USD	Unit price birr	Total price (birr)
1	ITB/2018/2885 6/1	Class II Bio Safety Cabinet	1	16,826.71	496152.37	496152.37
2	ITB/2018/2885 12/3	Digital Laboratory Colony Counter	1	321.21	9471.20	9471.20
3	ITB/2018/2885 12/4	Nematode Counting Dishe	10	259.15	7641.30	76412.92
4	ITB/2018/2885 23/1	Dispenser (Bottle Top)	1	942.20	27781.71	27781.71
5	ITB/2018/3046 73/5	Digital imaging compound microscope with camera	1	6310.40	186068.45	186068.45
6	ITB/2018/3046 73/9	Scanning Electron Microscope	1	238,389	7029138.05	7029138.05
7	ITB/2018/3046 73/10	Stereo Zoom microscope with digital camera	2	9872	291085.79	582171.58
8	ITB/2018/2823 93/3	Autoclave (steam sterilizer)	1	6071.75	179031.62	179031.62
9	ITB/2018/2823 96/2	Analytical/precision electronic balance (0.0001g)	2	1322.99	39009.68	78019.37
10	ITB/2018/2823 100/1	Benchtop pH/mV Meter	1	82.13	2421.69	2421.69
11	8/7	Digital laboratory centrifuge	1	270.69	78490.87	78490.87
12	16/1	Benchtop pH/mV meters 2	2	653.49	18950.88	37901.77
13	25/2	Chlorophyll meter/leaf area meter	1	5601.98	162454.62	162454.62
14	26/2	Portable leaf area meter	1	7434.56	215598.52	215598.52
15	28/1	Sieve nematode	10	1535.41	44526.12	445261.22
16	28/3	Laboratory sample/seed grinder	5	3712.82	18564.10	107669.92

17	29/1	Digital burette (50ml)	1	1132.20	32833.23	32833.23
18	74/2	Refrigerator	1	2230.63	64687.15	64687.15
19	74/5	Refrigerator/freezer	2	2450.63	71067.04	142134.09
20	74/7	Deep freezer	1	5422.11	157238.48	157238.48
	Total			310,842.06	9168212.87	10,110,938.83

1.1.2 Soil laboratory [Bedele Agricultural Research Centre]

Soil is the central and valuable natural resource vital as “storehouse of nutrients and water” for agricultural production. Soil testing for its nutrient composition, physical and chemical structure is the key for fertilizer use efficiency and increasing crop productivity. Besides, knowing the physico-chemical properties of soil is fundamental in making soil management and utilization decisions. Fertilizer application based on soil testing usually leads to an increase in crop yields by providing the correct amounts of nutrients keeping ecological and economic feasibility. Therefore, furnishing soil laboratory with the required lab equipment is one of the most pinpointing schemas in proper land use planning, boosting agricultural productivity and maintaining environmental sustainability. Accordingly, followings are some of the facilities purchased with financial support of AGP-II (Table 3).

Table 3. List of Laboratory facilities procured for Soil Laboratory

#	ITB/Lot/ Item No	Item	Qty	Unit price USD	Unit Price birr	Total price (birr)
1	ITB/2018/2843-76/1	Block Digester With 20-24 Heating Places For Kjeldhal Nitrogen Determination	2	12,755.79	410736.44	821472.88
2	ITB/2018/2843-76/4	Microwave Digestion System (Microwave Assisted Extractor)	1	24358.23	784335.01	784335.01
3	ITB/2018/2843-78/1	Chemical Safety Fume Hood with Installation	1	3606.79	116138.64	116138.64
4	ITB/2018/2843-79/3	Munsell Soil Color Chart	5	595.20	19,165.44	95827.20
5	ITB/2018/2843-79/4	Pressure Plate Apparatus Full Set	1	10,710.24	344869.73	344869.73
6	ITB/2018/2843-80/3	Digital burette (50ml)	4	729.00	23,473.80	93895.20
7	ITB/2018/2843-82/5	Water Distiller	1	5455.81	175677.08	175677.08
8	Stock # 75/1	Atomic absorption spectrophotometer (AAS) with installation & full training	1		4,027134.18	4,027134.18
9	Stock # 75/4	ICP-OES (inductively coupled plasma optical emission spectrophotometer with installation & full training	1		5,935040.57	5,935040.57
9	76/5	Nitrogen analyser/fully automatic (kjeldali nitrogen analyser)	1		1048491.42	1048491.42
10	77/1	Benchtop pH/Ec/TPs meter pcs	3		34190.41	102571.23
10	282741*	Double Ring Infiltrrometer	3		103140.05	309420.15
	282741*	Munsell	4		23287.50	93150.00
	Total				13,045,723.83	13,948,023.29

Key: * indicated local purchase

1.1.3 Biotechnology lab

Due the dynamic nature of environmental factors and the extreme increase in population size in the world, conventional research alone may not mitigate the frequent occurrence of climate change & could never feed the population in the globe. Therefore, supporting conventional research with advanced biotechnology tools could shorten the duration required to generate a given technology and also increase the expected level of precision. To this end, IQQO established biotechnology research infrastructure (tissue culture) at Adami Tullu ARC & planned to start molecular lab at IQQO head quarter. AGP-II procured some of the required facilities for both labs (Table 4 & 5).

a) Tissue culture facilities (Adami Tullu ARC)

Table 4. List of laboratory facilities procured for biotechnology laboratory

No	ITB/Lot/ Item No	Item	Qty	unit price (USD)	Unit price (birr)	Total price (birr)
1	ITB/2018/2885-6/1	Class-II Bio Safety Cabinet	1	16826.71	499315.79	499315.79
2	ITB/2018/2885-7/3	Ductless Chemical Fume Hood	1	2670.50	79244.42	79244.42
3	ITB/2018/2885-10/3	Autoclave	1	10611.07	314872.89	314872.89
4	ITB/2018/2885-14/1	Water Bath	1	361.93	10739.91	10739.91
5	ITB/2018/2885-16/1	Bench top Ph/mV meter	1	653.49	19391.66	19391.66
6	ITB/2018/2885-23/2	Automatic media dispenser	1	5798	172049.85	172049.85
7	ITB/2018/2885-29/2	Burettes, digital & automatic	2	6310.40	187254.81	374509.62
8	ITB/2018/2885-34/1	Storage cabinet, flammable hood	1	3070.50	91114.02	91114.02
9	ITB/2018/2885-34/2	Storage cabinet, volatile chemicals	1	5954.30	176687.90	176687.90
10	ITB/2018/2885-39/1	Battery Backup Uninterruptible Power Supply (UPS) & Power Conditioner	2	1732.80	51419.14	102838.21
11	ITB/2018/2885-40/1	MicroPure-Water purification apparatus with accessories	1	5133.97	152345.43	152345.43
12	ITB/2018/2885-72/1	Vacuum pump	1	3333.00	98903.44	98903.44
13	ITB/2018/2885-73/5	Digital Imaging compound microscope with Camera	2	6310.40	187254.81	572130.16
14	ITB/2018/2885-73/6	Fluorescent microscope	1	9640.26	286065.08	286065.08
15	9/4	Microwave oven	2	258.50	7496.37	14992.74
16	35/1	Temporary immersion system	30(1)	7403.66	214,702.44	214,702.44
17	73/7	High power stereo-zoom fluorescence	1	13961.30	404870.72	404870.72
18	74/3	Refrigerator/freezer	2	1420.75	41201.04	82402.08
	Total			101451.54	2,994,929.72	3,667,176.36

b) Molecular lab at IQOO HQ

Table 5. List of laboratory facilities procured for biotechnology laboratory (IQOO HQ)

No	ITB/Lot/ Item No	Item	Qut	unit price (USD)	Total price (birr)
1	ITB/2018/2885-6/1	Class-II Bio Safety Cabinet Model LB-4B1-E type B2	2	16826.71	975932.35
2	ITB/2018/2885-30/2	Liquid nitrogen storage Vessel model ET 35	1	918.65	53280.78
3	ITB/2018/2885-31/2	Micro plate reader Model:ELX808	2	8637.40	500960.56
4	ITB/2018/2885-32/1	Pipette washing set Model: NALGDSS250-0060	2	696.35	40387.60
5	ITB/2018/2885-32/2	Plate washer automatic strip washer Model: 50TS12	2	8545.25	495615.95
6	ITB/2018/2885-39/1	Battery Backup Uninterruptible Power Supply (UPS) And Power Conditioner	2	1732.80	100500.67
7	ITB/2018/2885-40/2	Polisher cartridge for use with micro pure Model: 50132372	1	433.3	12565.48
8	ITB/2018/2885-41/1	Spectrophotometers Model:Genova nano	2	6417.85	372228.88
9	ITB/2018/2886-45/2	Electrophoresis blotting system Model: EW28580-00	2	1482	85954.52
10	ITB/2018/2886-45/3	Vertical gel electrophoresis system Model WW-28571- 10	2	2602.08	150918.04
11	ITB/2018/2886-46/2	Horizontal Mini gel electrophoresis system Model: Multi-sub mini	3	407.61	35461.46
12	ITB/2018/2886-46/3	High-through put Horizontal Mini gel electrophoresis system Model: Multi-sub screen	3	1110.73	96631.84
13	ITB/2018/2886-46/4	Power supply for gel electrophoresis system. Model: power pro 300	6	415.93	72370.57
14	ITB/2018/2899-64/1	Water distiller Model: 2104	2	7800.00	452392.20
15	ITB/2018/3046-73/2	Digital imaging binocular compound microscope with dell computer; model Microscope CX43,SC50	1	6567.85	190464.37
16	ITB/2018/2885-7/3	Ductless Chemical Fume Hood	1	2670.50	79244.42
17	ITB/2018/2885-15/3	Digital shaking water bath	3	2240.14	199421.73
17	ITB/2018/2885-33/1	Sample concentrator	3	9133.44	813077.1
18	ITB/2018/2885-33/2	Sterile electroporation cuvettes	1	765.46	22714.26
19	ITB/2018/2885-34/1	Storage cabinet, flammable hood	1	3070.50	91114.02
20	ITB/2018/2885-34/2	Storage cabinet, volatile chemicals	1	5954.30	176687.90
21	ITB/2018/2886-47/1	PCR machine 96-well thermal cycle (standard)	3	3926.3	349527.09
23	ITB/2018/2886-47/3	Real time PCR instrument with tower computer	1	34310.98	1018144.02
23	ITB/2018/2886-47/2	Real time PCR	1	34310.98	1018144.02
25	ITB/2018/2886-47/4	PCR workstation	1	3181.29	94401.60
26	ITB/2018/2886-91/1	Digital gel 4documentation	1	15000	445110.00
27	9/4	Microwave oven	1	258.50	7,496.37
28	29/2	Burettes, digital & automatic	2	6,310.40	365,996.89
29	43/1	High performance flow cytometer instrument	1	37,346.06	1,083,017.07
30	44/2	Automated gel imaging instrument/gel doc system with Camera	1	10,623.60	308,079.09
31	74/6	Deep freezer	1	2,896.08	83,984.87
32	8/4	Laboratory micro centrifuge/ bench top	2	29434.39	58874.78
33	8/8	Multipurpose centrifuge	2	415209.91	830419.8
34	74/4	Refrigerator/freezer	1	100514.30	100514.30
35	74/8	Deep freezer	2	157238.48	314476.96
36	74/11	Ice maker	2	25660.21	51320.42
37	45/1	Completed functional 2D-Gel electrophoresis	2	36,593.80	2,122,403.81
	Total			1,001,244.13	13,269,835.79

1.1.4 Fishery research lab

Aquaculture in Ethiopia remained more potential than in actual practice due to the fact that the country's environmental and socio-economic conditions support its development (FAO, 2005). The consumption and demand for fish as a cheap source of protein is highly increasing in Ethiopia. But, most of the easily accessible Ethiopian lakes are over exploited and their fisheries production is declining at an alarming rate (Vijverberg *et al.* 2012). Batu Fisheries Resources Research Centre (BFRRC) is attempting to alleviate some of these and other problems at the farmers' level to introduce and sustain the pond culture of fish. In strengthening fishery research and development plan, AGP-II project supported the procurement of important lab facilities indicated in table 6 below.

Table 6. List of Laboratory facilities procured for fishery research

No	Item	Lot No.	OARI	USD	Birr
1	Discrete-flow analyser (wet chemistry) with full set, and accessories	1	1	49392.7	1450061.08
2	Digital flame photometer with automatic flame faller detection air compressor unit	1	1	7133.64	209428.06
3	Muffle Furnace	2	1	5677.74	166540.61
4	Drying oven	2	1	2668.35	78268.58
5	Autoclave	2	1	10860.89	318573.8
6	BOD Incubator	2	1	1851.3	54302.7
7	Water distiller	2	1	5031.72	147591.27
8	Water deionizer	2	1	4039.93	118500.03
9	Refrigerator	2	1	2791.26	81873.8
10	Bench top Orbital Shaker	2	1	2279.63	66866.56
11	Ultra Violet (UV) water sterilizer	2	1	922.64	27063.06
12	Micro balance	4	1	30240.48	887019.66
13	Sensitive Balance	4	2	840.02	24639.63
14	Hot plate magnetic stirrer, digital	4	1	2801.87	82185.01
15	Electronic pipette controller	5	1	250.29	7341.56
16	Under-water Photosynthetic Active Radiation(PAR) sensor	5	1	947.8	27801.06
17	Turbidity meter	5	1	2248.53	65954.33
18	Portable multi-meter for pH, conductivity, oxygen, TDS, salinity and temperature	5	1	5895.24	172920.36
19	Portable echo sounder	5	1	1986.02	58254.34
20	Hand held depth meter	5	1	242.28	7106.61
21	Feed extruder/pellet maker	5	1	5452.25	159926.49
22	Epiflorescent Lamp with power source /Accessory/	6	1	5128.14	149015.56
23	Inverted Phase contrast microscope	6	1	39133.34	1137152.3
24	Electro fishing Equipment water sampler	7	1	16826.28	488944.8
25	Depth water sampler (Van Dorne type)	7	2	2745.07	79767.4
26	Benthos-Sieves set	7	1	1176.2	34178.45
27	Beach Sein	7	6	1292.84	37567.77
28	Tubular Plankton Chamber	7	2	1294.49	37615.92
29	Counting Chamber for Zooplankton	7	2	973.41	28285.8
30	Plankton net 25µm	7	2	790.05	22957.64
31	Plankton net 50µm	7	1	395.03	11478.82
32	Plankton net 64µm	7	1	387.84	11269.94
33	Plankton net 100µm	7	1	373.48	10852.82
34	Plankton net 150µm	7	1	366.29	10643.94
35	McDonald-type Fish Hatching Jar	7	9	1090.05	31675.11
36	lab cold digital temp display		1	121.87	3541.34
37	accessory platform laser cradle		1	468.96	13627.51
38	Disc		1	2279.48	66239.49
39	Fume hood		1	1,333,722.44	1,333,722.44
40	Horizontal biosafety cabinet Class-II		1	1,973,036.30	1,973,036.30
41	UV and visible double beam scanning spectrophotometer	3.01	1	150,539.95	150,539.95
	2, position cell charger	3.02	1	51,409.77	51,409.77
	2 x10mm cell holder	3.03	1	9479.00	9479.00
	Plastic dust cover	3.04	1	8031.24	8031.24
	Fuse kit	3.05	1	2614.92	2614.92
	USB memory device & printer	3.06	1	14848.44	14848.44
	Desktop PC keyboard, monitor, mouse & window	3.07	1	37355.18	37355.18
	Sub-Total			3,799,434.64	9,968,070.45

1.1.5 Food science lab (IQQO HQ)

Technology generation without quality assurance is becoming value less. Enhancing Production & productivity alone will never fulfil nutrition security unless it is supplemented by nutritional composition analysis. Besides, intensive food sciences research is mandatory to recommend healthy & nutritionally enriched dietary compositions to the community. IQQO AGP-II fulfilled the following facilities to strengthen the research in this program (Table 7a & b).

Table 7a. List of Laboratory facilities procured for food science lab through AGP-II CU

No	Lot No	Item	UT	Unit price USD	Unit price birr	Total price birr
1	ITB/2018/2899-59/5	Digital Ph/EC/TDS/ Temperature Meter with CAL Check	2	1,228.56	36456.29	72912.58
2	ITB/2018/2899-59/11	pH/Mv Meter	1	1,052.82	31,241.38	31241.38
3	ITB/2018/2899-59/13	Water bath	1	702.19	20836.79	20836.79
4	ITB/2018/2899-60/1	Analytical Balance	2	1,590.48	47195.9	94391.8
5	ITB/2018/2899-60/2	Sensitive Balance	2	866.37	25708.66	51417.32
6	ITB/2018/2899-62/5	Glass Bead Sterilizer	1	1,733.98	25708.66	25708.66
7	ITB/2018/2899-57/3	Fully automatic kjeldehal nitrogen analyser	1	11328.87	328531.57	328531.57
8	ITB/2018/2899-57/4	Automatic fibre analyser	1	24132.97	716121.75	716121.75
9	ITB/2018/2899.-62/6	Microbiological incubator	1	3269.69	97024.78	97024.78
10	ITB/2018/2899-65/4	Flame photometer	1	4262.92	126497.89	126497.89
11	ITB/2018/2899-66/2	Oven	2	2576.94	76468.12	152936.24
12	ITB/2018/2899-55/1	Texture profile analyser	1	39440.5	1,258,151.95	1258151.95
13	59/12	Rotary evaporator	1	4019.16	116553.63	116553.63
14	65/3	Digital bomb calorie meter	1	4657.20	135056.47	135056.47
15	51/2	Freeze dryer/lyophilized	1	41148.8	1193318.99	1193318.99
16	57/2	Kjeldahi digestion system	1	689.37	199991.86	199991.86
17	65/1	UV-Vis-spectrophotometer	1	12400	359623.67	359623.67
18	70/1	Seed counter	1	1830.97	53098.08	53098.08
	Total		22	156,931.79	4,847,586.44	5,033,415.41

Table 7b. List of Laboratory facilities procured for food science laboratory through IQQO

	Type	Unit	Quan	Reg no	total price birr
1	Evaporating dishes Volume 50ml	pack	4	282624	2260.87
2	Forceps	Pcs	10	282624	600
3	Funnel short term 100mm	Pack	2	282624	1130.4
4	Inoculating loop platinum coated	Pcs	5	282624	695.65
5	Round –botton flask 250ml	pcs	10	282624	573.91
6	Test tubes holder spring clip type	pcs	3	282624	65.22
7	Test tubes rack polprolene	Pcs	2	282624	208.7
8	Acetonitrile HPLC grade	Lit	5	282625	2826.09
9	Chloroform	Lit	2	282625	641.74
10	Disodium Hydrogen phosphate	Kg	1	282625	381.74
11	Glycerol	Lit	2	282625	224.34
12	Methyl Blue	Gm	200	282625	786.09
13	Magnesium Nitrate	kg	1	282625	495.65
14	Methyl Red	gm	200	282625	660
15	Nin hydrin	gm	650	282625	16238.7
16	Petroleum ether A.R	Lit	1	282625	347.83
17	Silica Gel Granites	Kg	5	282625	2608.7
18	Silver Nitrate	kg	1	282625	33043.48
19	Sodium hypo chloride	Lit	2	282625	660.86
20	To'unc	Lit	1	282625	347.83
21	What man Filter paper No 1	Pack	10	282625	17391.3
22	Ferrous sulfate 500gm	pcs	2	282625	796.52
23	Cork Borer	pcs	6	282627	160.87
24	Crucible	Pcs	3	282627	83.49
25	Crucible tong 300mm	Pcs	4	282627	417.4
26	Separator funnel 250 ml glass	Pcs	5	282627	586.96
27	Agar 500gm	Pcs	2	282627	2086.96
28	Agaros 100gm	Pcs	10	282627	34695.65
29	Buffer PH 40	Pcs	1	282627	86.96
30	Buffer PH 70	Pcs	1	282627	86.96
31	Buffer PH 9.2	Pcs	5	282627	434.78
32	Iron Sulphate 500gm	Pcs	2	282627	608.7
33	Break Tongs	Pcs	10	282628	826.1
34	Cotton Wool	Pack	20	282628	2087
35	Dedicator	pcs	6	282628	3756.54
36	Flask -Volumetric 100ml	pack	10	282628	5652.2
37	Flask -Volumetric 25ml	Pack	10	282628	3565.2
38	Flask -Volumetric 50ml	Pcs	10	282628	3903
39	Flask -Volumetric 1000ml	Pcs	20	282628	3217.4
40	Glass Stirrer	Pcs	5	282628	104.35
41	Tripod stand	Pcs	2	282628	156.52
42	General purpose tongs	Pcs	10	282628	739.1
43	Bolin chips (marble)	Kg	3	282628	834.78
44	Nutrient agar 500gm	Pcs	1	282628	1434.875
45	Sasitic acid	Kg	1	282628	773.91
46	Sodium Nitrate	Kg	1	282628	417.39

47	What man Filter paper No 1	pack	10	282628	11304.3
48	Sucrose 99.5%	Kg	1	282628	421.78
49	Cover Slide	Pack	3	282630	46.95
50	Potassium Hydroxide	kg	2	282630	626.08
51	EDTA Na 2EDTA	kg		282630	539.13
52	Volumetric Flask 250ml	pcs	15	282630	1239.15
53	Volumetric Flask 500ml	pcs	10	282630	1173.9
54	Watch Glass	Pcs	1	282630	39.13
55	Buffer Ph 10	Pack	4	282630	660.88
56	Calcium chloride	Kg	2	282630	695.66
57	Calcium carbonate	kg	2	282630	730.44
58	Methyl orange 25 gm	Pcs	8	282630	626.08
59	Potassium sulphate	kg	1	282630	365.22
60	Potassium Iodide	Kg	1	282630	2434.78
61	Bromocresol geern	kg	1	282632	13043.48
62	Copper Sulphate pent hydrate	kg	2	282632	1043.48
63	Ethanol 70%	Lit	10	282632	565.22
64	Ethanol 95% Ethly alcohol	Lit	10	282632	608.7
65	Ethanol 97 %	Lit	10	282632	608.7
66	Hexane	Lit	5	282632	1391.3
67	Ortho phosphor acid	Lit	5	282632	1086.95
68	Tin chloride	Gm	500	282632	43478.26
69	Tri sodium citrate dehydrate	Kg	1	282632	434.78
70	Bunsen Burner	Pcs	3	282632	482.61
71	Alpha Naphthol	kg	3	282634	5460
72	Phenol phthalein indicators	Gm	100	282634	193
73	Sodium Thiosulphate	kg	1	282634	358.8
74	Grain Moisture Tester	“	1	282722	16500
75	Alarm	set	1	282730	3680
76	Electrical Conductivity	“	1	282727	5980
77	Ice Box 40 lit	“	5	282722	14500
78	Vortex Mixer	“	1	282727	3737.5
79	Laboratory Stool Chair Rotary Base	Pcs	20	282737	89999.92
	G. total (including VAT 15%)				429,822.73

1.1.6 Seed cleaning and grading lab (Bako Agricultural Research Centre)

Because of the lack of seed cleaning and grading facilities, the centre was obliged to take seed samples to different maize seed grading lab before the seed is distributed to different regional state in the country. Construction of modern seed store, seed grading room, medium lab and the office were completed with the support of regional government. Furthermore, some of the required lab facilities were procured with the support of AGP-II (Table 8).

Table 8. List of Laboratory facilities procured for seed cleaning & grading laboratory at Bako ARC

No	ITB/Lot/ Item No	Item	Qut	Unit price USD	Unit price birr	Total price (birr)
1	ITB/2018/2885-20/2	Analytical Balance	1	1017.77	30009.97	30009.97
2	ITB/2018/2823-94/1	Air conditioner	3	628.44	18530.18	55590.55
3	ITB/2018/2823-95/1	Laboratory Sample/Seed Grinder	1	658.34	19411.81	19411.81
4	ITB/2018/2823-96/1	Laboratory digital balance	2	150.37	4433.81	8867.62
5	ITB/2018/2823-96/4	Top loading digital balance (0.01g)	1	233.77	6892.94	6892.94
6	ITB/2018/2823-98/1	Automatic Seeds/grain counter machine	1	477.76	14087.23	14087.23
7	ITB/2018/2823-103/1	Water distiller	1	2152.50	63468.62	63468.62
8	ITB/2018/2823-104/1	Magnifier lamp	3	90.31	2662.88	7988.64
9	ITB/2018/2823-105/1	Plastic bag sealer	7	125.10	3688.70	25820.89
10	ITB/2018/2823-105/2	Bag swing machine	1	125.10	3688.70	3688.70
11	ITB/2018/2823-107/2	Plastic top Lab stools	5	49.55	1461.03	7305.16
	Total			5709.01	168335.87	243132.13

1.1.7 Seed laboratory equipment and supply (Fedis Agricultural Research Centre)

Table 9. List of seed laboratory facilities procured

No	Lot	Item	Qut	Unit price (USD)	Unit price (birr)	Total price (birr)
1	ITB/2018/2823-92/1	Seed Germination Chamber (Type I)	1	9026.18	290643	290643
2	ITB/2018/2823-92/2	Seed Germination Chamber (Type II)	2	10,113.68	325660.5	651320.99
3	ITB/2018/2823-93/2	Drying oven	1	1399.30	45057.46	45057.46
4	ITB/2018/2823-96/4	Top Loading Digital Balance (0.01g)	1	233.77	7527.39	7527.39
5	ITB/2018/2823-97/1	Manual Grain Sample Divider	1	275.46	8869.81	8869.81
6	ITB/2018/2823-97/2	Precision Sample Seed/Grain Divider	1	717.72	23110.58	23110.58
7	ITB/2018/2823-98/1	Automatic Seeds/Grain Counter Machine	1	477.76	15383.87	15383.87
8	ITB/2018/2823-100/1	Illuminated Seed Purity Work Board	1	82.13	2644.59	2644.59
9	ITB/2018/2823-104/1	Magnifier Lamp	2	90.31	2907.98	5815.96
10	ITB/2018/2823-104/2	Magnifier Glass with Head Band	6	74.60	2402.12	14412.72
11	ITB/2018/2823-105/1	Plastic Bag Sealer	4	125.10	4028.22	16112.88
12	ITB/2018/2823-107/1	Lab Seed Trolleys	3	371.62	11966.16	35898.49
13	ITB/2018/2823-107/2	Plastic top Laboratory Stools	5	49.55	1595.51	7977.55
14	74/12	Refrigerator	1		51630.41	51630.41
	Total				793427.6	1176405.7

1.1.8 Mechanization engineering lab (Asela Agricultural Engineering Research Centre)

Traditional agriculture remains labour intensive and lower in productivity due to pre- & post-harvest losses. Although not widely popularized & adopted by the end users, Agricultural Engineering research centres are trying to bridge the traditional & conventional agricultural practices to modern & mechanized practices. The current labour shortage in the farming community necessitated further strengthening & capacitating Agricultural Engineering research centres with advanced research facilities which helps them to generate demand driven mechanization technologies. To this end, AGP-II procured the following facilities to Asela AERC. Those facilities will be delivered to the centre after inspection in near future.

Table 10. List of Laboratory facilities procured for Agricultural mechanizations

No	Item	Lot No.	QUT	Unit price		Total price	
				Dollar	Birr	Dollar	Birr
1	Air Plasma Cutting M/c	8	1		97797.03		97797.03
2	MIG welding machines	8	1		42912.88		37314.7
3	TIG welding machines	8	1		24897.36		21649.38
4	3D printing machine	8	1		165004.09		151878.9
5	CNC Lathe machine	8	1		2199714		2199714
6	Tractor dynamometers	10	5		297784.74		1,398,923
7	Dynamometer with handhold indicator	10	4		15429.54		61718.16
8	Dynamo meter (Force Gauge)	10	5		204973.4		1024867
9	Variable speed motor (three phase induction motor)	10	1		45,505.45		45,505.45
10	Variable speed motor (three phase induction motor)	10	1		84,240.30		84,240.30
11	Universal Tensile Test Machine with full accessories (Screen Display Universal Testing Machine (UTM))	11	1		757412.6		757412.6
12	Soil shear strength tester	11	1		0	0	0
13	Soil moisture meter	11	4		6569.42		26277.68
14	Digital non-contact type Tachometer	11	4		17548.93		70195.72
15	Thermo-hygrometer with remote sensor	11	2		997.33		1994.66
16	Grain moisture meter (Grain Moisture Tester high precision capacity)	11	3		5826.87		17480.61
17	Digital inclinometer	11	5		1118.71		5593.55
18	Soil hydrometer /soil specific gravity tester	11	5		1165.24		5826.20
19	Soil inflitro-meter/ gulf inflitro-meter	11	4		9711.44		38845.76
20	Solar irradiance meter	11	4		20199.60		80798.40
21	Digital Anemometer with Thermometer	11	4		275.93		1103.72
22	Belt tension meter	11	5		7108.60		35543.00
23	Digital Vibration Meter (Vibration Tester)	11	3		2719.33		8157.99
24	Portable digital liquid density meter with high quality	11	4		76548.43		306193.73
25	LCD Digital biomass Moisture meter	11	6		932.25		5593.50
26	Liquid specific gravity meter	11	4		0		0
27	Calorific value bomb calorimeter	11	1		646778.24		646778.24
28	Kinematic Viscosity	11	1		66037.49		66037.49

	Meter/Kinematic Viscometer					
29	Hay moisture meter	11	1		14167.09	14167.09
30	Pocket Penetrometers/ Soil Tester/	11	5		4570.18.	22850.90
31	Soil Auger	11	5		2680.86	13404.30
32	Laboratory Test Sieve Vibrating/ Sieve Machine for Granule, Powder Different Screens/ with accessories	11	4		24473.35	97893.40
33	Stainless Steel Lysimeter	11	2		50848.98	101697.96
34	Digital pressure Gauge (pressure plate apparatus)	11	3		12521.88	37565.66
35	Digital Torque Gauges Series	11	3		52555.68	157667.05
36	Carbon monoxide Analyser	11	4		0	0
37	Portable LCD flue gas analyser	11	4		50499.18	201996.72
38	Combustion efficiency Analyser	11	3		126248.11	378744.34
39	Portable combustible gas analyser	11	3		6409.65	6409.65
40	Hardness testing machine	11	1		107058.21	107058.21
41	Automatic seed germination testing cabinet machine	11	1		243518.9	243518.9
42	Growth chamber	11	1		958280.9	958280.9
	sub-total				6,453,042.17	9,538,695.85

1.1.9 Animal health lab [Adami Tulu Agricultural Research Centre]

Livestock diseases and insects are the major constraints in livestock industry. The prevalence is high in the lowland areas of the counter where livestock population is relatively higher. Efforts were made by Adami Tulle to establish and fulfil lab facilities by the Government & also through different projects such as UNDP and ARTP. However, there are still some facilities lacking and thus hinder the laboratory to provide the expected services particularly in diagnosing parasitic, bacterial, viral and other non-infectious diseases of livestock. The following facilities were supplied through AGP-II to supplement the gaps.

Table 11. List of Laboratory facilities procured for Animal health Laboratory

No	ITB/Lot/ Item No	Item	Qut	unit price (USD)	Unit price (birr)	Total price (birr)
1	ITB/2018/2885-7/2	Fume hood	1	2806.00	82265.24	82265.24
2	ITB/2018/2885-9/1	Digital drying oven	2	3360.15	99709.09	199418.18
3	ITB/2018/2885-10/1	Autoclave	1	5997.56	177971.60	177971.60
4	ITB/2018/2885-12/3	Digital lab colony counter	2	321.21	9531.59	10063.17
5	ITB/2018/2885-16/4	Conductivity meter	1	1213.26	36002.28	36002.28
6	ITB/2018/2885-73/6	Fluorescent microscope	1	9640.26	286065.08	286065.08
7	ITB/2018/2885-73/5	Digital Imaging compound microscope with Camera	1	6310.40	187254.81	187254.81
8	8/1	High speed refrigerated centrifuge	2	29516.52	855964.32	1711928.64
9	73/4	Stereo microscope	1	22084.79	640447.87	640447.87
10	74/6	Deep freezer	1	2896.08	83984.87	83984.87
11	57/2	Kjeldahl Digestion System	1	6,896.39	199,991.86	199,991.86
12	59/14	Hot Plate Magnetic Stirrer, Digital	1	2,726.04	79,053.80	79,053.80
13	12/1	Differential counters	2	18.4	533.59	1067.18
	Total			93,787.06	2,738,776	3,695,514.58

1.1.10 Animal nutrition lab (Adami Tulu Agricultural Research Centre)

Ruminant stocks are the very important component of agriculture in mid rift valley of Oromia due to their multi-functional roles in livelihood of farmers and pastoralists. Natural pasture and crop residue is the main sources of feed in the area. The main shortcoming of these feed is, the high crude fibre content, low digestibility coefficients and low available net energy that finally impair animal production and productivity. Quantification of specific nutrients from different feeds, and determining intake and digestibility of feeds helps to decide any supplementation or application of any feeding technologies. This in turn requires lab facilities. Several research activities were conducted and currently undergoing at Adami Tulu Agricultural Research Centre. The centre did not fully utilized the expertise and well-constructed lab due to lack of some important lab equipment. Therefore, some of the facilities prioritized by the centre and fulfilled with the financial support of AGP-II are listed below.

Table 12. List of Laboratory facilities procured for Animal nutrition

No	ITB/Lot/ Item No	Item	Qut	unit price (USD)	Unit price (birr)	Total price (birr)
.1	ITB/2018/2885-20/2	Analytical balance	2	1017.77	30201.31	60402.61
2	ITB/2018/2885-57/1	Automatic Kjeldahal distillation unit	2	6896.39	204643.48	409286.95
3	ITB/2018/2885-60/1	Analytical balance	2	1590.48	47195.90	94391.81
4	57/4	Automatic fibre analyser system	1	24132.97	699844.06	699844.06
	Total			33637.61	981884.75	1,263,925.43

1.1.11 Agronomy & crop physiology lab (Sinana Agricultural Research Centre)

Table 13. List of laboratory facilities procured for agronomy & physiology laboratory

No	ITB/Lot/ Item No	Item	Qut	unit price (USD)	Unit price (birr)	Total price (birr)
1	77/7	Chlorophyll Meter	1	2,088.47	60,535.59	60,535.59
2	77/8	Refractometer (Reflectometer)	1	1489.75	1489.75	43202.01
3	77/9	Digital Refractometer	5	4125.12	119626.42	598132.09
4	84/1	Portable photosynthesis system (infrared gas analyser) with hands on training	1	57,659.61	1,672,099.86	1,672,099.86
5	105/1	Plastic bug sealer	7	125.10	3627.84	25,394.86
6	87/1	Multi grain moisture tester	2	462.97	13425.90	26851.80
	Total			65,951.02	1,870,805.36	2,426,216.21

1.1.12 Computational facilities (ICT related facilities)

Almost all AGP-II supported research centers were equipped with the necessary internet facilities & thus connected to the global environment. Computers, LCDs, photo cameras, printers, modern photo copy machine, fax machine, scanners & other ICT facilities were also procured for the different processes & teams at head quarter. About 1,811,708.95 birr was invested to purchase these IT facilities.

Table 14. Facilities related to Information Communication Technologies

No	Item	Unit	Quant	Reg. no.	Total price birr
1	External Hard Disk 4TB	Pcs	5	282716	37375.00
2	Flip Chart stand	“	2	282716	8050.00
3	Router 1941	“	6	282716	233999.98
4	Wireless Access Point 2602	“	1	282716	41975.00
5	Fire Wall	“	1	282716	234999.99
6	Wi-Fi control with power	“	1	373554	54625.00
7	Laptop Computer Core i7	“	1	373562	26450.00
8	Rack Cabinet 9V	“	4	282718	19550.00
9	Wireless Access Point CISCO WAP 4410N access Point	“	12	282719	141243.00
10	HP Laptop Core i7	“	4	282720	117999.98
11	HP LaserJet M604n Enter pries Printer	“	4	282720	117999.98
12	Projector Pointer Targas	“	2	282720	7000.00
13	CISCO 1941 W/2 GEE WIC Slots (Router)	“	5	282721	198375.00
14	HP Scan Jet 2500Fi	“	2	282723	31000.00
15	Desktop Computer Dell 3050 Core i5	“	5	282724	100050.00
16	Canon L150 Fax Machine	“	1	282725	8107.50
	CISCO 2960 -24TCL (Switch 2960 -24 port TCL)	“	4	282728	112010.00
17	Nikon D90 Camera	Pcs	2	282735	72450.00
18	Panasonic Indoor & outdoor Unit Cooling 18000BTU	Pcs	1	282735	44850.00
19	HP Laptop Core i7	Pcs	4	282736	107920.00
20	RJ-45 connector	Pcs	2500	282623	10425.00
21	Patch Cord 3 meter	Pcs	190	282623	18834.70
22	Wall Outlet Single	Pcs	206	282626	21496.10
23	Patch Cord 1meter cable	Pcs	240	282626	15652.80
24	Wall Outlet Double	Pcs	204	282629	29269.92
	Total				1,811,708.95

1.1.13 Office furniture & related facilities

Several furniture's such as book shelves to IQQO library, file cabinet to IQQO archive, office shelves to IQQO AGP-II & record office, office chairs & tables to the different research & supportive directorates at the head quarter, 1000 meeting hall chair (distributed to Sinana, Bako, Haro Sabu, Mechara, Adami Tullu & Fedis ARC) & others were procured with about 2 million birr during the project period. About 2,201,245.76 birr was utilized for this purpose

Table 15. Office furniture & related Facilities

No	Types of facilities	Unit	Qnt	Voucher #	Total cost birr
1	Filling cabinet wooden 4 Drawers	Pcs	4	282701	18579.40
2	Managerial Medium Table size 1.80x 0.90x0.76&0.48x0.58	“	1	282705	13098.40
3	Executive Managerial Chari (Managerial Leather Chari)	“	4	282705	43360.80
4	Expert Office Table Size 1.60x0.80x0.76& 0.48x0.58x0.75	“	3	282705	35970.00
5	Book Shelf 2 Door	“	3	282714	20100.01
6	Book Shelf 3Door	“	10	282714	89899.09
7	Managerial Office Table size 160x 80x0.75 cm S_503	“	4	282714	50000.02
8	High Back chair Half Lather B-3888A	“	4	282714	36800.00
9	Medium Bake chair Mesh YYmo2	“	16	282715	49572.36
10	Imported High Quality writing Table With mobile pedestal	“	5	282717	23115.98
11	Executive Managerial Table Size 160x080x75cm	“	2	282717	26312.00
12	Guest Chair with arm mesh	“	15	282717	50024.66
13	Rack Cabinet 9V	“	4	282718	19550.00
14	Three door shelf -WF/G03	“	5	282726	35690.25

15	Coffee Table –MK 1260 Cherry)	“	1	282726	1776.75
16	Executive High Back Chair 226-1(Black)	“	2	282726	22057.00
17	Drawer File cabinet YD-D4B	“	4	282726	20930.00
20	Shelf 40x90 x3m x6	“	20	282729	36400.03
21	File Cabinet	Pcs	4	282731	18000.00
22	Imported Sheraton Chair	pcs	400	282732	581283.60
23	Imported Sheraton Chair	pcs	370	282733	537687.33
24	Imported Sheraton Chair	pcs	230	282734	334238.07
25	Laboratory Stool Chair Rotary Base	Pcs	20	282737	89999.92
26	File Cabinet Metal 4 Drawer	Pcs	6	2827840	46800.01
	Total				2,201,245.76



Fig 21. Office furniture procured to IQQO HQ & centers

1.1.14 Vehicle repairing related facilities

One of the chronic problems of IQQO head quarter is lack of ordinary vehicle servicing facilities including car wash, tyre replacement, oil filtering & other minor maintenance activities. Such gaps exposed the institute to invest very huge money for vehicle maintenance every year in the company & frequent breakage of vehicles. Majority of IQQO's field vehicles spent much more time in the garage. This in turn affected regular day to day activities; field supervision was not conducted as required, directorate directors & senior staffs are not getting vehicle services from home to work place, and etc. Accordingly, besides supplying vehicles to the institute, IQQO AGP-II tried to fulfill important facilities to at least operate preliminary services & maintenance activities at institute level.

Table 16. Vehicle servicing & related facilities

No	Item	Unit	Quan	Reg no	Total price birr
1	Compressor 200 lit 3HP	Pcs	1	282738	38,000.00
2	Prassur Washer pump 4 Hp	Pcs	1	282738	77,999.99
3	Hose Air 12mm (1/2)	Mtr	15	282738	5,699.92
4	Grinder Bench 250 W	pcs	1	282738	3,599.99
5	Tyer Gage Ari Level	Pcs	2	282738	1,800.00
6	Tyer Lever	Pcs	6	282738	2,099.95
7	Hammer Big	Pcs	1	282738	1,000.00
8	Hammer Small	Pcs	1	282738	700.01
9	Tool Box	Set	1	282738	18,000.00
10	Driller 850	Pcs	1	282738	3,500.00
11	Tip Top	Set	20	282738	31,999.90
12	Compressor Hose 10mm	Mtr	15	282739	2,999.95
13	Leba Goma Long	Pcs	2	282739	1,400.01
14	Leba Goma (short)	Pcs	2	282739	1,300.01
15	Mastic	Pcs	4	282739	960.02
16	Grease Gun (Greasing Tools (big)	Pcs	2	282739	89,999.99
	Total				281,059.73

1.1.15 Electric power generator, Water pumps & water lifting facilities

High power ground water lifting generator was procured to Batu fishery research center, medium generator to Bako ARC, 270 meter power cable to Adami Tullu ARC & 100m to Fedis ARC, water pipe to Bako ARC, Batu FRRC & Adami Tullu ARC. About 1,650,550 Birr was invested to purchase these facilities.





Fig 22. Electric power & water lifting related facilities procured

1.1.16 Poultry house equipments & materials to make the constructed house functional

Adami Tullu ARC procured the following list of equipment, facilities & materials to make the constructed poultry house functional. Five facilities such as incubator, Hatchery, Electric power generator, Brood & Brood guard/heater, Egg room cooler /chillier will be purchased through EIAR AGP-II coordination unit. Budget already transferred to both Bako & ATARC, *where* Adami Tullu ARC accomplished the mission but Bako is in progress.

Table 17. List of materials, furniture & facilities procured to make poultry farm functional at A/Tulu ARC

No	Description and specification)	Unit	Quant	Estimate price	
				Unit Price	Total cost
1	Pressure and washer machine (Electrical and portable)	Pcs	1	15800	15800
2	Digital chicken Weighing balance 10/50gm accuracy, up to 10kg capacity	Pcs	2	3965.22	7930.44
3	Digital calliper	Pcs	2	1391.31	2782.62
4	Laying boxes (Automatic laying boxes with partitions)	Pcs	8	8869.57	70956.56
5	Refrigerator (For bacterial vaccines storages, 250 L vertical standing with 2-10-degree temperature range, 0.1-degree temperature accuracy, large screen LED display, Glass doors (Two layer), Adjustable 5 to 6shelves)	Pcs	2	22956.52	45915.04
6	Office chairs Chair with arm rest	Pcs	10	4347.82	43478.2
7	Executive Chair (office/executive chairs, Swivel, with Armrests)	Pcs	4	2695.65	10782.61
8	Table (Wooden office tables, with two drawers fitting for small offices (Width not more than 1.5m))	Pcs	10	3478.26	34782.60
9	Air conditioner (AC): Split type (With indoor and outdoor units), cooling capacity - 24,000Btu/hr, voltage 220-240v-50Hz. Full copper units	Pcs	2	36521.74	73043.48
10	Water pum 2HP, 1 by 1 inch, 45 meter head and 8m suction , electric operated	No	02	9540	19080
11	Submersible water pump 7.5HP	No	01	180,000	180,000.00
12	Crates (pullet/grower Chicken) handling (High quality made from Polyethylene (PE), used for chick en handling)	Pcs	50	1434.78	71,739.00
13	Crates for day old (High quality made from Polyethylene (PE)	Pcs	50	478.26	23,913.00
14	Chicken's drinker (Plastic drinker(Pcs	100	152.17	15,217.00
15	Chicken's feeder (Plastic circular and line feeders)	Pcs	100	156.52	15,652.00
16	Hand egg candling lamp	Pcs	4	1739.13	6,956.52
17	Overcoat and overalls	Pcs	30	313.04	9,391.20
18	Boots shoes	Pcs	10	243.48	2,434.80
19	Egg trays (Plastic-made, each with a capacity of holding Up to 30 eggs, different colors)	Pcs	500	26.09	13,045.00
20	Automatic Vaccination syringe	No	03	5217.39	15652.17
21	Water container (Rotto) (5000 litter capacity) with accessories	No	2	23913	47826
22	HDPE Pipe 1 inch	Meter	100	18.26	1826
23	Adapter (HDPE) 1 inch (Male)	Pcs	3	52.43	157.29
24	Adapter (HDPE) 1 inch (Female)	Pcs	2	51.30	102.60
25	Elbow adapter 1 inch	Pcs	2	62.60	125.20
26	Foot valve 1 inch	Pcs	1	356.52	356.52
27	HDPE pipe ½ inch	Meter	300	10.43	3129
28	Get valve ½ HDPE	Pcs	10	80	800
29	Elbow (HDPE) ½ inch	Pcs	10	26.08	260.80
30	Elbow adapter ½ inch	Pcs	10	63.47	634.70
31	Adapter (HDPE) ½ inch (Male)	pcs	10	27.82	278.20
32	Adapter (HDPE) ½ inch (Female)	Pcs	10	2782	278.20
33	Electric cable (4by 16)	Meter	400	398	159,200
34	Electric cable(2.5)	Roll(m	1	1280	1,280.00
35	Breaker 200 AMP	pcs	1	3700	3,700.00
36	Breaker (single phase) 32 AMP	Pcs	2	98	196.00
37	Nastro	Pcs	30	13.50	405.00
38	2 x 1.5m2 cable electric	Roll	6(600m)	3030	18,180.00
39	40A contactor single phase 220 volt	Pcs	4	2100	8,400.00
40	40Asingle phase breaker	Pcs	4	110	440.00
41	Phot cell compound light 220 volt	Pcs	3	852.17	2556.56
42	50w LED lighting	Pcs	20	850	17,000.00
43	Nastro	Pcs	5	13.50	67.52
44	125mn x 80mn x 130mn panal board	pcs	6	1600	9,600.00
45	Pvc pipe	Pcs	150	20	3,000.00
46	Pvc pipe(50mm)	pcs	25	240	6,000.00
47	Steel bar (ferro) 10mm	Pcs	7	275	1,925.00
48	staffa	Kg	20	45	900.00
49	shibo	kg	10	59	590.00
50	Red ash	track	32	3208.4	102,668.80
	Total			344,663.43	1,070,435.63

1.2 STRENGTHENING FARM MACHINERY & FIELD VEHICLES CAPACITY

Sustainable supply of proven agricultural technologies and knowledge to reach the end users at all the required time necessitates for building research capacity and competence to adequately deliver the required technologies in a dependable manner. To this end, from the total 70 field vehicles & 30 tractors procured nationally, 17 field vehicles and 7 tractors were the share of Oromia Agricultural Research Institute (IQQO). IQQO management and AGP-II coordination unit has thoroughly discussed regarding the distribution of those facilities & provided to the project implementing centres essentially based on the number of AGP-II districts addressed by the centre, technical performance/implementation efficiency of the centre, number of AGP-II research activities conducted by the centre & number of deliverable technologies the centre could generate & demonstrate to meet project objectives, current status and availability of those facilities in the centre, priority commodity, the status & coverage in implementing large scale demonstration in the past & also for the future, previous history in getting vehicles from the project & etc. were considered. Distribution decision during the different years took the following form.

Table 18. Distribution of vehicles & tractors to implementing centre

Beneficiary Research centre/directorate	First round Vehicle (2017)	2 nd round Vehicle (2020)	Tractor share (2017)
Adami Tulu Agricultural Research Center	1	-	1
Asela Agricultural Engineering Research Center	1	-	-
Bako Agricultural Engineering Research Center	1	-	-
Bako Agricultural Research Center	1	1	2
Bedele Soil Research Center	1	-	-
Fedis Agricultural Research Center	1	-	1
Haro Sabu Agricultural Research Center	1	-	1
Mechara Agricultural Research Center	-	1	1
Sinana Agricultural Research Center	1	1	1
OARI AGP-II Coordination Unit	1	-	-
IQQO HQ Research Directorate directors (for field supervision)	1	1	-
Jimma Agricultural Engineering Research Centre	-	1	-
Batu Fishery Resource Research Centre	-	1	-
Holeta Bee Research Centre	-	1	-
Total	10	7	7

Key: The double advantage recorded at Bako & Sinana was mainly due to their significant contribution for the successful achievements of IQQO AGP-II (more that 60% of the total technologies generated, 75% of technology demonstrated, 93% of EGS multiplied with the support of AGP-II were from the two centres). Besides, 432 ha of large scale demonstration (of the total 612 ha) were covered by the two centres in 2019 & 360 ha out of 475 ha in 2020.

Table 19. Price of vehicles & tractors

No	Item	Qty	unit price (USD)	Total price (USD)	Unit price (birr)	Total price (birr)
1	Hardtop land cruiser (former 2017)	10	34321.90	343219	825458.19	8,254,581.90
2	Hardtop land cruiser76 (later-2020)	4	28418.62	113674.48	929539.00	3,718,156.00
3	Toyota land cruiser79 double cabin pickup (later-2020)	3	27282.36	81847.08	892373.31	2,677,119.93
4	New Holland tractor	7	36250.76	253755.32	871848.20	6,102,937.41
	Total		126273.64	792495.88	3,519,218.70	20,752,795.24



Fig 1. Seven tractors procured & distributed the centers



Fig 2. Seventeen field vehicles procured & distributed to the implementing centers

1.3 POULTRY HOUSE CONSTRUCTION

Evidences indicated that total poultry population in the Oromia National Regional State (ONRS) is estimated to be more than 37 Percent, as a proportion of the total population of the country. This implies that poultry is becoming important livestock species in the region. However, research and development efforts made to improve farmers' livelihoods through enhancing poultry production were limited to only some institutes and vicinities due to lack of basic infrastructure, and institutional and organizational capacity. Such limited efforts could not bring a significant impact on the livelihood of smallholder farmers in the region.

Research facilities which mainly include poultry housing are a prerequisite for those researchers to design and conducted problem solving researches. As part of this effort, 6 block poultry farm (including 4 poultry housing, 1 incubator and hatchery room and 1 feed storage and processing room) were constructed at Adami Tullu ARC and a big block partitioned into 4 poultry housing classes were constructed at Bako ARC with the support of IQQO AGP-II. The total cost of construction was 7,204,388.14 birr for Adami Tullu and 2,352,631.07 birr for Bako & the summation becomes **9,557,019.21 birr.**



Fig 3. Six poultry research blocks constructed at ATARC (7,204,388.14 birr)



Fig 4. Poultry research block constructed at Bako ARC (2,352,631.07 birr)

1.4 CONSTRUCTION OF IRRIGATION INFRASTRUCTURE

There was no plan in the PIM or any AGP-II documents that impose implementing institutions to construct irrigation infrastructure at any of the research centres in Ethiopia. However, donor partners' practically observed on field condition, convinced in the importance of irrigation infrastructures for all crop based research centre after visiting research centres (particularly Bako ARC) during the first AGP-II Joint Review and Implementation Support (JRIS) Mission held from 5 December to 16 December 2016. It was agreed that irrigation could shorten the cycle or duration of crops technology generation, multiply source technologies twice a year, production of perennial crops & develop crop management recommendations for irrigated field. Accordingly, it was decided to launch construction of small scale irrigation schemes to research centres through the then Oromia irrigation development authority (OIDA). IQQO AGP-II insisted OIDA to start pre-feasibility study across six research centres (Adami Tulu, Bako, Bedele, Sinana, Mechara & Haro Sabu research centres) & facilitated all the process on April 2017. The first three were proposed for surface water irrigation, but the last three for ground water source.

Despite the ambition & interest of research centres & the institute, practical implementation was delayed due to different factors.

Current status

As per the letter written from Oromia Bureau of Agriculture & Natural resource on 22/3/2013 EC with Ref. No. 10-1/569/36, the client or beneficiary of the project, Oromia Agricultural Research Institute (IQQO), has given the responsibility to technically follow-up all irrigation schemes constructed across IQQO research centers. Accordingly, dedicated team was established on 16/12/2020 and conducted field monitoring & supervision four times to date (from 26-31 Feb 2021; on 3 March 2021 and 26 – 28 March 2021, 10-15 July 2021). Eventhough there is minor progress than before (from 19.2% to 30% for bako & from 65% to 90% for Adami Tullu), none of them were completed as per the plan. Here below is the status of each scheme.

Bako Agricultural Research center small scale Irrigation

Strength

- ✚ All canal excavation has been completed and also wet well; pump and generator house construction is on progress.
- ✚ Current physical status is close to 30%

Gaps/weakness observed and way forward

- ✚ Eventhough there is minor progress around wet well & power house construction, and canal excavation, none of the electro mechanical works were implemented.
- ✚ No effort was made to procure the required facilities such as pump, PPC, generator, geo-membrane and etc as suggested by the technical committee.

Action taken & way forward

- ✚ Despite the frequent supervision (4 times since January 2021), constructive advices and comments given to the firm, the overall progress made so far was much behind the schedule, unsatisfactory and critically harm the center in particular and the region at large. Accordingly, first warning and re-advices was given to the firm, but the contractor claimed as he has no financial capacity to procure the required facilities and requested the client to purchase of pumps, generator and different PPC by its own and settled as “material onsite”. Detailed discussion was made with top management from research, bureau of Agriculture & AGP-II coordination unit on how to complete this scheme and respond to the contractor’s request. It was agreed that the only safe option from project guideline side is to terminate the agreement. Accordingly, the project was terminated. The fate of this scheme will be decided by the top management of the project from Federal & regional project coordination office until 30 July 2021.

Adami Tullu Agricultural Research center small scale Irrigation Strength

- ✚ Wet well excavation is completed
- ✚ All canals were excavated, PPC were installed (for both sprinkler & drip irrigation)
- ✚ Night storage was excavated & covered by geo-membrane
- ✚ All the remaining electro-mechanical materials are on site.
- ✚ Current status is close to 90%
- ✚ The contractor agreed to complete until mid-August 2021
- ✚ **Gaps/weakness observed and way forward**
 - The estimated area to fence sprinkler & drip irrigation area is far below the actual area.

Mechara Agricultural Research Center drilling bore hall

Agreement was signed on 5 March 2021. Site hand over was made and drilling, preliminary pumping and discharge test was completed for one borehole a week ago. Currently, drilling work has been undergoing for the remaining one.

1.5 RENOVATION AND MAINTENANCE OF INFRASTRUCTURE (MAJOR)

1.5.1 Renovation of office at Bako Agricultural Research Centre

A research block comprising 13 classes with size of 3m x 4m each, one bath room and one rest room was constructed at Bako ARC in less than a year duration with the total cost of 2,620,000 birr including office furnishing.



Fig 5. Renovation of office at Bako ARC

1.5.2 Renovation of office at Batu Fishery Resource Research Centre

Construction of a block comprising 12 classes' office (of different size) & two syndicates' rooms were constructed at Batu Fishery RRC within 8 months (Nov 2019 – June 2020). The total estimated costs including furnishing were **2,130,000** birr.



Fig 6. Renovation of office at Batu Fishery Resource RC

1.5.3 Renovation of Laboratory at Batu Fishery Resource Research Centre

Research Laboratory with 8 x 10m size was constructed at Batu Fishery RC in a year. Besides two processing shade around Lake Ziway and Koka, Previous Pond maintenance, Renovation of street in center was conducted with the total cost of **1,200,000** birr for the whole activities including Laboratory furnishing.



Fig 7. Renovation of research Laboratory at Batu Fishery Resource RC

1.5.4 Renovation of office at Bako Agricultural Engineering Research Centre

About 8 classes' office with size of 3.5m x 3.5m each was constructed at Bako Agricultural Engineering research center. The estimated cost including office furnishing were **1,159,700** birr



Fig 8. Renovation of office at Bako Agricultural Engineering research center

1.5.5 Renovation of office at Fiche Agricultural Research Centre

A total of 6 class office was constructed at Fiche Agricultural Research Centre. The estimated cost of construction including finishing & pavement around office was 1,227,655.50 birr.



1.5.6 Renovation of office, lab & store at Bedele Agricultural Research Centre

Research Building (G +2) comprising 25 class offices, 3 classes store, 1 meeting hall, 1 laboratory, 1 cafeteria, 2 rest rooms and 2 bathrooms are under construction since Sep 2018 at Bedele Agricultural research Centre. The total area is 450 m². About 14.5 million birr was utilized to complete this construction & inaugurated on 31 July 2021.



Fig 15. Renovation of lab & office at Bedele ARC

1.5.7 Renovation of forage seed store at Adami Tulu Agricultural Research Centre

Ware house of 15 x 26m (390m²) has been constructed at Adami Tullu Agricultural Research Centre with estimated cost of 1,045,552.00.



Fig 16. Renovation of feed store at Adami Tulu ARC

1.5.8 Renovation of workshop at Asela Agricultural Engineering Research Centre

Metal workshop (right) & wood workshop (left) has been constructed at Asela Agricultural Engineering Research Centre with estimated cost of **1,096,518.88 Birr**



Fig 17. Renovation of workshop at Asela Agricultural Engineering Research Centre

1.5.9 Renovation of soil chemistry lab at Nekemt Soil Research Centre

Soil chemistry lab comprising two classes lab 1 class office and 1 syndicate room was contracted at Nekemt Soil research centre. The estimated cost of construction including finishing goes up to 748,959.00 birr.



Fig 11. Renovation of soil chemistry lab at Nekemt soil research center

1.5.10 Renovation of chicken hatchery block at Bako Agricultural Research Centre

About 8x16m sized block & partitioned into the standard poultry hatchery (hatchery room, vaccine room, egg storage room, dispatch/waiting room, office, bed room, bath & rest room) was constructed at Bako agricultural Research Center. The estimated cost of construction including finishing goes up to 1,400,000 birr



Fig 13. Construction of Incubator & hatcher block at Bako ARC

1.5.11 Renovation of Store & office at Jimma Agricultural engineering Research Centre

A total of 3 class offices (left) & store (right) was constructed at Jimma Agricultural Engineering Research Centre with estimated cost of 850,000.00 including finishing



1.5.12 Renovation of office & soil lab at Batu Soil Research Centre

Three classes' office with size of 3m x 4m each was constructed with the total cost of 550,000 birr at Batu Soil research Centre



Fig 9. Renovation of office at Batu Soil research Centre

1.5. 13 Maintenance of Coffee drying & washing room at Mechara Agricultural Research Centre

Coffee store & coffee processing rooms were constructed at Mechara Agricultural Research center. The estimated cost of construction including finishing goes up to 584,749.36 birr



Fig 13. Renovation of coffee store & processing room at Mechara ARC

1.5.14 Fishery research Pond maintenance at Batu Fishery Resource Research Centre

About 32 x 10m pond partitioned into different sub blocks for their variable research function were constructed with the total cost of 430,000 birr (left). Besides, about 1,000,000 birr was invested to complete the already regionally funded big pond (right)



Fig 10. Renovation of fishery multiplication pond at Batu fisher resource research center

1.5.15 Night storage Pond Renovation at Bako Agricultural Research Centre

About 12x12m area & 2.6m depth night storage pond was constructed to irrigate 15 – 20 ha land. The estimated cost of construction including finishing goes up to 717705 birr



Fig 12. Renovation of night storage irrigation water pond at Bako ARC

1.5.16 Maintenance & renovation of barn at Adami Tulu & Bako Agri Research Centre

Barn for cattle were maintained at Bako & Adami Tullu. Small ruminant research block was also maintained at Adami Tullu. The estimated cost for both centres was 625,000 birr. Besides, modern barn is under contraction at Adami Tullu with 2,600,000 (middle) & at Bako with 3,500,000 (right) todate.



Fig 17. Maintenance of barn at Adami Tulu & Bako ARC

1.5.17 Renovation of crop protection Lab at Bako ARC

New quality standard plant protection research lab (9m x 21m) is under construction at Bako. Close to 550,000 birr was invested to date.



Fig 18. Plant protection lab construction at Bako ARC

1.5.18 Renovation of research and training centre at Batu fishery RRC

About 38 classes (36 bedrooms and two training classes) are under construction at Batu Fishery resource research centre. About 4,500,000 million birr is expected to complete this training centre.



Fig 19. Batu Fishery research resource centre under construction

1.5.19 fencing of Lab & office at A/Tullu & permanent nursery site at Sinana ARC

Fencing of office & biotechnology lab was made at Adami Tullu Agricultural Research Centre (left) with the total cost of 1,463,266.54 birr. Permanent nursery site of Sinana Agricultural Research centre (right) was fenced with estimated cost of 250,000 birr. Coffee nursery site was established in different areas of Bako coffee research site with a total cost of 90,000 birr.



Fig 20. Fencing of nursery site (SARC) & office (ATARC)

1.5.20 other maintenance activities

Lath house was constructed at, Adami Tullu (twice) & Bako Agricultural Research centres, and currently in progress at IQQO HQ. Besides, diffused light stores (DLS) for potato tuber storage were established at Sinana and Bako Agricultural Research centres. The overall cost of construction goes up to 542,500 birr.



Fig 18. Establishment of lath house & DLS

1.5.19 Office partitioning at IQQO

A total of six classes (three classes to AGP-II coordination Unit, two classes to communication team and one class to finance & procurement process) were partitioned with total cost of 250,000 birr.



Fig 19. Office partitioned at IQQO HQ

2. HUMAN POWER CAPACITY BUILDING

About 14,255 participants comprised of mainly farmers (FREG members), DAs and expertise were participated on short term training of different topics. As part of long term capacity building, thesis research activities of 30 MSc graduate students were supported by AGP-II among which 20 of them already defended & the remaining will completed the latest on October 2020. Besides, parts of PhD dissertation of 7 graduate students were supported so far. Among these, only one defended, two of them completed their research work & on full write-up, others are in progress.

Tadle 19. List of graduate students supported by AGP-II with their respective research title

#	Thesis/Dissertation Research Title	Name	Program	Center	activity Status	Study status
1	Evaluation of Ethiopian sorghum landraces for anthracnose (<i>Colletotrichum sublineolum</i>) resistance	Girma Mengistu	PhD	IQQO	completed	Defended
2	Heterosis and combining ability of sorghum (<i>Sorghum bicolor</i> (L.) Moench) landraces for yield and anthracnose resistance in western Ethiopia	Girma Mengistu	PhD	IQQO	completed	
3	Evaluation and identification of adaptable bread wheat varieties for Mid Rift Valley of Oromia	Urgaya Balcha	MSc	ATARC	completed	Defended
4	Identification of Slow Rusting Resistance to Stem Rust in Bread Wheat Genotypes and Association of Yield and Disease Parameters in Southeastern Ethiopia	Tilahun Bayisa	MSc	SARC	completed	Defended
5	Phenotypic diversity study among food Barley Accessions in Sayo District	Geleta Negash	MSc	HSARC	completed	Defended
6	Characterization of Coffee Berry Disease <i>Colletotrichum kahawae</i> in Arsi Zone	Hika Bersisa	MSc	MARC	completed	Defended
7	GEI & grain yield stability for sorghum varieties	Gebeyehu Chala	MSc	MARC	completed	Defended
8	G EI & stability for grain yield of F.been varieties	Tekalign Afeta	MSc	Bore ARC	completed	Defended
9	Dendrochronological growth characterization and forest carbon stock modeling of timber species in Ethiopia: The tree ring CHRONOLOGIES and the COFIX V 3.2 Approaches	Zelege Asaye	PhD	ATARC	?	?
10	Effect of Organic and Inorganic Fertilizer on major soil physico-chemical properties and yield of wheat under moisture stressed areas of Lume District	Mekonin Workineh	MSc	ATARC	completed	Defended
11	Farmers' management and conservation of Indigenous woody tree species in different agroforestry practices of Dugda District, Central Rift Valley, Ethiopia	Bonsa Fantale	MSc	ATARC	completed	Defended
12	Effects of Land Surface Management on Moisture Conservation, and Yield and Yield Components of Maize (<i>Zea mays</i> L.) at the Mid Rift Valley of Oromia, Ethiopia	Ayub Jelde	MSc	ATARC	completed	Defended
13	Analaysis of the determinants affecting the applicability of activity-based costing method on agricultural mechanization implements: the case bako agricultural engineering research center, west shewa, oromia, Ethiopia	Tamiru Chemedu	MSc	BAERC	completed	Defended
14	<i>Genetic variability among barley accession for resistance to scaled disease, grain yield and associated traits</i>	Hora Megersa	MSc	BARC	completed	Defended
15	Yield and land profitability influenced by maize-soybean intercropping and optimum fertilizer rate at bako (oromia)	Fufa Anbesse	MSc	BARC	completed	Defended
16	Influence of Inter-row spacing and Weed Control Methods on weeds, Yield and Yield Attributes of Maize (<i>Zea mays</i> L.).	Megersa Kebede	MSc	BARC	completed	Defended

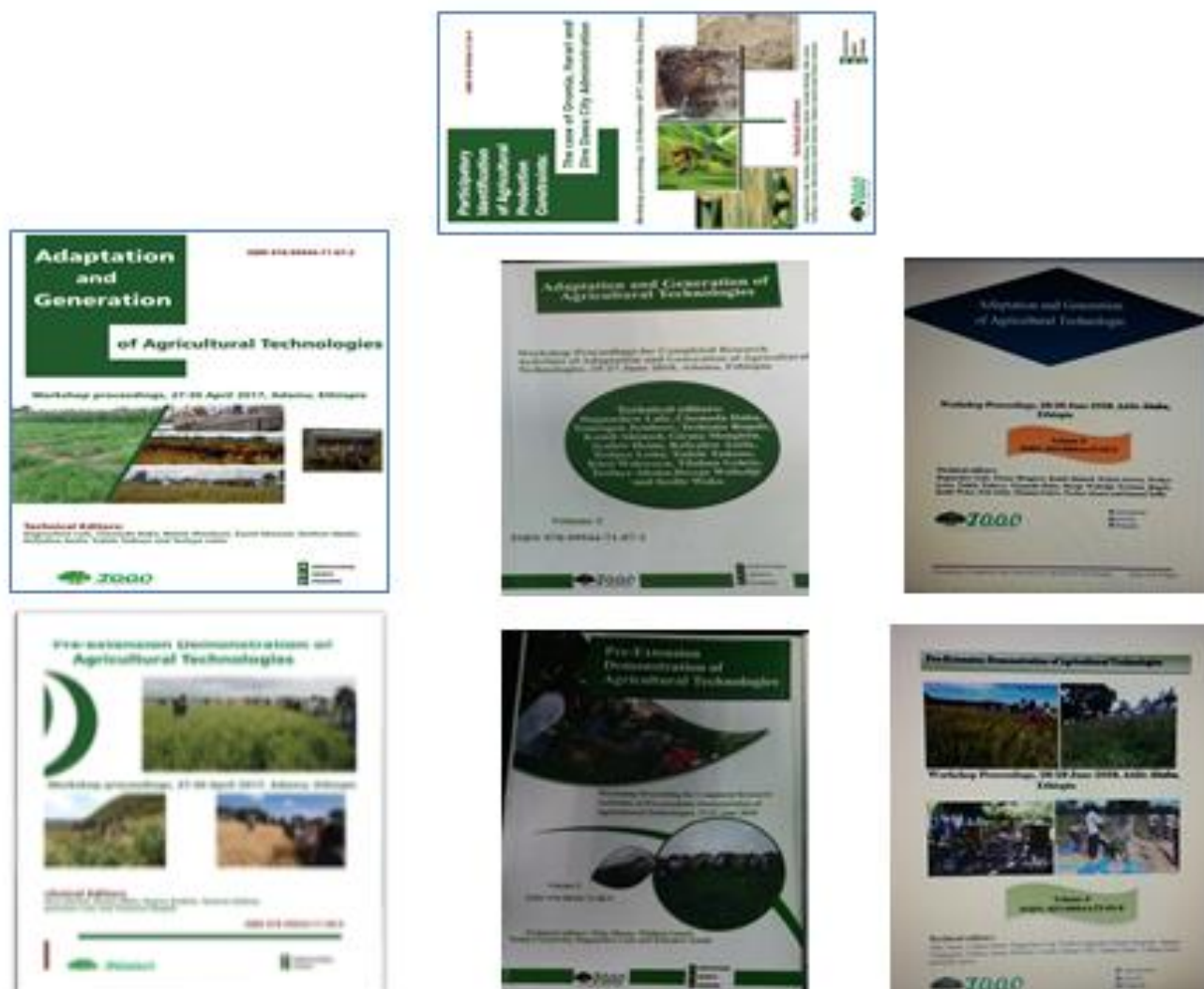
17	Genetic variability and associated traits among sesame (<i>Sesamum indicum</i> L) genotypes for yield and yield related at western Oromia, Ethiopia	Feyera Takele	MSc	BARC	completed	Defended
18	Feed Intake, Digestibility, Growth performance, Carcass characteristics and Blood profiles of Horro Sheep fed Napier Grass (<i>Pennisetum purpureum</i>) and Dolichos Lablab (<i>Lablab purpureus</i>) Silage	Tusa Gemechu	MSc	BARC	completed	Defended
19	Vulnerability of aquaculture and fisheries development to Climate change in Ethiopia	Getachew Senbate	PhD	BFRRC	Ongoing	Ongoing
20	Nile tilapia (<i>Oreochromis niloticus</i>) of Rift Valley; their environmental status phenotypic character, reproductive performance and responses to elevated fry rearing temperature.	Megersa Hindhabu	PhD	BFRRC	completed	Ongoing
21	Genetic Variability and Character Association For drought tolerance of Soybean at Fadis, Eastern Oromia	Habte Birhanu	MSc	Fedis	completed	Defended
22	Evaluation of early Maturing Sorghum/ Cowpea Varieties herbage, grain yield and nutritive value under intercropping forage production in East Hararghe zone, Fedis district	Wubishet Tesfaye	MSc	Fedis	completed	Defended
23	Genetic Variability and Character Association in Bread Wheat Genotypes at Sayo Woreda, Western Oromia	Zewdu Tegemu	MSc	HSARC	completed	Defended
24	Screening of best bet bread wheat variety for P-efficiency on acid soils using pot experiment and evaluating on the field using lime and mineral fertilizers at Wayu-tuka District	Refissa Leta	PhD	NSRC	Ongoing	Ongoing
25	Vermicompost preparation, characterization and evaluating of its effect on soil physico-chemical properties and on yield and nutritional quality of bread wheat in combination with mineral fertilizers under limed conditions at Wayu-tuka District.	Refissa Leta	PhD	NSRC	Completed	
26	Genetic Variability and Characters Association and Quality Traits in Ethiopian Durum Wheat Landraces in Sinana, Bale Highlands	Mulatu Abera	MSc	SARC	completed	Defended
27	Genetic Variability and Association among Grain Yield and Yield Related Traits of Chickpea (<i>Cicer arietinum</i> L.) Genotypes.	Amanuel Tekalign	MSc	SARC	completed	Defended
28	Changes in vegetation structure & aboveground biomass in response to traditional grazing land management practices in the central highlands of Ethiopia	Teklu Wegi	PhD	SARC	completed	Ongoing
29	Evaluation of forage species in the central highlands of Ethiopia in terms of their chemical composition, in vitro digestibility, in vitro total gas and methane production	Teklu Wegi	PhD	SARC	completed	
30	Assessment of Soil Fertility Status under Different Land Use System and Landscape Positions In The Case Of Dinsho Distinct Of Bale Highland, Southeastern Ethiopia	Mulugeta Eshetu	MSc	SARC	completed	Defended
31	Effect of Lateral Spacing and Irrigation Water Level on Water Use Efficiency, Yield and Net Return of Onion under Drip Irrigation System at Awash Melkassa, Ethiopia	Asnake Tilaye	MSc	AAERC	completed	Ongoing
32	Effects of Nitrogen Rates and Time of Application on Yield component and yield of intermediate maturity Maize(Zeamays).(BH 546) at Bako	Megersa Debele	MSc	BARC	completed	Ongoing
33	Evaluation of Common Analytical lime requirement methods for acidic soils in south west Oromia Buno Bedele Zone Bedele District	Abdulmalik Mohammed	MSc	Bedele ARC	completed	Ongoing
34	Evaluation Of Farm-Level Grain Sorghum Postharvest Loss And Exploration Of Appropriate Postharvest Loss Reduction Tools And Operation Conditions For Small Holdrer Farmers	Birhanu Atomsa	PhD	FARC	Ongoing	Ongoing

35	Effect of Different Spacing of Napier Grass (<i>Pennisetum Purpureum</i>) Intercropped with or without Alfalfa (<i>Medicago Sativa</i>) on Biomass Yield and Nutritional Quality	Worku	MSc	FARC	completed	Ongoing
36	The Effect of Intercropping Two Vetch Species (<i>Vicia sativa</i> and <i>Vicia dasycarpa</i>) At Different Plant Densities on Yield and Nutritional Value of Desho Grass (<i>Pennisetum Pedicellatum</i>)	Yerosan	MSc	HSARC	completed	Defended
37	Effect of Lime and Vermicompost on Selected physio-chemical Properties of Acidic Soils and Yield of Maize at LaloAssabi district, W. Ethiopia	Wegene N	MSc	HSARC	completed	Ongoing
38	Genotype X Environment Interaction and Grain Yield Stability of Finger Millet (<i>Eleusine coracana</i> (L.) Gaertn) Varieties in Oromia, Ethiopia	Shanene Haile	MSc	MARC	completed	Ongoing
39	Soil Fertility Status and Nutrient content in Maize (<i>Zea mays</i> L.) Tissue at Uke in Guto Gida District, East Wollega, Ethiopia	Mintesinot Desalegn	MSc	NSRC	completed	Ongoing
40	Genetic Diversity Study Of Bread Wheat (<i>Triticum Aestivum</i>) Genotypes For Drought Stresses Using Phenotypic Marker.	Kasahun Tadese	MSc	SARC	completed	Ongoing

3. PUBLICATIONS & RESEARCH DOCUMENTATION CAPACITY

Workshop proceedings

Seven volumes of workshop proceeding were published so far, such as one production constraint analysis conducted in Oromia, Dire Dawa & Harari regional states; four volumes of AGP-II supported completed research activities in 2016/17 (Vol-I), 2017/18 (Vol-II), 2018/19 (Vol-III) and 2019/20 (Vol IV) from the sub component 2.1 (Adaptation & generation of agricultural technologies); and four volumes of sub component 2.2 (Pre-extortion demonstration of agricultural technologies) in 2016/17 (Vol-I), 2017/18 (Vol-II), 2018/19 (Vol-III) and 2019/20 (Vol IV). All published proceedings were peer-reviewed, have ISBN number and available on the website of the institute (<http://www.iqqo.org>). About 1000 copy was printed for volume-1 & production constraint analysis, but 300 copies each for volume-II, III & IV. But, 400 copies were printed for PED of volume 4. Besides, each copy of the publications were distributed to implementing centres, sister institutions, donor partners, Woreda office of Agriculture & other stakeholders. Total publication cost for all proceedings were **836,520** birr.



Publication of User manual

Publication of four Technical Users manuals on four themes of livestock research fields (Dairy, fattening & small ruminant; Forage development; Fishery technology & Apiculture technology) were supported by AGP-II. All manuals were distributed to end users from region to Woreda level. Total publication cost for all user manual was 83,700 birr.



Media coverage

Wider Media coverage such as OBN, ETV & Hareri TV; plus press coverage such as Addis Zemen, Barisa & Ethiopian Herald; documentary film and Masa program were among the major media addressing the tangible progress & output of AGP-II supported research and development activities across the majority of research centres during the last four years. Massive field days were conducted in the different implementing research centres participating larger numbers farmers, DAs, expertise at different levels, higher officials and collaborating institutions.

4. SUMMARY OF BUDGET ALLOCATED FOR PHYSICAL CAPACITY BUILDING

Major physical capacity development activities conducted formally (1-4 listed in table 20 below) and informally (5) since the inception of AGP-II and the corresponding budgets utilized for each physical capacity building are listed below. Except for Bedele ARC, all renovation & maintenance activities were completed up to date. Costs of minor maintenance & renovation activities such as guard office at Bako & Bedele; toilet rooms at Holeta, Adami Tullu, & Batu fishery; mini store at Batu soil and Fiche ARC; office partitioning at Yabello; fencing at Batu soil research centre; roofing iron sheet at Nekemte; car shed at Bako, Fedis & Haro Sabu; and Pavement around office at Haro Sabu and Bako were not included.

Table 20. Summary of budget utilized for physical capacity development during the last 4 years

No	Description	Estimated budget birr	Remark
1	Procurement of lab facilities	81,786,182.80	
2	Vehicle & farm machinery	20,752,795.24	
3	Poultry house construction	9,557,019.21	
4	Publication fee	919,520.00	
5	Renovation & maintenance of infrastructure	21,748,698.78	
	Total	134,764,216.03	