Second Washera and Wollo sheep improvement Workshop in Amhara region: Summary Report

October 4, 2022

BenMas Hotel, Bahir Dar, Ethiopia

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Acknowledgement

We, the consultative workshop organizers, would like to thank all participants and paper presenters who attended and contributed to the consultative workshop. Financial support for the consultative meeting was provided by SAPLING initiative of the CGIAR.

1. Workshop background

Since 2009, the International Centre for Agricultural Research in the Dry Areas (ICARDA) in partnership with the International Livestock Research Institute (ILRI), the University of Natural Resources and Life Sciences (BOKU) and Ethiopian NARS has been implementing community-based breeding program (CBBP) in Ethiopia, to support the livelihood of smallholder farmers by improving the productivity of small ruminants through selective breeding. Since then, a remarkable progress has been made in improving the livelihood of small holders in different parts of the country. Currently, the CBBP initiative has been expanded to cover more than 10,000 households in Ethiopia. Generally, improved productivity, higher offtake, and higher annual income were recorded in those households participating in CBBPs. For example, an average genetic gain of 0.20kg per year for six-months weight and, and increased mutton consumption (from 1 sheep to 3 slaughtered/year/HH) were achieved in CBBP intervention areas.

ICARDA has been working on Menz sheep and Abergelle goat CBBPs improvement closely with the Amhara Regional Agricultural Research Institute (ARARI) and Amhara Region Bureau of Agriculture to transform small ruminant value chains in Amhara region and beyond. CBBPs is adapted by different institutions in the region and being expanded in many parts of the region. As an example, Washera sheep CBBPs and Wollo sheep improvement has been implemented by various institutions (different universities, research centers and the Ethiopian Biodiversity Institute). However, there is no a harmonized breeding objective, CBPP implementation modality and a clear roles and responsibility shared among stakeholders working in the region. Hence, bringing all institutions together and harmonizing the scattered efforts in Washera and Wollo sheep improvement is crucial to bring impact at scale. As part of the joint effort, it has been recalled that ICARDA in collaboration with ARARI organized a two-day consultation and planning workshop in Bahir Dar at Unison Hotel from 14-15 April 2022. Since then, as per the agreements of implementation modality during the first consultative workshop, various activities were performed by the respective stakeholders. To evaluate such progresses made so far, the second consultative workshop was organized by ICARDA and ARARI on October 04, 2022 in BenMas Hotel, Bahir Dar. A total of 27 participants from different partnering institutes attended the consultative workshop.

2. Objectives of the consultation workshop

The specific objectives of the second consultative workshop were,

i) To evaluate the WaWO implementation progress
ii) To agree on a framework for scaling up to a larger population
iii) To identify the need for capacity development

3. Session I. Session introduction and welcoming speech/opening remarks

Following a brief session and participant's introduction, a welcoming speech on the second consultative workshop was delivered by Dr.Aynalem Haile form ICARDA/Dr.Likawent Yiheyis from ARARI. Then different technical presentations were delivered according to the provided workshop schedule. Dr. Aynalem has made a brief overview about the overall WaWo implementation progress and the motivation and objectives of the second consultation workshop. Following the welcoming and opening remarks, technical presentations were made on Washera and Wollo sheep breed improvement as follows,

4. Session II: Technical presentations (Experiences and progresses made so far)

4.1. Welfare impact of community Based Veterinary and Breeding Services on small ruminant keepers, by Dr.Girma Kassie, ICARDA

Dr. Girma Kassie from ICARDA has made his presentations on his research findings about the role of community based veterinary and breeding services in impacting the income and livelihood of small ruminant keepers. In his presentation he has introduced the historical development of novel approach, called community-based breeding program (CBBP) in Ethiopia, which was started in 2009 with four sheep breeds (Afar, Bonga, Horro, and Menz) representing different production systems and involving eight communities in Ethiopia. He mentioned that CBBP is a better option compared with the conventional nucleus schemes or importation of exotic breeds in that it is inherently sustainable as it supports local-level decision making, focuses on locally adapted indigenous breeds, and considers the constraints that smallholder farmers face. CBBP involves collective action, participatory breeding goal definition and trait identification, breeding male selection, distribution of selected sires and introducing mating management, culling of unselected males, training of farmers, and data collection and management.

He also mentioned that a new global partnership under the CGIAR's Livestock and Fish Research Program (Livestock Research Program since 2017) was initiated since 2012, and implemented more participatory and local knowledge-based approaches in small ruminant health and breeding programs in Ethiopia. The breeding interventions were undertaken across locations in various parts of the

country. Sheep breeding programs have been implemented in Menz, Horro, and Doyo gena districts. Goat genetic improvement interventions were undertaken in Abergelle district. Doyo gena, Horro, and Menz represent sheep-dominated production systems. Abergelle represents goat dominated production systems. The two species were combined, and referred interventions as small ruminant breeding practices. In each of the districts, there are intervention and control Kebeles. The study considered farmers who were trained and who understood and practiced the different components of the breeding programs in the intervention sites as participants of the improved breeding program. Animal health interventions were introduced into the study sites as part of the concerted effort to transform the small ruminant value chains. Participatory epidemiological approach, was adopted and veterinary health interventions were developed and embedded in the CBBPs. The key assumption behind the choice of this community-based approach is that prevention of selected infectious and non-infectious diseases is less expensive than treating conditions as they occur. The design of the interventions was guided by participatory identification

He explained that their motivation to carried out this research was the hypothesis that improved veterinary services and breeding practices affect small ruminant fertility and offtake and then improve returns per head of animal and gross income per capita. To assess these impacts, they did two rounds of comprehensive surveys in 2014 and 2018. The study covered nine districts, 28 kebeles and 1,108 households. The base line survey used as representative of the small holder producers, while, the endline study covered only sites where the small ruminant health and improved breeding interventions have been ongoing since 2014. The end line covered Menz and Abergelle in Amhara Region, Horro in Oromia Region, and Doyo gena in Southern Nations, Nationalities, and People's Region (SNNPR). For the end line survey, they talked to the participants and non-participants that we visited in the baseline survey in these four districts. In total, they covered 571 farm households with an attrition rate of only about 5%, in which 542 observations were considered for the analysis.

Using panel data treatment effect models, the study revealed that access to veterinary services improved market participation in terms of increased offtake, income earned per head of sheep and goat, and gross income per adult equivalent. Similarly, taking part in small ruminant breeding programs improved offtake and gross income per adult equivalent. The study concluded that the veterinary and breeding interventions have significantly increased the number of sheep and goats smallholders supply to the market.

Figure 1. Dr. Girma Tesfahun, a CARDA economist, presented his research findings.

4.2. Presentations on WaWo CBBP implementation progress, by implementing stakeholders

The implementation progress of WaWo Sheep CBBP by various stakeholders was evaluated in the second workshop. Debre Birhan Agricultural Research Center, Andassa Livestock Research Center, Injibara University, Wollo University, Debre Markos University, Bahir Dar University, Debre Markos Agricultural Research Center, ILMWA project, Kunzila, ANRS Livestock and Fishery office, presented their own CBBP implementation progress and challenges faced during the implementation. Workshop attendants were raised various questions and suggestions on the respective presentations.

4.3. Breeding structure for Washera and Wollo sheep breed improvement By Dr.Tesfaye Getachew, ICARDA

Framework was developed based on the existing CBBP sire production capacity and target sheep population in the whole areas. Scaling framework works based on the principle that existing CBBPs responsible to produce improved genetics for the surrounding flock called production unit. Production

unit always rely on CBBPs for ram source so that all male lamb born in the production unit will be linked to fatteners or directly sold to consumers. pro Currently 28 and 9 CBBPs are available in five clusters of Washera and two clusters of Wollo sheep breed respectively (Figure 2). The Washera CBBPs include 10,799 breeding ewes and considering the biological assumption has a capacity of 4487 breeding sires per year. About 228 rams will be used for CBBPs and the remaining 4259 ram disseminated annually to mate 266,247 breeding ewes in the production unit. Available CBBPs in Wahera is then has a potential of producing 187,231 lambs for market in 2.5 years.

In wollo, there are a total of 9 CBBPs (five in Awassi x Wollo crossbreeding and four in Wollo sheep selective breeding). Crossbreeding program aimed to improve the indigenous Wollo sheep breed through repeated backcrossing with exotic Awassi ram. Currently about 5500 breeding females with mean of around 40 % exotic Awassi blood available in Chiro areas. Considering valid biological assumption 5500 ewes can produce 1874 breeding ram for the production unit and these rams can mate 168,716 ewes in the production unit. Similarly, 4 CBBPs available in Wollo pure breeding sites can produce 775 rams annually for the production unit and able to mate around 70,000 ewes. The crossbreeding and pure selective breeding program can be able to produce around 101000 and 46000 lambs respectively for fattening in every 2.5 years.

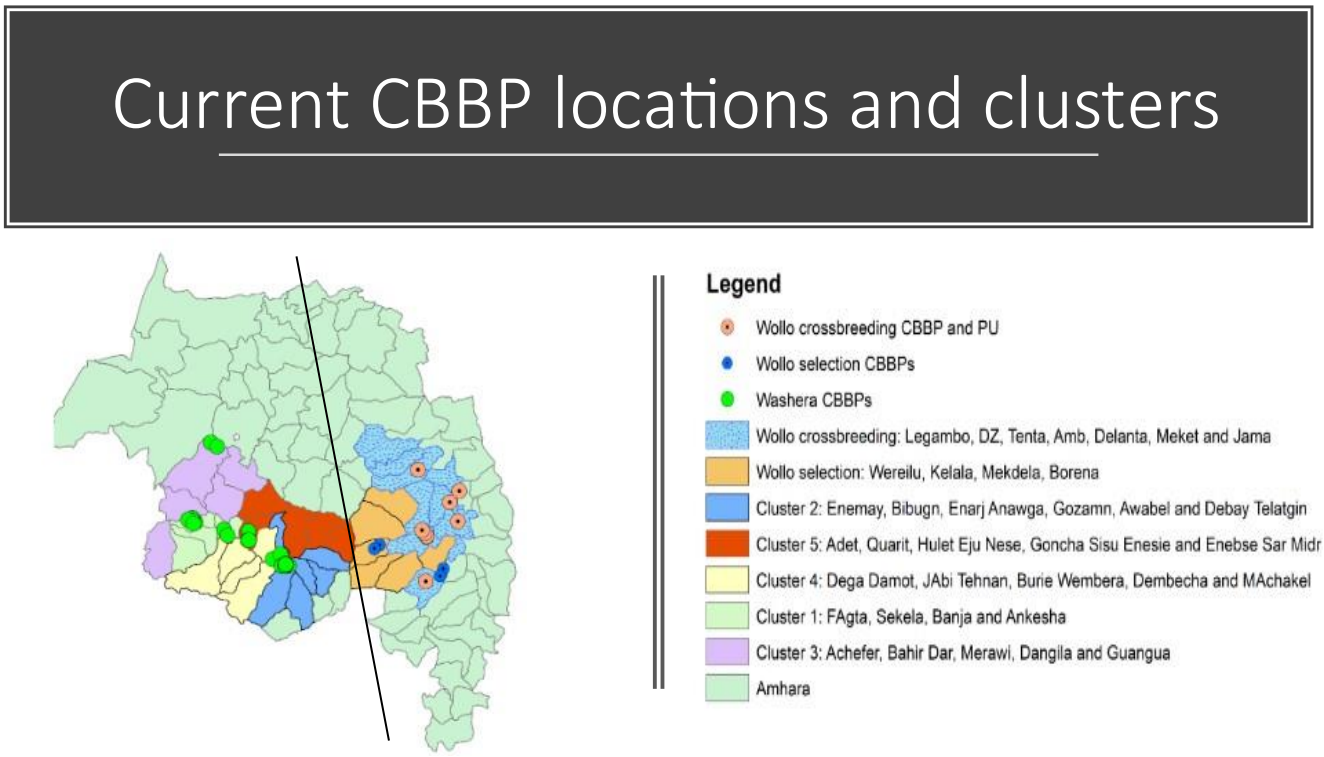

Figure 3. Washera and wollo sheep improvement sites

4.4. Term of Reference (ToR) on the governance of CBPP in Amhara region, by Dr.Likawent Yiheyis

Dr.Likawent Yiheyis has presented the draft ToR for CBBP implementation in Amhara region. The draft ToR included the responsibilities of key stakeholders, monitoring and evaluation, by laws, and CBBP implementation governance. Participants has commented the drafted ToR.

5. Session III: Question and answer

After question and answering session, participants were grouped into two groups (Washera and Wollo) based on their interest and previous field experiences. Based on drafted group work guidelines, groups were expected to agree on the objectives and vision of Wasera and Wollo sheep improvement, with 10 years program (first and second five years plans).

6. Session III: Group work based on working cluster

Based on drafted group work guidelines, groups were expected to agree on the objectives and vision of Wasera and Wollo sheep improvement, with 10 years program (first and second five years plans). Each group is expected to set a realistic ambitions/goal with clear methods of achievement, resource mobilization plan and identification of key stakeholders. They need to identify and consolidate the existing initiatives (both GOs, NGOs and private) in their plan. Groups were also expected to identify possible areas of collaboration among partnering institutions (Research centers, universities, extension and private bodies). For group discussion participants were aligned in to with their cluster and answer the same questions at the meeting. The specific questions to be considered during their planning were;

- What is your ambition or goal for 2024?
- How do you achieve your goal? How will you cover the entire sheep population over the next three years?
- What are the plans for resource mobilization and haring?
- How do you able to link Smart pack to graduate students?
- What capacity building requirements do you have?

6.1. Group I presentations on Washera sheep CBBP implementation plan

Clusters: 1, 3 and 5

Group Members:

1. Prof. Berhanu Belay, ICARDA
2. Dr. Mengisitie taye, BDU
3. Dr.Adebabay Kebede, ALRC/ARARI
4. Dr. Wossenie Shibabaw, BDU
5. Dr. Yeshwas Ferede, BDU/ASC
6. Mr.Teshome Derso, WLRC
7. Mr. Melakam Abate, IU
7. ----------DMU
8. Baynesagn Worku, DARC

6.1.1. Setting goals

Group II has set their goals for 10 years. (First five years). Specific goals are,

- improve income of sheep producers by 20%
- Improve meat consumption/Slaughter =2head/year
- Genetic progress to be estimated

6.1.2. How to achieve these goals?

They stated that the above goals will be achieved through,

- Strengthening the existing CBBPs and establishing the new ones
- Empower the existing coops and establish new coops
- The entire population will be covered through establishing new CBBP and production sites

The existing, new CBPPs and cooperatives to be strengthened are showed (Table 1).

Table 1: Existing and new CBBPs and Coops to be strengthened and established (five years)

	BDU	ALRC	ILMWA	IU	Bure Campus	Total
CBBPs						
Active	3	2	2	4	0	11
New	2	2	1	1	2	8
Cooperatives						22
Existing	-	-	-	3	-	3
New						**19**
New production sites	-	-	-	-	-	**-**

Moreover, to meet the stated goals, strengthening the smart pack interventions (health, AI, Gender, nutrition, marketing), start with full smart pack interventions at each CBBPs sites are crucial. For this, each responsible stakeholders shall take their full stake (Table 2).

6.1.3. Plans for resource mobilization requirements

To effectively implement the CBBPs as planned above, resource mobilization is highly needs. The required human power, land, animal (ram), technologies and equipment need to be identified and mobilized. The respective implementing institutes shall plan their resource requirements and commit their own resources. Community mobilization should include contributions like, land allocation, labor, etc).

6.1.4. How to link smart packs to graduate students

Table 2. Responsible universities under their cluster mandate, shall use these CBBP sites as learning and research model sites for undergraduate and postgraduate students. They can generate various data from these model villages.

Institute	Contributions	Remark
ICARDA	• Input supply (ram, AI tools, data collection tools, • Capacity building (trainings)	
LFSDP	• Sire supply • Training • Facilitate sheep marketing • Coops formation	If CBBPs are implemented in its mandate areas
WLRC	• Ram supply • Feed development • Training • Coops formation	
Research centers and Universities	• Shoulder Technical aspects (Planning, implementation, training, ME, data collection)	
Extension	• Scale out production sites • Community mobilization • Ram supply • Feed supply • Animal health service delivery • Coops formation	
Cooperative agency	• Coops formation and auditing • Licensing • Credit supply, saving • Market linkage	

6.1.5. Capacity building

A sustained capacity development effort shall be carried out in each cluster. These includes capacitating data collection, management and analysis and using other technologies that can facilitate the adoption of CBBPs. The respective Universities and research centers can be a center of capacity development through providing various short-term trainings using their own technical staff.

6.2. Group II presentations on Wollo sheep CBBP implementation plan

Cluster: Wollo cluster

Wollo CBBP Group Members:

1. Dr. Tadesse Amare
2. Dr. Berehanu Admasu
3. Dr. Likawent Yeheyis
4. Dr. Kassa)Mekdela Amba University)
5. Dr. Alula Alemayehu
6. Mr. Abebe Hailu
7. Mr. Dagne Muluneh
8. Mr. Shambel besufekad
9. Mr. Ahmed Alkadir– Livestock office

Figure 3. Team work.

6.2.1. The goals of the Project

- Upgrading the blood level up to 50 to 60 % of the composite breed
- Genetic improvement through selection (Local pure blood lines)

- ❖ Synthetic breed development

6.2.2. Project objectives

- ❖ Upgrading the blood level from 50 to 60 % of the composite breed
- ❖ Upgrading bodyweight gain up to 4kg/head at the first 5 years
- ❖ After 10 years 6 kg/head of body weight gain will be achieved
- ❖ The body weight at yearling stage will be upgrade 40 kg for crossbred sheep and 28 kg for local pure breed
- ❖ Smart pack innovations will be used for performance improvement of the breeds and attained at desired goals
- ❖ From the beginning of 7 synthetic CBBP and 4 pure lines has established
- ❖ Appropriate production unit will be established at the end of 2024

6.2.3. Methods to Cover the Goals and Strategies to address the entire sheep populations?

The CBBP has taken place in the four district of South Wollo Zone by Wollo University and ICARDA collaboration. Four districts and eight *kebeles* are selected for CBBP program in the highland part of South Wollo Zone. A total of 18, 829 breeding parent ewes are available in the four districts and eight *kebeles*. The genetic improvement program has designed on crossbreeding and selection from pure lines and based on 1:25 male to female ratio 754 Rams will be required at the initial phase. However, based on the assumption of conception rate (0.9); 18, 829*0.9 equal to 16, 946 ewes will be conceived per annual. Then, the twining rate of Wollo Highland sheep is 1.05 and can be produced (16, 946 ewes * 1.05) 17,793.4 F1 lambs per year.

- Total number of target fattening lambs are 73, 079
- Total number of target breeding ewe lambs are 48, 240
- Total number of target breeding ram lambs are 1,930 in the three years of project lifetime.
- By the assumption of 5 ewes per hhs and 500 ewes per 1 CBBP, initially we have 4 CBBPs and
- Additionally, we will be established 59 CBBPs for additional 29, 411 ewe lambs from F1 and F2 generation (48, 240 total number of ewes - 18, 829 Parent ewes = 29, 411 ewe lambs)

Table 3. The number of parent ewes in the population unite and no of ram acquiring

Districts	***Existed CBBP***	**Ewes in CBBP**	**Villages in PU**	**Parent ewes in PU**	**Parent rams acquiring**	**Participants**
Delanta	1	*500*	*Village 1*	2140	86	
			Village 2	2071	83	
Jama	1	*500*	*Village 1*	3200	128	
			Village 2	2650	106	
Guguftu	1	*500*	*Village 1*	2340	94	
			Village 2	2150	86	
Kutaber	1	*500*	*Village 1*	2152	86	
			Village 2	2126	85	
Total	4	*2000*	*8 Village*	18, 829	754	

Table 4. Summary of target sheep population in the CBBPs and PU areas

Parent stocks / no of lambs	Parents	F1 lambs / 3 years lambing	F1 breeding lambs	F1 lambs for fattening	F2 Lambs	F2 Breeding Lambs	F2 lambs for Fattening	Total
Ewes/ ewe lambs	18, 829	42,365	19,560	16,662	19, 203	9,851	6, 432	132, 902
Rams/ ram lambs	754	42,365	782	33,904	19,203	394	16,081	113, 483
Total	19,583	84,730	20, 342	50, 566	38, 406	10,245	22,513	246, 385
Culled		3, 622			898			4,520
Total								250, 905

Since the project has three years of implementation period and within these years the ewes will have 4.5 average number of lambing. Then, 18, 829 ewes * 4.5 lambing rate equal to 84,731 F1 lambs will be produced from the parent stock within the three years of project lifetime. The lamb survival rate is 0.9 (90%) and the total lambs that will survive in the three years of project implementation phase equal to 84, 731 *0.9 = 76,258 lambs from parent ewes. Out of these survived number of lambs (76,258) 3,813 lambs will be culled out by the assumption of physical fitness problems (0.05 culling rate). The culled lambs (3, 812.8) will be joined to the fattening activities. The remaining 72, 445 examined lambs by 50% male to female ratio 36, 222 female and 36, 222male lambs will be produced with in the project lifetime.

Whereas, 36 222 survived F1 ewe lambs after 15 months of age at first lambing they will be given birth. Now, by assumption of selection proportion (0.6) multiplied by 36 222 F1 ewe lambs and will be produced 21,733 F1 breeding ewe lambs. Subsequently, by the conception rate assumption of 0.9 (90%) multiplied by 21,733 breeding ewe lambs can be produced 19,560 F1 conceived ewe lambs, and give birth at age at firs lambing. Based on male to female ration (1:25) 782 Ram lambs will be required for 19, 560 F1 breeding ewe lambs. The variation between 36 222 survived F1 ewe lambs and selected 19, 560 F1 breeding ewe lambs the remaining 16, 662 unselected ewe lambs will be for fattening purpose.

From the total number of survived F1 male lambs (36, 222* 0.6 selection proportions) 21, 733 ram lambs can be selected for breeding purpose at CBBP and PU site. However, for selected F1 ewe lambs,

782 Ram lambs will be required for breeding. Then, after the remaining 20,951 ram lambs will be joined to the population unite, but here also only 1,536 ram lambs are necessary to join to the total breeding ewes in the PU. The total number of 2,318 (782 + 1536) breeding ram lambs at CBBP and PU, will be used as breeding rams. The difference between survived F1 ram lambs of 36 222.3 and 2,318 selected breeding ram lambs 33, 904 survived unselected F1 ram lambs to be joined to fattening purpose.

From those 19,560 conceived as F1 ewe lambs with the assumption of 1.05 twins rate and there will be given 20,538 F2 lambs produced at age at first lambing. This could be achieved after 21 months of project implementation time. These ewes might be produced an average of 1.87 lambing during the remaining 15 months of project lifetimes. Hence, from F1 conceived breeding ewes lambs (19,560) multiplied by 1.87 average number of lambing and 1.05 twins rate will give 38,403 F2 lambs will be produced at the end of the project lifetime.

6.2.4. Resource mobilization Plan

- Each institution has to be contributed the resources required for the implementation of the expected goals
- Active Ngos or projects will be involved in the resource mobilization and sharing activities
- The local communities also need to be involved the resource allocation and utilizations
- Private sectors also will be participated in the resource sharing and mobilizations.

6.2.5. How do you able to link smart pack to graduate studies?

- Smart packs innovations will be implemented to achieve the desired goals
- The group members will be considered the smart pack approach to implement the graduate studies intervention at all levels of project elements (universities).

6.2.6. What capacity building requirements do you have?

- All aspects of intervention of feeding, breeding, marketing and data recording training will be provided to the coops members and attendants.
- Genomic level selection, Artificial insemination and synchronization technologies capacity development will be provided to the members and actors.

- ❖ Advanced genomic level selection of human and physical capacity development will be implemented and attained at the end of 2024

6. Closing remarks

As part of the concluding remarks, Dr. Aynalem Haile has summarized the key points of the workshop. He emphasized that the overall implementation progress of CBBP was good, however, some of the stakeholders were not implementing the CBBP activities as per the implementation framework agreed during the first consultation workshop. After the second workshop, a harmonized CBPP implementation framework will be adopted by all implementers. All stakeholders are expected to include all smart packages in their CBBP implementation, and start a comprehensive data recording and selection based on EBV based on their plan and agreed points during the second workshop. Besides, implementers should strengthen the existing and establishing new CBBPs and cooperatives based on their cluster-based plan, and include gender mainstreaming in their plan. University implementers were advised to develop CBBP proposals and solicit funds from their institute, attach post graduate students in their CBBP sites. To fully engage university presidents and other regional stakeholders, IACARDA and ARAI will arrange stakeholder's workshop in the near future.

Dr. Murad Rekik has forwarded his suggestions regarding the sustainability of CBBP and the role of ''co-creation'' among stakeholders to solicit finds, mobilize resources from different donors.

Table 5. List of participants

Se No	Name	Institution
1	Dr Tadesse Amare	Wollo University
2	Dr Berhanu Admau	Private
3	Dr Likawen Yeheyis	ARARI
4	Dr Kassa	Mekdela Amba University
5	Dr Alula Alemayehu	Wollo University
6	Abebe Hailu	EBI
7	Dagne Muluneh	LDI
8	Shanbel Besufkad	DBARC
9	Ahmed Alkadir	Regional Livestock Office
10	Prof Berhanu belay	ICARDA
11	Dr Mengitie Taye	NDU
12	Dr Adebabay Kebede	ARC
13	Dr Wossenie Shibabaw	BDY
14	Dr Yehiwas Ferede	BDU
15	Teshome Derso	WLRC
16	Dr Melkam Abate	IU
17	Bainesagn Worku	DMRC
18	Dr Tesfaye Getachew	ICARDA
19	Dr Aynalem Haile	ICARDA
20	Dr Mourad Rekik	ICARDA
21	Dr Girma Tesfahun	ICARDA
22	Dr Mamusha Lemam	ICARDA
23		DMU
24	Alemash Melese	Amhara. LFSDP
25	Mulatu Dagew	Amhara Livestock office