



Pre-implementation capacity Building training on SI-MFS initiative

Dejene K. Mengistu, Yosef Gebrehawaryat Kidane, Bogale Nigir, Mulugeta Tilahun and Hailu Terefe

Alliance of Bioversity International and CIAT

Abstract

Building capacity of key implementing stakeholders is a prerequisite for successful implementation of projects. We have caried capacity building training on several topics under the framework of Sustainable Intensification of Mixed Farming Systems (SI-MFS) initiative. Briefing on SI-MFs, crowdsourcing platform for accelerated varietal evaluation and selection, and potential of local landraces for breeding and yield improvement for sustainable development were given for a total of 39 participants from 9 district agricultural officers, 18 kebele level extension workers and 12 selected model farmers from norther, central and southern parts of the country. This training workshop has also provided opportunity to strengthen collaboration among different actors of the project within the same district as well as across country. Furthermore, participants from the different corners of the country have shared experience and gained common understanding of the initiative to be implemented in their respective areas.

Bishoftu Ethiopia 22 – 23 December 2022

Table of contents

1. Introduction					
2. Introducing each other					
3. Trainings					
3.1 Sustainable Intensification of Mixed Farming System (SI-MFS)					
3.2 Expanding access to improved seeds through crowdsourcing approach: concepts and					
implementation in Ethiopia					
3.3 Exploring own genetic resources: experiences from Ethiopia7					
4. Identifying priority problems for future planning7					
Annex I: List of training participants					
Annex II: What Alliance of Bioversity International and CIAT Does?					
Annex III: Training topic one: Sustainable Intensification of Mixed Farming system (SI-MFS)13					
Annex IV: Training topic two: Crowdsourcing approach to create access to winner crop					
varieties: concepts and implementations					
Annex V: Training topic three: Exploring own genetic resources: Experiences from Ethiopia 17					

1. Introduction

Two days intensive training was given to district agricultural officers, kebele level agricultural extension experts and performer model farmers that came from four different districts of the country (Annex I). Prior to the training, trainees were selected from Meket district in North Wollo and Basona Worena district of North Shewa in Amhara region; Gimbich district of East Shewa in Oromia region and Lemo district of Hadiya Zone in South nations, nationalities and people's region (SNNPR). Groups were formed having at least one member from all districts to know each other, share experiences and the like. Dejene Kassahun has introduced the goals of the training and presented the contents in detail. Accordingly, the objectives of the training were: 1) to build adequate capacity and create strong linkage/collaboration among professionals at different hierarchy with in the same district where the SI-MFS project is planned to be implemented; 2) to introduce the project activities to be implemented; 3) to widen perspectives as the south-north partners meet and discuss together; 4) build strong collaboration and sense of ownership all the line from the project leaders to the farmers. The trainings were highly participatory expressed by the group discussions, group reflection through reports/presentation as well as questions and answers at each training topics and during the group presentation times. The trainees were highly satisfied by the training and motivated to perform the project works at their respective locations/sites expressed by their feedback and promises at the wrap up group discussion.

2. Introducing each other

At the beginning, Dejene Kassahun has introduced the contents of the training topics and the schedule for each topic for the two days and Yosef Gebrehawaryat has welcomed participants and invited each participant to introduce him/herself. Yosef Gebrehawaryat has extended his welcoming by emphasizing on the importance the gathering of all relevant stakeholders to discuss on the implementation modalities of SI-MFS initiatives and to plan together for future activities. Afterward, each participant (Annex 1) introduced him/herself with emphasis on where he/she comes from and what is his/her responsibility in the area he/she came from. During the introduction session, participants were also requested to put forward their expectation from the training to allow the organizers shape the training content according to the needs.

Following the introduction, Dejene has briefly introduced what the Alliance of Bioversity international and CIAT does, CGIAR and its vision, the new 2030 research and innovation strategy of the CGIAR, five new impact areas of 2030 research and innovation strategy namely 1. Nutrition, health and food security; 2. Poverty reduction, livelihood and jobs; 3. Gender equality, youth and inclusion; 4. Climate adaptation and mitigation; and 5. Environmental health and biodiversity (Annex II).

3. The trainings

3.1. Sustainable Intensification of Mixed Farming System (SI-MFS)

This briefing was given by Dejene Kassahun, member of the SI-MFS team. He has presented to the participants the basic components of mixed farming systems, the aim of SI-MFS initiate, global implementation perspectives of SI-MFS, national implementation perspectives of SI-MFS, integration of CG centres by SI-MFS project, the holistic approach in SI-MFS research and the major components to consider in the approach (Annex III). At the end of this briefing session, the following six questions (in *Amharic*, the local language) were identified for clarification in plenary group discussion. The questions were:

- 1. Why did we (farmers) start application of chemical inputs (fertilizers, herbicides, pesticides)? What were the driving factors?
- 2. What should we do to maintain the soil health and then sustain productivity?
- 3. What should we do to provide balanced food/rich nutrition to our family?
- 4. Do you think that community participation is necessary for agricultural sector improvement? If yes, how can we do that?
- 5. What is the experience of farmers in growing diversified crops/crop species on the given plot of land?
- 6. Is agro biodiversity increasing or decreasing in your area? If it is decreasing, what is the cause and how can we improve it?

To enrich the points raised in each question, participants were assigned into groups, five groups formed, discussed each of the questions to their local context. The summary of groups reflections is presented below.

Question 1. Why did we start applying chemical inputs (fertilizer, herbicides, pesticides)? What were the driving forces?

Participants responses:

- Gradual decline in soil fertility and the need to increase crop production/yield
- Difficult to prepare organic fertilizer/compost for all plots due to limited biomass availability
- Labour shortage to prepare and distribute organic fertilizers/compost
- Reluctant working culture to prepare compost and distribute to all plots
- The government push/policy to promote chemical fertilizer
- The extension system more favours the use of chemical inputs over organic inputs
- Intensification required due to land fragmentation
- Government direction to feed the growing population
- Tendency to look for short term benefits over the long-term effects
- Use of crop residues as animal feed, caused continuous decline in soil fertility
- Dominance of cereal monocropping without rotating with pulses due to occurrence pulse disease
- Limited works done to support organic farm input technologies (organic fertilizer, organic pest/herbicides)

Question 2. What should we do to maintain the soil health and then sustain productivity?

- Awareness creation on disadvantages and advantages of chemical farm inputs
- Production of organic farm inputs in quality and sufficient quantity
- Soil and water conservation through proven natural resource conservation practices
- Use organic fertilizers
- Practice crop rotation with pulses
- Practice minimum tillage
- Move towards sustainable crop production like crops-agroforestry practices
- Leave sufficient crop residues on the farm
- Plough while the soil is wet to facilitate decomposition of green/organic matter and reduce soil erosion by wind
- Practice under ploughing of green pulses for soil mulching and fertility restoration

Question 3. What should we do to provide balanced food/rich nutrition to our family?

- Apply integrated mixed farming systems including agro forestry to have diversified products.
- Need to change our culture/tradition of farmers such as 'from farm to market' to from 'farm to home' and allocate sufficient share of egg, milk, meat and variety of pulses and cereal grains for home consumption to improve household nutrition.
- Produce crop varieties and crop species that improve household food and nutritional security. Provide diversified and quality food to household members.
- Thrive to produce and consume organic products. It is possible!
- Allocate homesteads for vegetables and fruits production to complement household diet and nutrition.
- Support household nutrition with animal protein such as milk, butter, egg and meat.
- Raise awareness about balanced diet

Question 4. Do you think that community participation is necessary for agricultural sector improvement? If necessary, how can we do that?

Participants response:

Yes, it is necessary for/to:

- Efficient family labour mobilization for different farm operations (weeding, harvesting, keeping, threshing, transporting etc.)
- Ensure gender sensitive participation in agricultural practices
- Timely demonstration or training on new agricultural technologies to uptake, upscale any good technologies/practices
- Train and increase awareness to revers existing bad practices (use of agro chemicals) and promote good practices and technologies
- Orientation of communities towards Integrate (system oriented) farm operation than commodity-based farm operations
- Creation of sustainable forum for experience sharing and community discussions.

Question 5. What is the experience of farmers in growing diversified crops/crop species on the given plot of land?

Participants responses:

- The habit of growing different crop varieties or crop species on piece of farm has been decreasing, though it differs with localities and farmers.
- Participants have agreed that farmers have been practicing monocropping of few crop varieties; thus, there is limited experience of crop diversifying
 - Some farmers, however, are growing diverse crops and crop species on the same plot of land in Hadiya.
 - There is experience of growing mixed cereals and pulses or pulses with pulses (e.g., *Wasiera* = growing barley and wheat together; *Wajera* = growing mixture of faba bean and field pea together) in north Wollo.
- Small landholding is mentioned as factor to discourage growing diversified crop varieties/species

Question 6. Is agro biodiversity increasing or decreasing in your area? If it is decreasing, what is the cause and how can we improve it?

Biodiversity is declining; thus there is a need to:

- Increasing awareness (especially of farmers for biodiversity is at their hand)
- Practice agroforestry and promote forest restoration
- Promote the plantation of indigenous tree species
- abandoning, if not, reducing agro-chemicals
- Control industrial impacts, pollutions and land degradations
- When chemical application is necessary, apply safely and with due consideration of the biodiversity (insects, micro fauna in the soil, water and on the surface) and the right chemical to the right pest.
- Re-introducing crop genetic resources of different important crop types.

General discussion

Following group reflection on the above questions, a general discussion was held so that participants explain their listed ideas. Consensus reached on the following points by the participants.

- Preparation of organic inputs is feasible in all areas as enough labour is available.
 Furthermore, availability of organic biomass could not be a series limiting factor
- 2) Even though there is willing for rotation of cereals with pulses is a good solution for restoring soil fertility; but, due to disease and climate change impacts pulse production is declining exposing farming practice to cereal mono cropping.
- 3) Participants unanimously agreed that most animal products and vegetables are channelled to markets without even considering household demand. This has been greatly contributing household food and nutritional insecurity. Farmers sell these products to satisfy their financial demand. There is a need to maximize production to satisfy the market demand and family needs.

3.2. Crowdsourcing approach for sustainable intensification: concepts and implementation in Ethiopia

This training was given by Mulugeta Tilahun. The concepts, principles and practices of crowdsourcing approach were presented in a way that participants understand well. Success stories of applying crowdsourcing approach was focused to impress the participants and arose their willing to adopt the approach. Contents of the training was presented in annex IV.

At the end, participants (trainees) have embraced the concept of crowdsourcing and provided the following remarks for its successful implementation.

- Recommend devising simple and easy ways of implementing it at the grassroot level without committing any mistakes. Also promised to be training their colleagues what they have learned here.
- To plan crowdsourcing trials in advance, in terms of time, to avoid any inconvenience in land allocation and timely seed distribution to crowd farmers.

The team from the Alliance of Bioversity International and CIAT has agreed to provide adequate trainings at each district, prepare trial packages in good time and distribute to farmers and follow up with the trials for their successful implementation. Attending experts from the agricultural

sector also promised to assign technicians to implement the trials, follow up its implementation and to convivence farmers to allocate quality land for such trials. Participant farmers were also happy to participate in the trials as they understood well the benefit is theirs.

3.3. Exploring own genetic resources: the case of durum wheat in Ethiopia

This training was given by Yosef Gebrehawaryat. This training helped the participants to value the genetic resource at their hand rather that treating them as useless resources. The potential of farmers varieties of durum wheat for adaptation to climate change, improve farm production and productivity, and their potential as breeding materials was presented. The detail of the training was presented as annex V.

Perception of the trainees:

- The participatory approach of Bioversity International was much appreciated by the participants and consequently participant farmers showed willingness to allocate their own land for trials managed by this institution.
- Representative of the agriculture offices of each district showed their readiness to embed the approaches Bioversity international is using to their variety's evaluation, selection, multiplication and dissemination schemes by mobilizing farmers and their organizations.
- The participants have requested Bioversity International to work towards policy influence to see policies that support farm diversification, use of indigenous crop genetic resources and organic farming.
- The participants again requested Bioversity for continuous capacity building at local level so that the technologies and approaches recommended are simply up taken and upscaled.
- Requested to improve the value chain of important crops such as durum wheat, enset, faba bean to ensure farmers benefit from their production.

4. Group discussion for major problems identification and intervention planning

This time, participants from the same district were grouped together to discuss on the major problems their community is facing and suggest possible ways to tackling the prioritized problem/s. The identified problems to be considered in SI-MFS initiative of each group is presented below.

I. North Shewa: Bassona Worana district

Mixed farming system is the major feature of *Basona Worenda* district where wheat and faba bean are among the dominant crops grown. Their priority crops are wheat, especially durum wheat, and faba bean to address triple goals: improved productivity, improved nutrition, and restored soil fertility.

Major problems noticed by participants from Basona Worena district were:-

- Lack of adaptable and improved varieties of many crops and hence dependence on few crops' varieties.
- Top down approach of the extension system that undermine the participation of beneficiary farmers in technology generation and dissemination.
- Increased dependency on chemical inputs for agricultural production.
- Low level of awareness on the importance of local crop varieties (landraces) at various levels including farmers.
- High staff turn-over which has been causing discontinuity of specific activities, missing of data/records, failure to follow up.

II. East Shewa: Gimbichu district

Like north Shewa, mixed farming system with the domination of wheat and beans characterize this district. The participants from this district wanted to continue the upscaling of winner varieties of durum wheat and faba bean, varieties identified through previous ABC projects. The concern from Gimbichu district participants include: -

- Quantity of provided breeder/pre-basic seeds: The amount of seeds given to individual farmers is small and want to multiply the seeds in organized manner to cover larger production area.
- Climate change: The climatic condition of their area is becoming unpredictable which has been exposing crops to various biotic and abiotic stresses. Selection of crops for biotic and abiotic resistance was suggested.
- Low level of awareness on the importance of local crop varieties (landraces) and negative impact of agrochemicals at various levels including farmers. The awareness on the impact of agrochemicals is, however, gradually increasing.

III. Hadiya zone: Lemo district

Subsistence traditional agricultural farming system dominates the district's economy, with mixed farming system practiced by most farmers. Enset (*Enset ventricosum*), wheat, teff, barley, and maize are the most widely grown crops in the area. Livestock is also an important component of the economy.

Participant from Lemo district indicated that lack of adaptable varieties of enset (to bacterial wilt), faba bean (to root rot disease) and wheat for the prevailing climatic conditions is the major production constraint in their area. Pinpointed problems include:

- Decrease of enset production due to bacterial wilt disease
- Climate change impact is very prominent and visible which is affecting crop production in the area
- Low accessibility of the area for research and development works
- Traditional way of doing farm business (untimely operations of farm activities, suboptimal application of farm inputs etc)
- Low level of farmers' awareness on superior indigenous varieties, plot allocation for testing and negative impact of agro-chemicals
- Staff turn-over and discontinuity of tasks; missing of data/records, failure to follow up

IV. North Wolo: Meket district

Farming system of Meket district is a combination of crop cultivation and livestock rearing. Crops are mainly produced for home consumption, while most of the income for household expenses is raised by selling animals. Hence working toward improving both the crop and livestock sectors will be sustainably improve the livelihoods of the small-scale farmers. In the highlands the main cereals are wheat, barley and teff, while sorghum and maize predominate in the lowlands.

Participants from the district have embraced the works done by Bioversity International in their district on durum wheat and faba bean selection and dissemination and aspired to ensure such activities continuity in their area. They have identified the following problems among the others:

• Lack of systematic coordination between various actors for successful implementation of project activities

- Lack of well-organized local seed producing cooperatives for seed multiplication and dissemination to farmers in need.
- Lack of needed infrastructures such as seed stores to advance the local seed sector
- Dwindling diversity of crops and lack of in-situ genetic resources conservation centres

With the notice on the problems mentioned by participants from each district, we believe that continued working on varieties evaluation, selection and dissemination/upscaling still benefit the target communities a lot. In due course, we work with other centres especially ILRI to address the entire value chain of the farming system by addressing the crop – livestock integration problems. Our crop commodities for the SI-MFS initiative works will be Enset and Faba bean in Hadiya, durum wheat and faba bean in the other zones of the target area.

No	Trainaa nama	Profession/expertise	Dogion	Zona/District/Kabala
1	Aweke Decalew	Head District agri office	Region	
2	Aweke Desalew	Former (Coop member)	_	
2	Nigot Tomon	Natural R mammat (DA)	_	
3	Alabal Kagaia	Natural K Ingilint (DA)	_	North Wolo
4	Alebel Kassle	Development Agnet		Meket
5	Magas Alam	Head livestock (district)	_	kehele
5	Domoko Ambachow	Crop production (DA)	_	Receite
7	Valalat Molla	SWC (DA)	_	
/ 8	Mulugata Satagn	Farmer (model)	_	
0	Rowket Heilu	Farmer (model)	Amhara	
9	Getia Adama	Farmer (model)	_	
10	A dimosu Vigzow	Farmer (model)	_	
11	Auliliasu Tigzaw	Notural P. Mampt (DA)	_	
12	Alman Manajatu	Natural R. Mglillit (DA)	_	
13	Almaz Mengistu	Crop science (DA)	_	
14	Aynadis Nega	Crop science (DA)	_	North Showa Decone
15		Animal Science (DA)	_	Woropo
10	Samuel G/kidan	Heas, Agri-extension office	_	worana
1/	Negesse W/Mariam	Head, district agri. office		Aba moti Kebele
18	Molla Endalamaw	Irrig. Agrono (DA)	_	Aba moti Kebele
19	Nigusse Agonafir	Farmer (model)	_	
20	Belayihun Lake	Farmer (model)	_	
21	Muluneh Mengesha	Farmer (model)		
22	Abush Arage	Head, district agri. office	_	
23	Sisay Kebede	Agronomist (district)	_	
24	Testaye Legesse	Extensionist (district)	_	East Shewa, Gimbichu
25	Mengistu Abebe	Head, cooperative (district)		Chafe Dance Kalada
26	Wondimu Abdeta	Plant sceince (DA)	Oromia	Chefe Donsa Kebele
27	Mesfin Mitiku	Plant science (DA)		
28	Gizachew Begi	Plant science (DA)		
29	Guta Tadesse	NRM (DA)		
30	Mesfin W/ Yohanes	Farmer (model) + coop.		
31	Mengistu Tegenu	Farmer (model)		
32	Gezahegn Ababiya	Plant science, Head, district agri. office	Southern	
33	Degitu Birhanu (F)	Plant science (DA)	Ethiopia	
34	Tsegaye Aboro	Farmer (model)	Nations	Hadiya
35	Kefelegn Mitiku	Plant science (DA)	Nationalit	Hosaena
36	Teshome Ertafo	Farmer (model)	ies and	Lemu district, Shurmo
37	Abirham Mamo	Natural resource (DA)	Peoples	kebele
38	Etalem Shigute (F)	Animal science (DA)		
39	Bezunesh Lama (F)	Animal science (DA)		

Annex I: List of training participants

Annex II: What Alliance of Bioversity International and CIAT Does?



🖄 📾 CIAT

12

Annex III: Training topic one: Sustainable Intensification of Mixed Farming system (SI-MFS)

+

Sustainable intensification of mixed farming system

Mixed farming system comprises of cropslivestock- natural resources The major feature of farming in most parts of Ethiopia.



The Sustainable Intensification of Mixed Farming Systems Initiative aims:

The approach

- to provide equitable, transformative pathways for improved livelihoods of actors in mixed farming systems
 - through sustainable intensification within target agroecologies and socio-economic settings







Annex IV: Training topic two: Crowdsourcing approach to create access to winner crop varieties: concepts and implementations



Training Workshop on Crowdsourcing Concepts and its Implementations for different partners of SI-MFS Initiative Project

> December 22-23, 2022 Bishoftu

What is crowdsourcing??

- *For important goal
- Similar objective
- For innovation
- For using new technology
- Using existing knowledge, experiences
- Based on group interest



Crowdsourcing??

≻Working in group (crowd):-

oBased on interest for common goal

oNumber of farmers (60, 100, 125) per specific village

Including experiences, personal intelligence

oTime

•With out any antagonism

While applying crowdsourcing

≻Intelligence individual farmers have

- oLinking to scientific finding and research
- Farmer do not request refund for their experiences, land they provide, and time
- oStake holders (regional, Zonal, District, Village) working together
- > Farmers receive seeds and conduct research based on their interest

Importance of Crowdsourcing

 \checkmark Testing a number of types, varieties of crops under farmers condition

- ✓ Improve research (based on only at research centers, institutes)
- ✓To provide farmers options (proper variety based on their interest, experience, soil type, local climate)
- ✓Make farmers scientist
- ✓ Distribute new tech or improved variety easily
- ✓Minimize extension process (Research Centers, MoA, Regional, Zonal, District)

Crowdsourcing Vs Participatory Variety Selection

Crowdsourcing

- Many farmers at a time
- Small amount of seeds
- All member farmers evaluate varieties
- Based on personal interest
 Each farmer has the right to
- select specific variety
- Farmers make decision
- ➤ Participatory Variety Selection

 ime
 • Small farmers participate
 - Two or three model farmers
 - receive seeds and evaluate • Farmers decide and select
 - variety based on group interest • Farmers interest masked by researcher
 - Researcher decide

Why small amount of seed and tri-cot in crowdsourcing??

- ✓ Tri-cot a new concept increase research efficiency in a changing environment (climate change)
- ✓ Minimize cost and loss (land, seed, fertilizer, chemical, due climate change)
- ✓ Provide more option to farmer (at least three variety)
- ✓Increase farmers decision capacity (select at least one variety)



Steps while using Crowdsourcing

*Planning

- Number of farmers (100-125) per village
- Number of varieties to be tested
 A minimum of ten varieties
- Each farmer has to receive a minimum of three varieties
- Amount of seeds provided per variety (30-40g) based on available seed
- Experimental land 3m2, 5m2
- The same variety might be for different farmers

Experimental land preparation





Seed preparation and distribution

- ✓ Seeds for all member farmers
- ✓ Seeds with tag, farmer's name
- ✓ Make sure each farmer received three types of variety
- ✓Village name, code with seed
- ✓ Ensure randomization
- ✓ Seeds tag should be carefully provided to each farmer





How to identify and kept tags after planting Tips

- Make sure all seeds have tag before planting
- Keep in mind if possible
- Planting
- · Slope or drainage should be considered
- from left to right,
- smallest to largest tag (code)
- planting on the same day
- Plot size
- 2.5 m length, 1.2 m width (3m2)
- 20 cm between rows
- Rows should be against the slope/drainage

Enumerators role

- >Help each farmers (designing, planting to harvesting)
- >Collect research data
- ✓ Responsible for each farmers data



Basic agronomic data are collected from each farmer plot for each varieties.

You can collect: Agronomic traits Phenological traits

✓Number of productive

√days to sowing, tillers, ✓ Days flowering, ✓ Spike length, ✓Number of seeds per spike ✓ days heading and

✓ Grain yield (g/plot) ✓ Days to maturity ✓If possible, biomass yield

>District experts, DA

- Following research
- Provide expertise
- Evaluating,
- · Following DA
- Make discussion with each farmers >Development Agents (DA)
- Follow each farmer in the village
- Provide expertise (planting to
- harvesting)
- Collect research data







> The head of the research process ≻Conduct the research >Record, score, evaluate each variety

Roles of stakeholders in the research process

- · Important data to be collected by
- farmers

 Planting date

Farmers

- Booting, heading date
 Tillering
- Disease resistance (1st, 2nd, 3rd)
 Maturity date (1st, 2nd, 3rd)
 Moisture resistance

- Frost resistance
 Yield (Kg, or others)

Problems associated with Crowdsourcing

- Row planting??
- Planting as a boarder crop (fence)
- Planting on eroded land
- Recording data??
- Interest??
- Leaving the research to expertise (enumerator, DA, Experts)



Most important considerations

- Make sure important evaluation data are collected and kept
- Harvest separately
- Do not forgot to keep tags with seeds harvested
- Harvest accordingly (late matured or early matured)
- Weight of each variety (in kilos)
- Do not forget to evaluate each variety (in terms of climate, nutrition, yield, disease)
- Make sure each farmer distribute seeds to five farmers for next cropping season to ensure seed distribution in the village









Annex V: Training topic three: Exploring own genetic resources: Experiences from Ethiopia





