

WP4

Community seed production and scaling of cereals, food legumes and potato innovations for mixed farming system of North Shoa, Ethiopia

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Published by
December, 2023

ICARDA

The [Sustainable Intensification of Mixed Farming Systems Initiative](#) aims to provide equitable, transformative pathways for improved livelihoods of actors in mixed farming systems through sustainable intensification within target agro-ecologies and socio-economic settings.

Through action research and development partnerships, the Initiative will improve smallholder farmers' resilience to weather-induced shocks, provide a more stable income and significant benefits in welfare, and enhance social justice and inclusion for 13 million people by 2030.


Activities will be implemented in six focus countries globally representing diverse mixed farming systems as follows: Ghana (cereal–root crop mixed), Ethiopia (highland mixed), Malawi: (maize mixed), Bangladesh (rice mixed), Nepal (highland mixed), and Lao People's Democratic Republic (upland intensive mixed/ highland extensive mixed).

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Abbreviations and acronyms

ARARI	Amhara Regional Agricultural Research Institute
CV.	Cultivar
ILRI	International Livestock Research Institute
ICARDA	International Center for Agricultural Research in the Dry Areas
SI-MFS	Sustainable Intensification of Mixed Farming Systems Initiative
WP	Work Package

Background

The highlands of North Shoa in Amhara region are dominated by cereals (wheat, barley and tef) followed by food legumes. The productivity of cereals and food legumes is low due to biotic and abiotic stresses as well as insufficient input supplies like certified seeds, planting materials, inoculants, and other inputs. Because of diseases and insect pests, acidity and water logging problems, farmers are reducing areas of food legumes and growing more cereals leading to low crop diversity that can reduce soil fertility and health, incomes, food diversity and increase disease threats. Several varieties of cereals, food legumes and potato were released by many agricultural research centers and did not reach farmers due to limited demonstration, lack of awareness and shortage of quality early generation seeds and planting materials. Poor access to quality seeds and planting materials contributes to low crop productivity and limited technology scaling in North Shoa. The scaling approach bundled crop technologies, agronomic innovations, and seed system innovations to accelerate the scaling and adoption.

Objectives

1. Scaling of farmer preferred wheat, faba bean and potato varieties.
2. Production of basic and certified seeds and planting materials; and
3. Creating awareness and demand of new varieties and innovations to crop growers and extension system.

Methodologies

Scaling of cereals, food legumes and potato were based on outputs from participatory variety selection (PVS) trials and early generation seed production mainly breeder and pre-basic seeds and planting materials in 2022 cropping season. Moreover, fungicide seed treatment to control the devastating faba bean gall disease was developed through ACIAR project and scaled out using SI-MFS funding in 2022/23 cropping season. The scaling approach bundled crop technologies, agronomic innovations, and seed system innovations.

Two improved bread wheat (cvs. *Sanate* and *Lemu*) were planted in two clusters. In cluster I, about 3.67 ha of land was covered with pre-basic seed of cv. *Sanate* hosted by 10 farmers and cluster II was planted with basic seed of cv. *Lemu* on 6.5 ha hosted by 13 farmers.

Faba bean scaling was carried out in Moretina-Jiru district using faba bean varieties (*Walkie*, *Hachalu* and *Shewa*) released for waterlogged areas of North Shewa zone. Faba bean seed was treated with Noble 25WP fungicide (a.i. *Triadimefon*) at a rate of 150 g/100 kg of seed to control faba bean gall disease. The partner research centre, DBARC, organized a workshop for joint planning and signed a memorandum of understanding with the Head of Moretina-Jiru District Agriculture Office so that the office will take the innovation as part of its extension packages.

Breeder planting material of potato cv. *Belete* was provided to six farmers who are members of potato seed growers and planted on 0.28 ha to produce quality tubers to produce basic seeds for further multiplication.

Results

Scaling of bread wheat and faba bean varieties as well as faba bean gall disease management was done in cluster approach where group of farmers plant the same crop and variety in adjoining fields and follow similar agricultural practices. The cluster approach is useful for easy access to inspections for seed regulatory authorities in the zone. Twenty-three farmers produced 43.2 t of basic and certified seeds of two bread wheat varieties during the cropping season (Table 1). Farmers perception showed that that the two varieties are adaptable to their area with good tillering capacity, long spike, and relatively tolerant to rusts compared with popular wheat varieties.

Table 1. Productivity and seed production of farmers' preferred bread wheat varieties, 2022/23 cropping season.

Variety	Area planted (ha)	Productivity (t/ha)	Seed produced (t)	Seed class	Male	Female
					farmers	farmers
Lemu	3.67	5.7	21.1	Basic	9.0	1.0
Sanate	4.33	5.1	22.1	Certified	12.0	1.0
Total/average	8.0	5.4	43.2		21.0	2.0



Figure 0.1. Field days organized to evaluate the performance of bread wheat varieties in North Shoa

Faba bean scaling and community seed production of waterlogging tolerant varieties was planted on 10 farmer fields as cluster. The performance of the crop was very good and yield data will be available in January 2024 and seeds produced will be used for next season scaling.



Figure 0.2. Clustering and seed production of faba bean improved cv Numan in Hagermariam district, North Shoa

Two hundred farmers (31 female farmers, 16%) treated their faba bean seed with fungicides to manage faba bean gall and about 85 ha was covered by new innovations (Table 2).

Table 2. Scaling of faba bean gall disease management innovation in five districts of North Shoa Zone, 2022/23 cropping season.

Districts	Kebeles	Area (ha)	Male farmers	Female farmers	Total
Menz-Lalo	Tole	27.0	39	2	41
Menz-Mama	K017	13.5	26	14	40
Hageremariam	Kumdingay	10.5	21	3	24
Asagirt	Koso-Amba	5.6	14	6	20
Moretina Jiru	Kusaye	5.2	13	1	14
Ankober	Debdebo	5.0	18	1	19
Basona-Worana	Chiraro-Debir	18.0	38	4	42
Total	7	84.8	169	31	200



Figure 0.3: Faba bean crop treated by fungicide (left & middle) in Hager-Mariam and untreated crop (right) in Ankober districts, North Shoa

The potato variety *Belete* was planted on 0.28 ha by six farmers and tuber seed will be harvested and stored in the cooperative Diffused Light Store. The cooperatives will multiply and sale the seed to other farmers for the next production season.



Figure 0.4: Performance of potato cv. *Belete* under farmer's condition at Basona-Worena woreda, North Shoa

Training and field days

Training was given to framers and development agents on cereal, food legume production and storage. For wheat innovations, 37 (9 female) farmers, development agents, and experts were trained.

Extensive training was given to faba bean farmers in managing the devastating faba bean gall disease using seed dressing with fungicide. A total of 286 famers (from seven districts were trained (Table 3).

Table 3. Training of male and female farmers on management of faba bean gall diseases, North Shoa

Districts	Kebeles	Male farmers	Female farmers	Total
Menz-Lalo	Tole	64	28	92
Menz-Mama	K017	19	7	26
Hageremariam	Kumdingay	62	5	67
Asagirt	Koso-Amba	16	5	21
Moretina Jiru	Kusaye	20	1	21
Ankober	Debdebo	16	3	19
Basona-Worana	Chiraro-Debir	36	4	40
Total	7	233	53	286

A field day was organized at Debre Berhan Agricultural Research Center and 124 (11 female) farmers, experts and other stakeholders from various organizations attended the event.



Figure 0.5. Field day organized at Debre Berhan Research Center, 2022/23 cropping season.

Conclusion

Farmer preferred bread wheat, faba bean and potato were scaled using seeds produced in 2021/22 cropping season through the support of SI-MFS initiative. The scaling efforts can increase crops and variety diversity in cereal dominated cropping system in North Shoa. The scaling was also focused on the management of faba bean gall disease which is affecting farmers to include faba bean in their rotation. Since the varieties were grown in clusters, they can be used for next cropping season to drive scaling in the zone and other similar agro-ecologies in the highlands of Ethiopia. All scaling activities were supported with training of farmers and development agents to narrow their skill and knowledge gaps.

During the crop season, there was a security challenge in organizing field days in each district where the innovations were scaled.

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