

# How Phase I Farmers Participatory Research Activities Succeeded in Amhara Region, Ethiopia: The case of Banja District

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**Host institution:** Amhara Regional Agricultural Research Institute (ARARI), Bahir Dar, Ethiopia

**Visiting institution:** University of Helsinki (UH), Helsinki, Finland

**Field visit conducted on** 29 October to 11 November 2021

**Specific field visit days:** 03-04 November 2021 in Banja District, Ethiopia

## Background

The Amhara Regional Agricultural Research Institute (ARARI), Bahir Dar, Ethiopia is conducting Farmers' Participatory Research (FPR) as part of InnoFoodAfrica (IFA) project funded by European Union Horizon 2020 research and innovation program for the period of 01.08.2020 to 31.07.2023. According to the experts of office of agriculture and participating FPR farmers, FPR is a new type of research undertaking in the area that they certainly not experienced before.

Table 1. FPR crops, varieties, testing sites, and hosting farmers in Banja district

Crops	No, of varieties / cultivars	Sites in Banja district	Number of host farmers	Varieties / genotypes
Faba bean*	8 (7+1)	Gashena Ephrata (Meskelua village))	3 (1 mother + 2 baby trial)	Dosha, EH01078-4-3, Tosha, Wolki, Numan, Gebelcho, Ashebeka, and local
Teff*	10 (9+1)	Gashena Akayta (Gubita village))	3 (1 mother + 2 baby trial)	Holeta key, Key tena, Dima, Filagot, Asgori, Dega teff, Gimbichu, Boset, Hiber-1, Local
Highland maize	5	Gashena Akayta (Gubita village))	3 (1 mother + 2 baby trial)	BH660, BH661, MH850, MH851, MH853

\* plus 1 indicates the local varieties included in the test; Mother trial includes all varieties of a crop in 3 replication, whereas baby trial includes all varieties of a crop in 1 replication.

Banja district is a cool highland area located 113 km away from Bahir Dar or 447 km away from Addis Ababa. This district has an altitudinal range of 1870 and 2570 m.a.s.l with minimum and maximum annual temperature of 9.4 and 26 °C, receiving mean annual rainfall

of 1215 mm between the months of June to November.

In this district, the specific FPR sites are located at mean altitude of 2550 m.a.s.l. The field crops adapted in this district include

potato, wheat, barley, teff, pea and in some parts of the district faba bean. ARARI in consultation of local agricultural experts and farmers chosen novel and new crops and varieties apt to local conditions to evaluate their performance using FPR model. Cool season crops such as faba bean, teff and highland maize (HL maize) varieties are being tested in Banja district (Table 1).

### **Faba bean**

In Banja district, faba bean is not entirely absent nor entirely available in agricultural fields. During our field visit in Gashena communal administration, we observed that within a few kilometres distance there are sites suitable and hostile for faba bean production. As a result, faba bean is treated as a minor crop but its value in the market is premium. Where it is grown, they grow it for its beans for home consumption and source of family income in the market, and its straw is a good source of livestock feed. Faba bean is sown in pure stand as well as in relay cropping with potato in rows after the potato crop has been matured. The benefit of the crop as N fixing crop and its ability to improve soil fertility for the ensuing crops comprehended by farmers. Faba bean growing farmers save seeds from the previous crops for the next season production, or buy seeds from the market from peer farmers. Improved faba bean genotypes and faba bean seed supply chain do not exist in the district. Hence, there is great expectation among

farmers and development agents from IFA project in changing this situation in the future.



**Figure 1.** FPR farmers evaluating the performance of improved faba bean genotypes in Gashena Ephrata, Meskelua village

Faba bean FPR is being conducted in the fields of three host farmers. Farmers named Ayana and Yihunie hosts baby trials and Workneh hosts mother trial. Gashena Ephrata, Meskelua village and the surrounding area is seemingly suitable for the production of faba bean. In the FPR fields, the eight faba bean genotypes showed good stand growth but with great variation in plant height, pod size and number, and chocolate spot and faba bean gall diseases resistance. Most genotypes and plants did not bear pods to the full length of the stem; presumably, flowers were aborted because of the heavy rain that was coincided with flowering during mid-September. Some farmers suggested late July planting of the crop may solve the problem, and the others argue that planting date may not be the cause of the problem as the size of the rain is unpredictable these days.

During the farmers' field day that was conducted on 04 November 2021 a group of 10

farmers allowed to blindly evaluate eight faba bean genotypes (7 improved + 1 local) based on a number yield and yield related traits. At this pod bearing stage of growth, farmers selected 3 genotypes as best performing cultivars based on plant stand, pod size and number, and disease resistance. These 3 genotypes are among the newly introduced genotypes by ARARI that showed greater potential to yielding ability as compared to the local check and the remaining others.

On the other side of the communal administration, at Gashena Akayta, Gubita village faba bean has never been grown at least in the last decade. The reason given by FPR farmers is the soil and the weather are not suitable for faba bean production. Previously, we tried to grow, they said, but at its young stage the plants faltered and faded in our eyes, and this may be due to the recurrent frost occurring in the area and faba bean gall disease. On the other hand, Atinkut Abera, Coordinator of Development Agents in the site within Banja District Office of Agriculture, argues that the main problem in this locality for faba bean production is soil acidity. He indicated the soil pH of the site ranges between 4.5 and 5. Abebe Wubet, a crop expert adds waterlogging and faba bean gall disease on top of soil acidity as major stresses affecting the production of the crop. The statement on soil acidity by Atinkut is supported by the soil analysis result of ARARI. Accordingly, the

site experiences a soil pH of 4.8 and the exchangeable  $Al^{3+}$  is 3.1 (ARARI soil analysis report). During the next cropping season of 2022, University of Helsinki in collaboration with ARARI will conduct a field experiment to test its four outstanding faba bean genotypes for acidity tolerance under limed and not-limed treatment conditions. This is part of the University's (UH) effort to introduce acid tolerant genotypes in the area and bring back faba bean into production where its production was abandoned due to soil acidity.

### **Teff**

In Banaja district, teff production is entirely linked with early varieties that have an ability to escape the erratic frost occurring at the end of November and beginning of December. Currently, improved teff varieties are not known by farmers in the visited sites. Farmers grow local early maturing teff variety called Debo (Yedega teff) year after year. Previously, there was another variety called Fesso that could mature within 90 days, but this variety was no more under production due to its susceptibility to disease.

ARARI conducts teff FPR using 10 (9 improved + 1 local) varieties. The FPR sites are located in Gashena Akayta, Gubita village and 3 farmers namely Yirgedu and Berhanu host baby trial and Yetwale hosts mother trial. Out of the ten, 6 of them are red-seeded types and 4 of them are white-seeded types (the local check is red). These varieties during the field

visit are at good condition and the appearance of the crop stand is encouraging. However, Yirgedu, one of the host farmer is not sure whether these varieties can manage to escape the frost that may occur during head bearing stage. **She said ‘for me the best variety is the one that escapes the frost occurring during panicle formation’.**



**Figure 2.** FPR farmers evaluating the performance of improved teff varieties in Gashena Akayta, Gubita village

Teff FPR farmers participated during the farmers day and compared the ten teff varieties based on height, tillering ability, earliness, and disease resistance. Up to 16 tillers were counted. From the varieties under investigation, farmers are highly interested in 3 improved varieties. However, their performance is yet to be seen at the end of harvest.

### **Highland Maize**

Due to the cool weather conditions in Banja that relates to its location in high altitude, maize production is highly limited in the backyard for home consumption. ARARI is testing 5 improved highland maize varieties in

order to introduce high yielding varieties in the locality. Three farmers host the baby and mother trials.



**Figure 3.** Highland maize stand in mother trial plots in Gashena Akayta, Gubita village

The highland FPR plots are in an excellent condition and the farmers are more interested in two outstanding varieties based on the scores on plant height (stalk size and biomass), ear number and size. Big stalk with larger biomass after harvest will provide animal feed and fuelwood for home cooking. Aschalew Yismaw, an expert in Office of Agriculture, expects from this FPR high yielding and gray spot disease resistant maize variety.

### **Conclusions**

Discussion with farmers and development agents indicated that there is greater expectation from the project. Disease, waterlogging and acid soil resistant faba bean genotype is highly sought by farmers. Early variety that can escape the erratic frost occurring at the later stage of teff development is the priority in Banja. Seed color and other parameters sounds secondary.