

ORIGINAL ARTICLE

Pre-scaling up of improved faba bean with bio-fertilizer in geta, and mierab azernet woreda

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Faba bean is the major pulse crop grown in Ethiopia and has an important place in the national diet in the country and is consumed in various forms for its high protein content. It has an important role in improving soil fertility by fixing nitrogen from the atmosphere in association with bacteria, and it is used in crop rotation with cereal crops. Even though, faba bean has paramount importance, it has principle production constraints like poor fertility, especially nitrogen deficiency. The application of biological fertilizers, indeed, has an incremental effect on the yield performance and productivity of crops. Hence, the aim of this activity was to demonstrate and popularize faba bean with biological fertilizer on productivity. The activity was conducted at, Geta woreda in (Fereze) kebele and Mierab Azernet woreda (Garmo) Kebele. The woredas were selected purposively based on the potential of faba bean production and they are AGP-II woredas from our mandate areas. The beneficiaries of the activity were mala 104 female 45. The seed rate 130 kg/ha, NPS 100 kg/ha and FB1036 Bio-fertilizer 4 packets per hectare were used. The number of participants during field day farmers male 122 female 51 total 173; researchers male 19 female 2 total 21; woreda experts and DAs male 3 female 1 total 4. The average yield of the Merab azernet woreda was 4.53 and average yield of Geta woreda was 43 qtl/ha. This shows that, the application of biological fertilizers has positive effect on the yield performance and productivity of the faba bean. Therefore the geta and Merab azernet woreda should transfer the technology in large scale demonstration widely.

Keywords: Bio-fertilizers, Faba bean, Pre-scaling up.

Introduction

Faba bean (*Vicia faba* L.) also referred to as broad bean, horse bean and sometimes field bean, occupies nearly 3.2 million ha worldwide (Torres *et al.*, and CSA, 2006). In Ethiopia, faba bean is grown in the highlands (1800-3000 m.a.s.l.) where the need for cold temperatures is met Asfaw *et al.*, 1994; ICARDA, 2006 and Samuel, *et al.*, 2012). Faba bean is the major pulse crop grown in the country and has an important place in the Ethiopian national diet and is consumed in various forms for its high protein content. It can be used as a green vegetable or dried, fresh or canned in the Middle East, Mediterranean region, China and Ethiopia. The stalks are also used as firewood for cooking, and may be composted. The faba bean has an important role in improving soil fertility by fixing nitrogen from the atmosphere in association with bacteria, and it is used in crop rotation with cereal crops. The crop can be grown for green manure, silage, cover crop, and animal forage. Even though faba bean has paramount importance it is challenged by production constraints like poor fertility, especially nitrogen deficiency. Therefore, chemical fertilizers are considered a limiting factor, but rarely used on the agricultural system because of their scarcity and high cost. An alternative source for (Yohannes, 2000 and FAOSTAT, 2014) nutritional elements is required for improvement of faba bean production that minimizes environmental pollution. Therefore the objective of this study was pre-scaling up of improved faba bean variety with bio fertilizer in geta and mierab azernet woreda to analysis the effect on the yield performance and productivity of the crop.

Objectives

- To raise farmers knowledge and skill on improved faba bean with bio-fertilizer production and management practices.
- To gather the feedback of farmers about the technology and its packages.
- To enhance the production and productivity of the faba bean technology.

Materials and Methods

Description of the study area

Geta district is located in Gurage Zone and is 98 km away Wolkite. It includes 14 rural kebele where its altitude ranges from 2,400 to 3,200 m and its agro-ecological zone is divided to dega (90%) and woina dega (10%) with an average minimum and maximum annual rainfall of from the 1001 mm to 1400 mm and the mean annual minimum and maximum temperature from 7.5% to 20%. The district is bordered to the south by Endegan woreda, to the east Gumer woreda and Silte Zone, to the north by Geta woreda and to the west by Enamuri woreda. The district has red and brown soil types, with a total land of 16580.32 ha. The main economic activity of the woreda is agriculture. The dominant crops grown in the district are barley, wheat, bean, pean, maize and enset (GWAO, 2021).

Location and farmers selection process

This activity was conducted at, Geta and Mieras Azernet woreda and they were selected purposively based on the potential of faba bean production and they were AGP-II woreda from our mandate areas. In communication with the woreda agricultural office and the extension department, potential kebele were selected in order to conduct the demonstration activity. Accordingly, Fereze kebele from Geta woreda and Garmo Kebele from Mieras Azernet woreda were selected. Afterwards, relevant and timely communication was made with kebele extension agents total 149 farmers were selected based on their willingness and availability of land in cluster. Farmers around testing and multiplication sites was given due attention in order to make them beneficiary. 15 ha of land from each kebele were covered (Table 1).

Table 1. Number of beneficiaries from each kebele.

Kebele	Male	Female	Total
M/Azernet	44	19	63
Fereze	60	26	86
Total	104	45	149

Implementation procedures

The communication was made with Woreda experts, kebele extension agents and farmers to make the conduction of the activity convenient and smooth. All necessary awareness was created through trainings and discussions with the participation of all the concerned stakeholders. The training was more focused on the aim of activities, land preparation, ways of input use (how to use biofertilizer), and management up to harvesting stage. A total of 97 participants including women were trained on the aim of demonstration basically on agronomic practice. The inputs were collected and distributed on time. The distance between people to people is far due to COVID-19 (Fig. 1).



Fig. 1. Awareness was created through trainings and discussions with farmers during farmers' selection with a total of 97 participants.

Agronomic practice

The variety applied were Tumisa which is currently popular and high yielding. All the needed inputs were provided by the center on time like seed 130 kg/ha, NPS 100 kg/ha, FB1036, 4 packet per hectare of Bio-fertilizer and other necessary chemicals were applied according to up to date scientific recommendations. Before sowing, farmers prepared their land appropriately and sowed the variety in rows by using 40 cm between rows and 10 cm between plants. All necessary management was done so far like weed management.

The responsibility sharing and the way of follow up

All responsible bodies were participated, the worabe agriculture research center by facilitating the logistics and inputs; Extension researchers were participated fully started from developing the activities up to its achievements through all stages and finally the woreda experts and DAs were participated by giving the potential kebele and model farmers. After sowing, relevant follow up had been preceded appropriately and conducted in depth in communication with concerned stakeholders. Weed management, disease and pest control, data collection and other related activities conducted accordingly.

Evaluation and data collection

Stage wise evaluation had made with concerned bodies and farmers. Evaluation of the varieties at different stages had been conducted in participation of farmers, researchers and kebele DAs. Especially, during germination, flowering and harvesting times, farmers took a chance to evaluate the varieties through observation.

Field days: It has great role on demonstration and popularization of new technologies because it gives the chance for the farmers to learn through observing on the field. Thus, in order to demonstrate and popularize the technology widely, Field days were arranged and all concerned stakeholders were invited at the end of the days. Relevant data such as samples of yield at the field, farmer preferences etc were gathered and success stories and case studies were developed as the part of the report (Table 2) (Fig. 2 and Fig. 3).

Table 2. Total participants during field day.

Kebele	Farmers	Researchers	Experts and DAs	Total
M/azernet	68	6	2	76
Geta	105	15	2	122
Total	173	21	4	198



Fig. 2. Field day at the field or site of the activity. The number of participants during field day farmers male 122 female 51 total 173; researchers male 19 female 2 total 21; woreda experts and DAs male 3 female 1 total 4.



Fig. 3. Field day after field or site of the activity in order record farmers perception.

Results and Discussion

The sample of yield estimation was taken from farmers and calculated in order to estimate the yield of the variety. Hence, the average or mean yield was 42.72 Qt/ha the maximum and minimum yield being 50.625 and 34.875 Qt/ha, respectively Table 3.

Table 3. Yield amount of the variety.

Location	Min	Max	Mean
M/Azernet	34.875	47.25	42.525
Geta	36	50.625	42.939
Total	34.875	50.625	42.72

Conclusion

Faba bean is the major pulse crop grown in Ethiopia. It has an important role in improving soil fertility by fixing nitrogen from the atmosphere in association with bacteria, and it is used in crop rotation with cereal crops. Nitrogen deficiency is one of the constraints of faba bean production and productivity. The application of biological fertilizers has an incremental effect on the yield performance and productivity of crops. Hence, the aim of this activity was to demonstrate and popularize faba bean with biological fertilizer on productivity. The activity was conducted at, Geta woreda and Mierab Azernet woreda. The woredas were selected purposively based on the potential of faba bean production and they are AGP-II woreda from our mandate areas. The beneficiaries of the activity were mala 104 female 45. The seed rate 130 kg/ha, NPS 100 kg/ha and FB1036 Bio-fertilizer 4 packets per hectare were used. The number of participants during field day farmers male 122 female 51 total 173; researchers male 19 female 2 total 21; woreda experts and DAs male 3 female 1 total 4. The average yield of the Merab Azernet woreda was 42.53 and average yield of Geta woreda was 43 qtl/ha. This shows that, the application of biological fertilizers has positive effect on the yield performance

and productivity of the faba bean. Therefore the geta and Merab Azernet woreda should transfer the technology in large scale demonstration widely.

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References

- Torres, A.M., Roman, B., Avila, C.M., Satovic, Z., Rubiales, D., Sillero, J.C., Moreno, M.T. (2006). Faba bean breeding for resistance against biotic stresses: towards application of marker technology. *Euphytica*, 147:67-80.
- CSA (Central Statistics Authority). (2006). Agricultural Sample Survey Report, Addis Ababa, Ethiopia, 2007.
- Yohannes, D. (2000). Faba bean (*Vicia faba*) in Ethiopia. Institute of Biodiversity, Conservation and Research (IBCR). Addis Ababa, Ethiopia, p: 43.
- FAOSTAT. (2014). Food and Agriculture Organization of the United Nations. Rome, Italy.
- ICARDA (International Center of Agricultural Research in the Dry Areas). (2006). Technology generations and dissemination for sustainable production of cereals and cool season legumes international center for agricultural research in the dry areas, Aleppo, Syria.
- Sahile, S., Abang, M.M., Fininsa, C., Ahmed, S., Sakhuja, P.K., Baum, M. (2012). Pathogenic and genetic diversity of *Botrytis fabae* Sand. isolates from faba bean fields in different agro-ecological zones of Northern Ethiopia. *Archives of Phytopathology and Plant Protection*, 45:1218-1236.
- Asfaw, T., Tesfaye, G., Beyene, D. (1993). Genetics and breeding of faba bean. In Coos-season Food Legumes of Ethiopia. Proceeding of the First National Cool-season Food Legumes Review Conference, pp: 16-20.

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