



## Pre-scaling up of improved faba bean technologies in the highland districts of Guji Zone, Oromia regional state, Ethiopia

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### ARTICLE HISTORY:

**Received:** 04-Dec-2017

**Accepted:** 11-Jan-2018

**Online available:** 26-Jan-2018

### Keywords:

Faba bean,  
Gebelcho,  
Walki,  
Farmers

### ABSTRACT

Pre scaling up of Gebelcho and Walki was conducted in the highland districts of Guji Zone during 2014/15-2015/16 year to increase farmers' capacity in production and management practices of faba bean. Two kebeles from each two districts namely Bore and Ana Sora were selected purposively based on their potential for faba bean production. From each kebele nine farmers were selected for the activity making it a total of 72 farmers for the two years. Depending on the capacity of farmers 50kg-100kg of faba bean was given for the selected farmers. Around 24.5ha was covered by the crop during the production years. Training was also given for participating farmers and others on production packages of faba bean. Exchange visits and mini field days were arranged for further promotion. The yield gained from the varieties was 33.76qt/ha and 27qt/ha from Gebelcho and Walki respectively. Both varieties were found to be acceptable during field days by farmers due to their disease tolerant capacity. Thus, highland farmers are recommended to use Gebelcho and Walki varieties to increase faba bean production and generate income for their livelihood. Further dissemination of faba bean is expected from seed multipliers in producing quality seed and addressing potential areas.

### Contribution/ Originality

Contrary to existing studies, who looked at the adaptation of different crop varieties on small plot area and on few farmers, this study focused on larger area. This study emerged from the results of adaptation and demonstration of faba bean. Based on farmers' preference criteria during demonstration the selected varieties of faba bean where needed for pre scaled up for further promotion of faba bean on larger area in similar agro ecology.

DOI: 10.18488/journal.1005/2017.7.6/1005.6.115.119

ISSN (P): 2304-1455/ISSN (E):2224-4433



**Citation:** Basha Kebede and Dembi Korji (2017). Pre-scaling up of improved faba bean technologies in the highland districts of Guji Zone, Oromia regional state, Ethiopia. Asian Journal of Agriculture and Rural Development, 7(6), 115-119.

## 1. INTRODUCTION

Faba bean (*vicia faba L.*) is one of the major pulse crops grown in the highlands (1800 – 3000 masl) of Ethiopia (Temesgen and Aemi, 2012). Faba bean is a protein-rich leguminous crop cultivated and consumed as human food in Ethiopia. Its straw is also used as animal feed during feed shortage. Furthermore, faba bean plays a significant role in improving the productivity of soil by fixing atmospheric nitrogen and is a suitable rotation crop for cereals. A major benefit of rotating pulse crops, such as faba bean with cereal crops is in compensation or response to low soil fertility as well as in the interruption of diseases and insect pest cycles (Barri and Shtaya, 2013). Among pulses, faba bean accounted for 31.4% (CSA, 2015). However, the productivity of the crops under smallholder farmers is not more than 1.89 t ha<sup>-1</sup> (CSA, 2015).

Despite the immense economic and ecologic merits, however, the productivity of faba bean, in Ethiopia is far below the potential due to a number of biotic and abiotic constraints, socioeconomic constraints in smallholder farms and inadequate technological interventions. Shiferaw *et al.* (2013) also mentioned the productivity of faba bean is far below expected potential due to low input usage, natural disasters like snow storm, depletion of macronutrient from cultivable land and unavailability of essential nutrients such as phosphorus.

The production of faba bean in the highlands of Guji Zone is well known. Faba bean serve as source of household food in the form of *kik wot* and *shumo* prepared during *Jigi*. Faba bean is also used as cash crop since the crop has high market price that brings high returns to the farmers. However, most highland farmers use local varieties which are not disease resistant that lead to low yield. Therefore, to over-come lack of improved seed and disease resistant variety the pre scaling up of improved faba bean technologies were initiated in the highlands of Guji Zone.

### 1.1. Objectives

- To scale up improved faba bean varieties in the community
- To increase production of faba bean in the highlands of Guji Zone

### 1.2. Description of the study areas

The experiment was executed at Bore and Ana Sora districts during the main cropping season of 2014/15 and 2015/16 under rain-fed condition. Bore and Ana Sora was situated at a distance of 385km and 410km from Addis Ababa to the South respectively. The districts have similar agro ecology where diverse crops such as bread wheat, food barley, horticultural crops (mostly potato, enset, garlic and head cabbage) and highland pulse crops (faba bean and field pea) were largely produced in each district. Both the districts were potential highland producers of faba bean in Guji Zone. The districts have longer growing season for the production major crops except for potato which has relatively a short maturity crop. In the districts there is high potential of honey production.

### 1.3. Sampling procedure

The pre -scaling up of improved Faba bean varieties were conducted at two (2) districts (Bore & Ana Sora). At each district two Kebeles were purposively selected based on their potential for faba bean production. From each Kebele nine (9) farmers were then selected having 0.25-1ha of land for each variety (Gebelcho and Walki). The amount of land used was based on the capacity of farmers to purchase fertilizer and perform management practices needed for faba bean variety. Generally, 72 farmers have participated and planted the two faba bean varieties in the study areas.

## 2. METHODOLOGY

For scaling up of faba bean varieties 49 quintals of two improved faba bean varieties (29 quintals of Gebelcho and 20 quintals of Walki) were freely distributed for selected farmers while fertilizers and managements were applied by farmers themselves. This was done based on agreement (cost sharing)

that enables ownership of farmers on the activity which in turn sustain the scaling up of varieties in the community. Cost sharing is also important for agricultural research centers because it reduces cost of research and providing all technologies and with their packages for farmers is impossible. Seed delivery alone does not ensure dissemination and scaling up of varieties in the community at a time. Seed producers should provide initial seed for farmers during crop production season and should arrange exit strategy (give mandate for agricultural actors) by preparing a workshop at the completion of the activity. In our case we delivered 800kg of faba bean (400kg of Gebelcho and 400kg Walki) for exit strategy in Bore and Ana Sora districts during the production year of 2017.

Trainings, exchange visit, leaflets and field days were the most approach used to popularize the faba bean varieties in the districts. Field day was arranged with collaboration of agriculture and natural resource office of respective district. Before the field day organization, the activity and performance of the faba bean varieties were monitored and evaluated.

### 2.1. Method of data collection

Regular interaction with participating farmers, key informant and focus group discussion were used to collect the yield data. Data was collected on technical data sheet. In order to present uniform results the farmers' yield data was adjusted to quintal per hectare (1quintal=100kg).

### 2.2. Data analysis method

Simple descriptive Statistics was used to analysis the data.

## 3. RESULT AND DISCUSSION

### 3.1. Training and Field days

Training was given for 144 farmers on the productivity of improved varieties of this crop with its all packages for both farmers who got seeds and who not got seeds in order to share information on the technologies. Mini field day was arranged at Bore district of Ano Kerensa Kebele and Ana Sora of Irba Buliyo Kebele to share experience among farmers and PAs participating on the activity. During the occasion farmers, DAs, experts were satisfied by observing the performance of delivered technologies farmers' land. On self-initiation, farmers, DAs and others encouraged to work together in similar activities. Around 140 farmers, 11 DAs 18 experts, two administrators (from each district) and six researchers attended and observed the yield advantage of the improved varieties over the local varieties. This field visit created a pressure of a good linkage among farmers, DAs and other participants on future research activities.

### 3.2. Yield performance faba bean varieties

From the pre scaling up of faba bean varieties in Guji zone the higher yield (33.76qt/ha) was obtained from Gebelcho variety while Walki variety only gave 27qt/ha. The current study states that faba bean production in Guji zone is at its maximum potential when compared to the production yield obtained by [Kissi et al. \(2016\)](#) which was 28.65 qt/ha in the highlands of Bale.

**Table 1: Yield of improved faba bean varieties scaled up**

Variety	Yield from Bore district (qt/ha)					Yield from Ana Sora district (qt/ha)					Average yield (qt/ha)
	2014/15		2015/16			2014/15		2015/16			
	Ano Kerensa	Abay Kulture	Ano Kerensa	Ano Kulture	Ave	Irba Buliyo	Bube Korsa	Irba Buliyo	Bube Korsa	Ave	
Gebelcho	40	46	22	24	33	48	44	26	20	34.48	33.76
Walki	34	36	18	20	27	9.5	32	22	20	27	27

The above table revealed that during 2014/15 production season the production of faba bean was higher than that of 2015/16 due to occurrence of frost and disease (chocolate spot) attacking the crop in 2015/16. Being affected by frost and disease the productivity of improved faba bean was higher than locally disseminated faba bean as farmers were interested to produce improved faba bean varieties during focus group discussion. Ana Sora district was higher faba bean productivity than Bore district. Gebelcho has higher yield than Walki variety.

#### 4. CONCLUSION

The pre scaling of faba bean in Guji Zone was conducted in the highlands of Ana Sora and Bore districts to increase the production of faba bean in the community. Faba bean is potential crop in the highlands of Bore and Ana Sora districts. The crop is used for household consumption as well as cash crop in generating income for farmers. Not only used for consumption and generate income for household faba bean but also used to keep the fertility of soil and thus contribute to increase productivity of subsequent crops. Training, exchange visit and mini field days capacitated farmers on production of faba bean. Gebelcho and Walki varieties were acceptable by farmers due to their productivity per hectare. Gebelcho and Walki variety has got acceptance by participants during mini field days.

#### Recommendations

- Highland farmers should use Gebelcho and Walki variety of faba bean in order to increase their faba bean production and generate more income for their livelihood.
- Further dissemination faba bean is expected from seed multipliers in producing quality seed and addressing potential area
- New adapted and disease resistant variety of faba bean should be adapted by research center

**Funding:** This study received no specific financial support.

**Competing Interests:** The authors declared that they have no conflict of interests.

**Contributors/Acknowledgement:** Authors would like to acknowledge OARI (Oromia Agricultural Research Institute) the then IQQO (Inistitiyuutii Qorannoo Qonnaa Oromiyaa) for their financial assistance. Farmers and development agents directly involved for the completion of pre scaling up improved faba bean research activity also heartily acknowledged. Author-1 Initiate the proposal and write the full paper Author-2 Support the writing of proposal and help the planting of varieties during 2014/15 year

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