

Participatory Evaluations of Mung Bean (*Vigna Radiata* L. Wilczek) Varieties in Selected Districts of East Shewa Zone, Oromia, Ethiopia

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Abstract

Adaptable Mung bean varieties to East Shewa zone of central rift valley of Oromia, Ethiopia were demonstrated to the farming communities in selected districts of Dugda and Adami Tulu Jiddo Kombocha. Varieties namely shewarobit, Beroda and Rasa N-26 were demonstrated with objectives of evaluating the yield performances of adaptable mung bean varieties in the study areas, to improve farmers knowledge and skill on mung bean production and management technology index a minimum gap between the demonstration yield and the potential yield was recorded for all varieties, revealing a comparable performance and the feasibility of all demonstrated varieties under farmers' circumstances. Scaling up works on Shewarobit variety is recommended for similar agro ecologies. Shewarobit variety has also less yield gap when compared with Rasa N-26 Variety.

Keywords: Adaptable; Mungbean; East shewa; Demonstration

Introduction

Mung bean, *Vigna radiata* (L.) Wilczek, which is also called Green gram or maash is an annual food legume belonging to the subgenus *Ceratotropis* in the genus *Vigna* [1]. Mung bean is originated from India and it has diversified to East, South, Southeast Asia (China) and some countries in Africa. It is a warm season annual legume which is a drought resistant crop with an optimum temperature range of 27- 30°C for good production. It is early maturing crop, requiring 75–90 days to mature. Best adaptation areas for Mung bean are at 1,000-1,650 meters above sea level; with annual rainfall of 600-750mm.

Mung bean can be produced for food and fodder purposes varying from place to places [2]. It is a nutritionally rich crop with significant protein and carbohydrate contents important for human beings. According to Prakit and Peerasak the crops is utilized in several ways, where seeds, sprouts and young pods are consumed as sources of protein, amino acids, vitamins and minerals, and plant parts are used as fodder and green manure. Furthermore, mung bean has a potential to make up the gap of protein shortage since its seeds are rich in protein and amino acids, thus serve as a protein source for human consumption.

In Ethiopian context it is a recently introduced pulse crop produced majorly in the north eastern part of Amhara region (North Shewa, Oromiya special zone and Southern Wollo, Gonder), SNNPR (Gofa area) and pocket areas in Oromiya region (Hararge, Ilubabor), Tigray [3]. Mung bean productivity in Ethiopia is estimated to be on average 0.9 ton/ha–1) with a volume of production is increasing year to year; whereas the world average productivity is 1.2ton/ha–1 [4].

It is majorly produced as a cash crop to generate income by selling it to exporters (ECX, 2019). Currently, the Ethiopia Commodity Exchange (ECX) also announced the entrance of the crop, Green Mung Bean, into its trade floor. Green Mung bean is the sixth product that ECX is trading. According to ECX In 2015/2016, Ethiopia exported a total of 30,694 MT of green Mung bean with a value of 35.8 million USD. Compared to export performance of 2014/2015, the export

volume and value grew up by 21% and 23%, respectively. The major export destinations for Ethiopian green Mung bean are: Indonesia, India, Belgium, UAE, and Singapore. Other major global players in Mung bean import comprises: USA, Netherlands, UK, Canada, France, Germany, Norway, Sweden, and Malaysia.

Despite increases in potential export markets as well as internal markets, the production is limited to certain areas with no considerable improvement in quantity. Yet, the crop has adaptability to different areas serving both the nutritional benefits as well as cash crop. To this end, adaptability trial of released varieties of mung bean has been conducted by Adami Tulu Agricultural Center for a possible introduction in the farming system of East Shewa zone, the central rift valley area of Oromia, Ethiopia. The study was conducted for two consecutive years across three locations. Accordingly, promising results with no significantly varying productivity have been found indicating adaptability. The results indicated that Shewa Robit variety had higher grain yield (1607.4 kg/ha) followed by N-26 (1542 kg/ha) and Beroda (1466.1 kg/ha). Thus, based on the results, a follow up demonstration and evaluation has been recommended.

Thus, this proposal activity was initiated to evaluate and demonstrate these adaptable mung bean varieties to the farming community of East Shoa zone with the following specific objectives.

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Objectives

To evaluate the yield performances of adaptable mung bean varieties under farmers' conditions in selected districts of East shewa zone.

To analyse the financial return of Mung bean production under farmers circumstances in the study areas

To improve farmers knowledge and skill on mung bean production and management

To create awareness about the importance of the technology to different stakeholders

Materials and Methods

Description of the study areas

The study was conducted in selected districts of East shewa zone. East shewa zone is one of the administrative zones of Oromia regional state, Ethiopia. The zone has an area of 10241km² and Adama town is serving as the capital town of the zone. There are 10 districts within the zone, among which Dugda and Adami Tulu Jiddo Kombolcha districts are the study districts where this demonstration activity took place.

Dugda district is located at 135km from the capital city of Ethiopia, Addis Ababa and 100km from Oromia region's and East Shewa's zonal capital Adama. The district covers 5.2% of East Shewa zone with an area of 751km². Dugda has 18 Kebele's among which one kebele was used for this study. The district has an average 636mm annual rainfall and 26°C average temperature. The major crops produced are wheat, teff and maize

Adami Tulu Jido Kombolcha district is located at 160 km from the capital city of Ethiopia, Addis Ababa and 115 km from Oromia region's and East Shewa's zonal capital Adama. The district lies at latitude of 7.58°N and 38.43°E longitudes. Its altitude ranges from 1500 to 2300 meters above sea level. The mean annual rainfall ranges from 750-1000mm and the distribution is highly variable between and within years. The mean annual temperature ranges from 22-28°C. Mixed crop-livestock farming system characterizes the agriculture of the district.

Map of the study area (Dugda and Adami Tulu Jiddo Kombolcha)

Site and Farmers selection

Sites were selected in collaboration with district offices of Agriculture. Two districts were involved (Dugda and Adami Tulu Jiddo Kombolcha). In each district 2 Kebele's were selected, so a total of 4 Kebele's were selected in the two districts. One FRG (Farmers research group) having 15 farmers was organized in each Kebele among which 3 were trial farmers. Totally, the demonstration activity involved twelve (12) trial farmers.

Planting materials: Three of the adaptable mung bean varieties (Shewa robit, Rasa (N-26) and Beroda) will be used

Accordingly the combined analysis results indicate that there is no statistically significant yield difference at ($p < 0.05$) between the varieties. Better yield was obtained from shewarobit Variety 12.1 ± 1.34 qt/ha followed by Beroda (12.1) and Rasa N-26 (10.4) qt/ha respectively. The following table describes the result