Case study report on improved mung bean technology demonstration under North-West Ethiopia

Zeru Yimer Kebede
Pawe Agricultural Research Center (PARC), Pawe, Ethiopia

Abstract
Currently the production of mung bean in Ethiopia is challenged by multiple threats; among these were biotic, abiotic and socioeconomic factors (such as limitation of demonstration and prescale up of improved technologies). Thus, on October 22, 2021 an organized improved mung bean technology demonstration was implemented with the aim to demonstrate the field performance of mung bean varieties (NVL-1, N-26, Shoarobit and MH-97-6) and to incorporate variety selection trends or means of farmers under pawe agricultural research center premises. A total of 66 participants involved during the event (among were farmers, agricultural experts and researchers). Based on the observations made under the field condition each group of the participant has its own variety selection criteria but some of them share more or less similar criteria. Small scale farmers (both male and female) variety preference criteria were more numbers of pods per plant, more numbers of seeds per pod, high yield, uniformity, pest and disease tolerant, short duration, even high biomass and overall field performance. Agricultural experts and researchers variety selection criteria were also similar with other groups. Generally the two improved mung bean varieties (NVL-1, N-26), among the tested, were selected by the groups. Hence, I recommend and suggest that the selected varieties has to be demonstrated in large area (Large Scale Demonstration) for the future and seed access for farmers must be given seriously so as to improve the production of mung bean in the study area.

Introduction
Ethiopia has the potential to produce more mung bean because currently there is availability of improved varieties and promising genotypes. A recent study conducted by (Teame et al., 2017) reported some promising mung bean genotypes identified by field research work.

In Ethiopia, mung bean covers about 49,123.52 ha of land and produces 557,928.53 quintals in main cropping season per annum with average productivity of 1.136 ton per hectare (CSA, 2019/2020).

According to (Yehuala Kassa, 2018) improved mung bean varieties have better yield potential and marginal rate of return. However; there is low technology adoption rate of crop varieties mainly mung bean. Similar study reported by (Umata, 2018) suggested that improved mung bean varieties had better yield advantage over the local check and hence further demonstration has to be conducted. As per (Degefa, 2016) report, improving mung bean genotypes has multidimensional importance for farmers.

So far to improve the agricultural sector ,Ethiopia has devoted, enormous amount of capital, skilled manpower, and implementation of working policy, subsidizing the agri-input materials, availability of financial sources, and others. Although several efforts made, by the concerned government and other stakeholders, previously but still our agricultural production is not improved as it expected (regardless of its potential).For this, multiple factors may contribute directly or vice-versa. According to (Nair et al., 2019) and (Yehuala Kassa, 2018) pests and diseases were major threats for the production of grain mung bean. Furthermore, abiotic factors like drought, salinity, climate change were also obstacles for the production of grain mung bean (Nair et al., 2019).

However, according to (Yehuala Kassa, 2018) report absence of improved mung bean seeds, pests and diseases, limited work on pre-scale up of improved mung bean varieties or technologies leads to low grain.

Participation scenario on the promotion and demonstration of proven agricultural technologies has played significant role in agricultural sector. To support this situation a review paper generated by (Yasin Goa, 2017) suggested that conducting of participatory approach in research and development programs is necessary.

Thus, this particular field work on mung bean technology demonstration and promotion is initiated with the objective to demonstrate field performance of lowland oil seeds and to identify small scale farmers' variety preference criteria.

Discussion
On October 22, 2021 cluster of field crops field demonstration was carried out with the objective to demonstrate field performance of lowland oil seeds (Soybean, Sesame, Groundnut) and lowland pulse crops like, common

bean and mung bean improved technologies or varieties, to identify small scale farmers' variety preference criteria and thereby to collect relevant information about the production challenges of these commodities from the participants.

This report is targeting only improved mung bean technology demonstration which was implemented at pawe agricultural research center during 2021 cropping season because other crops were to be reported by other researchers when needed.

The event took one day; the first program was visiting the whole field covered by lowland oil and pulse crops following that each improved varieties of these commodities were evaluated by two groups; the first group consisted small scale farmers and the second group or team contained both agricultural researchers, who actively involved in the improvement program of these crops, and district agricultural experts.

The demonstrated varieties were evaluated based on their traits like phenology (Days to maturity), and agronomic traits such as number of pods per plant, number of seeds per pod, yield potential, disease and pest reaction, biomass yield and overall field performance.

Majority of the participants selection criteria is almost similar, that is, they focused on time of maturity (because earliness is required by small scale farmers because they do not have enough time to carry out other farming practices), a greater number of pods per plant and a greater number of seeds per pod, disease reaction and general field performance. This selection scheme is common for the two groups.

The candidate improved mung bean technologies were NVL-1, N-26(Rasa), Shoarobit (the local check) and MH-97-6 (Boreda). Each of these varieties have their own merits(traits) that make differ from each other. Based on this trend the first two varieties, that is, NVL-1, N-26(Rasa) were selected by farmers and even by experts due to earliness and overall field performance followed by MH-97-6 (Boreda) and Shoarobit respectively. The unique feature of Shoarobit variety was high biomass which is good for livestock feed and important for cropping system (soil improvement activity).

The design implemented for this particular task was single plot having each candidate improved mung bean technology with 40-meter length and 40-meter width spacing. Following this each variety has 1600 square meter area.

Regarding on field day demonstration totally 66 participants were taking part, from this figure 34 were small scale farmers among them 6 were female growers and 32 experts, including researchers, involved during the event among which 8 were female experts (See [Table 1] and [Table 2] below).

Table 1: Improved mung bean technology demonstration event participants (Farmers)

No.	Small scale farmers	Sub-total
1	Male	28
2	Female	6
Total		34

Female farmers selection criteria are quite different from male farmers' selection trend such as targeting on marketing access, storage pest tolerance and cooking ability of the cultivars and early maturity were some of the traits.

Table 2: Improved mung bean technology demonstration event participants (Researchers and Experts)

No.	Researchers and Experts	Sub-total
1	Male	24
2	Female	8
Total		32

After field visit, we made general discussion focusing on what we observed on the field and what we have set about future plan; with this participant farmers and experts provided their reflections on different issues among these what inspired them was the performance of mung bean varieties mainly those matured early (NVL-1, and N-26), plus to that they raised pertinent questions like: what makes significant difference among the cultivated mung bean varieties? How much amount of synthetic fertilizer did we applied on the farm? How can the research team control the ever-coming pests and diseases? Weeding frequency? When and where can they get seed?

Responsible researchers and other management agents gave appropriate answers to raised issues and questions during the occasion.

Concluding remark

currently the interest of farmers on cultivating various pulses is increased due to many factors such as suitable agroecology, the reasonable price of their produce(ECX, 2018),direct use for home consumption (in different ways), access to improved seeds (for some varieties), nearby support from technical experts, government investment, job creation, establishment of agro-industries, and others. Due to this, their livelihood and life getting improved from time to time.

When I come to this, occasion, mung bean technology field day demonstration it achieved its object properly and we, the research team, gathered information how to modify the production and productivity of mung bean of the current ecology as well as the country for the coming season. We strongly struggle to supply improved mung bean seed to growers as per their request.

Acknowledgement

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