



Research Article

Improved Midland Maize (*Zea mays L.*) Varieties Demonstration at Western Harerghe Zone of Eastern Ethiopia

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Abstract

The research activity was carried out with the objective of evaluating and identifying adaptable improved maize varieties and to familiarize farmers with maize production techniques. It was executed at Badessa and Doba district of Western Harerghea Zone in main cropping season of 2019. The variety selection process was carried out from different dimensions including utilization, marketing and field performance. Maturity period, cob size, seed size, grain color, disease and pest tolerance/resistance, market demand and yield were identified as important farmers criteria in the trial sites. Using these criterias the farmers identified varieties that suit their respective location. Accordingly, trial farmers showed special interest to BH 546 and BH 547 varieties. As the preference of the farmers in each sites have already been identified, it will be productive if the extension service consider farmers' preferences in varietal promotion activity and are recommended for further scaling up to reach large small holder farmers through government organizations, Non-government Organizations, research institutes and other stakeholders works on maize technology promotion.

Introduction

Maize (*Zea mays L.*) is one of the worlds' three primary cereal crops. It occupies an important position in world economy and trade as a food, feed and industrial grain crop. Maize holds a unique position in world agriculture as a food, feed for livestock and as a source of diverse, industrially important products.

Maize is one of the most important cereal crops in Ethiopia. It is an important field crop in terms of area coverage, production and utilization. It ranks second in area coverage and first in total production [1]. It is grown for its food and feed values and one of the most important staples and cash crops and the main sources of calories [2].

In Eastern Ethiopia, maize is the second crop both in productivity and in production [1]. It is the most extensively cultivated food crops and the main source of calories in western, southern and eastern parts of Ethiopia [3].

The low productivity of maize is attributed to many factors like frequent occurrence of drought, declining of soil fertility, poor agronomic practice, cease/limited use of fertilizer, insufficient technology generation and adoption, lack of credit facilities, poor seed quality, disease, insect, pests and weeds. One of the major problems constraining the development of an economically successful agriculture is nutrient deficiency [4].

In most parts of Western Harerghea midland, small scale maize production gradually become permanent activity for different purpose. However, the production and productivity is very low. Therefore, there is strong interest from farmers to replace the currently growing low yielding varieties by improved maize variety. Different research centers releases different technologies of maize. However, demonstration of these varieties with their production package is not done widely in order to popularize the variety in the area. So, demonstrating improved maize varieties on farmers field are

the main tools for enhancing the adoption of technologies and to assess farmers' feedback to tackle the problem which cause lack of food security.

Therefore, this activity was designed to demonstrate the various improved midland maize varieties to farmers in major maize growing areas of Western Harerghea Zone, particularly, in Bedessa and Doba districts.

Objectives

- To create awareness among farmers, developmental agents and other participant stakeholders on improved maize production technology
- To build farmers' knowledge and skill of production and management.
- To strengthen linkage among stakeholders and collect farmers preference feedback informations.

Material and methods

Site and farmers selection

The activity was carried out at Bedessa and Doba districts Western Harerghea Zone of Oromia region in 2019 main cropping season. The demonstration of the trial was implemented on 20 farmers' fields based on their interest towards the technologies, willingness to manage and allocate field trial for the activity.

Implementation design

Three improved midland maize varieties (BH 546, BH 547 and SBRH) and one local check were used for the study. The varieties were replicated across ten trial farmers per districts. Each variety was planted on unreplicated plot design of plot size 10mx10m with total land size of 40mx40m at seeding rate of 25–30kg/ha on each selected farmer land. A spacing of 75cm*25cm (Between row and plant). Fertilizers, 100kg/hr of DAP and 100kg/hr urea basis rate were applied as per the recommended.

Training, field visit and field-day organized

Multidisciplinary research team; crop, extension and socio-economic research team and other stakeholders (Office of Agriculture and Natural Resource) actively participated by sharing their experience and knowledge. Development agents, experts and farmers were participated on the training given on improved maize production and management, post-harvest handling and marketing information. Field day was also organized for more awareness creation.

Data collection and analysis method

Both quantitative and qualitative data were collected. The collected quantitative data were subjected to analysis using SPSS software version 20 (frequency, mean, standard deviation and range) while qualitative data collected using group discussion, key informant interviews, field observation and focus group discussion were analyzed using descriptive

statistics and preference ranking. A total of 60 farmers were used doing data collection time. Finally data from different sources were triangulated to get reliable information.

Results and discussion

Based on a pre-informed visit it was attempted to follow up the trial on average every two weeks. During each visit discussions were made with the farmers and DAs right on the trial field in order to jointly evaluate the performance of the varieties on the field. During the visit both farmer's and DAs' data recording format were checked to observe how they handled the information gathering process.

Yield performance across districts

In the two districts the varieties tested with twenty trial farmers as indicated earlier were BH 546, BH 547, SBRH and local varieties. The following figure describes the yield performances of the demonstrated varieties across the study sites. The average grain yield performance of the improved variety BH 546 had the highest, 86Qt/ha and 82Qt/ha, at Bedessa and Doba respectively. BH547 also the second high yielder at both districts which scores 79Qt/ha at Bedessa and 80Qt/ha at Doba. SBRH and the local variety were comparatively found in yield Figure 1.

Farmers' opinion/perception

Farmers' in the study area selected the best performing improved midland maize varieties by using their own criteria. Farmers set these criteria after having know-how about the variety and using those criteria they could select the varieties at harvest time. The opinion of those farmers on varietal preference was collected from participants during variety demonstration during farmers' field day. The major criteria used by farmers were grain yielding, diseases and pest tolerance, cobe size, earliness, seed size, grain color and marketability. Based on the above criteria's; farmers evaluated the varieties and ranked first BH546 followed by BH547. Therefore, the most farmers selected both improved varieties to reuse on their farm for the future.

Farmers selection criteria in each sites ranked the maize varieties are indicated in Table 1 below.

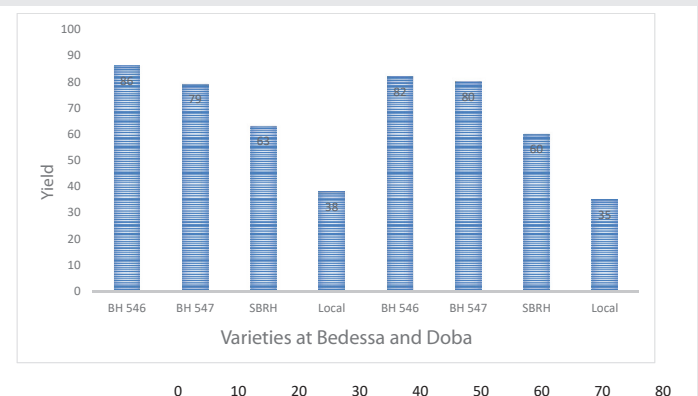


Figure 1: Average onfarm yield Performance at both districts.

**Table 1:** Overall farmers' decision and rank on the varieties performance at the study districts.

Bedessa and Doba District farmers (N-60)								
Varieties	Earliness	Cobe size	Seed size	Disease and Pest tolerance	Grain color	Marketability	Grain yield	Rank
	No.of Farmers	No.of Farmers	No.of Farmers	No.of Farmers	No.of Farmers	No.of Farmers	No.of Farmers	
BH 546	35	38	35	30	30	35	45	1 st
BH 547	15	20	20	20	23	21	13	2 nd
SBRH	7	2	5	8	7	4	2	3 rd
Local	3	0	0	2	0	0	0	4 th

Conclusions

In general, maturity period, cobe size, seed size, disease and pest tolerance/resistance, grain color, market demand and grain yield were identified as important farmers criteria of selection. The farmers have identified, using the above criteria, the varieties that suits their respective location. Accordingly, the trial farmers showed special interest to BH 546 and BH 547 improved midland maize varieties.

Recommendation

Based on the preference showed by the farmers and field performance of the improved maize varieties BH 546 and BH 547 in that order are best recommended in Bedessa and Doba districts of Western Harerghea Zone. It is believed that the order of importance may change depending on the behavior of the market, nevertheless, fitness to the target environment and preference by the farmers remains in this activity as a proof for significance of the varieties in the respective locations. It was observed that there is a better scope to improve productivity by improving the management practices which were less practiced by most farmers. Therefore, it would be necessary that follow up activities need to emphasize on improving cultural practices such as weeding, land preparation, row planting, etc.

Despite the high yield potential of preferred varieties in respective sites, absence of enough market information system leaves no option for incentive to continue production. Thus, there need to be a mechanism put in place to provide market information for the farmers.

The trial farmers have now developed a better capacity in identifying best varieties and management practices of maize, thus they should be given the opportunity to share their experience to other farmers thereby strengthen farmer to farmer extension. As the preference of the farmers in each sites have already been identified, it will be productive if the extension service consider farmers' preferences in varietal promotion activity. Overall the varieties are well accepted and suggested to widely promote and make farmers beneficial's through the Office of Agriculture and Natural Resource of the Zone. This can achieved through applying appropriate extension approach like giving training to DAs and farmers, experience sharing, field day organizing and collaborative work with stakeholders, private producers and NGOs.

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