

FTC based Pre-extension Demonstration of Tef Varieties in East and North Showa, Ethiopia

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Abstract

The objectives of this on-farm demonstration were to create awareness on the availability and importance of the new tef varieties and to create wider demand pull by reaching large number of users over relatively wider geographical area. In addition to this the study aimed to enhance institutional and functional linkages with key players through joint actions and performances. Training and experience sharing events like field days were used to demonstrate the new improved tef varieties. For the on-farm demos seeds of the newly released varieties were provided to farmers at the rate of 10 kg/ha on a revolving seed loan basis. The plot size was 10 m x10 m at all locations. Training on agronomic practices (land preparation, sowing, weeding, harvesting and post-harvest handling) was given for farmers and experts by experienced researchers from respective departments. Farmer together with researchers and agricultural experts periodically evaluated the performance of each variety during group visit. Data were collected through field observation and direct measurements. A field day was organized at maturity stage at all three sites Lume, Adea and Minjar-shenkora and a total of 816 participants (760 male and 56 females) were participated on the event. All the demonstrations were perform well at each site and great awareness has been created on the availability and importance of the new tef varieties. In addition, good institutional linkages were established among the partners including district and zonal agriculture offices, seed producer companies and seed producing farmer cooperatives. This study recommend that, on-farmer and farmers' training center (FTC) based demonstrations of improved new tef varieties would greatly enhance adoption and thereby production and productivity of tef along with minimizing the risks of failures of the newly released varieties at on farm level. Working in collaboration with zonal and district agriculture offices and seed producers proved useful for the sustainability of new improved varieties in production.

Introduction

Tef (*Eragrostis tef*), is an important and major staple cereal crop, playing apivotal role in the country's food security and farmers' lively hood in Ethiopia. It is extensively cultivated in many parts of Ethiopia [1]. With yearly main season acreage of 3.02 million ha and harvests of 5.283 million t [2], tef accounts for about 30% of the total acreage and 20% of the gross grain production of all cereals grown in the country. Since tef is an excellently adapted crop to the changing environments in the country, farmers face low risk of failure.

The nutritional status of tef grains is comparable to that of the other major world cereals [3]. The grain of tef is used as whole flour mostly for processing "injera", a staple food for the majority of Ethiopians. In addition to traditional foods and beverages, tef grain is processed for gluten free markets, in infant foods and various snack bars as whole grain supplement to the diet. On the other hand, both the grains and straw fetch relatively high market prices in comparison to other cereal crops [4]. Tef straw (*chid*) is the main source of feed for ruminants in various agro-ecologies of the country. According to the agricultural sample survey 2017/18 provided by CSA (2018), at the country level, about 6.772 million Ethiopian farmers household grown tef on about 3.02 million ha (29.54 % of the total cereal crops area), while maize, sorghum and wheat took up 18.53% (about 2.135 million ha), 18.53% (1.896 million ha) and 16.58% (1.697 million ha) of the cereal crops area, respectively. As to production, tef made up 19.73% (5.283 million t) of the gross cereal grain production next to maize (30.94% of cereals with 8.286 million t).

The average productivity of tef on smallholder farmers' field is still low (1.75 t/ha) [1]. So far, Debre Ziet Agricultural Research Center released about 26 tef varieties and recently three varieties (Filagot, Tesfa and Nigus) were released in 2017 in 2019 two new varieties Ebba and Bora were released with on station production of 2.3-3.2 t/ha and 2.0-2.8 t/ha respectively (Table 1). Hence, there was a huge yield gap to be bridged in production, productivity and income of smallholder tef growers. Therefore, these improved varieties commands to be

communicated through farmers training center (FTC) based together with their accompanying management packages so as to bring substantial improvement in the productivity of smallholder tef growers.

Objectives

- To create awareness on the availability and importance of the new tef varieties
- To enhance institutional and functional linkages with key players through joint actions and performances

Methodology

Plant materials

Table 1: Description of varieties used for demonstration

Common name	variety name	Year of released	Seed color	Grain yield(t)/ha On-research field	Grain yield(t)/ha On-farm
Ebba	D-Cr-485 RIL18	2019	Very white	2.3-3.2	2.0-2.6
Tesfa	DZ-Cr-457 RIL181	2017	White	2.3-3.0	2.1-2.7
Nigus	DZ-Cr-429 RIL125	2017	Very white	2.4-3.3	2.1-2.6
Filagot	DZ-Cr-442 RIL77C	2017	Brown	2.2-2.8	1.9-2.4

Research design and selection of farmers

Three districts and three target FTCs were selected in collaboration with the crop production experts and development agents of the Bureaus of Agriculture of the respective weredas or districts. The criteria used to select target FTCs include: willingness to provide the required plots and labor; representativeness for the district and willingness of the experts to collaborate with researchers. The plots and labor for all the activities like land preparation, planting, weeding harvesting and trashing were given by farmer to conduct the demonstration trail. Plot size was 10 m x 10 m (100 m²) per variety at each location. Seeds were provided to the participating FTCs at the rate of 10kg/ha. Method demonstration was used to demonstrate the improved tef varieties. Training on agronomic practices (land preparation, sowing, weeding, harvesting and post-harvest handling) were given for farmers and experts by experienced researchers from the various disciplines/departments.

Farmers together with researchers and experts periodically evaluate the performance of each variety during group visit. Data on performances of the varieties and feedbacks from farmers and experts at different stage the crop were collected by researchers.

A field day was organized at maturity stage of the crop for wider dissemination of the project impact to other farmers and stakeholders. Participants of the field day were farmers, different stakeholders, kebele administration officials, district bureau of agriculture and natural resource and researchers.

Data collection and analysis

Grain yield per plots were measured at in all of the target demonstration locations and ranking matrix was used to compare the performance of the varieties in terms of panicle length, tillering, grain color and marketability (Table 1). Both farmers and experts from each of the three districts were participated in evaluating the performance of the varieties. Numbers of trained farmers on the availability and importance of the technology and their perception/opinion/feedbacks on improved tef varieties were recorded. The number of farmers participated in training, field visits and field days were also recorded.

Results and Discussion

Based on the grain yield per plots (100 m²) Ebba ranked first rank at all locations except Minjar-shenkora. The highest yielder variety at Minjar-Shenkora was Nigus. The grain yield (kg/100 m²) of Nigus and Ebba was equal at Lume (Table 1). Even if farmers and experts had appreciated the performances of the Ebba and Nigus varieties, the performance of Ebba variety was remarkable at all locations in terms of some criteria like, panicle length, tillering and marketability (Table 1).

The performance of the evaluated varieties were good and encouraging at all location in this year. In addition to the grain yield per 100 m², ranking matrix at maturity stage was used to compare the performance of the varieties and to select the best varieties in the cropping season. Based on the grain yield per plots (100 m²) Ebba was at the first rank at all location except Minjar. The highest yielder variety at minjar was Nigus. The grain yield (kg/100m²) of Nigus and Ebba was equal at lume (Table 1). Based on the ranking matrix by farmers and experts at maturity stage, Ebba variety was the first in panicle length, tillering capacity and marketability. The whitest variety among the evaluated varieties was Nigus and it ranked second in panicle length, tillering capacity and marketability (Table 1). In general, the performance of Nigus and Ebba was good in all the locations and they were appreciated by both farmers and experts.

This study proved that, pre-extension demonstration is a best way to popularize the newly released tef varieties and to recommend the variety/ies suitable for the respective test locations. The report by [5] also revealed that agricultural demonstration is a best way for widespread the new technology and increase adoption.

Table 1: Grain yield and matrix ranking (based on panicle length, tillering, grain color and marketability) of four improved tef varieties demonstrated in three districts

Grain yield (kg/100m ²)						
No	Woreda	Area (m ²)	Tesfa	Filagot	Nigus	Ebba
1	Minjar	100	9	3.5	11	6
2	Ada	100	5	8	7	10
3	Lume	100	8	9	10	10

Matrix ranking of varieties performance at maturity stage						
No	Districts	Vatiety	Panicle .length	Tillering	Grain color	Marketability
1	Ada	Tesfa	3	3	3	3
2	Minjar-shenkora	Filagot	4	4	4	4
3	Lume	Nigus	2	2	1	2
		Ebba	1	1	2	1

A field day was organized at Lume, Adea and Minjar-Shenkora to visit the fields of Ebba, Nigus, Tesfa and Filagot varieties and a total of 816 participants (760 male and 65 females) attended the event (Table 2). Participants were researchers, seed producers (both private and community based), farmers from different districts, experts from district and Zones and & Oromia Bureau of Agricultural and Natural Resources (BoANR). Ebba and Nigus were selected as best variety by farmers and other stakeholders. The major lesson learnt from the event is that participating different stakeholders in the evaluation the varieties can help for easy acceptance and promotion of newly released varieties.

Table 2: Field day participant on tef variety evaluation

Districts	Kebele	Farmer		Das		Expert		Youth		Total
		M	F	M	F	M	F	M	F	
Minjare	Kobplich	600	7	1	3	10	5	0	0	626
Lume	Tilit	56	9	1	2	5	2	0	0	75
Ada	Gobessaa	65	15	0	1	0	0	22	12	115
Total		721	31	2	6	15	7	22	12	816

N.B; DAs=Development agents; M=Male; and F=Female

Conclusions and Recommendations

All the demonstrations were performed well at each of the locations and great awareness on the availability and importance of the new tef varieties was created. A wider demand pull was created by reaching large number of users over relatively wider geographical area through demonstration and field day events. In addition to this, good institutional linkage was developed between partners such as farmers, district and zonal agriculture offices, seed producer companies and seed producing farmers' cooperatives.

This study recommends that, demonstration of improved new tef varieties at FTC level is an excellent and effective working approach to enhance the promotion and the acceptance of newly released tef varieties and thereby to increase the production and productivity of the crop. This is because of the fact that the FTCs are mostly visited by all farmers during the field days as well as during their own business. Working in collaboration with zonal and district agriculture offices and seed producers is good for the sustainability of newly released improved varieties in production.

References

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