International Journal of Advanced Research in Biological Sciences
ISSN: 2348-8069
www.ijarbs.com
(A Peer Reviewed, Referred, Indexed and Open Access Journal)
DOI: 10.22192/ijarbs Coden: IJARQG (USA) Volume 9, Issue 3 -2022

Research Article

DOI: http://dx.doi.org/10.22192/ijarbs.2022.09.03.005

Cluster based demonstration of improved fingermillet technologies

[1]Misganaw Anteneh, [1]Endayen Melaku and [1]Seged Ayichew
[1]Fogera National Rice Research Center, P.O.Box, 1937, Woreta, Ethiopia
Corresponding author E-mail: *misgieantie@gmail.com*

Abstract

This activity was conducted in Dera district at two kebeles which are the most potential finger millet producing areas in South Gondar Zone. Nech and Tesema varieties were used under this large scale demonstration. A total of 34 farmers were involved in two clusters on 14 hectares of land. Both varieties were better than local variety in terms of productivity. Tesema variety had higher yield performance than necho variety but less acceptable at the market than necho due to grain color issue. Seed producing organizations or cooperatives should include this crop in their multiplication plan to establish sustainable seed multiplication system. There should be given due emphasis on this crop to ensure food security as the crop has not been given much attention by research and development sectors.

Keywords: Cluster, demonstration, finger millet, large-scale

Background and Justification

Millets are in the family of cereals grown globally with differential importance across continents and within regions of the world. They form a diverse group of small grains cultivated in diverse and adverse environments, mostly in the dry, semi-arid to sub humid drought-prone agro ecosystems. Worldwide, there are nine species of millets with total production of 28.38 million tons, out of which 11.36 million tons (40%) are produced in Africa.

Millets are extremely important in the African SAT (semi-arid tropics), produced in 18.50 million ha by 28 countries covering 30% of the continent. This is a significant 49% of the global millet area, with a production of 11.36 million tons by 1994. There are nine species which form major sources of energy and protein for about 130 million people in SSA (Sub-Saharan Africa). Among these, only four are produced significantly in Africa; including pearl millet (the most widely grown in 76% area), finger millet (19% area), tef (9%) and fonio (4%). Millet production is distributed differentially among a large number of African countries; largest producers being in West Africa led by Nigeria (41%), Niger (16%), Burkina Faso (7%), Mali (6.4%), Senegal and Sudan (4.8% each). Finger millet is produced mainly in East and Southern Africa (Oblana, 2013; tafere et al, 2013)

Production of millets is still at subsistence level by smallholders (0.3-5.0 ha farm size) and consumed as staple food and drink in most areas. They are crops of the present with high impact on the poor in Africa for food security, and sources of energy and protein for about 130 million people in sub-Saharan Africa (SSA). Millets are consumed as staple food (78%), drinks and other uses (20%). Feed use is still very small (2%). As food, they are nutritionally equivalent or superior to most cereals; containing high levels of methionine, cysteine, and other vital amino acids for human health. They are also unique sources of pro-vitamin A (yellow pearl millets) and micronutrients (Zn, Fe and Cu) which are especially high in finger millet (Oblana, 2013).
Finger millet is the sixth important cereal crop in Ethiopia both in area coverage and production after maize, tef, sorghum, wheat and barley and Its productivity is 22.6 quintals per hectare at the national level. Similarly it is the sixth important crop in Amhara region in terms of area coverage and production, its average productivity is 22.73 quintals per hectare. Finger millet productivity in Amhara region is lower than Oromia Region (23.4 quintals per hectare) but better than SNNP region (16.06 quintals per hectare) (CSA, 2018).

Farmers in Dera district have been using local finger millet varieties for long period of time. This resulted in lower yield performance of finger millet production at farmers' field. To tackle lack of improved technology access and availability to the farmers a participatory variety selection was done by Adet Research Center in 2014 using 8 improved varieties together with the local check. Three varieties named Necho, Mecha and Tesema were selected by farmers for further scaling up activities. Some of the criteria on which farmers selected the varieties under participatory variety selection were its productivity as compared to the local variety, the fingers are long and wide with full of seed and can resist lodging effect. From all varieties Necho is better because of the length of finger and also seed color for its marketability and good for making Enjera, but the yield is less than Tesema. Therefore finally the farmers were more interested on variety Necho, Tesema and Mecha varieties respectively. Based on this activity and need assessment further scaling up through large scale demonstrations were started at Dera district in 2019 to reach further the technology for beneficiaries.

Objectives

Learning objectives

To create wider demand on improved Finger Millet technology
To create and strengthen linkage among the possible actors
To enhance technology multiplication and dissemination systems

Production objectives

To enhance production and productivity of improved finger millet technologies

Materials and Methods

Description of study areas

This activity was conducted at Dera district which is one of the districts in the Amhara Region of Ethiopia and part of the south Gondar Zone, Dera is bordered on the south by the Abbay River which separates it from the West Gojjam. A survey of the land in this district shows that 46% is arable or cultivable, 6% pasture, 1% forest or shrubland, 25% covered with water and the remaining 25.9% is considered degraded or other. Teff, fingermillet, corn, sorghum, cotton and sesame are important cash crops. It has 36 kebeles from which two kebeles were considered under this demonstration.

Farmers and site selection

Based on demand assessment in the district and suitability of the agro-ecological system for finger millet production (cereal based system), site selection has been undertaken together with other stakeholders such as development agents, district level agricultural experts. Zara and Geregera kebeles were selected. Farmers were selected based on their interest and demand for the

technology: The other criterion was relied on clustering approach whether their plots of land clustered to other adjacent farms within the site.

Planting materials

Necho and tesema improved varieties were used. Two quintals of improved finger millet seed were delivered to selected kebeles. Necho variety has been distributed for Zara Kebele while tesema variety for Geregera kebele. The recommended quantity of 10-15kg per hectare of either Tesema and/or Necho variety has been applied during planting. The necessary efforts have been made to collect those improved varieties/technologies from different areas so as to make it available for the farmers. 150kg of Necho variety was obtained from Adet Research Center and 75kg of Tesema variety was also collected from Melkasa Agricultural Research Center.

Methods of data collection

Various methods of data collection were used to gather different parameters, feedbacks and perception of stakeholders. Participatory data collection methods including focused group discussion (FGD), interview of key informants, field observation and measurements

Data types

Both quantitative and qualitative types of data were gathered. Quantitative data such as yield data, number of farmers participated in training, field visits and field days by gender, and numbers of beneficiary farmers on demonstrated technologies. Whereas qualitative data on feedback and perception from farmers and different stakeholders have been collected and taken.

Method of data analysis

The collected data have been analyzed using descriptive statistics through applying Statistical Package for Social Science (SPSS), and simple Excel sheet. Mean, charts and percentage types of descriptive statistics were used to analyze and describe the collected data.

Yield advantage

Yield advantage of demonstrated finger millet varieties in percentage was estimated using the following simplified formula

Yield advantage %

$$= \frac{\text{yield of new variety} - \text{yield of standard check}}{\text{Yield of standard check}} \times 100$$

Variety preference ranking

Various parameters and criteria were considered to evaluate the varietal performance.

Researchers, farmers and other key stakeholders such as development agents and agricultural experts were able to jointly evaluate the varieties based on yield performance, food quality, and grain color and market acceptance.

Results and Discussion

Yield performance of demonstrated varieties

Tesema variety had high yielding performance than Necho variety but necho variety is more acceptable at the market than Tesema. Market acceptability of necho variety is due to its whiteness in color compared with Tesema which is brown. Necho Variety showed a yield advantage of 32.8% compared with local variety and tesema variety had 62.68% yield advantage over local variety. There was also productivity advantage between improved varieties. Tesema variety had showed a yield advantage of 22.5% against Necho variety. Tesema variety has yield advantage of 22.2% over the average productivity of finger millet in Amhara region and 21.7% yield advantage from its average productivity in country.

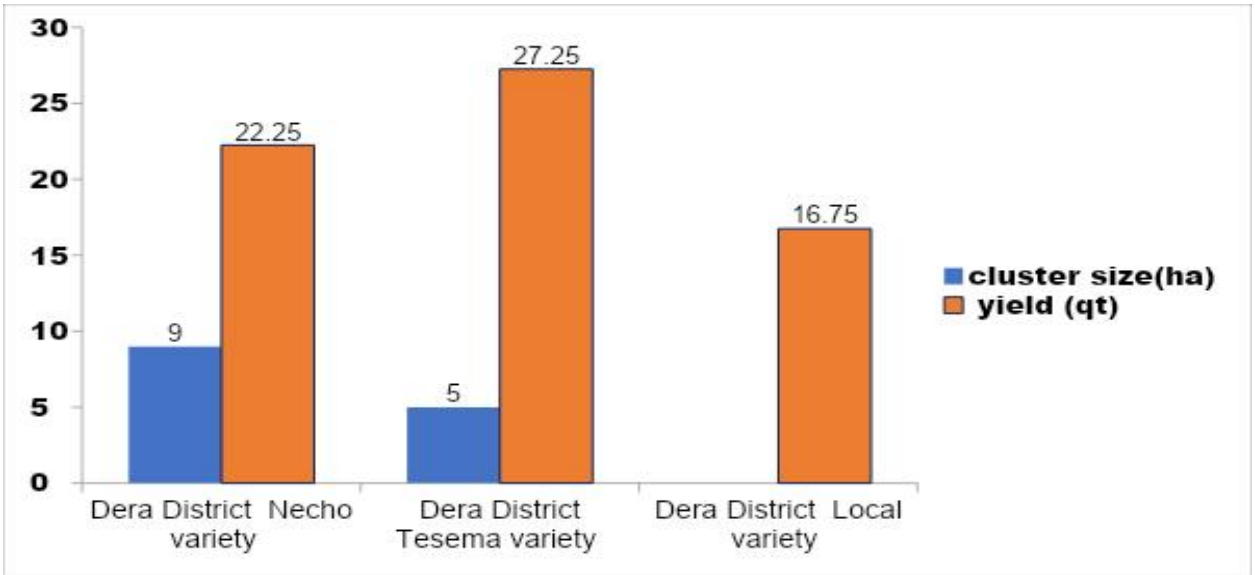

Figure. 1. Yield performance of improved and local varieties

Capacity building through Training

Training has been organized for farmers, development agents and agricultural experts about the technology package and implementation. The training was focused on components of general aspects about the crop and its nutritional benefits, agronomic practices and crop protection. A total of 44 farmers and 8 development agents and agricultural experts were participated in the training as mentioned on the figure 1 below. Out of this, 33 male farmers and 11 female farmers whereas 7 development agents and/or agricultural experts and 1 female development agent. Those stakeholders participated in the training were drawn from different disciplines at the district and kebele level offices.

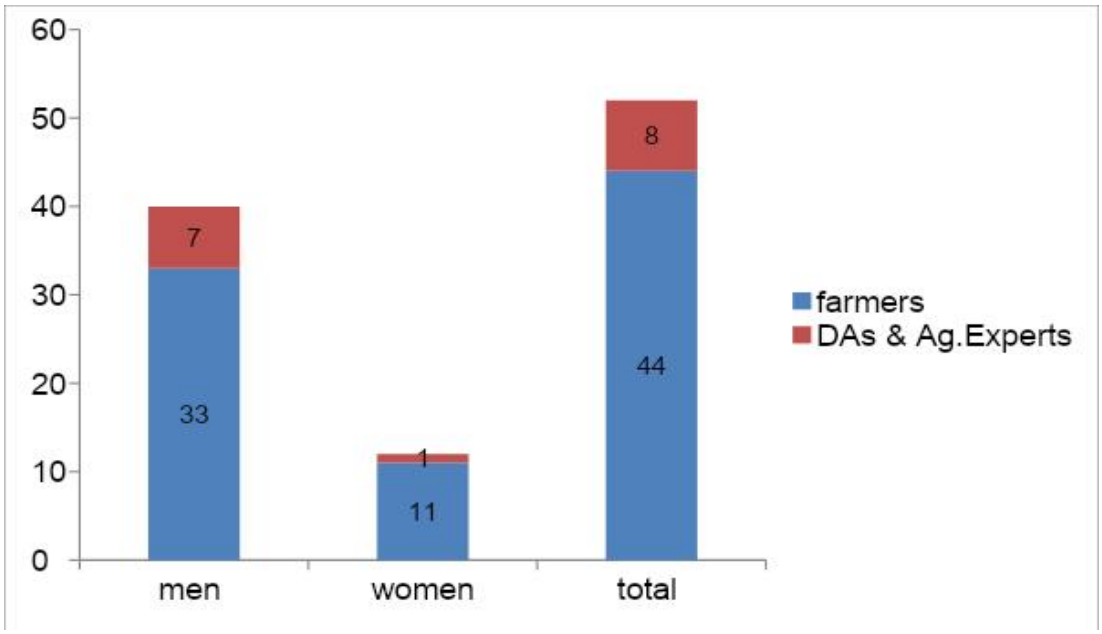

Figure 2. Training participants by gender-disaggregation

Cluster size and technology beneficiaries

Two clusters were established at two locations, one per kebele. In each target kebele on average of 5-9 hectares of land were covered per cluster. For each cluster 16 -17 farmers were participated. There were 34 farmers of technology beneficiaries with total of 14 hectares of land covered under large scale demonstration through clustering approach.

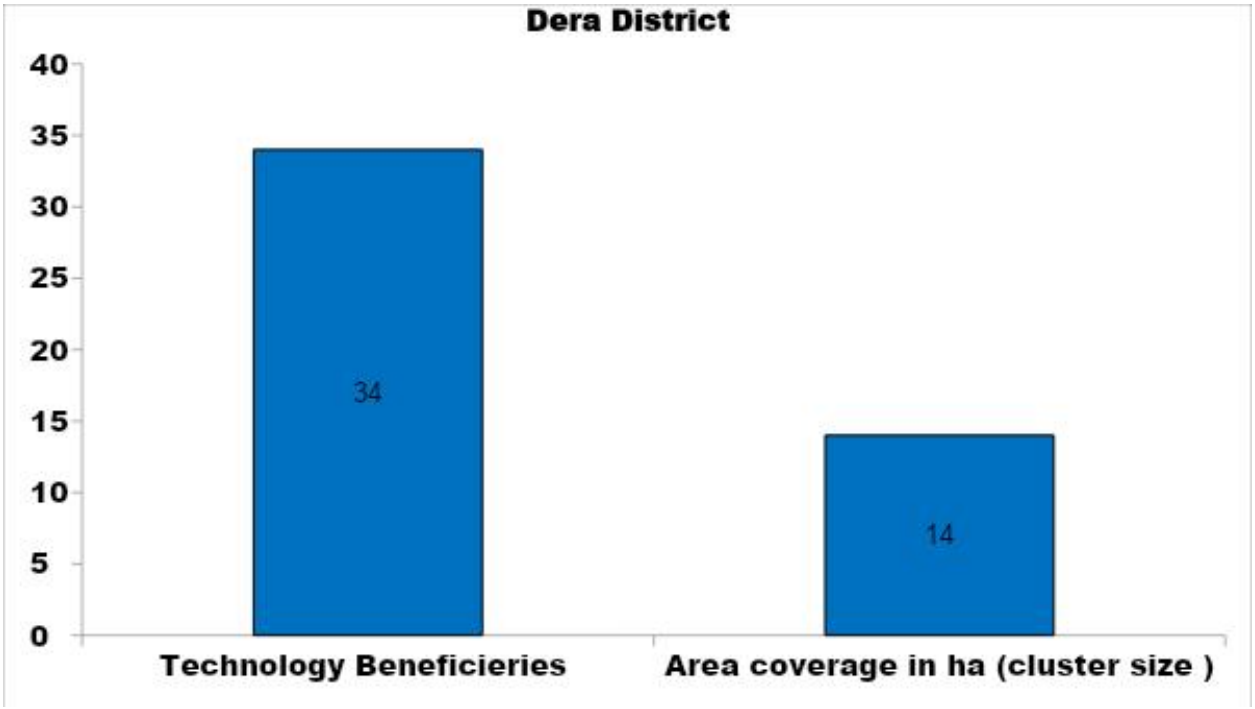

Figure.3. Technology beneficiaries and total cluster size

Field day

Field day was organized at target locations. Farmers, development agents, district level experts, zonal agriculture experts and other stakeholders were participated. A total of 100 farmers and 22 other stakeholders were participated.

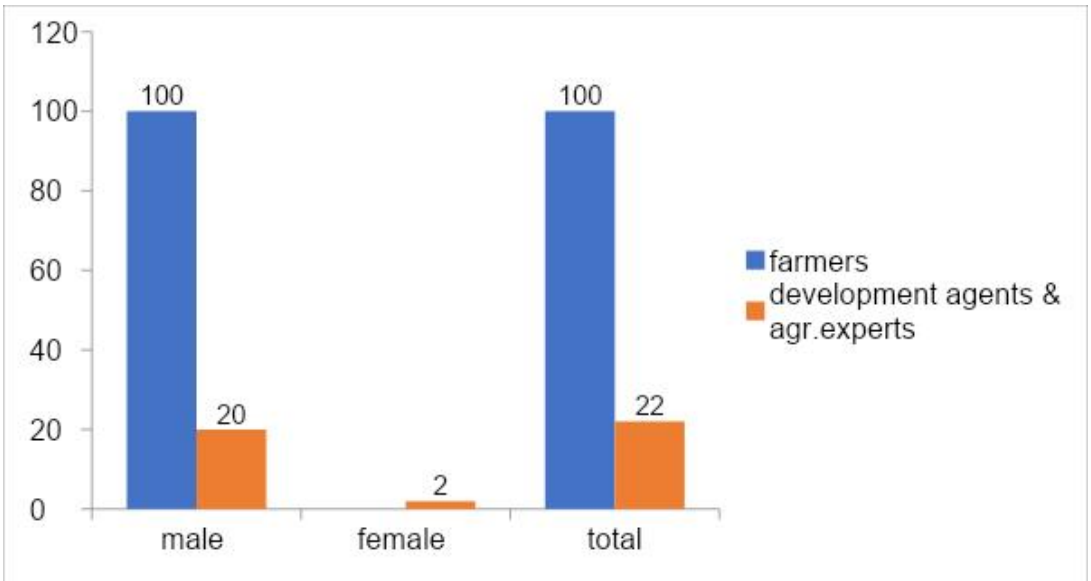

Figure 4. Field day participants by gender dis-aggregation

Feedbacks and farmers preference

Improved varieties were high yielding than the local variety. The food (Injera) prepared from improved variety is relatively hard but from the local variety is soft. Furthermore, local variety has high water holding ratio which increases the bunch of Injeras but improved varieties didn't have such food quality. While eating Injeera prepared from improved variety doesn't stay for long time in their stomach (immediately feeling hungry after eating) but local variety does stay for long time. It is also difficult to prepare injera from improved varieties without mixing with other crops like maize, tef etc but local variety alone can be used to prepare Injeera without mixing with any other crops. The food quality is attractive from local variety. Farmers dislike the strength of the straw for animals feed i.e it may not be easily palatable for animals (as compared to local). Most farmers also had complained on row planting of finger millet and also comment on the spacing of this crop is wide. The reason is directly related to land and labor.

Table.1. Preference and ranks of improved varieties in comparison with local one based on different parameters

Parameters / justification	**Ranks for varieties**		
	1st	**2nd**	**3rd**
Yield	Tesema	Necho	Local
Food quality	Local	Necho	Tesema
Grain color, marketability	Necho	Local	Tesema
Disease resistant	Tesema	Necho	Local

Conclusion and Recommendation

Though the yield performance of the two varieties demonstrated in the district was better than the local variety however there are still claims by farmers on the variety especially related to the characteristics of food quality and straw. Therefore, there should be alternative varieties which need to satisfy the demand of farmers in yield performance and good food quality. The crop is an ignored commodity which didn't have extension package. Attention need to be given to the crop to include it in 9 identified commodities under extension package by respective BoA and MoA. Seed producing organizations and cooperatives should consider the crop under their multiplication plan to establish sustainable seed multiplication system. Low attention to the crop, low weeding culture of the farmers, Seed system (much lower than other crops), few farmers didn't use the recommended agronomic package (row planting were some of the challenges under this intervention.

.

References

CSA, 2018: the federal democratic republic of Ethiopia central statistical agency. Agricultural sample survey. Volume I report on area and production of major crops (private peasant holdings, meher season)

Oblana., Ab, 2013 : Importance of millets in Africa a b obilana ICRISAT, p o box 39063, Nairobi, Kenya

Tafere., M, Adane., M, 2013: A survey on the status and constraints of Finger Millet (*Eleusine coracana* L.) production in Metekel Zone, North Western Ethiopia, Direct Research Journal of Agriculture and Food Science Vol.1 (5), pp. 67-72, November 2013 Available online at http://directresearchpublisher.org/drjafs © 2013 Direct Research Journals Publisher.

Access this Article in Online	
Quick Response Code	Website: www.ijarbs.com
	Subject: Agriculture
DOI:10.22192/ijarbs.2022.09.03.005	

How to cite this article:
Misganaw Anteneh, Endayen Melaku and Seged Ayichew. (2022). Cluster based demonstration of improved fingermillet technologies. Int. J. Adv. Res. Biol. Sci. 9(3): 38-44.
DOI: http://dx.doi.org/10.22192/ijarbs.2022.09.03.005