

PRE-EXTENSION DEMONSTRATION OF IMPROVED BREAD WHEAT VARIETIES IN DAWRO ZONE AND KONTA SPECIAL WOREDA OF SOUTHERN NATION NATIONALITIES AND PEOPLES REGIONAL STATE, ETHIOPIA.

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Abstract:-

The study was conducted in Dawro Zone of Tocha and Essera Woreda and Konta Special Woreda. The objective of the study was to demonstrate, recommend and transfer the best performing bread wheat varieties based on grain yield performance and farmers' preference. In each kebele, one FTC and twelve farmers (8 male and four female farmers) were involved during "meher" season of the year 2016. Training was given for the selected farmers and other stakeholders. Providing full packages of bread wheat technology- variety Ogoicho, Shorima and local were demonstrated in Konta Special Woreda but variety Shorima, Kakaba and Local were demonstrated in Dawro Zone of Tocha and Essera Woreda. Plot size of 10m X 10m was used and seeds were planted at a rate of 100kg/ha in all fields. The recommended rate of DAP (100kg/ha) and UREA (50 kg/ha) were used. The spacing between plots and row was 1m and 30cm by drilling respectively. Field days were organized; farmers evaluated and selected the best performed varieties depending on their criteria's set. The criteria were earliness, tillering capacity, seed size, spike length, resistance to diseases and grain yield. During farmers' selection process both female and male farmers had been incorporated so as to avoid gender bias. The result showed that variety Ogoicho was the best yielder with grain yield of 39.7 qt/ha and 36 qt/ha at Buba-damota Kebele and Chaka-bocha Kebele respectively followed by the variety Shorima (37.8 qt/ha at Buba Damota and 29 qt/ha at Chaka-bocha) in Konta Special Woreda. In Tocha and Essera Woreda, variety Shorima was with better grain yield performance at Edget kebele of Tocha Woreda (34.5 qt/ha) and Arsi-bale Kebele of Essera Woreda (34.4 qt/ha) respectively. Therefore, based on the farmers' criteria and grain yield performance, variety Ogoicho selected as first followed by Shorima in Konta Special Woreda, and variety Shorma in Tocha and Essera Woreda, were recommended with its full packages for further pre-scaling.

Keywords: - Improved varieties, Ogoicho, Shorima, Kakaba and Local Check.

Background and Justification

By large, agriculture in Ethiopia is subsistence. This is particularly true to the major food crops grown in the country. The major food crops are produced in almost all regions of the country in spite of the variation in volume of production across the by large, agriculture in Ethiopia is subsistence. This is particularly true to the major food crops grown in the country. The major food crops are produced in almost all regions of the country in spite of the variation in volume of production across the crops grown. Ethiopia is the second largest producer of wheat in Sub-Saharan Africa next to South Africa. Recently, wheat in general has become one of the most important cereal crops in terms of production and food security in Ethiopia (Tolesa, 2014). It has been selected as a target crop for the strategic goal of national food self-sufficiency. Wheat contributes; approximately 200 calories per day in urban areas compared to about 310 calories in rural areas. It accounts for about 12% of the national calorie intake (Omer Gebremedhin 2015).

Out of the total grain crop area in the country, 79.88% (9,974,316.28 hectares) was under cereals. Wheat took up 13.33% (about 1,664,564.62 hectares) of the grain crop area. Cereals contributed 86.68% (about 231,287,970.83 quintals) of the grain production and wheat made up 15.81% (42,192,572.23 quintals) of the grain production. Out of the total area covered by wheat and its production in quintals in the country, Southern Ethiopia constitutes 133,419.80 hectares of land and 3,346,339.28 quintals of production with the productivity of 25.08 quintal per hectare. Similarly the area covered, production and productivity of wheat in Dawro Zone in the year 2015/16 cropping season was 2274.05 ha, 42008.65 quintal and 18.47 quintal respectively (CSA, 2016).

As the current data of CSA showed, the production as well as productivity of the study area, Dawro Zone and Konta special Woreda, was low even compared with the country as well as the regional productivity even though the area has high potential. This is because access to newly released improved wheat varieties was limited by due to the remoteness of the area. Therefore, participatory demonstration and evaluation of the improved wheat variety in the area is critical. Thus, the purpose of this research was to increase production and productivity of wheat production through participatory demonstration, selection and dissemination of the improved bread wheat technologies.

Objectives

The specific objectives

- To demonstrate and evaluate different bread wheat technologies under farmers' condition.
- To enhance the dissemination of the improved bread wheat technology.
- To recommend the best-bet improved bread wheat varieties for further pre-scaling up.

Materials and methods

Description of the study area:

The research was carried out in Tocha and Essera districts of Dawro Zone, and Konta Special Woreda of Southern Nationalities and Peoples Regional State (SNNPRS). In Konta Special Woreda at Buba Damota and Chaka Bocha kebele was selected; in Tocha at Edgetand Medianalem kebele and in Essera Woreda at Bale Kebele and Arsi-balakebele respectively. Dawro Zone of Tocha Woreda is located in 499 km from Addis Abeba, 247 km from Awassa and 39 km from Tarcha. It is characterized with high land, mid land and lowland agro ecology with altitude of 2850, 2000 and 650 meter respectively mean above sea level and an average annual RF of 600mm-2300mm. Its annual average temperature of 25.5°C with minimum and maximum temperature of 18°C and 29°C respectively. Similarly, Dawro zone of Essera Woreda altitude ranges from 900 to 2600m.a.s.l. It is characterized with highland, midland and lowland agro-ecology with altitude of 1800-2600m, 900-1700m and below 900 meter above sea level respectively. Average annual rainfall is 1800mm and minimum and maximum rainfall of 1200-2400mm and duration of four months with uneven distribution. Average annual temperature is 25°C with minimum and maximum temperature of 15°C and 37°C respectively. It is characterized by loam and silty soil with 22003.6 ha arable land, 9901.62 ha of irrigable land, 11001.4 ha of grazing land, 43005.4 ha of forest land and 5501.3ha of bush land. The Woreda located 539 km from Addis Ababa, 347 km from Hawassa and 79 km from Tarcha town which is administrative center of Dawuro zone.

Konta Special Woreda:- Agro ecologically Konta is divided into three; high land (6%), midland (54%) and lowland (40%). The altitude of the Woreda ranges from 900 to 2300 meter above sea level. Maximum and minimum rainfall of 2290mm and 1200mm respectively, with mean annual rainfall of 1745 mm. The average mean temperature variation of the district is 25.5 degree centigrade. Types of soil in the districts is sandy soil (15%), sandy loam (75%) and clay soil (10%). Land scope type of Konta Woreda is flat land (15%), undulated (50%) and mountain (35%).

Experimental Design:- As the target area, two woredas of Dawro Zone and Konta Special Woreda were selected purposively for the implementation of the activity. Two wheat growing potential kebeles were selected from each participant districts & a total of six kebeles were selected for the study. Having twelve members with the composition of men, women and youth farmers was established in each kebele in addition to its' FTC. A total of 72 farmers (12 members X in 6 kebeles of 3 districts) and four FTC were participated in the activity. Out of twelve participants of each kebele, four female participants were included and a total of twenty four female participants were involved in the three districts. Farmers were considered as replications i.e. the demonstration activity was replicated on twelve farmers per kebele. Improved bread wheat variety Ogolicho and Shorima in Konta Special Woreda, and Shorma and Kakaba in Tocha and Essera Woreda, were planted with local check on plot size of 100m². The varieties were treated with full recommended

wheat production and management packages. The seed rate was 100 kg/ha and fertilizer rate was 50/100 kg/ha UREA/DAP with split application of *nitrogen*: 1/3 at planting time and 2/3 at tillering stage of the crop.

After distribution of bread wheat technologies and other agricultural inputs, regular field visit by extension agents, joint field visit and supervision at different crop stage was carried out. Field day were organized (110 male and 100 female farmers; 18 male and 2 female experts were involved in only Konta Special Woreda but in Dawro Zone-25 male and 106 female farmers, and 10 male and 4 female experts were involved) and the demonstrated varieties were evaluated jointly by farmers, agricultural experts, development agents and researchers to select the best performing varieties at crop maturity stage. Yield data and the farmers' opinions, ideas, perceptions, interest and views were collected. Then farmers were given the chance to rank each variety based on the attributes listed by them in each kebele. Both female and male farmers had been incorporated so as to avoid gender bias during farmers' selection process. The main traits of farmers' selection criteria used were spike length, tillering capacity, disease resistance, and grain yield. Each selection and evaluation criteria were rated from scale 1 to 5: 1= Very poor 2= Poor 3= Good 4= Very Good 5= Excellent. R-software was used as statistical package (descriptive statistics were used to analyze the data). Finally the varieties were ranked in the order of their importance based on farmers' preference mean Score. Out of the six kebeles selected, data was collected from only from five kebeles.

Results and discussion

Table 1: Average Wheat grain Yield (qt/ha) in Konta special woreda

Variety	Kebeles of Konta Special Woreda			
	Buba Damota Kebele		Chaka Bocha Kebele	
	Farmers' Field	FTC	Farmers' Field	FTC
Ogolicho	39.5 ^a	41	32 ^a	37
Shorima	37.8 ^a	37	29 ^a	35
Local	25 ^b	34	17.8 ^b	15
Mean	34.1	37	26.27	29
LSD (5%)	9.07		4.9	
CV	25		15.09	

Means with different superscript are statistically significant at $p < 0.05$

Table 2: Average Wheat Productivity (qt/ha) in Tocha and Essera Woreda

Variety	Tocha Woreda			Essera Woreda	
	Edget Kebele	Medhanalem Kebele		Arsi Bala Kebele	
	Farmers' Field	Farmers' Field	FTC	Farmers' Field	FTC
Shorima	34.5 ^a	34.6 ^a	45	34.4 ^a	34
Kakaba	32.9 ^a	31 ^a	35.2	30 ^a	37
Local	14.98 ^b	25.6 ^a	20.8	19 ^b	21
Mean	27.46	30.4	27.43	27.8	30.67
LSD (5%)	10.14	11.75		9.9	
CV	26.8	31		29	

Means with different superscript are statistically significant at $p < 0.05$

The result showed that there were statistical variations in grain yield performance between improved varieties and local check in all Woredas except Medianalem Kebele of Tocha Woreda. In Medianalem kebele, there was no statistical variation between the varieties in grain yield as the Table 2 showed above even though there was the mathematical difference between the varieties. Improved variety Ogolicho was the best yielded with grain yield of 39.7 q/ha and 32 q/ha at Buba-Damota and Chakabochoa Kebele respectively followed by Shorma (37.8 qt/ha and 29 q/ha) in Konta Special Woreda. In Tocha and Essera Woreda, the result showed that there was the statistical variations between the three varieties; thus, the variety Shorima grain yield (34.5 q/ha and 34.4 q/ha) was better performed at Edget kebele of Tocha Woreda and Arsi-bale Kebele of Essera Woreda respectively. Except in Chaka Bocha and Medianalem kebele (this is may be due to management problems), in all the rest of Kebeles, wheat productivity (grain yield in quintals) at FTC site exceeds the average productivity from farmers' field while comparing in the same kebele. From the above Tables, the mean wheat productivity of Konta special Woreda (30.185 q/ha from farmers' field and 33 q/ha from FTC) was better than mean productivity of Dawro Zone of Tocha (28.93 q/ha from Farmers' field and 27.43 in q/ha from FTC) and Essera Woreda (27.8 q/ha from farmer field and 30.67 q/ha from FTC). The mean productivity of wheat reported by this study in Dawro Zone (more than 27 qt/ha) was greater than the mean yield of Dawro zone which was reported by CSA (2016) during meher cropping season (25.08 q/ha). The difference was because of the new technology utilization by the farmers

during the demonstration of improved wheat varieties. The mean productivity of the improved varieties was in line with the given mean yield of wheat reported by ATA crop package manual.

Table 3: Farmer's Preference Ranking of Wheat Varieties at Konta Special Woreda

Variety	Buba Damota Kebele Farmers' preference ranking						
	SL	TC	DR	GY	overall	Average	Rank
Ogolicho	4	4	4	5	17	4.25	1st
Shorma	3	4	4	3	14	3.5	2nd
Local	2	3	3	2	10	2.5	3rd
Chaka Bocha Kebele Farmers' preference ranking							
Ogolicho	4	4	4	4	16	4	1 st
Shorma	4	3	4	3	14	3.5	2nd
Local	3	2	3	2	10	2.5	3rd

SL=Spike length, TC= Tillering Capacity, DR= Disease Resistance, GY=Grain Yield; Scores: 1= very poor, 2= Poor, 3= Good, 4= Very Good 5 =Excellent

Table 4: Farmer's Preference Ranking of Wheat Varieties at Tocha Woreda

Variety	Ediget Kebele Farmers' preference ranking						
	SL	TC	DR	GY	overall	Average	Rank
Ogolicho	4	4	5	4	16	4	1st
Shorima	3	3	1	3	10	2.5	2nd
Local	2	2	3	2	9	2.25	3rd
Medianalem Kebele Farmers' preference ranking							
Ogolicho	4	4	4	4	16	4	1 st
Shorima	3	3	2	3	11	2.75	2nd
Local	3	3	3	2	11	2.75	2and

SL=Spike length, TC= Tillering Capacity, DR= Disease Resistance, GY=Grain Yield; Scores:- 1= very poor, 2= Poor, 3= Good, 4= Very Good 5 =Excellent

Table 5: Farmer's Preference Ranking of Wheat Varieties in Essera Woreda

No.	Variety	Arsibala Kebele farmers' preference ranking						
		SL	TC	DR	GY	overall	Average	Rank
1	Shorima	4	4	4	4	16	4	1st
2	Kakaba	3	3	2	3	11	2.75	2and
3	Local	2	3	3	2	10	2.5	3rd

SL=Spike length, TC= Tillering Capacity, DR= Disease Resistance, GY=Grain Yield; Scores:-1= Very poor, 2= Poor, 3= Good, 4= Very Good 5 =Excellent

As the above Tables showed the mean scores of farmers' selection criteria ranged from 2.5 (local variety) to 4.25 (Ogolicho variety) at Buba Damota kebele in Konta district. The highest score (5) recorded for grain yield for Ogolicho and the lowest record recorded (2.5) for local variety. However, the score for variety Shorima (3.5) was next to Ogolicho. In both Kebeles, improved varieties, Ogolicho and Shorima were selected first and second respectively by farmers based on farmers' preference criteria (spike length, tillering capacity, disease resistance and grain yield) in case of Konta district. Average score of Tocha Woreda ranged from 2.25 (local check) and 2.75 (Kakaba and local variety) to 4 and 4 (Shorima variety) at Ediget and Medianalem kebele respectively. Similarly in Essera Woreda, average score of Shorima, Kakaba and local check was 4, 2.75 and 2.5 respectively at Arsi-angala kebele. In both Tocha and Essera Woreda only variety Shorima was selected over Kakaba and local varieties. Improved variety Ogolicho (except Kakaba) got higher score in all parameters than local check by farmers.

Conclusion and Recommendation

Therefore, based on the farmers' criteria and grain yield, Ogolcho and Shorma varieties were selected over local check in Konta Special Woreda. In addition to its better grain yield, variety Ogolcho had better performance score in spike length, tillering capacity and grain yield followed by variety Shorima when compared with local variety in Konta Special Woreda. In the same way, variety Shorima was selected over Kakaba and local check in Dawro Zone of Tocha and Essera Woreda. Even though variety Kakaba had better grain yield compared with local check, the study revealed that it had poor mean farmers' preference score especially because of its susceptibility to diseases such as yellow rust. Therefore, variety Ogolcho and Shorima in Konta Special Woreda, and variety Shorma in Tocha and Essera Woreda, with its full packages should be pre-scaled up/out.

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