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

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Abstract:-

The study was conducted in Konta Special Woreda at Opa-lashe Kebele during meher season of the year 2016. The objective of the study was to demonstrate, disseminate and recommend the best performing chickpeas varieties. The study was carried out in twelve farmers' field and one Farmer Training Center. Farmers were considered as replications. Training was given for the selected farmers, development agents and Woreda experts about improved chickpea technologies production and management. Then after, two varieties (Arerti and Natoli) were demonstrated in plot size of 100m². NPS and Seed rate used was 100 kg and 140kg per hectare respectively. The spacing between plots, rows and plants was 1m, 30cm and 10 cm respectively. Farmers evaluated and selected the varieties depending on their criteria's set. The ranking procedure was explained for participant farmers and each selection criterion was rated from 1 to 5. The listed traits in the criteria were earliness, number of pods per plant, resistance to disease and grain yield. The descriptive statistics result showed that the variety Natoli was with better mean grain yield performance followed by Arerti. The combined result of mean grain yield and farmers' performance score suggested that both Natoli and Arerti varieties were selected by the village farmers because of their ability to bear more pods per plant, large seed size, disease resistance and high grain yield but variety Natoli was selected as farmers' first choice for its higher grain yield compared with Arerti. Moreover, farmers calling for governmental and non-governmental organizations which promote large scale chickpea production with full packages in the study area.

Keywords: - Arerti, Natoli and Improved Variety

Background and Justification

Chickpea is an important source of dietary protein and minerals for many Ethiopians who cannot afford animal products. It is used in various forms, e.g., green seeds, dried seeds and flour. Chickpea straw is highly valued as animal feed. The farmers recognize the importance of legumes in improving soil fertility and thus grow chickpea and other legumes in rotation with cereals (Legesse Dadi, 2005). Ethiopia is considered as a center of diversity for chickpea and the wild relative of cultivated chickpea, *Cicer cuneatum*, which is found in Tere region of Ethiopia (Kanouni et al., 2011). The principal use of chickpea is seeds and flour. Chickpea straw is highly valued in Ethiopia as its use as food grain and it is valued as animal feed. The farmers recognize good source of protein (20% to 30%) as the importance of legumes in improving soil compared with cereals (8% - 10%). It is also fertile and thus grow chickpea and other a good source of calcium, magnesium, legumes in rotation with potassium, phosphorus, iron, zinc and manganese (Ibriki et al., 2003). It requires low input for production, and to maintain and restore soil fertility. It can fix up to 60 kg N /ha/year, and can be used as a rotation crop which improve both the soil structure and fertility. In addition, it is a high potential crop for domestic and export market which fetches high revenue for farmers and producers. Despite its importance, the average national seed yield of chickpea is generally low (1.3 ton/ha), unstable and less than its potential (>4 tons/ha), which is mainly due to disease, use of improved varieties and poor management practices. Though the national (19.13 qt/ha) as well as regional average yields (16.58 qt/ha) of chickpea was low due to various production constraints including: low yield potential of landraces, lack of superior varieties, their susceptibility to biotic and abiotic stresses and poor cultural practices are some the serious constraints in chickpea production in Ethiopia (Goa Y, 2014). Therefore, an introduction as well as participatory demonstration and popularization of the improved chick pea variety in the area is critical. Thus, the purpose of this research was to increase production and productivity of chick pea production through participatory demonstration, selection and transfer of the improved, high yielding and widely/specifically adapted chick pea varieties with desirable agronomic and quality traits in studying area.

Objectives:

- To demonstrate, disseminate and recommend the better yielding improved chickpea variety at farmers' management condition.
- To increase awareness for different stakeholders involved (farmers, women, youth, school children, and other actors) on best chickpea production practice

Materials and methods

Description of the study area: The research was carried out in Konta Special Woreda Southern Nation National People Regional State (SNNPRS) at Opa-lashe kebele. The woreda town is located at a distance of 454 and 630 Km from Hawassa and Addis Ababa respectively. Agro ecologically Konta is divided into three; high land (6%), midland (54%) and lowland (40%). Altitude of the Woreda ranges from 900 to 2300 meter above sea level. Maximum and minimum rainfall of 2290ml and 1200mm respectively, with mean annual rainfall of 1745 ml. 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 use type of Konta were flat land, undulated and mountain, 15%, 50% and 35% respectively.

Experimental design: As the target area, Konta Special Woreda was selected purposively for the implementation of the activity. One chick pea growing potential kebele was selected from the woreda. Having twelve members with the composition of men, women and youth farmers was selected in the kebele in addition to FTC. Out of twelve participants of the kebele, four were females in the districts. Farmers were considered as replications i.e. the demonstration activity was replicated on twelve farmers in the kebele. Training was given for the selected farmers, development agents and Woreda experts about improved chickpea technologies production and management since farmers had less experience of producing the crop. Two improved chickpea varieties (Arerti and Natoli) without local check were planted on selected farmers' plot (10m X 10m) in 2016 meher Season. The varieties were treated with full recommended chick pea production and management packages. NPS and Seed rate used was 100 kg and 140kg per hectare respectively. The spacing between plots, rows and plants was 1m, 30cm and 10 cm respectively. After packaging and distribution of chick pea technologies, the crop was planted and regular field visit by extension agents, joint field visit and supervision at different crop stage was carried out. To show the performance of demonstrated varieties, field day was jointly organized in collaboration with other stakeholders (total of 78 male and 32 female out of which 17 were agricultural experts including Das and research staffs) to evaluate the technology adaptation. Farmers evaluated and selected the varieties depending on their criteria's set. The ranking procedure was explained for participant farmers and each selection criteria was rated from 1 to 5 (1= very poor, 2= poor, 3= good, 4= Very good and 5= Excellent). Then farmers were given the chance to rank each variety based on the attributes listed by them.

During farmers' selection process both female and male farmers had been incorporated so as to avoid gender bias. The criteria's were earliness, number of pods per plant, resistance to root rot and bollworm occurrences and grain yield. Descriptive statistics was used to analyze the quantitative data by SPSS (statistical packages for social sciences).

Result and Discussion

The result of the study below in Table 1 reported that the mean grain yield of Natoli and Arerti Chickpea varieties were 34.5 qt/ha and 26 qt/ha respectively at the Opalashé kebele of Konta special Woreda. The grain yield of the variety Natoli showed better grain yield performance with the production potential of 17qt/ha to 49.5 qt/ha but the yield potential of the variety Arerti starts from 18 qt/ha to 33 qt/ha at farmers' field. In same agro-ecology of the area at FTC site the grain yield of Natoli and Arerti were 42 qt/ha and 29.7 qt/ha respectively. This study result of both varieties were higher in yield performance than country's national average (18.28 qt/ha) and region's average (18.14 qt/ha) grain yield performance of chickpea (CSA, 2016). But the study did not include local check because in the area chickpea production was not usual and well experienced. The combined average yield of both varieties was even more than the national as well as regional chickpea productivity. This indicates that chick pea varieties in the area became more adaptable with high production potential. The grain yield performance of this result was better than the research carried out by Yasin Goa (2017) which was 19 qt/ha for Arerti and 22 qt/ha for Natoli for the combined yield of Shanto and Mirab badawacho locations.

Table 1: Descriptive statistics For Grain Yield of Improved Chickpea Varieties (qt/ha) in Konta Special Woreda

Variety (N = 10)	Mean	Std. Error	Min	Max	FTC
Natoli	34.5 ^a	3.529	17	49.5	42
Arerti	26 ^b	1.48	18	33	29.7
Mean	30.25	2.1	17	49.5	35.85

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

The participant farmers were listed the traits of their interest and scored each of the traits based on the rate given which is 1 up to 5. After scoring, each value of the score were added and divided to the number of the traits listed by the farmer. Finally the mean score given for each variety was compared. As the result in the Table below showed that mean scores of the variety Natoli and Arerti were 4.2 and 3.8 respectively because of the differences between the individual score of the traits. Variety Natoli has got highest mean score value and selected as first by farmers. The highest score (5) recorded for number of pods per plant and grain yield for variety Natoli and score (5) was recorded of disease resistance (root rot and wiltresistance) for Arerti variety but in general both varieties have better performance of farmers' preference score which was more than the mean score 3 (Good). Farmers in the village selected Natoli as first and Arerti as second for its pods per plant, large seed size, better disease resistance (root rot and wilt disease reaction) and grain yield in general.

Table 2: Farmers' Preference Ranking of Improved Chickpea Varieties at Konta Special Woreda

Variety	Farmers' Preference Criteria							Rank
	EM	PP	SS	DR	GY	overall	Average	
Natoli	3	5	4	4	5	21	4.2	1st
Arerti	3	3	4	5	4	19	3.8	2nd

EM= Earliness, PP= Pods per Plant, SS = Seed Size, DR= Disease Resistance, GY=Grain Yield; Score: - 1= very poor, 2= Poor, 3= Good, 4= Very Good 5 =Excellent



Figure 1: Picture of Chickpea at Opa-lashe Kebele of Konta Special Woreda

Conclusion and Recommendations

The study depicted that the study area has high production potential regardless of its low experience and awareness of chickpea technology. The combined result of mean grain yield and farmers' performance score suggested that both Natoli and Arerti varieties were selected by the village farmers because of their ability to bear more pods per plant, large seed size, root rot and wilt tolerant trait and high grain yield but variety Natoli was selected as farmers' first choice for its larger grain yields compared with Arerti. Therefore, based on these criteria both varieties were recommended with its full packages for further pre-scaling up in the study areas. Moreover, the farmers of the study area calling for the governmental and non-governmental organizations which promote large scale production of the chickpea technology.

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