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PRE-EXTENSION DEMONSTRATION OF FERTILIZER RATE IN TARO (BOLOSO-1 VARIETY) IN BOLOSO SORE WOREDA, WOLAITA ZONNE SOUTHERN NATION NATIONALITIES AND PEOPLES REGIONAL STATE, ETHIOPIA.

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Abstract:-
Seasonal food shortage is amongst the principal problems of farmers in mid-altitude areas of Southern Ethiopia. Taro and sweet potato are important part of food security packages in some of the world's poorest nations. Taro is grown over a wide range of environments from 1,300-2,300m.a.s.l.; mostly by the resource poor farmers and the drought area. Its compatibility with various types of limited in put farming systems (versatility) and reliability under conditions such as drought, high rain fall, disease resistance and low soil fertility have made it attractive crop to farmers. There is no recommended fertilizer rate of taros so far demonstrated and popularized to farmers, and hence this pre extension demonstration of fertilizer rate in Boloso-1 was carried out to develop high yielding taro for the area. The research was carried out in Boloso sore woreda of Wolaita zone and two kebeles were selected which are Dubo and Gara Godo respectively in 2018. There were significant difference exists among the urea applied and non-applied Boloso-1 and Boloso-1 with urea application is recommended in the Boloso sore and in similar agro ecology.From the results of the treatment it was observed that farmers show great interest towards the Boloso-1 with urea application on top of the Boloso-1 applied without urea.

Keywords:- *Pre-extension, demonstration, fertilizer and rate*

1. INTRODUCTION

Taro (Colocasia esculenta(L.) Schott) is herbaceous, monocotyledonous, perennial stem root crop that is widely cultivated in tropical and subtropical regions of the world. It is originated from tropical areas of South and Southeast Asia and the Pacific Islands (Jianchu, et al, 2001) and then arrived in the east coast of Africa over 2000 years ago (TPI, 2000-2004). Today it is grown in nearly all parts of the humid tropics. It is a globally important crop, ranked fifth in area and production after cassava, potato, sweet potato and yam (FAO 2010; Tewodros 2013). In Ethiopia, it is cultivated and utilized extensively in South, South Western and Western parts of the country as food and fill economic problem.

For the last five-years reported data indicated that taro ranks 3rd followed by sweet potato both in terms of area coverage and production among the major root crops (Irish potato, cassava, enset and others) grown in major growing regions of the country. According to the Simon Adebo (1992), Farm Africa report, about two in every three farmers, in Wolaita Zone currently grow taro, due to the acute problem caused by Enset bacterial wilt and Sweet potato butter fly, the human population previous degree of dependence on these two staple food crops is being reduced in favor of maize and taro. Moreover, taro is cultivated because of its exceptionally high yield, resistance to disease and pests, wide ecological adaptation, ease of management as a crop, storage for a longer period and availability when needed for consumption (Simon, 1992; Edossa, 1995; Tewodros, 2012). Despite its importance, the production and productivity of taro deteriorating and the yield became low (Yared et al., 2014). Besides, the demonstration and popularization of newly released high yielding improved taro (Boloso-1) variety with its recommended fertilizer rate in the country. As a result, the country frequently faces a considerable amount of food shortage for the last decades (Tewodros, 2012). Therefore, demonstration and popularization, of improved taro (Boloso-1) variety with its recommended fertilizer rate to the farmers is the best way to increase the production and productivity of taro.

2. Objectives:

General Objective

- To demonstrate and popularize the recommended fertilizer rate with in Bolos-1 variety on Farmers' Training Centers and on the farmers' land around FTCs.

Specific Objective

- To create awareness for different stakeholders of the new recommended fertilizer rate in the studying area
- To recommend the new recommended fertilizer rate which are suitable for the different agro-ecological zones in the study area.

3. Materials and methods

3.1. Description of the study area

The research was carried out in Boloso sore woreda of Wolaita zone and two kebeles were selected which are Dubo and Garra Goddo respectively. Wolaita Zone of Boloso sore Woreda is located in 420 km from Addis Ababa which is the capital city of Ethiopia and 158 km from Hawassa which is the capital city of the Southern Nation National People Region. The total land area of the woreda is 28,800. It is characterized with high land (17%), mid land (83%) agro ecology (BSWARD offices, 2014).The altitude of the woreda ranges 1500-2500m.a.s.l (FAO, 2003).The average temperature varies between10 to 20. Rain is occurs during June to August and September is a transitional period between rainy and dry season and the annual rain fall of the Woreda is 1201mm to 1600mm (Wolaita Zone Metrological offices, 2014).

3.2. Experimental design

One regional woreda was selected purposively for the implementation of the activity this is due to the production potentiality. Two potential kebele were selected from woreda and having twenty three (23) members with the composition of men, women and youth farmers were established in the woreda in addition to its' FTC. A total of 23 farmers and 2FTC were participated in the activity. Out of twenty three (23) participants, twenty (20) male and three female farmers were included in the activity. Farmers were considered as replications i.e. the demonstration activity was replicated. Boloso-1 with urea and boloso-1 without urea were planted on selected farmers' plot (10mx15m) in 2018 year Belg Season. The technology was treated with full recommended production and management packages. The seed rate was 40 qt/ha and 4qt/ha urea with split application i.e. 2/3 application after sowing date 30 days for first and second time and 1/3 after two month for third time. Here, why the urea application is preferred from applications of DAP or NPS is because of due to cost benefit analysis the urea is better than the NPS.

After packaging and distribution of corm and other agricultural inputs, regular field visit by extension agents, joint field visit and supervision at different crop stage was carried out. Field day and demonstration were organized and the technology was demonstrated and evaluated jointly by farmers, agricultural experts and researcher to aware the best practice of the activity at crop maturity stage.

Yield data and the farmers' opinions, ideas, preference, interest and views were collected. Then farmers were given the chance to rank each variety based on the attributes listed by them. Both female and male farmers had been incorporated so as to avoid gender bias during farmers' selection process. The farmers' main selection criteria's used were earliness in maturity, ease of cooking, powederness in cooking, drought resistance, size of corm, number of corm, tuber yield and market demand. Each selection and evaluation criteria were rated using the rating scale: 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 technology were ranked in the order of its importance based on farmers' preference mean Score.

4. Result and Discussion

Table1: Average Taro Productivity (in quintal per hectare) in Boloso sore Woreda (Dubo and Gara godo Kebele).

Variety (23)	Dubo kebele(quintal per hectare)					Gara godo kebele(quintal per hectare)				
Boloso-1 with urea	Mean	Std error mean	Min	Max	FTC	Mean	Std error mean	Min	Max	FTC
	531	5.76	372.6	829	1016	454.28	5.56	403.2	672	537.33
Boloso-1 without urea	321.6	4.68	202.6	422	190.67	273	4.31	179.2	403.2	268.66

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

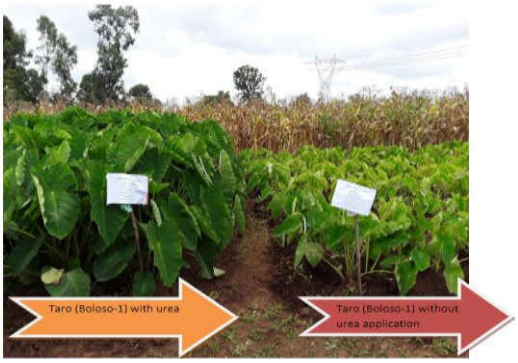
The number of participants during field day were male 92 female 28 total 120, Civil servant male; 12 female 3 total 15.Capacity building (training) have been given for number of farmers male: 64 female: 34 total 98 and number of experts and DAs male: 4; female: 3; total 7.Capacity building training was given on improved maize technology, common bean, faba bean, teff, chick pea and other varieties total package production system training has been given. The result showed that demonstration with urea was the best yielder with the yield of 531 and 454.28 quintal per hectare and demonstration without urea was less yielder with the yield of 321.6 and
273 quintal per hectare in Boloso sore woreda (Dubo and Gara godo kebele) at the farmer's farm respectively. In the case of FTC the yield of demonstration was 829 and 537.3 of with urea whereas 190.66 and 268.66 qt/ha without urea in both Dubbo and Garagodo kebele respectively.

Table 1: Farmers' preference in Boloso sore woreda

No	Varity	Farmers selection criteria(Dubo Kebele)								
		EM	EC	PC	MD	DR	SC	NC	TY	Overall	Average
1	Boloso-1 with urea	3	5	3	4	5	4	5	4	33	4.12
2	Boloso-1 without urea	4	3	5	2	3	3	3	3	26	3.25
No	Varity	Farmers selection criteria(Garagodo Kebele)								
		EM	EC	PC	MD	DR	SC	NC	TY	Overall	Average
1	Boloso-1 with urea	2	3	3	4	4	5	5	4	30	3.75
2	Boloso-1 without urea	3	4	5	3	2	4	3	2	26	3.25

EM=earliness in maturity, EC=ease of cooking, PC=powederness in cooking, DR= drought resistance, SC=size of corm, NC=number of corm, TY=tuber yield, MD= market demand

The participant farmers were listed the traits of their interest and scored each of the traits based on the rank 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. As the result in the Table showed above that mean scores of boloso-1 with urea was 4.12 and 3.75 and boloso-1 without urea was 3.25 in both kebeles because of the differences between the individual score of the traits. Bolso-1 with urea has got highest mean score value in the woreda and encouraged for further pre-scaling by farmers. For boloso-1 with urea highest score (5) recorded for ease of cooking, size of corm and tuber yield while for boloso-1 without urea highest score (5) recorded for powederness in cooking respectively.
As farmers said taro (boloso-1) without urea has better taste than the one with urea but the taro (boloso-1) with urea is soft (good for eating) and the taro without urea is dry (has powdered) while eating. The farmers confirm that taro with urea is better for marketability because of corms are bigger than taro without urea so that the market prefers the taro with urea. The farmers prefer taro without urea for planting and storing for long time because the taro without urea stay dormant in the soil if the rain comes late and the taro with urea will decay if the rain came late. Most of the farmers confirm that the taro without urea is easy to cooking and the taro with urea is lately cooked than the one without urea. Generally, the farmer accepted the urea application on taro (boloso-1) because of it's at least twice yield production than that of boloso-1 without urea.



Pre- Extension Demonstration Case team during monitoring and evaluation of the activity.
This helps to identify weather the activity going smoothly or not and at the last the decision have given to make continue or discontinue. But in this case the activity is going smoothly.

Awareness creation for stakeholders
The awareness creation program was done continuously at the FTC and at Farm level by center director and Pre-Extension Demonstration researcher and Woreda agricultural experts and the information or knowledge flow in both directions means that from researchers to farmers and from farmers to researchers.

Field day of the activity
The field day is based on demonstration of the technology by creating awareness for the stakeholder to make more pre-scaling up. It is again showing the work in the FTC and model farmers' farm in the Dubo and Gara Godo kebele in the Boloso sore woreda of Wolaita zone.

5. Conclusion and recommendation

Based on the farmers' preference criteria and total yield enhanced boloso-1 with urea application was better in palatability, corm size and number, total yield and marketability than that of boloso-1 without urea in the demonstration site. In order to increase the production and productivity of boloso-1 farmers should be aware, proper and on time application of inputs (seed and urea) and agronomic practice is critical. Therefore, based on farmers preference criteria and it's twice yield production boloso-1 with urea was recommended for more pre-scaling up with its full packages in Boloso sore woreda as well as in similar agro ecology respectively.

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