International Journal of Food Science and Biotechnology
2019; 4(2): 46-50
http://www.sciencepublishinggroup.com/j/ijfsb
doi: 10.11648/j.ijfsb.20190402.13
ISSN: 2578-9635 (Print); ISSN: 2578-9643 (Online)

Pre-Extension Demonstration of Fertilizer Rate in Taro (Boloso-1) Varietyin Boloso Sore Woreda, Wolaita Zone Southern Nation Nationalities and Peoples Regional State, Ethiopia

Abdirazak Abdala[1], Bereket Tufo[2]

[1]Southern Agricultural Research Institute, Hawassa, Ethiopia
[2]Areka Agricultural Research Center, Areka, Ethiopia

Email address:
abdirazak361@gmail.com (A. Abdala)

To cite this article:
Abdirazak Abdala, Bereket Tufo. Pre-Extension Demonstration of Fertilizer Rate in Taro (Boloso-1) Varietyin Boloso Sore Woreda, Wolaita Zone Southern Nation Nationalities and Peoples Regional State, Ethiopia. *International Journal of Food Science and Biotechnology.* Vol. 4, No. 2, 2019, pp. 46-50. doi: 10.11648/j.ijfsb.20190402.13

Received: April 16, 2019; **Accepted**: June 3, 2019; **Published**: June 25, 2019

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 GaraGodo 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, Fertilize Rate, Boloso-1 Variety

1. Introduction

Ethiopia, with an area of 112.3 M ha, is the 9th largest and with about 87 million people, the second most populated country in Africa next to Nigeria. According to Woldegiorgis [1], the country is endowed with suitable climatic condition and edaphic condition for quality and quantity of cultivation of various kinds of agricultural crops. In 2003, the agriculture sector accounted for about 42% of the country's Gross Domestic Product (GDP) and about 85% the export earnings. Around 81% of the economically active population works in agriculture. Most of Ethiopian population depends mainly on cereal crop as food source. The food potential of horticultural crops particularly that of root and tuber crops, like Taro has not been fully exploited and utilized despite their significant contribution towards food security, income generation, provision of food energy and resource base conservation [1].

Food insecurity is increasing in Ethiopia with 55% of farmers explaining that their annual harvest is insufficient to sustain the family for more than 6 months. At least seven million people require food aid every year since efforts to address the challenges through a grain-led approach has declined even to keep up with population growth. From the different strategies that should be employed to achieve national food self-sufficiency and food securityincorporation of horticultural crops in the food system is rated among the top. Among the potential horticultural crops for further production or extension, root and tuber crops are regarded as the most common

starchy/carbohydrate staples that could give a low-cost energy in the daily diet of the society. In addition, these groups of crops are known for their appreciable amounts of proteins, essential vitamins and minerals. To this end, had reported mean protein contents of 2-3% in cooked potatoes and yams [2].

Taro (Colocasiaesculenta(L.) Schott) is herbaceous, monocotyledonous, perennial stem root crop that is widely cultivated in tropical and subtropical regions of the world. The taro is comes from tropical areas of South and Southeast Asia and the Pacific Islands [3] and after that it reaches in the east coast of Africa over 2000 years ago [4]. Now days it is grown in almost all parts of the humid tropics. It is a globally useful steam root crop, ranked 5thin area and production after cassava, potato, sweet potato and yam [5]. In developing country like Ethiopia, it is produced and used 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 cultivation among the major root crops (Irish potato, cassava, enset andothers) grown in major growing regions of the country. The Farm Africa report, about two in every three farmers, in Wolaita Zone currently grow taro, due to the acute challenges 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 [6]. In addition to that, taro is produced why, because of its amazing of 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 [7-9]. However, its importance, the production and productivity of taro (Boloso-1) decline and the yield became low[10]. Besides, the demonstration and popularization of newly released high yielding improved taro (Boloso-1) variety with its recommended fertilizer rate in the country. Consequently, Ethiopia frequently faces a considerable amount of food shortage for the last decade [11]. 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 of the Paper

2.1. 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.

2.2. Specific Objective

1. To create awareness for different stakeholders of the new recommended fertilizer rate in the studying area
2. 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 GarraGoddo 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 seasonand the annual rain fall of the Woreda is 1201mm to 1600mm (Wolaita Zone Metrologicaloffices, 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 woredain 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 2018yearBelg 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.

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

The following table 1 and table 2 shows the average Taro Productivity (in quintal per hectare) in Boloso sore Woreda (Dubbo and GaragodoKebele).

Table 1. *Average Taro Productivity in Dubbo Kebele.*

Variety (23)	Dubbo kebele(quintal per hectare)				
	Mean	Std error mean	Min	Max	FTC
Boloso-1 with urea	531	5.76	372.6	829	1016
Boloso-1 without urea	321.6	4.68	202.6	422	190.67

Table 2. *Average Taro Productivity in Gara godoKebele.*

Variety(N=23)	Gara Godokebele (quintal per hectare)				
	Mean	Std error mean	Mins	Max	FTC
Boloso-1 with urea	454.28	5.56	403.2	672	537.33
Boloso-1 without urea	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 (Dubbo and Garagodokebele) 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 Garagodokebele respectively.

Table 3. *Farmers' preference in Boloso sore woreda.*

No	Varity	Farmers selection criteria(DubboKebele)									
		EM	EC	PC	DR	SC	NC	TY	MD	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

Table 4. *Continued.*

No	Varity	Farmers selection criteria(GaragodoKebele)									
		EM	EC	PC	DR	SC	NC	TY	MD	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.

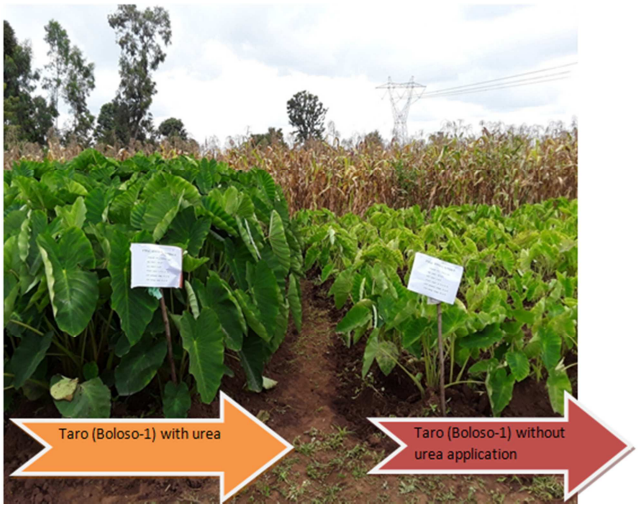

Figure 1. *Treatment indication.*

4.1. Pre- Extension Demonstration CaseTeam 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.

Figure 2. *Pre- Extension Demonstration Case team during monitoring and evaluation of the activity.*

4.2. 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.

Figure 3. *Awareness creation for stakeholders.*

4.3. 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 Dubbo and GaraGodokebele in the Boloso sore woreda of Wolaita zone.

Figure 4. *Field day of the activity.*

5. Conclusion and Recommendation

Based on the farmers' preference criteria and total yield enhanced boloso-1 with urea 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.

Acknowledgements

The authors would like to express their appreciation to Sothern Agricultural Research Institute for the financial support towards this research. They are also grateful to Southern Agricultural Research Institute and Areka Agricultural Research Center for their logistic support for this study. The authors also wish to thank all research assistants (Samuel J., Waza M., Wolde P and Demekech D.)inPreextension Demonstration Case Team for their nice cooperation and data collection.

References

[1] Woldegiorgis, G., E. Gebre and B. Lemega, 2008. Root and Tuber Crops: The Untapped Resources. Ethiopian Institute of Agricultural Research, Addis Ababa, Ethiopia.

[2] Scott, G. J., 2000. Roots and Tubers in the Global Food System: A Vision Statement to the Year 2020. IITA Publication, Lima, Peru, ISBN-13: 9789290602033, Pages: 111.

[3] Jianchu X., Y. Yang, P. W. Yingdong, G. Ayad and P. B. Eyzagüirre, (2001). The genetic diversity in taro (Colocasiaesculenta Schott-Araceae) in China: An Ethno botanical and genetic approach Economic Botany. 55 (1), 14-31.

[4] TPI (Taro Pharmaceutical Industries) (2000-2004). Taro Pharmaceutical Industries Reports. Taro Pharmaceutical.

[5] TewodrosMulualem and GetachewWeldeMichael (2013). Study on Genotypic Variability Estimates and Interrelation ship of Agronomic Traits for selection of Taro (Colocasiaesculenta (L.) Schott) in Ethiopia. Sky Journal of Agricultural Research. ISSN: 2315- 8751, Vol. 2. No. 11, pp. 132-137, December, 2013.

[6] Simon Adebo (1992). Taro root in North Omo. FPR Technical Pamphlet No.2. FARM Africa. AA, Ethiopia.

[7] TewodrosMulualem (2012). Diversity analysis of Taro (Colocasiaesculenta) in Ethiopia. Lambert Academic Publishing: ISBN No. 978-3-8454-2961-8.

[8] TPI (Taro Pharmaceutical Industries) (2000-2004). Taro Pharmaceutical Industries Reports. Taro Pharmaceutical.

[9] Woldegiorgis, G., E. Gebre and B. Lemega, 2008. Root and Tuber Crops: The Untapped Resources. Ethiopian Institute of Agricultural Research, Addis Ababa, Ethiopia.

[10] YaredDagne, TewodrosMulualem, AsfawKifle,(2014). Development of High Yielding Taro (Colocaciaesculenta L.)Variety for Mid Altitude Growing Areas of Southern Ethiopia. Journal of Plant Sciences. Vol. 2, No. 1, 2014, pp. 50-54. doi: 10.11648/j.jps.20140201.19.

[11] YaredDagne, TewodrosMulualem, AsfawKifle,(2014). Development of High Yielding Taro (Colocaciaesculenta L.)Variety for Mid Altitude Growing Areas of Southern Ethiopia. Journal of Plant Sciences. Vol. 2, No. 1, 2014, pp. 50-54. doi:10.11648/j.jps.20140201.19.