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Pre-Extension Demonstration of Selected Lablab Varieties at Midlands of Guji Zone, Southern Oromia, Ethiopia

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ABSTRACT

The activity was conducted during 2017/18 and 2018/19 main cropping season at Adola Rede, Wadera and Odo Shakiso districts of Guji zone, Oromia, Ethiopia with the objectives of to demonstrate lablab varieties in midland areas of Guji Zone, to develop and promote lablab varieties and assess farmers' feedbacks for further development of lablab variety production. Two Kebeles per district were selected based on livestock production potential and 15 farmers were selected from each Kebele and grouped as one FRGs considering gender. Two improved lablab varieties (Gabis and Baresa) was demonstrated on plot size of 100 m^2 area per variety at 50 cm inter- and 20 cm intra- row spacing and with recommended seed and fertilizer rates. Capacity building methods like; training, exchange visit and field day were organized to promote lablab and enhance farmer to farmer learning with and between FRGs members on lablab production. Observation, measurement and face to face interview were employed to collect the data and the collected data were analyzed by descriptive statistics while farmer's perception was analyzed qualitatively. The demonstration result revealed that Gabis variety gave 4.63 ton/ha and 24.96 qt/ha of biomass and grain yield respectively. Whereas Baresa variety gave 4.18 ton/ha and 23.59 qt/ha of mean biomass and grain yield. Limited farmland resource coupled with lablab life span on the farm was problems at study areas. Both varieties were almost comparable average biomass and grain yield. Thus, both varieties are recommended for further scaling up/out either on low land agro-ecological areas or intercropped with cereal crop like maize.

Keywords: *FRGs, Lablab varieties, Demonstration, Guji Zone.*

INTRODUCTION

Livestock sector has considerable economic and social importance at household and national levels and provides significant export earnings. The sector contributes 15 to 17% of gross domestic product (GDP) and 35 to 49% of agricultural GDP and 37 to 87% of the household income (Behnke and Metaferia, 2011). However, the productivity of the sector is very low due to a number of constraints, among which feed shortage both in quality and quantity is very crucial.

Livestock development in Ethiopia are mainly limited by technical problems (insufficient and low-quality feed sources) and institutional factors (poor linkages between research centers and end users, limited extension and financial services (MOA, 2013). However, the Ethiopian govern ment's second Growth and Transformation Program (GTP II) has envisaged increasing by 2020 the productivity and total production of livestock through improving genetics and feed services (MOA, 2015).

In order to mitigate the feed shortage problems production of improved forage like Lablab is highly important (Getnet *et al*., 2003). Berhanu *et al*., (2003) also reported that improved animal nutrition through adoption of sown forage could substantially increase livestock productivity. Utilizing improved forage varieties has several advantages. Not only does it improve animal nutrition resulting in higher producing livestock; it also compliments crop production by maintaining soil fertility through nitrogen fixation, while as grazing depletes the fertility of the land, forage growing improves soil health. (GIZ, ILRI October 2013).

Lablab (*lablab purpureus*) is a summer-growing annual or perennial forage legume. Lablab is a multipurpose legume. Its immature seeds and pods, and young leaves are edible and cooked as vegetables. Mature dry beans are edible but they require prolonged cooking with several changes of water (Cook *et al*., 2005; Adebisi *et al*. 2004).

Midland districts of Guji Zone were well known by the livestock production potential and suitable agro ecologies for the production forage like Lablab (*lablab purpureus*). However, Tegegne *et al*. (2013) has mentioned low accessibility of extension services and inadequacy of practical demonstrations as the causes of poor performance of the livestock extension service among small dairy holders.

The production of Lablab (*lablab purpureus*) variety is not only used for improve animal nutrition resulting in higher producing livestock; it also compliments crop production by maintaining soil fertility through nitrogen fixation. While grazing depletes the fertility of the land, forage growing improves soil health. Therefore, to obtain the advantage of forage for livestock production and crop improvement the demonstration of improved forage like Lablab (*lablab purpureus*) is essential.

Objectives of the Study

- To demonstrate Lablab varieties in midland areas of Guji Zone.
- To develop and promote Lablab varieties in midlands districts of Guji Zone, Oromia Region, Ethiopia.
- Assess farmers' feedbacks for further develop ment of Lablab variety production.

Materials and Methods

Description of Study Area

Adola Rede, Odo Shakiso and Wadera districts are located at about 470 KM, 490 KM and 530 km to the south from Addis Abeba respectively. Districts are characterized by three agro-climatic zones, namely Dega (high land), Weina dega (mid land) and Kola (low land) which are suitable for production of different crops and forages with different coverage. The mean annual rain fall and temperature of the districts are about 950 mm and 12-34 ^{0}c respectively. Based on this condition two-time cropping season was commonly practiced i.e. Arfasa (main cropping season) which start from March to April especially for maize, haricot bean, wheat and barley. The second cropping season is called Gana (short cropping season) which was practiced as double cropping using small size cereal crops like tef, wheat and barley after harvesting the main cropping season crops. Mixed farming, mining and forest product production are the major livelihood of study area. Generally, in midland areas of Guji Zone, there are no areas used for the research-based forage production.

Site Selection

Pre-extension demonstration of lablab varieties were conducted in Adola Rede, Wadera and Odo Shakiso districts of East Guji Zone during 2017/18 and 2018/19 main cropping season. Purposively two Kebeles from each district were selected based on their livestock production potential.

Hosting Farmer's Selection

Farmer's Research Group (FRG) approach was followed to select farmers and group under hosting farmers. A total of 9 FRGs were organized having 60 male and 30 female members. Among the FRG members, a total of thirteen (13) interested hosting farmers were selected. Having suitable and sufficient experimental land to accommodate the trials, initiatives to implement the activity in high-quality, vicinity to the roads, having or have to invest on small dairy or beef farming and willingness to explain the technologies to others were the criteria used to select the hosting farmers.

Materials Used and Field Design

Two improved lablab varieties (Gabis and Baresa) were planted on selected hosting farmers land on 100 m^2 plot for each variety in the main cropping season. Full packages of technologies that include row planting at50 cm inter- and 20 cm intra- row spacing, recommended seed rate of 20 kg per hectare and fertilizer rate of 121 kg of NPS per hectare were applied. In addition, twice hand weeding was done on time.

Land was provided by hosting farmers. Land preparation was carried out by trial/hosting farmers, whereas land leveling, planting, follow up and visit, harvesting, threshing was handled and managed by BoARC Agricultural Extension Research Team.

Data Types and Methods of Data Collection

Both qualitative and quantitative data were collected using direct field observation, measurements and face to face interview. The grain and biomass data were collected using data collection sheets. Feedbacks were collected using checklist by conducting face to face interviews.

Data Analysis

The collected agronomic data was analyzed using descriptive statistics. Farmers' perceptions to

demonstrated varieties were also analyzed qualitatively.

Results and Discussions

Capacity Building on Lablab Production

In order to capacitate the farmers' knowledge on lablab production trainings were given for selected Farmers, Development Agents (DAs), and Subject Matter Specialists (SMSs). Exchange visit and field days were organized to enhance farmer to farmer learning on the production and management of lablab. Multidisciplinary research team; animal feed, extension and socio-economic research team and other stakeholders (Offices of Livestock and Fish development) actively participated by sharing their experience and knowledge during training and field day organized.

Table 1 shows the number of farmers, develop ment agents, SMSs and other participants who attended training, exchange visit and field day of lablab demonstration.

Table1. *Capacity building methods and number of participants for demonstration of lablab*

Capacity building methods	Participants	Number of participants		
		Male	Female	Total
A. Training	Farmers	60	30	90
	DAs	10	3	13
	SMSs	9	3	12
B. Exchange Visit	Farmers	17	3	20
	DAs	3	1	4
	SMSs	3	1	4
	Others	4	1	5
C. Field day	Farmers	121	27	148
	DAs	13	6	19
	SMSs	9	2	11
	Others	38	7	45

DAs = development Agent, SMSs = subject matter specialist

Figure1. *Training at Wadera district*

Figure2. *Field day at Odo Shakiso district*

Mean Grain Yield and Biomass of Lablab Varieties

Grain Yield Performance of Lablab

Variability was observed among demonstrated varieties for grain yield qt/ha which was ranged from 18 qt/ha to 30 qt/ha with the mean value of 24.96 qt/ha from Gabis variety and 19 qt/ha to 28 qt/ha with the mean value of 23.59 qt/ha from Baresa variety. Mean grain yield values of both varieties were almost comparable. The mean grain yield of lablab varieties was less than from previously conducted adaptation which were 29.3 qt/ha and 33 qt/ha from Gabis and Baresa variety respectively (Teshale *et al., 2017* unpublished report). This yield difference could be due to soil fertility and dissimilar management practice of hosting farmers. Table 2 show that the yield performance of demonstrated lablab varieties.

Table2. *Grain yield performance of lablab varieties demonstrated*

Grain Yield Performance of Lablab Varieties in Qt/Ha					
Variety	N	Minimum	Maximum	Mean	Std. Deviation
Gabis	13	18.00	30.00	24.9615	4.03351
Baresa	13	19.00	28.00	23.5962	2.84227

Biomass Performance of Lablab

Table 3 indicates that above-ground biomass of demonstrated lablab varieties were varied in ton/ha.

Gabis variety gave higher biomass yield range from 4 ton/ha to 5.2 ton/ha with average mean value of 4.63 than Baresa variety which range from 3.5 ton/ha to 4.8 ton/ha with average mean value of 4.18 ton/ha.

The mean biomass yield of Gabis variety was less than from previously conducted adaptation which were 6.54 ton/ha (Teshale *et al., 2017* unpublished report). This difference could be due to diverse management practice of hosting farmers.

Table3. *Biomass performance of lablab demonstrated*

Biomass Performance of Lablab Varieties in Ton/Ha					
Variety	N	Minimum	Maximum	Mean	Std. Deviation
Gabis	13	4.0.00	5.2.00	4.63846	4.07305
Baresa	13	3.5.00	4.8.00	4.18462	3.95487

Table4. *Result of independent sample t test*

	Test for Equality of Variances		T-Test for Equality of Means				
Equal Variances Assumed	F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
	.096	.759	2.882	24	.008	4.53846	1.57458

Table 4 show that the equality of biomass performance of demonstrated lablab varieties were tested by independent sample t test. The significance value for equality of variance is ($p = .759 > .05$). This indicated that there is no statistically significant difference between the two means biomass yield of both varieties. Thus, farmers can produce one or both varieties based on available feed source.

Farmers' Perception on Lablab

Promotion of certain technologies should be based on farmers' perception which is important for sustainability and utilization of technology. For Lablab demonstration, farmers were ordered to reflect their own ideas on lablab variety production. According to farmers perception, both lablab varieties had good smell and palatable by cattle. Gabis variety had more pod/plant and number of branches than Baresa variety. The demonstrated lablab varieties were also tolerant to insect and disease. The flower of lablab was used for a source of food for bees. Thus, lablab production had multifunction for farmers as source of feed for bee and livestock. However, lablab was not early matured forage crop at the study area; its life span on the farm was 8 months. For that reason, it was not used for double cropping. Once it got moisture the crop would regenerate itself. But, in the study area there is high population pressure and scarcity of land. Therefore, farmers of the study area were more interested to produce early mature crops and double cropping. Thus, farmers mentioned lablab should be planted as intercropping with cereal crops like maize.

Conclusions and Recommendations

Conclusions

Midland parts of Guji were well known by the livestock rearing (sheep, goats and cattle). But there were no research-based forage technologies. For that reason, livestock feed depends mainly on natural pastures and crop residues which are often limiting in quantity and nutritional quality. Demonstration of lablab helped farmers to overcome feed shortage during dry season. Nutritionally, lablab was used for fattening of cattle when used with other feed mixture.

Recommendations

In study area, farmers give more attention on food than feed type crops. Therefore, extension system should break through balance production of crop and forage. Gabis and Baresa varieties

were accepted by farmers. Thus, farmers should better to produce both lablab varieties either on low land agro-ecological areas or Using intercropping practices with cereal crop like maize.

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