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Pre-Extension Demonstration of Improved Legume Forage Species in Irrigated Lowlands of Bena-Tsemay District, South OMO Zone

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***Abstract*—The demonstration was undertaken in Duma and Enchete kebeles of Bene-Tsemay woreda with the objectives of introducing and popularizing improved lablab intoritum specie forage production technology and assessing agro-pastorals perception towards the technology. Site selection was undertaken purposively based on access to irrigation facilities, potential for livestock production, and access to suitable land for forage production. A total of 23 agro-pastoralists were selected purposively based on their willingness to participate on demonstration. Training was offered to participant agro-pastoralists and members' of farmers research and extension groups at each kebele's pastoralist training center. Each participant agro-pastoralists allocated an area of 10m x 20m plot of land and sowed seeds with rate of 15kgha-1at spacing of 50cm between rows and 30cm between plants. Periodic supervision and monitoring of the fields was done by researchers whereas frequent follow-up and support was carried out by development agents and members of agro-pastoralist research and extension group of the respective kebeles. Agro-pastorals perceptions towards the technology were collected and also analyzed using likert-scale ranking. Relevant feedbacks were collected from participant agro-pastorals and summarized. Result of this demonstration revealed that fresh biomass yield, short maturity period and intake by animals were mostly liked attributes of the technology. Moreover, during dry season high biomass yield of the forage increases the dry matter requirement for supplementation to livestock in the areas. Therefore, the improved lablab forage production practices should scale-out in the areas with similar agro-ecologies**

***Index Terms*—agro-pastorals, demonstration, intoritum.**

I. Introduction

The pastoral sector is a source of livestock meat and milk destined for domestic consumption and export markets. Thirty-four percent of the national red meat, 38 percent of total milk, and 21 percent of cow milk are produced by PAPs in lowland grazing systems [1]. Livestock production systems in Pastorals and agro-pastorals areas of the study district entirely depended on feed from range forage.

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About 80-90% of major livestock feeds were come from open communal grazing land and the crop residues contributed major feed resource next to communal grazing in the pastoral area of Bena-Tsemay district, whereas the indigenous browse species were an important feed source next to natural pasture during dry season in Dassenech district [2]. However, the productivity generated from these feed sources is under extensive deterioration along with the every-increase deforestation for agriculture, fuel wood gathering and recurrent drought [3].

Feed shortages both in quality and quantity is one of the main impediments for livestock production in the study area., The situation is aggravated by lack feed conservation practices, limited production of improved forage to supplement their livestock during dry period and un expected occurrence of flood; are considered as the main limiting factors for low productivity of livestock in PAP areas [4]. Moreover, the total dry matters produced from different feed sources were not enough to satisfy the dry matter requirement of livestock in the study area [2]. To alleviate such a gap, different improved forage species were introduced and selected by agro-pastoralists and pastoralists through participatory approach in the study area using irrigation and rainfall by JARC. Although, participatory selection of high biomass yielder and well adapted improved legume forage (lablab) species were conducted, the technology was not widely demonstrated to the pastorals and agro-pastorals areas. Therefore, this demonstration was carried out aimed to introduce and popularize improved lablab intoritum forage with its full package and to assess agro-pastorals perception towards the improved forage technology in lowland areas of Bena-Tsemay district.

II. Materials and Methods

Description of the study area

The rainfall distribution of the Bena-tsemay district is bimodal with main rainy season extends from January to May and the second cropping season, from July to October. It receives annual average rainfall of 876.3 mm and the monthly average minimum and maximum and minimum temperatures of 18.2 and 37.3 ° C, respectively. Its altitude ranges 588m above sea level.

Site and agro-pastoralists Selection

Demonstration of improved lablab legume forage species was conducted in two purposively selected kebeles namely Enchate and Dumma kebeles of Bena-Tsemay district. The selection of kebeles and district was undertaken based on their access to irrigation facilities, high potential of livestock production, and access to suitable land for forage production. Finally, 23 agro-pastoralists were selected purposively based on; willingness to participate, access to irrigation facility and suitable farm land by considering women as 30% of participants. Both site and participant selection were undertaken by active participation of Jinka Agricultural Research Center (JARC) researcher jointly with the Zonal,districts' experts and respective kebele' administrators and Development Agents (DA).

Demonstration design

Participatory demonstration of lablab intorintum species was conducted on twenty three participants' farming field and two PTC of the respective kebeles in 2019 *belg* cropping season. Appropriate land preparation practices were undertaken, the seeds were planted at recommended seed rate of 15kg/ha and spacing between rows and plants were 50cm and 30cm respectively.

Approaches were followed

Land preparation and plantation

Pertaining to implementation of improved lablab intorintum species demonstration, about two participatory agro-pastorals research and extension groups (PREGs) were organized in both kebeles. Seed plantation practices was undertaken by active participation of selected agro-pastorals, members of PREGS, kebele DAs and stakeholders of the respective kebeles. On-farm training was provided to enhance practical skills and knowledge of participants on improved lablab species sowing, prior to seed plantation, input seeds were distributed to all participant agro-pastorals based on recommended seeds rate. Periodic follow up was conducted by researchers of JARC, whereas routine follow up and support was conducted by the respective kebele DAs and PREG Members.

Training

On-farm training was provided to 23 participant agro-pastorals, 37 members of PREG, and 4 DAs in both host *kebeles*' of pastorals training center (PTC) by JARC researchers in collaboration with kebele level stakeholders. The training was mainly focused on awareness creation skill and knowledge improvement, associated agronomic practices and utilization of improved lablab intoritum legume forage species. .

Data Collection Methods and Analysis

Data on agro-pastorals' perception were collected through face to face interview of thirty four respondent agro-pastoralists, and also conducting discussion with two PREGs. Prior to data collection, agro-pastoralists were let to identify and rank various characteristics of lablab forage which was significantly important to them through group discussion.. Therefore, maturity period and fresh biomass yield were ranked 1st, and 2nd respectively, whereas animal preference and resistance to moisture stress attributes were ranked as 3rd having equal perception on the other hand ease of establishment, pest/disease resistance, storability and repeatedly harvest per- year were ranked from 4th to 7th respectively. Mean and percentage were used to summarize the numbers of participants involved on demonstration and presented in gender disaggregated data. similarly agro-pastoralist's perception data on performances of improved lablab forage was captured using a eight item statements rated on a three point Likert-scale assigned values 3(very good), 2(moderate) and 1(poor). A midpoint of 2.0 was obtained and decision rule was set; that states mean with score of 2.0 and above are accepted good performance while those with mean score less than 2.0 are considered as poor performance.

III. Results and Discussions

Training

Practically, on-farm training was given to participant agro-pastorals, DAs and kebeles' administrators to enhance awareness and practical skill on improved agronomic and field management practices of lablab intoritum species prior to sowing at PTC.. Totally, 32 agro-pastorals, 6 DAs and 4 administrators of the kebeles were participated on training. On average, about 85.71% and 14.29% of the participants were men and women agro-pastorals respectively as shown in (table 1 below).

Table 1; Participants on improved lablab forage technology training

R/n	Participants	Numbers of participants on training			% of participants in gender	
		Males	Females	Total	Male	Female
1	Agro-pastorals	28	4	32	87.5	12.5
2	Das	4	2	6	66.7	33.3
4	Administrators	4	0	4	100	-
	Total	36	6	42	85.71	14.29

Agro-pastorals' perception towards the improved lablab forage technology

Agro-pastorals were invited to evaluate the on-farm performances, post-harvest handling and animal preference based on the pre-determined characteristics of improved lablab forage technology in two *kebeles* of the district. Result of Likert-scale ranking of the perceived performances of the improved lablab forage technology in the area was shown in table 2, revealed that fresh biomass yields was ranked as first, as indicator of most perceived parameter of the performance of the technology to lablab producing agro-pastoralists with mean rank of 2.76. Short maturity period, intake by animals, and resistance to moisture stress were ranked as second, third, and fourth with mean rank of 2.72, 2.53, and 2.09 respectively. Whereas, the mean rank blow 2.00 values were recorded for disease/pest resistance, storability status, repeated harvest per-year, and ease of establishment were inorder of fifth, sixth, seventh and eighth respectively as they were perceived as poor performance status of the improved lablab forage technology with mean rank of 1.97, 1.18, 1.15 and 1 respectively.

Table 2;. Perceived characteristics of the improved lablab forage technology as indicator of performances characteristics

Characteristics	Mean	Std. Dev.	Ranking
Short maturity period	2.72	0.448	2nd
Storability status	1.18	0.387	6th
Fresh biomass yield	2.76	0.431	1st
Intake by animals	2.53	0.507	3rd
Repeated harvest per-year	1.15	0.359	7th
Resistance to moisture stress	2.09	0.712	4th
Diseases/pest resistance	1.97	0.576	5th
Ease of establishment	1	0	8th

N=34 the mean is measured on a 3-point likert scale. The rank 3 being very good and 1 being poor

IV. Conclusion and Recommendation

From the demonstrated technology, perception data were collected through individual interview and analyzed. Accordingly, the result of Likert-scale ranking revealed that the fresh biomass yield, short maturity period, intake by animals and resistance to disease/pest were ranked perceived as 1st, 2nd, 3rd and 4th respectively as good indicator of performance. While disease/pest resistance, storability status, repeated harvest per-year, and ease of establishment were put in the order of fifth, sixth, seventh and eighth respectively and perceived as poor performance indicator characteristics of improved lablab forage technology in the area. Therefore, production of improved lablab intoritum species with its full package in wider scale would increase the dry matter as supplement for livestock in the study area and areas with similar agro-ecologies.

V. Conflict of Interest

The authors declare that there is no conflict of interest.

VI. Acknowledgement

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