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Pre-Extension Demonstration and Evaluation of Lowland Bamboo Technologies in West and Kellem Wollega Zones

Temam Mama*, Kemiso Dirbaba and Wegene Negese

Oromia Agricultural Research Inistitute, Haro Sabu Agricultural Research Center, Haro Sabu, Ethiopia

***Corresponding Author:** Temam Mama, Oromia Agricultural Research Inistitute, Haro Sabu Agricultural Research Center, Haro Sabu, Ethiopia.

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Abstract

The demonstration was conducted at Dale Sadi and Sayo of Kellem Wollega and Lalo Asabi from west Wollega with the objectives to demonstrate and evaluate the adaptation potential of lowland bamboo technology under farmer management conditions, raise awareness, and gather farmer feedback's for future technology development and enhancement in specific places. Two PA's were specifically chosen from each of the selected districts, and a FRG with 15–20 members was formed at each PA. Three trail farmers were chosen from the established FRG of each PA, and each trail farmer at each PA received a cutting of two bamboo species—D. hamlitoni and D. memebranceous—that were grown at nearby nurseries. Data on survival rate and farmers feed-backs were collected. The collected data were analyzed by descriptive statistics and matrix ranking. Results show that D. hamlitoni had a greater mean survival rate in the study areas. Farmers also chose D. hamlitoni based on its suitability for handicrafts and furniture. .However, D. memebranceous was chosen by farmers due to its ability to tiller more, use in construction, more culm diameter, rapid growth, and stem strength. In general, both species should be simultaneously disseminated in the study areas because they both have special benefits for farmers.

Keywords: Bamboo Species, Cutting, Demonstration, Dale Sadi, Sayo, Lalo Asabi

Introduction

Bamboo is a fast growing and high yielding perennial plant with a considerable potential to the socioeconomic development and environmental protection [1,2]. In nature, bamboo grows as pure stands or is mixed with other trees. Bamboo growing in forested catchments plays a vital role in the protection of soils and water sources [3,4].

Bamboo forms the bulk of elephant and wildlife feed and has diverse utility ranging from construction to delicacy in Asia and Africa [5]. It has also several desirable qualities that make it a useful resource compared to many other plants. It is tremendously valuable plant which has been used for hundreds of years with society. Long lasting accountability of bamboo with society is for its ability to restore degraded sites, short growing cycle, and ability to regenerate vegetative, tolerance to repeated harvesting, strong and lightweight material, and compatibility with other tree species [6,7].

Bamboo propagated either by sexual (reproductive) or asexual (vegetative) means of propagation [8]. However, the seed propagation method is not popular in Ethiopia due to rarity of the flowering of common bamboo species plus difficulties to acquire the seeds [9]. The species give seed once in its lifetime and after giving the first seed within 30-40 years old immediately collapse so it's difficult to propagate using seeds. Vegetative propagation method is suitable for farmers and different stakeholders for their low cost and eases of management techniques [10].

Adaptation of four lowland bamboo species through cutting was done at Haro Sabu on station and two species: D. hamlitonii and D. memebranceous were well performed and recommended for demonstration. So as to enhance the future considerable potential of those recommended bamboo species to the socioeconomic development and environmental protection to farmers of West and Kellem Wollega zones demonstration and evaluation of those species is critical. As a result this activity was initiated with the following objectives: Four lowland bamboo species were adapted by cutting at

the Haro Sabu station, and two species D. hamlitonii and D. memebranceous performed well and were recommended for demonstration. Demonstration and evaluation of those bamboo species are essential in order to maximize their future significant potential for the socioeconomic development and environmental protection of farmers in the West and Kellem Wollega zones. Consequently, the following objectives were set when this activity was started:

Objectives

- To demonstrate and evaluate adaptability potential of lowland bamboo technology under farmer management condition at selected districts.
- To create awareness on lowland bamboo trees on selected area.
- To collect farmers' feedbacks for further technology development/improvement

Methodology

Description of the Study Area

The study was carried out in Dale Sadi and Sayo in the Kellem Wollega zone and Lalo Asabi in the west Wollega zone. Dale Sadi, Sayo, and Lalo Asabi districts are situated between 350 06′ 34.5″ E longitudes and 80 43′ 35″ N latitudes, 340 41′ 00″ E longitudes and 8012′ 44″ N latitudes, and 9010′ longitude and 35040′ 59″ N latitudes, respectively. Dale Sadi, Sayo, and Lalo Asabi districts have elevations range of 1650 to 1900 meters, 1300 to 2000 meters, and 1500 to 1900 meters above sea level respectively. For Dale Sadi, Sayo, and Lalo Asabi districts, the average annual rainfall is 1200 mm, 1400 mm, and 1500 mm, respectively. The districts of Dale Sadi, Sayo, and Lalo Asabi have average annual temperatures of about 28, 25, and 26 degrees Celsius, respectively.

Site and Farmers Selection

This study was conducted selecting two potential districts from Kellem Wollega and one potential districts from West Wollega Zones for three years (2015 to 2017 E.C.). From each district, two PA's were selected purposely. From each PA, one FRG consisting of 15-20 members was established considering gender balance, interest and land ownership. Among FRG members three trial farmers were selected purposely.

Materials and Design

Cutting of two bamboo species (D. hamlitonii, and D. memebranceous) were grown on nursery and planted on each three trail farmers fields that were selected from group of FRG members of each PA's.

Data Types and Methods of Data Collection

The collected quantitative data includes the number of farmers who engaged in FRG, the number of beneficiary farmers by age and sex, the survival rate, and the number of stakeholders who participated. Qualitative data was collected regarding farmers' perceptions of the new technology.

Data Management and Statistical Analysis

Survival rate data and number of participants on training were analyzed using descriptive statistics. Farmers' selection criteria were examined using pairwise and matrix ranking.

Technology Demonstration and Evaluation Approaches

FRG's members were encouraged to participate on different Trainings and mini field-days organized at selected sites. Training was given for farmers and experts (DA's and SMS) before the start of the demonstration process in order to build their capacity on approaches and principles of FRG, the role and responsibility of the FRG members in managing, necessary packages and management practices, and monitoring required for the trial.

Result and Discussion

FRG Participants by Districts

Before starting the activity implementation, one FRG was established in each selected PA's. Accordingly, a total of 94 males and 24 females were participated.

Districts	Kebeles	No. of Trial Farmers	No. of FRGs	FRG members		Total
				Male	Female	
Sayo	Mimko	3	1	13	2	15
	A/Mikal	3	1	12	3	15
Dale Sadi	A/ogiyo	3	1	14	1	15
	Cole	3	1	14	1	15
Lalo Asabi	Kelay	3	1	13	2	15
	Inango	3	1	13	2	15
Total	18	6	79	11	90	
Percentage	87.8%	12.2%	100.00%			

Table 1: Numbers of FRGs and thier Members

Awareness Creation Training

Before trial establishment, awareness creation training was given for a total of 115 peoples composing of 90 farmers,17 DAs, and 8 agricultural experts on strengthening FRG approaches, effective trail management, the use and management of bamboo

No participants	Sayo		Dale Sadi		Lalo Asabi		Total
	Male	Female	Male	Female	Male	Female	
Farmers	24	6	28	2	26	4	90
DA	5		6		4	2	17
Experts	2		3		3		8
Total	**31**	**6**	**37**	**2**	**33**	**6**	**115**

Table 2: Participants of the Trainings

Mini Field Day

Mini field day on which FRG members, neighboring farmers, DAs and agricultural experts participated was arranged in Dale Sadi Cole PA.

As it is shown in the table (3) below, a total of 50 farmers, 7 DA's and 7 agricultural experts were participated on this mini field day events.

Participants	Sex		Total
	Male	Female	
Farmers	38	12	50
DAs	6	1	7
Experts	5	2	7
Total	49	15	64

Table 3:The Participants of Minefield Days

Survival Rate of Planted Bamboo Species

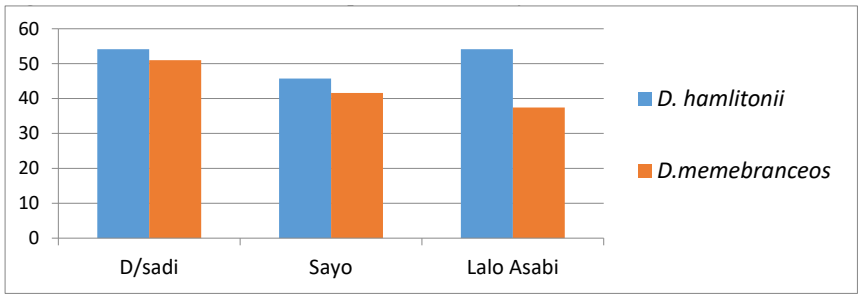

Figure 1: Survival Rate of Bamboo Species at the Study Areas

Farmers Feedbacks

The participants of field day had listed down the species traits based of their selection criteria. Accordingly, Fast growing, disease stem strength, tillering capacity, culm diameter, use for construction and survival rate were listed as their species selection criteria. Listed criteria were then organized and prioritized using pair wise matrix ranking techniques

Code	Parameters	FG	SStg	TC	CD	UFC	SR	SC	EM	SB	Freq.	Rank
1	FG		2	3	1	5	6				1	3rd
2	SStg	1		3	4	5	6				1	3rd
3	TC	1	2		3	3	3				5	1st
4	CD	1	2	3		5	6				1	3rd
5	UFC	1	2	3	4		6				3	3rd
6	SR	1	2	6	4	6					4	2nd

Table 4: Traits' Pair Wise Ranking Matrix Results

FG=Fast growing, SStg=Stem strength, TC=tillering capacity, CD=Culm diameter UFC =Use for construction, SR= Survival rate

Farmers' Species Selection

No	Criteria	**D. memebranceous**	**D. hamlitoni, and**	Reason For Selection
1	Fast growing	1	2	Fast growing
2	Stem strength	1	2	More strength
3	Tillering capacity	1	2	More tillers
4	Culm diameter	1	2	More diameter
5	Use for construction	1	2	More for construction
6	Survival rate	2	1	More survival rate
7	Suit for hand craft and furniture	2	1	More suit for handcraft and furniture
Total Score		5	2	
Rank		**1st**	**2nd**	

Table 5: Farmer's Selection and Ranking of the Demonstrated Bamboo Species:

Where: 1= selected for that specified criteria, 2= selected 2nd for that specified criteria

Farmers prioritized tillering capacity, use for construction, culm diameter, fast growing and stem strength traits by which D. memebranceous excelled. However, D. hamlitoni was favored for higher survival rate and suit for hand craft and furniture traits.

Conclusion and Recommendation

Conclusion

The study was conducted to demonstrate and evaluate the adaptability potential of two lowland bamboo, D. memebranceous and D. hamlitonii under farmer management condition,raise awareness, and get feedback's from farmers. D. hamlitoni has shown higher mean survival rate at the study areas. Farmers' feedback's were collected on mini field day. Accordingly, farmers had selected D. memebranceous for its tillering capacity, use for construction, culm diameter, fast growing and stem strength traits. D. hamlitoni was also selected for higher survival rate and suit for hand craft and furniture traits.

Recommendation

Since both species have unique advantages for farmers both of them should be concurrently popularized in the study areas. Therefore, there should be appropriate mechanisms for disseminating both species in the study area. Trainings should be given for farmers about those distinct advantages of the two species.

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