Pre-Extension Demonstration of Faba Bean Thresher Through Freg In Selected AGP-II Districts of Arsi Zone

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Abstract

Pre-extension demonstration of faba beab thresher through FREG in selected AGP-II Districts of arsi zone was carried out in two purposively selected districts namely Tiyo and Lemu Bilbilo from Arsi zone with the objectives of enhancing farmers awareness on the importance and use of the machine, evaluating the performance of the machine under farmers condition, collect farmer's feedback on technology, evaluating the economic analysis/ cost-benefit gain of the machine. Two kebeles were purposively selected based on their accessibility and two framers research extension groups composed of members representing male, female and youth were organized to undertake the demonstration. Training was given to a total of 84 participants of which 64.3% was male and 35.7% female from four districts participated on both theoretical and practical training. The training was mainly focused on how to operate technology and relative advantage of technology. The demonstration was conducted on two hosting farmers from FRGs. Among the farmer interviewed 50% had responded that it was simple to operate the faba bean thresher, 33.3% of farmers responded that it was very simple and 16.7% of respondent farmers were responded that it was medium to operate faba bean thresher technolog. Maintenance of the technology was also considered as one criterion to see the simplicity of technology. Regarding to the simplicity of maintenance of technology; 40% of farmers responded that maintenance of technology was medium, 31.3% and 11.7% answered as it was simple and very simple to maintain technology. Whereas only 15% the respondent responded that it was difficult to maintain it. Regarding affordability of the technology; about 46.7% of respondent farmer responded that the cost of technology was medium that it can be affordable by the average farmers and 23.3% of farmers responded that the price of technology was low to purchase. About thirty percent 30% of respondent said that the price of technology was high to afford. From the result of this finding net income of farmers increased from six thousand three hundred fifty (6, 350) birr. Thus, faba bean thresher technology was recommended for further scaling. the average threshing capacity of the machine was three point eight quintals per hour (3.8quintals/hr). Whereas threshing by tradition practice was one point two quintals per hour (1.2quintals/hr). As revealed in the following graph threshing faba Bean using thresher reduce labor from four person to two person. Apart from this no breakage recorded by traditional one whereas 8% breakage recoded while threshing by faba Bean thresher. *Therefore technology was recommended for farther improvement.*

Key words: Demonstration, Faba bean thresher, Faba bean, Net benefit and Farmers perception

Introduction

Faba bean (*Vicia faba* L.) is one of the most important cool season grain legumes in Ethiopia in terms of hectarage, total production, foreign exchange earnings and soil amelioration (Amare, 1990). Faba bean contributes to smallholder livelihoods in multiple ways. It can play a significant role in improving smallholders' food security, as an affordable source of protein and other essential nutrients.

Faba bean can have an income benefit for smallholders as it yields a higher gross margin than cereals (IFPRI, 2010). Its crop residue is also widely used as animal feed In addition to improving food and nutritional well-being, faba bean can improve soil fertility through its ability of fixing atmospheric nitrogen to the soil. According to Somasegaran and Hoben (1994), faba bean is the efficient N fixer (240 to 325 kg ha⁻¹ yr⁻¹) when inoculated with *Rhizobium leguminosarum* by. *viciae*.

Research on cropping systems in Ethiopia indicated that the improvements in soil fertility from planting wheat after faba bean in rotation can improve grain yield of wheat by more than one ton per hectare and can reduce fertilizer usage for cereals up to 60% (Amanuel and Daba, 2006). Different research works made in recent years revealed that inoculation of faba bean with *R. leguminosarum* can *increase* yield by 10 to 50% (Abere et al., 2009).

Despite tremendous advantage of this crop, faba bean producer farmers are facing challenge of threshing it in traditional way which is backward, time consuming and tedious farm activity. Bako Agricultural Engineering research center adapted a faba bean thresher with good and promising capacity. According to Bako Agricultural Engineering research center (unpublished report of 2017) the threshing capacity of 306.31Kg/hr was obtained percentage of mechanical damage and threshing efficiency at this operation is 0.02 and 95.2%, respectively.

Therefore, this study is initiated with the objectives of demonstrating Faba bean thresher to farmers of selected AGP-II districts Arsi zone.

Objective

- To enhance farmers awareness on the importance and use of the machine
- To evaluate the performance of the machine under farmers condition
- To collect farmer's feedback on Faba bean thresher technology
- To evaluate the economic analysis/ cost-benefit gain of the machine

Material and methods

Materials

The materials that were used for the implementation of this study were faba bean thresher, 10HP motors, digital balance and stopwatch.

Method

Site selection, Technology evaluation and demonstration methods/techniques

Demonstration of faba bean thresher was held in two districts purposively selected based on their crop potential. Based on this Lemu Bilbilo and Munessa districts of Arsi zone were selected. Two kebeles from each district and in each Kebele one FRG which has different category of farmers like male, female and youth established. The technology was tested and compared with traditional way of threshing faba bean at selected kebele station. Both result and method demonstration method and techniques was followed. The mechanisms used to enhance farmer to farmer learning and information exchange was field visit/tour and field day. The experiment was done on two treatments which were new practices with its local practices.

Data type and Method of data collection

This study was employed both qualitative and quantitative data from primary data sources. Primary data such as time reduced because of using this machine, labor reduced, economic return/profitability, total number of farmers participated in training, field visits and field days by gender, numbers of farmers become aware of the relative advantage of the technology by gender, role of farmers and other stakeholders in technology demonstration, farmers' opinion was collected using different appropriate data collection method/technique such as field observation, household/participant interview, focus group discussion.

Method of data analysis

Data was analyzed using descriptive statics like percentages, mean values and frequencies. Economic data on Faba Bean Thresher was analyzed using partial budget analysis.

Result and Discusion

A total of 84 participants of which 64.3% was male and 35.7% female from four districts participated on both theoretical and practical training. The training was mainly focused on how to operate technology and relative advantage of technology as indicated in the (Table 1) below.

Disticts	Description of participants	Male	Female	Total
Lemu-Bilbilo	Farmers	18	12	30
	Agricultural Experts	4	2	6
	Development agents	4	2	6
	Supervisor	2	-	2
Tiyo	Farmers	18	12	30
	Agricultural Experts	4	-	4
	Development agents	4	2	6
	Supervisor	-	-	-
Grand total		54	30	84

Performance of the technology

As it was revealed on the following graph the average threshing capacity of the machine was three point eight quintals per hour (3.8quintals/hr). Whereas threshing by tradition practice

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Profitability analysis of the machine

The profitability analysis of the machine was done by comparing two crop threshing mechanisms which were traditional animal trampling and stationary engine driven machine threshing. Faba bean thresher technology reduced the cost of human labor and animal labor which were calculated as four thousand 4,000 birr to three thousand two hundred fifty birr 3,250 respectivly. Whereas total cost incurred for human labor force both for machine operation and re-cleaning of crop were nine hundred (900) birr. From the result shown in the following table net income of farmers increased to six thousand seven hundred fifty (6, 750) birr. The other quality of the machine that adored by farmer's was straw chopping capacity of the machine for their livestock feed which was serious problem in the study area.

	Traditional practices	Faba bean thresher
Average yield in quintal per hectare	22.5	24
Gross return	90,000	96,000
Labor for transportation	1,200	850
Labor for threshing	1,800	-
Labor for winnowing	600	-
Animal labor	400	-
Labor for operation	-	600
Labor for re-cleaning	-	300
Machine cost	-	1,500
Total cost that vary	4,000	3,250
Net income	86,000	92,750

Table 2:- profitability analysis of machine

Farmer perception

Among the farmer interviewed 50% had responded that it was simple to operate the faba bean thresher, 33.3% of farmers responded that it was very simple and 16.7% of respondent farmers were responded that it was medium to operate faba bean thresher technology Table 2. Maintenance of the technology was also considered as one criterion to see the simplicity of technology. Regarding to the simplicity of maintenance of technology; 40% of farmers responded that maintenance of technology was medium, 31.3% and 11.7% answered as it was simple and very simple to maintain technology respectively. Whereas only 15% the respondent responded that it was difficult to maintain it. Regarding affordability of the technology; about 46.7% of respondent farmer responded that the cost of technology was medium that it can be affordable by the average farmers and 23.3% of farmers responded that the price of technology was low to purchase. About thirty percent 30% of respondent said that the price of technology was high to afford as depicted in the table 2 below.

$N^{\underline{0}}$	Criteria	Attributes	$N^{\frac{0}{2}}$ of respondent	Percentage (%)
1	Ease of operation	Very simple	20	33.3
		Simple	30	50
		Medium	10	16.7
		Difficult	0	0
		Very difficult	0	0
2	Maintenance	Very simple	7	11.7
		Simple	20	31.3
		Medium	24	40
		Difficult	9	15
		Very difficult	0	0
3	Price to afford	Very low	0	0
	technology	Low	17	28.3
		Medium	20	33.3
		High	23	38.3
		Very High	0	0
4	Portability of	Very simple	12	20
	technology	Simple	18	30
		Medium	20	33.3
		Difficult	10	16.7
		Very difficult	0	0

Table 3. Farmer	's response	towards	the tec	hnology
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Framers` feedback and reaction

In the process of demonstrating faba bean thresher mini-field day was organized. In the course of field day different stakeholders and researcher were participated and reacted on what they observed during operation. Criteria's were threshing capacity, time and labor reduced, easiness of operation, portability and affordability of technology and feedback were collected and analyzed. Beside all these attributes there were seed breakage of 8% during the operation of fababean threshing using thresher. As a result, all participant farmers and stakeholders liked and accepted faba bean thresher technology with slight modification which was seed breakage due to different size of seed and high speed of machine.

Conclussion and Reccomendation

Demonstration of faba bean thresher was under taken in the purposively selected districts of Arsi zone. Demonstration of the technology intended to enhance farmers awareness on the importance and use of the machine, evaluate the performance of the machine under farmers condition, collecting farmer's feedback faba bean thresher technology and evaluate the economic analysis/ cost-benefit gain of the machine to minimize the problems that were faced by faba bean producer farmers threshing it in traditional way which was backward, time consuming and tedious farm activity. The technology was tested and compared with traditional way of threshing faba bean at selected kebele station. Both result and method demonstration method and techniques was followed. The mechanisms used to enhance farmer to farmer learning and information exchange was field visit/tour and field day. From result of this finding the average threshing capacity of the machine was three point eight quintals per hour (3.8quintals/hr). Whereas threshing by tradition practice was one point two quintals per hour (1.2quintals/hr). As revealed in the following graph threshing faba Bean using thresher reduce labor from four person to two person. Apart from this no breakage recorded by traditional one whereas 8% breakage recoded while threshing by faba Bean thresher. Result of this finding indicate that among farmer interviewed 50% had responded that it was simple to operate the faba bean thresher, 33.3% of farmers responded that it was very simple and 16.7% of respondent farmers were responded that it was medium to operate faba bean thresher technology. Maintenance of the technology was also considered as one criterion to see the simplicity of technology. Regarding to the simplicity of maintenance of technology; 40% of farmers responded that maintenance of technology was medium, 31.3% and 11.7% answered as it was simple and very to maintain technology. Whereas only 15% the respondent responded that it was difficult to maintain it. Regarding affordability of the technology; about 46.7% of respondent farmer responded that the cost of technology was medium that it can be affordable by the average farmers and 23.3% of farmers responded that the price of technology was low to purchase. About thirty percent 30% of respondent said that the price of technology was high to afford. Profitability analysis of the machine was done by comparing two crop threshing mechanisms which were traditional animal trampling From the result shown in the following and stationary engine driven machine threshing. table net income of farmers increased from six thousand three hundred fifty (6, 350) birr. As a result, all participant farmers and stakeholders liked and accepted faba bean thresher technology with slight modification which was seed breakage of 8% due to different size of seed and high speed of machine.

Therefore, Researchers have to solve the problem related newly developed faba bean thresher technology which was high percent of breakage.

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