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**PRE-EXTENSION DEMONSTRATION OF FIELD PEA VARIETIES IN  
SELECTED DISTRICTS OF BALE HIGHLANDS, OROMIYA NATIONAL  
REGIONAL STATE, ETHIOPIA**

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Pre extension demonstration of improved field pea varieties was conducted in Goba, Sinana and Agarfa districts of Bale zone. The main objective of the study was to demonstrate and evaluate recently released (Weyib) variety along with standard check. The demonstration was under taken on single plot of 10mx10m area for each variety with the spacing of 30cm between rows and recommended seed rate of 75kg/ha and fertilizer rate of 100kg/ha NPS. Mini-field day involving different stakeholders was organized at each respective site. Yield data per plot was recorded and analysed using descriptive statistics, while farmers' preference to the demonstrated varieties was identified using focused group discussion and summarized using pair wise ranking methods. The demonstration result revealed that Weyib variety performed better than the standard check (Tulu shanan variety) with an average yield of 34.47qt/ha, while that of the standard check was 27.26qt/ha. Weyib variety had 17.27% yield advantage over the standard check. Thus, Weyib variety was recommended for further scaling up.

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## INTRODUCTION

Field pea is the most important high land pulse which is mainly used for human consumption in Ethiopia. It is considered as the least expensive source of protein and income for the poor farmers (Merkine, 2017). Among the pulse crops produced in Bale zone, 9,562.24 hectare of land was covered by field pea with average productivity of 20.15 quintal per hectare (CSA, 2017). It contains high levels of amino acids, lysine and tryptophan, which are relatively low in cereals. It also contains approximately 21-25 % protein and rich in carbohydrates. Moreover, it plays a significant role in soil fertility restoration as a suitable rotation crop that fixes atmospheric nitrogen. It is used as source of protein and income for the poor farmers (Telaye et al., 1994). However, local varieties are becoming low yielding and less profitable to subsistence farmers. The reduction in yield is due to pests like pea weevil and pea aphid; diseases like *Ascochyta* blight and powdery mildew, poor management practices and climatic changes (Fikere, 2010). By considering this prevailing problem, researchers from Sinana Agricultural Research Center had made significant efforts by releasing high yielding and disease tolerant variety namely Weyib with yield potential of 43 quintal per hectare. The yield advantage of Weyib is 21.72% and 37.92%, respectively. However, this variety was not evaluated by target beneficiaries, since it was released.

Participatory technology evaluation on farmers management condition may have many advantages, such as increased and stable crop productivity, faster release and adoption of varieties, better understanding farmers' criteria for variety selection, enhanced biodiversity, increased cost effectiveness, facilitated farmers learning and empowerment (Sperling et al, 2001). The two way feedback between farmers and researchers is indeed vital component of high yielder and disease and pest resistant varietal development process (Getachew et al, 2008). Hence, participatory on farm demonstration of these varieties under farmers' condition and enhancing farmers to select variety/ies of their interest to their locality is a vital task. Therefore, the objectives of this study were to evaluate the yield performance of field pea varieties and to create awareness on the importance of field pea varieties among farmers and other stakeholders in Bale zone, Ethiopia.

## METHODOLOGY

### Description of the study area

The activity was carried out at Goba, Sinana and Agarfa districts of Bale zone, Oromiya National Regional State (ONRS), Ethiopia. Bale zone is among the 20 Administrative zones located in south eastern parts of Oromiya, Ethiopia.

### Site and farmers selection

Purposive sampling methods were employed to select the districts based on the potential of the crop. Two PAs from Goba and Agarfa and three PAs from Sinana were selected based on accessibility or vicinity to the road. Similarly, one trial farmer from each PA was used to carry out the demonstration process considering each farmer's field as replication of the trial.

### Materials used and Field design

Improved field pea variety (Weyib) was demonstrated and compared with standard check Tulu shanan. The demonstration was under taken on simple plot design of 10mx10m area for each variety with full production packages. In addition, twice hand weeding was done on time. SARC was the source of all agricultural inputs. Hosting farmers provided their land. Land preparations were carried out by trial/hosting farmers, whereas land leveling, planting, first and second weeding, follow up and visit, harvesting, threshing were handled and managed by SARC.

### Data collection

Data were collected using direct field observation/measurements, key informant interview and focused group discussion (FGD). Yield data per plot in all locations were recorded. Farmers' preference to the demonstrated varieties was identified.

### Data analysis

Descriptive statistics was used to analyze the yield data. Pair wise ranking and simple matrix ranking were used to compare traits of demonstrated varieties.

## RESULT AND DISCUSSION

### Training

Training was given to farmers, DAs, and agricultural experts on field pea crop production techniques and management packages, agro-chemical applications and safety precautions. Stakeholders such as zone and district level agriculture development office, Zone and district level cooperative promotion offices, zone and district level agricultural inputs regulations and quarantine experts were invited and participated during consultation meeting and training.

### Yield performance of Demonstrated varieties

The mean yield of demonstrated varieties of field pea collected from all sites was summarized in the following chart.

**Table 1.** Yield performance of the demonstrated varieties

No.	Variety	Yield obtained (Qt/ha)				Yield advantage over standard check
		Goba	Sinana	Agarfa	Mean	
1	Weyib	30.98	39.3	30.13	33.47	21.78%
2	Tulu shanan	31.3	25.15	26	27.48	-

The demonstration result revealed, the newly released field pea variety (Weyib) showed better performance than the standard check Tulu shanan variety at all demonstration sites. The mean yield of Weyib variety was 30.98qt/ha, 39.3qt/ha and 30.13qt/ha respectively at Goba, Sinana and Agarfa districts respectively with the overall mean of 33.47 quintal per hectare. Similarly, the mean yield of Tulu shanan variety was 31.3qt/ha, 25.15qt/ha and 26qt/ha at Goba, Sinana and Agarfa districts respectively with the overall mean of 27.48 quintal per hectare (chart 1). As shown in table 1 below, cost benefit ratio analysis also showed that, Weyib had higher cost benefit cost ratio analysis (1.81) than Tulu shanan variety (1.34).

**Table 1.** Cost-Benefit Analysis of the Demonstrated varieties

No.	Variables	Varieties	
		Weyib	Tulu shanan
	Yield obtained (qt/ha)	33.47	27.48
	Sale price (ETB/qt)	1600	1600
	Gross Returns (Price X Qt) TR	53552	43968
	Total Variable Costs TVC (ETB/ha)	11050	10770
	Fixed cost (FC)	8000	8000
	Total cost (TC)	19050	18770
	Net Return (GR-TC)	34502	25198
	Benefit cost ratio (NR/TVC)	1.81	1.34

**Table 2.** Result of Independent sample t test

	Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Equal variances assumed	1.226	.330	1.710	4	.162	5.99	3.50

As shown in the table above (table 2), there was no statistically significant difference between the mean yield of the new variety Weyib and standard check Tulu shanan. But there was 5.99qt/ha mean difference between both varieties.

#### Farmers' preference to demonstrated varieties

The farmers' preferences toward the demonstrated varieties were assessed by enhancing them to reflect their preference to varietal attributes by setting their own varietal selection criteria.

**Table 3.** Pair wise ranking result to rank variety traits in order of importance

Pair wise ranking was used to identify farmers' preference of variety traits. Accordingly, yield, disease tolerance, number of branches/plant, pod/plant and early maturity were the top five priority concern given by farmers.

No.	variety traits	A	B	C	D	E	F	G	H	I	J	Frequenc y	Rank
1	A											7	2 <sup>nd</sup>
2	B	B										7	2 <sup>nd</sup>
3	C	A	B									4	6 <sup>th</sup>
4	D	A	B	D								6	4 <sup>th</sup>
5	E	A	E	E	D							6	4 <sup>th</sup>
6	F	A	B	C	D	E						3	7 <sup>th</sup>
7	G	A	B	C	D	E	F					0	10 <sup>th</sup>
8	H	A	B	C	D	E	F	H				1	9 <sup>th</sup>
9	I	A	B	C	D	E	F	I	I			2	8 <sup>th</sup>
10	J	J	J	J	J	J	J	J	J	J		9	1 <sup>st</sup>

A= Disease tolerance, B= Number of branches, C= Seed/pod, D= Pod/plant, E= Early maturity, F= Uniformity of maturity, G= Stem strength, H= Seed color, I= Plumpness, J= Yield

**Table 4.** Rank of the varieties based on farmers' selection criteria

Varieties were ranked based on the farmers' preference criteria. Their preference criteria were almost similar in all locations.

No.	Varieties	Rank	Reasons
1	Tulu shanan	2 <sup>nd</sup>	early mature, tolerant to disease, seed/pod(1-6), fewer number of pod/plant, poor crop stand, good stem strength
2	Weyib	1 <sup>st</sup>	Tolerant to disease, seed/pod (2-7), good crop stand, higher number of branch, better stem strength but late mature.

**Table 5.** Rank of the varieties based on farmers' selection criteria at Goba district

No.	Varieties	Rank	Reasons
1	Tulu shanan	1 <sup>st</sup>	Early mature, plumpness, tolerant to disease, seed/pod, higher number of pod/plant, good crop stand, better stem strength, good stand,
2	Weyib	2 <sup>nd</sup>	Lack of plumpness, late mature, less tolerant to disease, poor crop stand, lower number of branch, but better stem strength

## CONCLUSIONS AND RECOMMENDATIONS

Pre extension demonstration and evaluation of field varieties was carried out on representative trial farmers' fields. Improved variety viz. Weyib was demonstrated along with Tulu shanan variety which is the standard check. Accordingly, Weyib gave higher yield than Tulu shanan variety.

Moreover, Weyib was selected by participant farmers in Sinana and Agarfa districts due to disease tolerance, seed/pod (2-7), good crop stand, higher number of branch, better stem strength but it is late mature. Similarly, farmers selected Tulu shanan variety in Goba district due to early mature, plumpness, tolerant to disease, seed/pod, and higher number of pod/plant, good crop stand, better stem strength and good stand. Based on these facts, Weyib variety was recommended for further scaling up in the area it was selected.

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## CONFLICT OF INTEREST

The authors declared that there is no conflict of research interest.

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