

## Research Article

## Economic evaluation of improved Faba bean on farmers yield in Zalingei locality of Central Darfur State-Sudan

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**Abstract:** Faba bean is a traditional crop in Central Darfur state. It is the major food crop where it produced as an irrigated winter crop. The crop is also produced as rainfed crop in the plains of the highlands of Jebel Marra and the alluvial plains along the borders with Tchad and Central Africa. This study is an attempt to identify the economic performance of faba bean on farmers yield. The study was conducted in Zalingei locality of central Darfur state during 2017/2018 cropping season. Clustered Random sampling technique was applied. Partial crop budget was applied to know cost benefit analysis. Result revealed that productivity of faba bean was found to be 2.5, 2.2 and 1.7 ton per hectare in improved shendi, basabeir and local super, respectively. Results also revealed that improved genotypes exceed the local super by 47% and 29%. Partial crop budget result showed that The highest net returns was obtained by improved shendi (SDG 43,335) followed with improved basabier (SDG 34,950) while the lowest net returns recorded by local super with SDG 30,362. In contrast the highest SDG cost was given by improved basabeir (17,070) and the lowest obtained by local super (SDG 16,328). Study noted that the net return of local super was lower than that of improved genotype by 43 and 15% for shendi and basabeir, respectively. Result also showed that the cost benefit ratio is varied from 1.9 to 2.1 to 2.6. The study recommended agronomic research needed especially in crop water requirement and pests and diseases control for minimizing the production costs and maximizing the economic yield.

**Keywords:** Faba bean, Economic, Productivity, partial budget, Cost, Benefit.

### INTRODUCTION

Grain legumes are an important component of agricultural and food systems in practically all over the world, and serve to complement the cereal crops in several aspects. First in terms of human nutrition, legumes supply a higher percent of protein while cereals are the primary source of calories. The amino acid profile of legume protein tends to complement that of cereals, adding lysine to the diet while cereals better source of sulfur containing amino acids. Furthermore, legumes are better source of minerals, presenting two or more times the levels found in most cereals. Within the group of leguminous having edible seeds, faba bean is one the most important. It is originated in the near East and is one of the earliest domesticated legumes after chick pea and pea. Ethiopia is considered as the secondary center of diversity and also one of the nine major agro-geographical production regions of faba

bean. Ethiopia is one of the largest faba bean producing countries in the world only second to China. At present faba bean is the third most important cool-season food legume in the world. It is grown as field crops throughout the highlands and is most common in woina dega between the altitudes 1800 m.a.s.l and 3000m.a.s.l. In Ethiopia, faba bean is the leading protein source for the rural people and used to make various traditional dishes. Moreover, it can improve soil fertility through fixing atmospheric nitrogen and provides large cash for producers and foreign exchange for the country (Bekele, 2016).

Faba bean production is concentrated in the North of Sudan; production takes place under farming system of small private pump schemes and some big public schemes. Faba bean is the most important legume in Sudan; it constitutes the main dish on the

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<http://www.easpublisher.com/easjvms/>

Article History

Received: 12.02.2019

Accepted: 25.02.2019

Published: 08.03.2019

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DOI: 10.36349/easjvms.2019.v01i02.002

breakfast and dinner tables for large sector of population, and consumed by all income groups. The average per capita consumption was found to be 2.25 kg/month in the urban area, it is considered among the most important annually produced crops with respect to its share in area and farm income in the River Nile State (Siddig *et al.*, 2007).

Faba bean in central Darfur state in general is described by low crop productivity, lack of improved seeds, pests and diseases, marketing problems, lack of extension, credit services and climate change. To alleviate the problem, improved varieties accompanied with technical packages were introduced in the study area for enhancing crop productivity and improving farmers' livelihoods security.

The overall objective of the study is to know the economic performance of improved seeds in the study area. More specifically the study investigates for: Assessing the yield performance of faba beans against local check. Furthermore study aims to know the extent of which improved faba bean can be introduced as leguminous and notorious crops in the study area

#### RESEARCH APPROACH

Zalingei locality lies between Latitudes 14 – 12° N and longitudes 23 – 22° E. Research on faba bean was carried in association with faba bean breeder at Hudeiba research station. Two improved Faba Beans (Shendi & Basabeir) were planted against one local check (Super bolded seed). Seeds were planted on one side of ridge 70 cm wide at plant spacing of 20 cm with two seeds per hole. The gross plot area for each genotype was 4200 m<sup>2</sup>. 100 kilogram of urea was applied into two doses. Clustered Random sampling technique was applied. Productivity coefficient and partial crop budget were used in analysis.

#### Crop Productivity

Productivity is commonly defined as a ratio between the output volume and the volume of inputs. In other words, it measures how efficiently production inputs, such as labour and capital, are being used in an economy to produce a given level of output (Krugman, 1994).

Dewett *et al* 1966 has suggested, that the concept of productivity is based not only on the single relationship between output and input, but rather on the differences between two or more relationships i.e., differences in the same agricultural region or sub-region as between successive periods (in time), and between similar agricultural regions in different countries or regions during the same period (in space). It may also be possible to make comparisons between the trends of productivity for different products, between different regions of the national economy or between the agricultural regions and the national economy as a whole.

The formula for assessing productivity coefficient would be read as:-

$$\frac{Y}{Y_n} : \frac{T}{T_n}$$

Where:-

Y = Total yield of respective crop in the unit area

Y<sub>n</sub> = total yield of the crop at the national level

T = Total crop area of unit

T<sub>n</sub> = Total crop area at the national level

#### Partial Crop Budget

Partial budgeting is a management tool that can compare the costs and returns that are affected by a potential change in a business. It is especially useful in evaluating budgets that involve small, specific, and limited changes within a business by helping to determine the profitability of that change, Breima *et al.*, 2016).

### RESULT AND DISCUSSION

#### Crop Productivity

The productivity of faba bean was found to be 2.5, 2.2 and 1.7 ton per hectare in Shendi, Basabeir and local super, respectively. Results also revealed that improved genotypes exceed local super by 47% and 29%. This results highlight that improved faba bean has good potential to be used as cash and notorious in the study area. This result goes with what had been said by Abusarra, 1996, Table 1.

#### Partial Crop Budget

Result of partial crop budget was presented in table 2. Yield from on farm experiment was adjusted downwards by 20% to reflect the difference between the experimental yield and the yield that farmers expected from the same treatment. The highest net returns was obtained by improved Shendi (SDG 43,335) followed with Basabier (SDG 34,950) while the lowest net returns recorded by local super with SDG 30,362. In contrast the highest SDG cost was given by improved Basabeir (17,070) and the lowest obtained by local super (SDG 16,328). Study noted that the net return of local super was lower than that of improved genotype by 43 and 15% for Shendi and Basabeir, respectively. Result also showed that the cost benefit ratio is varied from 1.9 to 2.1 to 2.6. This give evidence that faba bean is financially profitable and acceptable to be grown in the area of the study. This result agreed with Chanza *et al.*, 2016 the farmers have benefitted from the use of improved legume technologies.

#### CONCLUSION

The study concluded that there was increase in faba bean productivity and this attributed to improved genotypes. The overall performance of improved faba bean is financially good and this confirmed the existence of profitability in the study area. The study recommended agronomic research needed in crop water requirement and pests and diseases control for

minimizing the production costs and maximizing the economic yield.

**ACKNOWLEDGEMENT**

This work is sponsored by Agricultural Research Corporation, Ministry of Forestry and Irrigation. The financial support of research technology transfer and the Regional Universities Forum for Capacity Building in Agriculture (RUFORUM) through the award of postgraduate scholarship to Mr. Elnour is really appreciated.

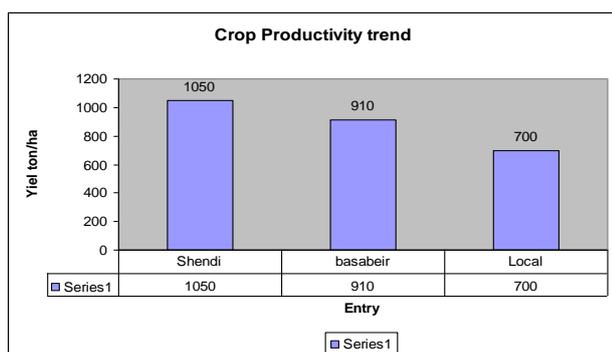
**DECLARATION OF NO CONFLICT OF INTEREST**

We the authors of this paper hereby declare that there are no competing interests in this publication.

**Table: 1 yield performance in hectare**

Entry	area m <sup>2</sup>	yield /kg	yield ton/ha	% change (differ)
improved Shendi	4200	1050	2.5	47
improved Basabier	4200	910	2.2	29
local (super bolded)	4200	700	1.7	

Source: Author, 2017



**Table: 2 shows partial crop budget**

operation costs	SDG/ha		
	Shendi	Basabeir	local super
<b>1. Costs</b>			
land preparation (plowing, harrowing)	2857	2857	2381
planting	1190	1310	852
seeds	2380	2380	2857
seed dressing	238	238	238
weeding	2619	2619	2619
pest control	476	952	476
fertilization	1905	1905	1905
irrigation	3571	3571	3571
harvesting	1429	1238	1429
<b>Total variable costs</b>	<b>16,665</b>	<b>17,070</b>	<b>16,328</b>
<b>2. Returns</b>			
yield (kg/ha)	2500	2167	1667
Adjusted yield (kg/ha)	2000	1734	1334
price (SDG/kg)	30	30	35
gross field benefits	60,000	52,020	46,690
<b>Net returns (2 - 1)</b>	<b>43,335</b>	<b>34,950</b>	<b>30,362</b>
<b>cost benefit ratio</b>	<b>2.6</b>	<b>2.1</b>	<b>1.9</b>

Source: Author, 2017

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