International Journal of Agricultural Sciences
Volume 14 | Issue 2 | June, 2018 | 367-370 ■ e ISSN-0976-5670
☞DOI:10.15740/HAS/IJAS/14.2/367-370
Visit us : *www.researchjournal.co.in*

RESEARCH PAPER

Resource use efficiency and resource use pattern of soybean in Dharwad district of Karnataka: An economic analysis

Priyadarshini C. Gadad*, Shilpa P. Chowti **and** S.M. Mundinamani
Department of Agricultural Economics, College of Agriculture, University of Agricultural Sciences, Dharwad (Karnataka) India
(Email : chintipriya@gmail.com)

Abstract : The study was conducted to know the resource use efficiency and resource use pattern in Soybean cultivation in Dharwad district of Karnataka. In Dharwad district 2 villages were selected randomly such as, Kavalageri and Narendra. From each village, 15 respondents growing Soybean were selected thus making a total sample of 30. Multistage sampling procedure was followed for selection of 30 Soybean growing farmers. Production function techniques were used to analyze the data. To estimate the resources use efficiency Cobb-Douglas production function was employed and Allocative efficiency = MVP/MFC. In order to determine the efficiency of allocation of the resources or price efficiency. The analysis of input utilization clearly indicates that the labour utilization was more. With respect yield obtained in study area was 21.24 quintal of main product and 15.07 tones of by product. The regression co-efficient of fertilizer (0.27) and bullock labour (0.05) are significant hence, it indicating increase in the use of these resources over and above the present level lead to a significant increase in gross returns.Whereas, the resources in study area was over utilized but are still in the rational region of production except hence there is need of optimal use of resources.

Key Words : Soybean, Protein, Animal feed, Crop

View Point Article : Gadad, Priyadarshini C., Chowti, Shilpa P. and Mundinamani, S.M. (2018). Resource use efficiency and resource use pattern of soybean in Dharwad district of Karnataka: An economic analysis. *Internat. J. agric. Sci.*, **14** (2) : 367-370, **DOI:10.15740/HAS/IJAS/14.2/367-370.** Copyright@2018: Hind Agri-Horticultural Society.

Article History : Received : 27.12.2017**; Revised :** 28.04.2018**; Accepted :** 14.05.2018

INTRODUCTION

Soybean (*Glycine max*) is a species of legume native to East Asia, it is an important global crop widely grown for its edible bean which has numerous uses. Fat-free (defatted) Soybean meal is a significant and cheap source of protein for animal feeds.

Soybean is known as the “Golden bean”, “Miracle crop” etc., because of its several uses. It is an excellent source of protein and oil. It contains about 40 per cent of good quality protein. Besides utilization of Soybean as vegetable, it is also used in oil industry where it occupies first place in the world oil production. Soybean

*** Author for correspondence:**

based food products are also suitable to diabetic patients as they contain less carbohydrates and low cholesterol. Soybean protein is also good to people who are allergic to animal protein. Therefore, it is one of the most economical protein sources in the world. It is a versatile crop with innumerable possibilities of improving agriculture and supporting industry (Parekh *et al*., 2012).

Soybean was first introduced to Europe in the early 18th century and to British colonies in North America in 1765. It is a major oilseed crop in the world covering 91.29 million hectare under oilseed crops and contributing around 57 per cent (220.81 MT) of the total oilseed production (390.39 MT), which makes it as the leading oilseed crop in the world. The phenomenal increase in its area and production together with the expansion in processing units has earned a prominent position for India on the world map of Soybean industry.

It was observed that the ratio of price received of Soybean to each of its competing crops particularly Groundnut and Cotton seen to be more profitable for farmers particularly in Maharashtra and Madhya Pradesh (Jaiwal and Hugar, 2011 and Gaddi *et al.*, 1999). However, non-availability of short duration high yielding varieties and good quality seed on adequate scale and low and unbalanced use of chemical fertilizers are the major constraint in achieving higher productivity. As the country is in short supply of edible oil and about 50 per cent of our edible oil consumption is fulfilled by imports of different vegetable oils, there is a direct need to promote the production of oilseeds like Soybean. There has been a slow but steady growth in the production of Soybean in India, which is attributed to erratic monsoon, poor management, incidence of pests and disease, shattering of pods, Soybean rust and above all low input technology (Prasad *et al.*, 2001).

MATERIAL AND METHODS

The study was carried out in Dharwad district of Karnataka as it has larger area under soybeancultivation. A multistage random sampling procedure was adopted for the selection of respondents. In first stage, Dharwadtaluk was selected in second stage 2 villages were selected randomly such as Kavalageri, Narendra. From each village, 15 respondents growing Soybeanwere selected thus making a total sample of 30. For evaluating the specific objectives of the study, requisite primary data pertaining to the agricultural year 2015-16 were collected from the sampled farmers by personal interview method with the help of pre-tested and well-structured schedule. The data thus collected were processed using tabular analysis, multiple regression/ production function.

Cobb-Douglas production function was employed to study the resource use efficiency of Soybean. The estimated regression co-efficients indicate the production elasticities. The general form of Cobb-Douglas production functions used in the present study as follows,

Y = aX1 b1X2 b2X3 b3X4 b4X5 b5X6 b6 X7eu

where, Y = Gross returns in rupees per hectare

a = Intercept (efficiency) term

X1 = Expenditure on seeds (Rs./ha)

X2 = Expenditure on FYM (Rs./ha)

X3 = Human labour expenditure (Rs./ha)

X4 = Machine labour expenditure (Rs./ha)

X5 = Bullock labour expenditure (Rs./ha)

X6 = Expenditure on Fertilizer (Rs./ha)

X7 = Expenditure on PPC (Rs./ha)

eu = Error term,

bi's = Output elasticities of respective factor inputs (i=0,1,2,…,n) (n=7)

Allocative efficiency :

Allocative efficiency exists when resources are allocated within the farm according to market prices. To decide whether a particular input is used rationally or irrationally, its marginal value products were computed. If the marginal value product of an input just covers its acquisition cost it is said to be used efficiently. Allocative efficiency= MVP/MFC In order to determine the efficiency of allocation of the resources or price efficiency, the value of the marginal product obtained by multiplying the marginal product (MP) with the price of the product and was compared with its marginal cost. The criterion for determining optimality of resource use was,

MVP/MFC > 1 underutilization of resource

MVP/MFC = 1 optimal use of resource

MVP/MFC < 1 excess use of resources.

RESULTS AND DISCUSSION

Input Used pattern per hectare of soybean cultivation in the study area are presented in Table 1. In the study area sample farmers cultivating Soybean only and the analysis is done for soybean cultivation. It can be observed from the table that the average per hectare utilization of seed was 72.25 kg. However, the average per hectare utilization human labour was 45.21 man days

Table 1 : Input use pattern and output obtained in Soybean (Per Hectare) (n=30)

Sr. No.	Particulars	Unit	Soybean
1.	Input utilization pattern		
	Seeds	kg	72.25
	FYM	tones	4.69
	Fertilizers		
	N	kg	30.04
	P	kg	33.06
	K	kg	14.85
	PPC	ml/liter	4.94
2.	Labour utilization pattern		
	Men	Man days	23.32
	Women	Man days	21.89
	Total human labour	Man days	45.21
	Bullock	Pair days	12.34
	Machine	Hours	5.80
3.	Output realized		
	Yield	Qtl	21.24
	Byproduct	Tones	15.07

and the bullock labour used in study area was 12.34 pair days. Whereas, the tractor used in soybean cultivation was 5.84 hours.

The input like FYM, Fertilizer and PP Chemicals were used at the rate of 4.69 Tonnes, 77.95 kg and 4.94 ml/litre, respectively. With respect yield obtained in study area was 21.24 quintal of main product and 15.07 tones of by product.

The estimates of the production function were presented in Table 2. The variables included in the function explained 83.70 per cent of the variation in production of soybean cultivation. The regression co-efficient of PP Chemicals (-0.02) was negative, indicating that increase in use of PPC results in reduction in gross returns hence, it is advisable to reduce applicable of PPC. However, The regression co-efficient of fertilizer (0.27) and bullock labour (0.05) are significant hence it indicating increase in the use of these resources over and above the present level lead to a significant increase in gross returns. The regression co-efficient of seed (0.015) and Farm Yard Manure (0.04) machine labour (0.019) and human labour (0.045) were not significant so there is no scope to increase gross returns by increasing the use of machine labour and human labour. The similar results was obtained by Laxmi (2013) in Resource use efficiency of Soybean in Dharwad district of Karnataka.

Table 3 provides the details of allocative efficiency in Soybeancultivation. The ratio of Marginal value

Table 2 : Production function estimates of Soybean Resource Use Efficiency in the Cultivation of Soybean by using CD function

Particulars	Parameters	Regression co-efficient of CD
Intercept	b0	07.63
Seed	b_1	00.01
FYM	b_2	00.04
Fertilizers	b_3	00.27
PPC	b_4	-00.02
Human labour	b_5	00.04
Bullock labour	b_6	00.05
Machine labour	b_7	00.02
Coefficient of determination	R^2	00.83
Adjusted R square		00.78
F value	F	16.18
Standard error	SE	00.02
Returns to scale	Σbi	01.42

Note: Figures in parentheses indicate standard error of respective regression coefficients

** and * indicate significance of value at P=0.01 and 0.05, probability levels, respectively

MVP= Marginal Value Product; MFC=Marginal Factor Cost

Product (MVP) to Marginal Factor Cost (MFC) was computed for each of the factor of production to draw some inference about the allocative efficiency (Table 3). The MVP to MFC ratio for Seed (0.35), Human labour (0.50), Machine labour (0.18), PP Chemicals (-3.12) were less than 1 hence the resources in study area was over utilized. FYM (1.00) optimally utilised Bullock labour (3.81), Fertilizer (4.66) were more than 1 hence the resources in study area was underutilized. Hence there is need of optimal use of these resources (Senthil Kumar and Alagumani, 2005).

Table 3 : Allocative efficiency of soybean cultivation

Particulars	Marginal value product (MVP)	Marginal factor cost (MFC)	MVP/MFC
Seed	0.35	1	0.35
FYM	1.00	1	1.00
Fertilizers	4.66	1	4.66
PPC	-3.12	1	-3.12
Human labour	0.50	1	0.50
Bullock labour	3.81	1	3.81
Machine labour	0.18	1	0.18

Conclusion :

The results of estimated production function reveals that fertilizer was the important input to which gross returns is responsive in soybean. On other hand regression co-efficient of PPC was negative indicates

excessive use but when we look into allocative efficiency of the most of the variables are over utilized hence farmer need to be educate to use the resources optimally. In Soybeansince any further increase in the use of above resources would lead to financial losses and environmental damage.

REFERENCES

Gaddi, G.M., Koppad, M.B., Gummagolmath, K.C. and Naik, A.D. (1999). An economic analysis of growth performance of oilseed crops in India. *Karnataka J. Agric. Sci.*,**12** (1/4): 93-98.

Jaiswal, Ankit and Hugar, L.B. (2011). An economic analysis of soybean cultivation and competing crops in Madhya Pradesh. *Karnataka J. Agric. Sci.*, **24** (4): 591-592.

Laxmi (2013). An economic analysis of production of major crops in dharwad district. M.Sc. (Ag.) Thesis, University of Agricultural Sciences, Dharwad, Karnataka (India).

Parekh, Ankita, Dsouza, Ravi and Shah, Kunal (2012). Soybean seasonal report. Oct-102012.1-15.

Rajendra Prasad, V., Raju, V. T. and Shareef, S.M. (2001). Study of costs and returns in cotton production *vis-à-vis* its competing crops in Guntur districts of Andhra Pradesh. *Agric. Situ. India*, **58** (2) : 375-376.

Senthil Kumar, C. and Alagumani, T. (2005). Resource use efficiency in lower Bhavani Basin Command Area in Tamil Nadu. *Indian J. Agric. Econ.*, **60** (4) :551 – 568.

14th Year
★★★★★ of Excellence ★★★★★