



Comparative economics of different soybean based cropping systems in North-Eastern Karnataka

Vijaykumar N.^{1*}, Suresh S. Patil², B. S. Reddy³, S. B. Goudappa⁴

¹Department of Agricultural Economics, ARS, College of Agriculture, B'Gudi (Karnataka), INDIA

²Department of Agricultural Economics, College of Agriculture, B'Gudi (Karnataka), INDIA

³Department of Agricultural Economics, College of Agriculture, Kalaburagi (Karnataka), INDIA

⁴Department of Agriculture Extension, UAS, Raichur (Karnataka), INDIA

*Corresponding author. E-mail: vijaykumarecon@gmail.com

Received: December 2, 2016; Revised received: March 15, 2017; Accepted: August 20, 2017

Abstract: The research study was conducted in Bidar and Kalaburagi Districts of Karnataka. To study the comparative economics of different soybean cropping systems. A sample size of 160 farmers was selected using multi-stage random sampling method. Field level data were elicited for the agricultural year 2013-14 through personal interview method. Soybean + Redgram, Soybean + Jowar, Soybean + Bajra, and sole Soybean were the major cropping systems identified. Study revealed that, the average age of the sample respondents was 43, 45, 41, 44 and 43 years, respectively in CS-I, CS-II, CS-III, CS-IV and overall cropping system. The literacy percentage was highest in CS-I followed by CS-IV, CS-II and CS-III respectively. The net returns realized in these major cropping systems were ₹ 54443.20, ₹ 34108.18, ₹ 21047.27 and ₹ 13503.06 respectively. The gross returns realized in CS-I was highest, as compared CS-II, CS-III and CS-IV respectively. Similarly, the net returns obtained in CS-I was found to be the highest followed by CS-II, CS-III and CS-IV respectively. Returns per rupee spent was found to be the highest in CS-I. Among the studied soybean based cropping systems, CS-I (soybean + redgram) and CS-II (soybean + jowar) were found to be the most profitable system under rainfed condition in the study area.

Keywords: Costs and returns, Cropping System, North-Eastern Karnataka, Soybean

INTRODUCTION

The agriculture continues to be pivotal to the sustainable growth and development of the Indian economy. The production of foodgrains is 252.22 million tons in 2015-16. Soybean is a high valued and profitable crop. The economic viability of soya production is determined by the commercial utilization of its sub-products, meal and oil which respectively, account for about two thirds and one third of the crop's economic value. Cropping system is an important component of a farming system, represents a cropping pattern used on a farm and their interaction with farm resources, other farm enterprises and available technology, which determine their makeup (Jayapalreddy *et al.* 2013). The cropping system should provide enough food for the family, fodder for cattle and generate sufficient cash income for domestic and cultivation expenses. Adoption of dynamic cropping systems would be expected to result in more sustainable crop production systems over time (Kumara *et al.*, 2013). Soybean based cropping systems are important for sustaining agricultural production. In North-Eastern region especially in Bidar and Kalaburagi districts, most of the farmers are growing soybean because of suitability of climatic factors *viz.*, rainfall, temperature, sunshine, humidity and soil

type and it is an important pulse as well as oilseed crop in the North-Eastern Karnataka region. Unless the focus of research is shifted from sole crops to inter crops and from irrigated crops to *rainfed* crops; no worthwhile breakthrough in Indian agriculture can be anticipated.

MATERIALS AND METHODS

The research study was conducted in Bidar and Kalaburagi Districts of Karnataka. A sample size of 160 farmers was selected using multistage random sampling method. Field level data were elicited for the Agricultural year 2013-14 through personal interview method. In the first stage, two districts were selected based on the highest area under soybean crop. In the second stage, two talukas from the selected districts were chosen based on the highest area under soybean based cropping system. Similarly, two villages from each talukas were selected based on the same criterion. Finally, 20 farmers from each village were interviewed randomly. Thus, in all 160 farmers were selected representing 80 farmers from each district. Tabular analysis technique was used to estimate the cost and returns under soybean based cropping systems in North-Eastern Karnataka. Tabular analysis comprised of arithmetic mean, percentage and ratio. This method

Table 1. Socio-economic characteristics of sample respondents in the study area. (N=160).

S. N.	Particulars	Units	Cropping Systems				Overall
			CS-I	CS-II	CS-III	CS-IV	
1	Average age	Yrs	43	45	41	44	43
2	Family size						
	i. Male	Nos	1.75 (22.79)	1.62 (23.34)	1.58 (23.69)	1.72 (26.83)	1.67 (24.10)
	ii. Female	Nos	1.68 (21.88)	1.64 (23.63)	1.55 (23.24)	1.67 (26.05)	1.64 (23.67)
	iii. Children	Nos	4.25 (55.34)	3.68 (53.03)	3.54 (53.07)	3.02 (47.11)	3.62 (53.23)
	Total	Nos	7.68	6.94	6.67	6.41	6.93
3	Engaged in agriculture						
	a. Male	Nos	1.67 (53.35)	1.20 (48.97)	1.35 (50.75)	1.02 (49.75)	1.31 (50.97)
	b. Female	Nos	1.46 (46.65)	1.25 (51.02)	1.31 (49.24)	1.03 (50.24)	1.26 (49.02)
	Total	Nos	3.13	2.45	2.66	2.05	2.57
4	Education level						
	a. Illiterate	Nos	10 (25.00)	12 (30.00)	10 (25.00)	12 (30.00)	44 (27.50)
	b. Primary	Nos	09 (22.50)	10 (25.00)	08 (20.00)	10 (25.00)	37 (23.12)
	c. High school	Nos	10 (25.00)	08 (20.00)	12 (30.00)	07 (17.50)	37 (23.12)
	d. PUC and above	Nos	11 (27.50)	10 (25.00)	10 (25.00)	11 (27.50)	42 (26.25)
	Total		40	40	40	40	160
5	Average size of holding						
	i. Rainfed	Ha	6.65 (83.75)	6.15 (85.42)	4.85 (75.20)	5.55 (92.04)	5.80 (84.06)
	ii. Irrigated	Ha	1.29 (16.25)	1.05 (14.58)	1.60 (24.80)	0.48 (7.96)	1.10 (15.94)
	Total	Ha	7.94	7.20	6.45	6.03	6.90

Note: Figures in parentheses indicate percentage to respective total. CS-I = Soybean + Redgram, CS-II = Soybean + Jowar, CS-III = Soybean + Bajra, CS-IV = Soybean sole crop

Table 2. Comparative economics of Soybean based cropping system followed in the study area. (₹/ha)

S. N.	Particulars	CS-I Soybean + Redgram	CS-II soybean + jowar	CS-III soybean+bajra	CS-IV sole soybean
1	Total Variable Cost	29607.50 (65.54)	19151.80 (57.05)	16219.7 (57.31)	15381.50 (58.01)
2	Total Fixed Cost	13945.40 (30.87)	12909.70 (38.46)	10767.8 (38.05)	9970.26 (37.60)
3	Family Labour Cost	1624.75 (3.60)	1504.00 (4.48)	1310.34 (4.64)	1161.60 (4.39)
4	Total Cost	45177.60 (100.00)	33565.40 (100.00)	28297.80 (100.00)	26513.30 (100.00)
5	Gross Returns	99620.80	67673.6	49345.1	40016.4
6	Net Returns	54443.20	34108.27	21047.30	13503.1
7	Returns per rupee spent	2.21	2.02	1.74	1.51

Note: CS-I= Soybean + Redgram, CS-II= Soybean + Jowar, CS-III= Soybean + Bajra, CS-IV= Soybean sole crop

was used to determine the costs and returns of all crops. Tabular analysis was also used in case of land use pattern, cropping pattern and socioeconomic characteristics of the farmer.

RESULTS AND DISCUSSION

Socio-economic characteristics of sample respondents:

The information on socio-economic characteristics of the sample respondents is presented in Table 1. It was observed that, majority of the respondents belong to middle age group in all the selected soybean based cropping systems. The average age of the sample respondents was 43, 45, 41, 44 and 43 years in cropping system-I (soybean + redgram), cropping system-II (soybean + jowar), cropping system-III (soybean + bajra), cropping system-IV (soybean sole crop) and overall respectively. As majority of the farmers were under middle age group which had influenced on innovative and timely decisions in adoption

of new technology and enhances their farm income. As far as family composition is concerned the proportion of adult male accounted for 22.79, 23.34, 23.69, 26.83 and 24.10 per cent respectively in CS-I, CS-II, CS-III, CS-IV and overall. Average family size was 7.68, 6.94, 6.67, 6.41 and 6.93 in CS-I, CS-II, CS-III, CS-IV and overall respectively.

With regard to occupational pattern of the sample respondents, the proportion of male family members involved in the agriculture which accounted for 53.35 per cent, 48.97 per cent, 50.75 per cent, 49.75 per cent and 50.97 per cent in CS-I, CS-II, CS-III, CS-IV and overall respectively.

Literate sample respondents had education ranging from primary to Pre -University Course and above level. In CS-I, 22.50 per cent had primary school education, 25.00 per cent had high school education, 27.50 per cent had PUC and above level education and 25.00 per cent of them were illiterate. In CS-II, 25.00 per

cent had primary school education, 20.00 per cent had high school education, 25.00 per cent had PUC and above and 30.00 per cent of them were illiterate. In CS-III, 20.00 per cent had primary school education 30.00 per cent had high school education and 25.00 per cent of them are illiterate. In CS-IV, 25 per cent had primary school, 17.50 per cent had high school, and 27.50 per cent had PUC and above level and 30 per cent of them are illiterate. It was noticed that 27.50 per cent of the farmers were illiterates. This indicated that, literacy level in the study area was higher as compared to state level average. To take care of the illiterates, there is need for the extension agencies to educate the respondents regarding recent developments and technologies in agriculture and other enterprises to increase their level of income and productivity on the farm. With regard to occupational pattern, the participation of adult's male respondents in agriculture was more (50.97%), compared to female respondents (49.02%) which was quite obvious in paternal farmers. This indicated that, the main source of income of the sample respondents was from agriculture.

As far as pattern of land holding was concerned, about 83.75 per cent, 85.42 per cent, 75.20 per cent, 92.04 per cent and 84.06 per cent of cultivable land was under *rainfed* condition and proportion of irrigated land was 16.25 per cent, 14.58 per cent, 24.80 per cent and 7.96 per cent, 15.94 per cent under CS-I, CS-II, CS-III and overall respectively. Incidentally irrigated land was not found in case of CS-IV category. The major proportion of landholding was under *rainfed* condition ranges between 75.20 to 92.04 per cent with an average of 84.06 per cent. In other words, all the sample respondents were having *rainfed* landholding. The majority of the sample respondents had medium to large size landholdings. Similar results were reported while studying knowledge and its relationship with personal, socioeconomic (age, education, family size, land holding) and psychological (knowledge, behaviour, attitude, perception) characteristics of sunflower growers of Bijapur district by Aski (2010).

Comparative economics of soybean based cropping system followed in the study area: The total cost incurred, gross returns obtained and net returns realized under soybean based cropping systems were computed and presented in Table. 2 respectively. The maximum total cost was observed in CS-I (₹ 45,177.65/ha) and least was in CS-IV (₹ 26,513.30/ha). The similar results were reported while studying cost and returns structure of paddy by Suneetha and Narendra Kumar (2013). The share of variable cost in the total cost was found to be the highest in CS-I (65.54%), followed by CS-IV (58.01%), CS-III (57.31%) and CS-II (57.05%). Whereas, the share of fixed cost was highest in CS-II (38.46%). The gross returns were found to be highest in the case of CS-I (₹

99,620.80/ha), followed by CS-II (₹ 67673.6/ha), CS-III (₹ 49345.1/ha) and CS-IV (₹ 40,016.4/ha) respectively. The cost of family labour was found to be highest in CS-I (₹ 1,624.75/ha) whereas, least in CS-IV (₹ 1,161.60/ha). Findings are in agreement with study Jimjel Zalkuwi *et al.* (2015). With respect to the net returns per hectare, the net returns over total variable cost and total cost were found to be the highest in CS-I (₹ 54443.20), followed by CS-II (₹ 34,108.27), CS-III (₹ 21,047.30) and CS-IV (₹ 13,503.1). The return per rupee of expenditure was found to be the highest in CS-I and it was the least in CS-IV. Among the different cropping systems, CS-I was considered as the most profitable among the cropping systems studied, as it contributed higher returns per rupee spent (2.21). The climatic factors and soil were most suited for the production of crops like soybean and redgram. However, the farmers may be advised to expand their area under cultivation with these crop combinations to get more returns. The similar results were reported while studying Costs and returns of major cropping systems (Maize + redgram, Sorghum + redgram, Greengram + redgram, Soybean sole crop) in northern transition zone of Karnataka by Kumara *et al.* (2013).

Conclusion

Among various cropping systems CS-I covered highest area under soybean + redgram (142.80 ha) followed by, CS-IV sole soybean (140.0 ha), soybean + jowar (57.20 ha), CS-III, soybean+bajra (15.20 ha). The major soybean based cropping systems followed were soybean + redgram, soybean + jowar, soybean +bajra and soybean sole crop in the study area. The gross returns realized in CS-I was highest, as compared CS-II, CS-III and CS-IV respectively. Similarly, the net returns obtained in CS-I was found to be the highest followed by CS-II, CS-III and CS-IV respectively. Among the studied soybean based cropping systems, CS-I (soybean + redgram) and CS-II (soybean + jowar) were found to be the most profitable system under *rainfed* condition in the study area. Hence, it is advisable to the farmers of the study area to follow this cropping system which gives highest returns compared to other cropping systems.

REFERENCES

- Aski, S.H., S.H. Gotyal, M.B. Patil and R.H. Hanumanaikar. (2010). Knowledge and its relationship with personal, socioeconomic and psychological characteristics of sunflower growers of Bijapur district. *Agriculture Update*. 5(3-4): 430-432.
- Jayapalreddy. R. and Sandhya Shenoy, N. (2013). A comparative economic analysis of Traditional and System of Rice Intensification (SRI) rice cultivation practices in Mahabubnagar district of Andhra Pradesh. *International Journal of Scientific and Research Publications*. 3(10):1-3.
- Jimjel Zalkuwi, Rakesh Singh and Madhusudan Bhattarai. (2015). Production cost and return; comparative analy-

sis of sorghum in India and Nigeria. *Economics.* 4(2):18-21.

Kumara, B. R. S. B. Hosamani, Mamle desai N. R., Megeri S. N. and Hosamani M. H., (2013). Costs and returns of major cropping systems in northern transition zone of

Karnataka, *Karnataka Journal of Agricultural Sciences.* 25(2):208-211.

Suneetha, K. and Narendra Kumar, I., (2013). Cost and returns structure of paddy in Andhra Pradesh. *Indian Journal of Research.* 3(5):15-18.