

## A study on income and employment generation under sugarcane based intercropping systems

Sugarcane (*Saccharum officinarum* L.) is an important commercial crop of the world, cultivated over an area of 20.10 million hectares with a production of 1,318.10 million tonnes and productivity of 65.5 tonnes per hectare (FAO, 2006). Sugarcane area and productivity differ widely from country to country. Brazil has the highest area (5.34 million ha), while Australia has the highest productivity (85.1 tons/ha).

India ranks second among the sugarcane growing countries of the world in both area and production after Brazil with an area under sugarcane cultivation of 4.20 million hectares (2006-07). The production of sugar has witnessed a dramatic increase to around 27.00 million tonnes during 2006-07. Sugarcane occupies an area of 3.85 lakh hectares with a production of 324.79 lakh tonnes of cane in Karnataka. The productivity of sugarcane in the state is high (84.40 tonn/ha) as compared to the national average (64.6 tonn/ha) with more than 50 sugar factories. In the state Belgaum district ranked first in area occupying about 1,15,849 hectares and production of about 98,41,129 tonnes and in Belgaum district Raibag taluk ranked first in area occupying about 26,676 hectares with a average productivity of 87.5 t/ha.

About 50.45 per cent and 55.97 per cent of the total cropped area in the Belgaum district and Raibag taluk is under cereals respectively. And about 47.22 per cent and 43.26 per cent of the total cropped area is under pulses, oilseeds and commercial crops respectively. The area under Maize in Belgaum district and Raibag taluk was 99,128 ha and 2,637 ha respectively. Likewise the area under wheat in Belgaum district and Raibag taluk was 45,645 ha and 8,100 ha respectively and area under Chickpea in Belgaum district and Raibag taluk is 31,986 ha and 1,700 ha respectively.

Cropping system refers to the kind and sequence of crops grown on an area of land over a period of one year was considered as cropping system. It is one of the very important tool to augment the agricultural production. The approach involves sequential as well as intercropping and mixed cropping system aimed at efficient utilization of natural and man made resources of production. The role of intensive cropping is to increase the cropping interest in irrigated as well as rain fed areas of the country. The cropping intensity of country was 131.2 per cent in 1995-96 which needs to be increased to 150 per cent by the end of eleventh five year plan to meet the food needs of the country.

An indepth study of different crops and their relative economic significance with reference to both time and space sequences would enable identification of the most efficient crops in a region. The impact of different cropping systems on cost, returns and profit of different size groups of farmers in Raibag taluk of Belgaum district (Karnataka) would throw light and enable the farmer to plan for the right cropping system. This main concept of intercropping is to get increased total productivity per unit area and time, besides equitable and judicious utilization of land and others resources

Raibag taluk of Belgaum district of Northern Karnataka was selected for the study since, it was one of the major sugarcane based intercropping system growing district in Karnataka. Sugarcane was grown as a major field crop by majority of the farmers and had a maximum area under sugarcane, and 12 villages having maximum area under sugarcane based intercropping system were selected and farmers were choosen randomly from each village thus totaling the sample of 120 The pilot survey done in the study area, enable to identify four following major sugarcane based intercropping systems.

1. CS-I (Sugarcane+Maize)
2. CS-II (Sugarcane + Wheat)
3. CS-III (Sugarcane + Chickpea)
4. CS-IV (Sugarcane sole crop)

The data collected from the respondents pertained to the agricultural year 2006-2007 comprises, general information, size of holdings, cropping pattern followed, inputs used, input prices, output obtained and opinions about various problems faced by the farmers in crop production.

Table I revealed that the CS-I farmers derived maximum net farm income of Rs. 45,828.00 per ha. This was mainly attributable to the fact that the farmers have harvested good yield from both the crops in the system. The CS-III ranked second with respect to maximum net income in the study area with a net income of Rs.27,471.97/ha, The reason few this cropping system involved more remunerative crops. The CS-II ranked third with respect to net farm income, followed by CS-IV.

It was also found that generation of employment was high in CS-II. (213.2 man/days/ha) in the study area (Table 1), since the crops cultivated under this cropping system were labour intensive. CS-I (208.31 man/days/ha) was the next most labour consuming followed by sole CS-IV (207.92 man/days/ha) and CS-I (201.12 man/days/ha). With respect to profitability, the farmers under CS-I has realized the highest net returns per hectare followed by CS-III, CS-II and CS-IV farmers. Hence, it could be advisable to adopt CS-I (Sugarcane + Maize), followed by CS-III, CS-II and CS-IV in that order to maximize net returns per hectare, depending on the possibility and practicability of cropping system. Similar observations are observed by Nagpure *et al.* (2004).

The farmers maintain bullocks mainly for the cultivation purpose. Therefore efficient utilization of the existing resource was also an important goal in the cropping systems. It was found that (Table 1) maximum bullock labour use was found in CS-I (9.76 pairdays/ha), compared to CS-IV, CS-II and CS-III.

This may be due to the fact that farmers were regularly using bullock labour for ploughing, harrowing, intercultivation, weeding, etc in Cropping System "Regarding labour utilization in different cropping systems, the labour utilized, both human as well as bullock labour, were given ranks; Based on the result,

Table 1. Income and employment generation in different cropping systems in the study area

Sl. No.	Particulars	Units	CS-I	CS-II	CS-III	CS-IV
I	Income					
a.	Net farm income	Rs./ha	45,828.00	24,840.55	27,471.97	13,287.16
II	Employment					
a.	Human labour	Mandays/ha	201.12	213.2	208.31	207.92
b.	Bullock labour	Pair days/ha	9.76	6.67	5.70	6.76
III	Ranks for net returns/ha	No.	1	3	2	4
IV.	Ranks for laobur/ha					
a.	Human labour	No.	4	1	2	3
b.	Bullock labour	No.	1	3	4	2
	Total labour	No.	5	4	6	5
Note:	CS-I	Sugarcane + Maize				
	CS-II	Sugarcane + wheat				
	CS-III	Sugarcane + chickpea				
	CS-IV	Sugarcane sole crop				

it could be seen that, CS-III required the least labour where as CS-II, required the highest labour among the different cropping systems considered, because in mixed cropping system we have to follow the package of practices required for both the crops which increased the labour requirement as well as cost of production. Whereas, it was not so in case of sole cropping system. Similar results were observed by Baliyan *et al.* (1998).

Intercropping systems aimed at the efficient use of resources to maximize the income. It also minimize the production risk by spreading the risk from one crop to another crop. With respect to employment generation, CS-II (Sugarcane +Wheat) generated highest employment (213.2 mandays/ha), as it required more labour followed by CS-III (208.31 mandays/ha), CS-IV (207.92 mandays/ha) and CS-I (201.2 mandays/ha).

Department of Agricultural Economics,  
University of Agricultural Sciences,  
Dharwad - 580 005, Karnataka, India.

NAMADEV A. SHINDE  
B. L. PATIL  
C. MURTHY  
N. R. MAMLE DESAI

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