

## Efficient use of natural resources for sugarcane production in western Maharashtra

S.D. PATOLE, J.S. KUMBHAR, AND D.B. YADAV

Deptt. of Agril. Economics, Mahatma Phule Krishi Vidyapeeth,  
Rahuri, Distt. Ahmednagar, Maharashtra-413722

Received : 05-01-2017 ; Revised: 15-03-2017, Accepted: 20-03-2017

### ABSTRACT

The productivity of the crop primarily depends on the extent of levels of resource use and total management of the crop. The inputs play a significant role in agricultural production. The study is based on primary data which is collected from the sample sugarcane growers by cost accounting method with the help of specially designed schedules under the Maharashtra State Sponsored Cost of Cultivation Scheme. The per hectare use of human labour was maximum in adsali sugarcane while the per hectare use of bullock labour was highest in ratoon. The per hectare utilization of machine power was observed more (i.e. 44.69 hrs.) in case of adsali planting. The use of manure was not observed to be sufficient in all planting type of sugarcane. The use of manure was found less in ratoon sugarcane. In the adsali sugarcane, the per hectare use of chemical fertilizers i.e. nitrogenous, phosphorus and potash was 411.00 kg, 234.91 kg and 237.14 kg ha<sup>-1</sup>, respectively. In all planting type, the per cent gap observed in case of chemical fertilizers was excess than the recommended doses. The benefit cost ratio at cost 'C' was highest in case of ratoon sugarcane (1.58). The inputs used by the sugarcane growers for all the planting types were below than recommendation except chemical fertilizers. The inputs used by the sugarcane growers for all the planting types were below than recommendation except chemical fertilizers.

**Keywords** : B.C. ratio, costs, gross income, resource use gap, return

Maharashtra is the leading State in India for sugarcane cultivation next only to Uttar Pradesh occupying an area of around 18 per cent with respect to total area under sugarcane crop in country in the year 2012-13. Maharashtra ranks first in recovery of sugar, second in production and seventh in productivity of sugarcane in the country. The productivity of the crop primarily depends on the extent of levels of resource use and total management of the crop. The inputs play a significant role in agricultural production. The labour, seed, manures, fertilizers, irrigation, plant protection and intercultural operations are the major factors responsible for the increasing yield of the crop. In general, it is noticed that most of the sugarcane growers in Western Maharashtra are not using the recommended levels of inputs. Therefore, there exists a gap between the recommended and actual use levels of inputs. The present investigation is an attempt to estimate yield gap as well as production of sugarcane.

### MATERIALS AND METHODS

The study is based on primary data which is collected from the sample sugarcane growers by cost accounting method with the help of specially designed schedules under the Maharashtra State Sponsored Cost of Cultivation Scheme. On the basis of operational holding 73 adsali sugarcane growers, 40 pre-seasonal sugarcane growers, 39 suru sugarcane growers and 162 ratoon sugarcane growers from western Maharashtra were selected by the three stage stratified random sampling technique. The primary data for the year 2013-14 were

considered for the study. The gaps in the use levels of various inputs and outputs have been worked out. The use levels of various inputs and outputs obtained in all types of sugarcane cultivation were estimated by simple tabular method of analysis with the help of means, averages and percentages.

### RESULTS AND DISCUSSION

The quantities of various inputs used directly affect the cost of cultivation and therefore, utilization of inputs such as human labour, bullock labour, seeds, manures, fertilizers, etc., have been studied in per hectare physical and monetary terms. In order to get an idea as to whether there is any difference in inputs used in different planting type of sugarcane. The information regarding per hectare resource use is presented in table 1.

It can be seen from the table that, in adsali sugarcane, the use of human labour was 402.19 man days ha<sup>-1</sup>, comprising 219.91 male human labour and 182.28 female human labour days. The per hectare use of human labour was maximum in adsali sugarcane .

The per hectare use of bullock labour was highest in ratoon ( 5.74 pair days ) followed by 5.69, 4.24 and Rs. 4.00 for suru, pre-seasonal and adsali, respectively.

The per hectare utilization of machine power was observed more (i.e. 44.69 hrs.) in case of adsali planting. The machine power i.e. use of tractors was mostly for the operation of ploughing and harrowing of the plot.

The use of manure was 77.07 quintals per hectare in case of adsali. The use of manure was not observed to

**Table 1: Per hectare resource use levels of sugarcane ( 2013-14)**

Sl.no	Particulars	Adsali	Pre-sea	Suru	Ratoon
1	Human labour (Days)	402.19	359.75	300.88	232.55
	a.Male	219.91	207.73	181.29	150.27
	b.Female	182.28	152.02	119.59	82.28
2	Bullock power ( pair days)	4.00	4.24	5.69	5.74
3	Machine power in hrs.	44.69	40.71	42.76	10.37
4	Seed (Kg)	6064.21	5694.44	5680.01	0.00
5	Manures (Qtl.)	77.07	50.10	56.97	18.87
6	Fertilizers ( Kg)				
	N	411.00	364.92	294.23	262.12
	P	234.91	218.65	188.64	151.35
	K	237.14	229.03	154.38	142.84

**Table 2: Per hectare resource use gap for sugarcane**

Sl. no	Resource use	Recom.	Actual	Gap	% Gap
<b>Adsali</b>					
1	Planting material ( t)	7.5	6.06	1.44	19.20
2	Manures ( Qtl.)	200	77.07	122.93	61.47
3	Nitrogen ( Kg)	400	411.00	-11.00	-2.75
4	Phosphorus ( Kg )	170	234.91	-64.91	-38.18
5	Potash ( Kg )	170	227.14	-57.14	-33.61
6	Output (q)	1854.1	1396.09	458.01	24.70
<b>Pre-sea</b>					
1	Planting material ( Ton)	7.5	5.60	1.90	25.33
2	Manures ( q.)	200	50.10	149.90	74.95
3	Nitrogen ( Kg)	340	364.92	-24.92	-7.33
4	Phosphorus ( Kg )	170	218.65	-48.65	-28.62
5	Potash ( Kg )	170	229.03	-59.03	-34.72
6	Output ( q)	1495.8	1226.10	269.70	18.03
<b>Suru</b>					
1	Planting material ( t)	7.5	5.60	1.90	25.33
2	Manures ( q.)	200	56.97	143.03	71.52
3	Nitrogen ( Kg)	250	294.23	-44.23	-17.69
4	Phosphorus ( Kg )	115	188.64	-73.64	-64.03
5	Potash ( Kg )	115	154.38	-39.38	-34.24
6	Output ( q)	1379.2	1040.58	338.62	24.55
<b>Ratoon</b>					
1	Palnting material ( t)	0	0.00	0.00	0.00
2	Manures ( q.)	100	18.87	81.13	81.13
3	Nitrogen ( Kg)	250	262.12	-12.12	-4.85
4	Phosphorus ( Kg )	115	151.35	-36.35	-31.61
5	Potash ( Kg )	115	142.84	-27.84	-24.21
6	Output ( q.)	1176.9	929.98	246.92	20.98

**Table 3: Per hectare costs, return, gross income, and B.C.ratio for sugarcane**

Sl. No.	Particulars	Size groups				
		Unit	Adsali	Pre-sea	Suru	Ratoon
1	Total cost					
	i) Cost 'A'	Rs.	179470.18	150041.50	124324.90	76137.18
	ii) Cost 'B'	Rs.	237637.79	199733.52	168104.91	116570.49
	iii) Cost 'C'	Rs.	262974.21	222916.16	190033.70	131539.17
2			<b>Profit at</b>			
	i) Cost 'A'	Rs.	134852.40	125750.56	108209.94	131772.38
	ii) Cost 'B'	Rs.	76684.79	76058.54	64429.93	91339.07
	iii) Cost 'C'	Rs.	51348.37	52875.90	42501.14	76370.39
3	Production	Qtls	1396.09	1226.10	1040.58	929.98
4	Gross income	Rs.	314322.58	275792.06	232534.84	207909.56
5			<b>B:C ratio</b>			
	i) Cost 'A'		1.75	1.84	1.87	2.73
	ii) Cost 'B'		1.32	1.38	1.38	1.78
	iii) Cost 'C'		1.20	1.24	1.22	1.58

be sufficient in all planting type of sugarcane. The use of manure was found less in ratoon sugarcane.

In the adsali sugarcane, the per hectare use of chemical fertilizers *i.e.* Nitrogenous, Phosphorus and Potash was 411.00 kg, 234.91 kg and 237.14 kg ha<sup>-1</sup>, respectively.

The agricultural universities and institutes recommended the input use for higher production of the crops. This differs from the actual use of inputs by the farmers. The per hectare resource use gap in different type of sugarcane is presented in table 2.

It is seen from the table that in all planting types, chemical fertilizers use was excess than the recommended doses. The other inputs were under utilized by the farmers in the study area. Hence, there is no single farmer found to use the recommended doses of inputs. Such imbalance nutrient use lead to losses of nutrient, improper growth and reduced yield level as compared to the potential. Thus it is uneconomic to use imbalance nutrient.

From the table 3 the per hectare gross income received was Rs. 314322.58, Rs. 275792.06, Rs. 232534.84 and 207909.56 for adsali, pre-seasonal, suru and ratoon sugarcane. The per hectare profit at cost 'C' was the highest in case of ratoon planting (Rs. 76370.39) followed by pre-seasonal (Rs. 52875.90) and suru sugarcane (Rs. 42501.14). The benefit cost ratio at cost

'C' was highest in case of ratoon sugarcane (1.58), followed by pre-seasonal (1.24) and suru sugarcane (1.22). The benefit cost ratio in all planting types were observed more than unity therefore the cultivation of sugarcane is viable economic proposition in the area under study.

The inputs used by the sugarcane growers for all the planting types were below than recommendation except chemical fertilizers. The application of manure was very less almost on all type of sugarcane farms.

## REFERENCES

- Inamke, N.M., Pokharkar V.G. and Nawale S.K., 1996. Productivity of sugarcane in Maharashtra - A Zone wise analysis. *Maharashtra J. Agril. Econ.* **3** : 5 -7.
- Malik, S.K. 2000. Extent and magnitude of adoption of new sugarcane production technology in Western Uttar Pradesh. *Indian Sugar.* **50** : 621 - 24.
- Mathur, P., Chaurasia S.P.R. and Gauraha A.K., 2001. Technology adoption, yield gaps and production constraints in rice and wheat in the plains of north-western Uttar Pradesh. *The Bihar J Agril. Marketing.* **9(3)**: 329-34.
- Pagire, B.V. and M.S. Jadhav, 1996. Resource use level and productivity of sugarcane in Western Maharashtra. *Indian Sugar.* **46** : 543-54.