



Impact of new technology on sugarcane production in reserve and free area of sugar mill

Sanjeev Kumar

Assistant Professor, Department of Agriculture Economics, Kisan PG College, Simbhaoli, Hapur, Uttar Pradesh, India

Corresponding Author: Sanjeev Kumar

Abstract

Uttar Pradesh alone contribute almost fifty percent share of India's total sugarcane production. It is also a main source of fodder for animals in western Uttar Pradesh. In comparison to other state per hectare low yield indicate the gap between recommended and adopted technology of sugarcane production by the farmers the present study is based on 150 sugarcane growers which was selected 75 each from reserve and free area of the sugar mill. Result of the study indicate that the majority of sugarcane growers in reserve area i.e. 64 percent were under the higher adopted group of sugarcane technology while that 31 percent were under the free area. Further on an average 14,39 and 47 percent farmers were under the lower, medium and higher adopted group of sugarcane technology. The average cropping intensity was calculated 130 percent in reserve area and 134 percent in free area. It is also analyzed that sugarcane occupies an average of 72 percent of the gross cropped area followed by wheat. The yield of sugarcane was found higher in higher level of adoption technology in both reserve and free area. Further the net income was calculated average 68737 rupees in reserve area and 63966 rupees in free area which was less than overall average.

Key words: Sugarcane, production technology, sugarcane growers, cropping intensity, cropping pattern, sugar mill, productivity

Introduction

Sugarcane is one of the most important cash crop cultivated entirely in the Western Uttar Pradesh. Besides being a cash crop, it also provides fodder for animals, food for men and casual employment to the agricultural labourers around the sugar industry. Apart from the large masses of agricultural labourers nearly 35 million farmers and their families are involved in sugarcane cultivation.

It has been generally expressed that the modern sugarcane production technology, due to the differential adoption rates, accentuates the income disparities between the adjoining and so far regions of the sugar factory. Such an effort would require, a comprehensive study incorporating both the aspects as well as interactions between the level of adoption and economic benefits of the sugarcane cultivation to determine an integrated scenario regarding the potentialities of the adoption of new technology across the production and income sphere of cane growers. Hence, the present study is a modest attempt in this context, confined to sugarcane dominated region of Western Uttar Pradesh. The specific objectives of the study are (i) to find out the level of adoption of new sugarcane technology and (ii) to assess the impact of new technology on cropping pattern, production

and income distribution.

Materials and Methods

The present study is based upon 150 respondents which were selected 75 each from reserve areas (considered upto 10 km around the sugar factory) and free area (defined 10 to 25 km far off from the sugar mill). The total sample was drawn through a multi-stage stratified random sampling design from 8 villages in Hapur district of western Uttar Pradesh. The primary data on various aspects were collected through conventional survey method using specially structured schedule. The data pertained to the agriculture year 2017-18 in order to identify the level of adoption of new technology; adoption index of selected cane growers was developed with the help of the following formula:

$$L = \frac{1}{4} \frac{X_1}{A_0} \times 100 + \frac{X_2}{F_0} \times 100 + \frac{X_3}{I_0} \times 100 + \frac{X_4}{P_0} \times 100$$

Where, L = Level of adoption (in percentage)

X_1 = Area under improved sugarcane varieties (in hect.)

X_2 = Dose of fertilizers applied per hect (in kg.)

X_3 = Number of irrigation applied by farmers.

X_4 = Investment on plant protection measures (in

A_0 Total area under sugarcane (in ha)
 F_0 = Recommended dose of fertilizers (in kg)
 l_0 = Recommended number of irrigation.
 P_0 = average recommended investment on Plant Protection (in)

The level of adoption varies from 0 to 100 percent depending upon the rate of adoption of new technology. Further on the basis of adoption technology, all the 150 respondents were classified into lower adopter (upto 30%),

medium adopter (31 to 60%) and higher adopter (above 60%) categories.

Table 1: Adoption level of sugarcane production technology

Level of adoption	Number of a doters		
	Reserve area	Free area	Total
Lower	6(8)	15(20)	21(14)
Medium	21(28)	37(49)	59(39)
Higher	48(64)	23(31)	71(47)
Total			150(100)

Table 2: Cropping Intensity on different adopter Groups of Farms

Level of adoption	Reserve area				Free area			
	Net Sown area	Total cropped area	% Share of sugarcane in cropped area	Cropping Intensity	Net Sown area	Total cropped area	% share of Sugarcane in cropped area	Cropping Intensity
Lower		17	66	142			52	152
Medium	51	69	71	135	78	104	63	133
Higher	130	164	73	126	70	90	68	129
Total Average	193	250	72	130	175	235	63	134

Results and Discussion

Level of adoption Technology

It is obvious from the data furnished in Table 1 that a proportion of 64 percent sugarcane growers were computed under the higher adoption category in reserve area while 28 and 8 percent farmers were examined under the medium and lower adopter groups respectively. But in case of free area, it was observed that the majority (i.e., 40 percent) of farmers are medium adopters and a small fraction (i.e., 31 percent) of sample were accounted under the category of higher adoption along with a proportion of 20 percent belonging to lower level of adoption. Further, on an average 47, 39 and 14 percent farmers were under the lower, medium and higher level of adoption respectively. Therefore, this clearly indicates that the conventional methods of sugarcane cultivation were still predominant in general and particularly in free area of sugar mill.

Cropping Pattern and the Intensity

In the present fast changing farming method, the new crop production technology have a significant contribution in determining the cropping pattern and the intensity due to

shifting the area of various crops. It is apparent from the Table 2 that the intensity of cropping in reserve area on an average as nearly 130 percent and varied with the level of adoption from 126 percent at higher level to 142 percent at lower.

Similarly, in free area higher cropping intensity i.e., 152 percent was observed at lower level and lower i.e., 129 percent noted at the higher level of adoption. It may be because to increase the proportionate area of sugarcane.

Further Table 3 shows that sugarcane is an important crop constituting an average of 72 percent of the gross cropped area followed by what (14.6 percent) and Jawar (6.23 percent) in reserve area. The total sugarcane area varied from 66 percent at lower level to 73 percent at higher level of adoption. Towards the free area the share of sugarcane was observed lower i.e., 68, 63 and 52 percent at the higher, medium and lower levels of adoption respectively. The other major crops viz. Wheat, Paddy and jawar were contributed 14.9.8 and 7 percent in total cropped area. Therefore, it implies that the area of sugarcane has been increased with the increment in the level of adoption in both reserve and free areas.

Table 3: Area of different crops under various levels of adoption in reserve and free area (In percentage)

Name of the crops		Reserve area			Total/average	Free area			Total/average
		Level of adoption				Level of adoption			
		Lower	Medium	Higher		Lower	Medium	Higher	
Cereals Maize	-L	0.50			0.03	0.50	0.20		0.27
	-H	1.00	0.50	0.50	0.60	1.50	0.80	0.50	1.00
Paddy	-H	5.00	2.00	2.00	2.30	9.80	8.00	7.00	8.00
Wheat	-H	16.00	15.00	14.50	14.60	20.00	14.00	13.00	14.90
Others		0.50	0.50	0.20	0.35	0.60	0.50	0.50	0.60
Pulses									
Pea	-L	0.40	0.10	0.10	0.11	0.20		0.10	0.07
	-H	0.30	0.30	0.30	0.35	0.40	0.30	0.50	0.50
Lentil	-L	0.10	0.10	0.10	0.09	0.20	0.20	0.10	0.20
	-H	0.20	0.20	0.20	0.35	0.40	0.30	0.20	0.31
Urad& Moong	-L	0.20	0.40		0.20	0.50	0.50	0.40	0.50
Moong	-H	1.00	0.60	0.50	0.37	1.00	0.50	0.50	0.60
Others		0.50	0.20	0.20	0.35	0.30	0.20	0.20	0.32
Oil Seeds									

Mustard	-L	0.20	0.10		0.28	0.50	0.60	0.30	0.50
	-H	0.60	0.70	0.50	0.42	2.00	1.90	0.90	1.60
Others		0.20	0.30	0.10	0.15	0.50	0.50	0.30	0.50
Fodder Crores									
Jawar	-L	6.30	7.00	6.40	6.20	7.00	7.00	6.40	7.00
Bajra	-L	0.30	0.30	0.10	0.15	0.50	0.40	0.30	0.50
Berseem	-H	0.40	0.50	0.50	0.36	0.30	0.40	0.50	0.50
Others		0.30	0.20	0.30	0.30	0.20	0.20	0.30	0.43
Commercial Crores									
Sugarcane	-H	66.00	71.00	73.00	72.00	52.00	63.00	68.00	63.00
Potato	-H			0.50	0.32	1.40	0.50		0.50
Others						0.20			0.03
Total		17.00	69.00	164.00	250.00	41.00	104.00	90.00	235.00
cropped area in (Hect)		(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)

Note: L = Area under local varieties

H = Area under high yielding varieties.

Table 4: Details of Yield, Cost and Return of Sugarcane with different levels of adoption

Level of adoption	Sugarcane yield (qtl/ha)	Gross income (I ha)	Total cost of Cultivation (I ha)	Net Income (I ha)
Reserve area Lower Medium Higher Average Free area Lower Medium Higher Average Overall average	570	170,000	120,437	49563
	691	207300	135610	71690
	754	226200	142542	83658
	672	201600	132863	68737
	576	172800	127320	45480
	658	197400	130540	66860
	729	218700	138842	79858
	654	196200	132234	63966
	663	198900	132674	66226

Income Distribution

The impact of the adoption of new scientific crop production technology is basically believed to have generated high productivity and more income to the farmers. Efforts, therefore, has been made to analyse the all aspects in details and the results are presented in Table IV. It reveals that the yield of sugarcane 754, 691 and 570 qtl per hect. at higher, medium and lower level of adoption respectively in reserve area. But in case of free area it is recorded 729, 658 and 576 qtl per hect in order of higher, medium and lower level of adoption technology.

Further, the net income per hectare was positively associated with the level of adoption. It was accounted to f 49563, 71690 and 83658 at the lower, medium and higher level of adoption in reserve area. Regarding free area, net income was observed the highest i.e., (79858 at the higher level of followed by (66860 and 45480 at the medium and lower level of adoption respectively. Therefore, the degree of adoption of new technology was directly influenced the income of sugarcane growers in both reserve and free areas of sugar mill.

Conclusion

It may be inferred from the aforesaid facts that the rate of the adoption of new sugarcane technology was higher in around the sugar factory area. Although, the level of adoption was positively associated with the per hectare income and yield of sugarcane, yet it was found negatively related to the cropping intensity. It was also concluded that the sugarcane cultivation was more remunerative in reserve area than the free area. Therefore, efforts should be made from the sugarcane development departments and sugar factory side to boost up the adoption level of new

technology and to minimize the disparity in income distribution by way of providing better inputs facilities and technical know-how to sugarcane growers specially in free area.

References

1. Bhatia R, Nakhija VK, Laharia SN. Adoption of improved Sugarcane production technology in Haryana. Haryana Agriculture University, Hisar, India. Ariculture Situation in India. 1994;48(11):781-784.
2. Chandra N, Singh RP. Determinants and impact of new technology on tribal agriculture in Bihar. Ind. J Agril. Econ. 1992;47(3).
3. Ramasamy C, Paramasivam P, Otsuka K. Modern seed-fertiliser technology and adoption of labour saving technologies in rice production: The Tamil Nadu case. Indian Journal of Agricultural Economics. 1992;47(902-2018-3141):35-47.
4. Ramasamy C, Rajagopalan V. Impact of new technology on the pattern of income distribution among farmers. South Econ Rev. 1973;2(3).
5. Malik SK, Singh RP. Impact of new technology on income and production of sugarcane in reserve and free areas of sugar mill. Indian Sugar. 2000;50(4):209-13.

Creative Commons (CC) License

This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY 4.0) license. This license permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.