

Impact of University Released Variety of Sugarcane Crop on Socio-economic Status of Farmers

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Abstract – A survey conducted on impact of advanced varieties of sugarcane shows that both the year of study, Majority (72.50 per cent) of respondents fulfill their fund requirement from Primary Agri. Credit Society and 97.50 per cent of respondents were obtaining short term loan for crop. For cultivar of Co-8014 and Coc-671 adoption gap was 100 per cent where almost all cultivars has 100 per cent adoption gap due to non adoption of *suru* seasons Majority of respondents were belonged below Rs. 2,00,000/- in the year 2010-2011 (73.33 per cent) and 2015-16 (48.33 per cent). Majority (89.17 per cent) of respondents obtained sugarcane yield below 150 t/ha.

Keywords – Impact, Social Status, Economical Status, University Released Variety and Sugarcane.

I. INTRODUCTION

The Indian sugar industry is second largest industry in the country, generates surplus exportable power through cogeneration thereby playing a major catalytic role in the socio-economic transformation of rural population. It encompasses 526 operating sugar mills, 309 distilleries, 180 co-generation, numerous paper and pulp plants [1]. In India, sugarcane productivity is 69.8 t/ha and still lower when compared to other countries. According to the Indian Sugar Mill Association (ISMA) area under sugarcane crop in 2015-16 was 53.58 lakh hectares in India which is almost similar to that of last 2014-15 (53.23 lakh ha). Similarly, Maharashtra, have a 10.6 lakh ha area during same year. Due to poor rainfall than for 2014-15, yields affected in 2015-16 and, therefore, sugarcane production is likely to be less than previous 2014-15. It is estimated that by 2020, India will require to produce more than 500 MT of cane with average recovery of 11.0 per cent. Kolhapur district is a major sugarcane growing district having 1,46,295 ha area and average productivity 93.2 t/ha. Sugarcane is a suitable crop for Maharashtra farmers as there is suitable climate for its cultivation however, Tamil Nadu is now ahead to Maharashtra regarding sugarcane yield. Though Maharashtra covers only 16 % area of total sugar cane cultivation, it contributes to 35 % in the country's total sugar production because of higher recovery of sugar than any other state [2]. Sugarcane is a long duration crop and faces various abiotic stresses like shortage of water, high temperature during summer, low temperature during winter, flooding during rainy season, nutritional stress, salinity, alkalinity and biotic stresses like fungal diseases as red rot, smut, wilt, rust, viral diseases, pests like which are responsible for reduced sugarcane yield and sugar productivity. Further excess use of irrigation and chemical fertilizers the

soil has been degraded causing the problems in sustainability of the crop. All the factors put together are responsible for varietal degeneration. Sugarcane is highly productive crop and the biomass yield of sugarcane is the highest than any other crop. The increase in sugarcane productivity is the main concern of sugarcane breeding programs. Early maturing and high yielding multiple stresses tolerant varieties are therefore needed for sustaining sugarcane cultivation. In Maharashtra, various sugarcane variety under cultivation; are an early maturing and high sugared variety showing declining trend due to its genetic degeneration. Further, it is also susceptible to many diseases and pests resulting in lower yield and sugar content hence needs to be replaced. Conventional breeding methods have resulted in failure of improvement in this variety and transfer of early maturity and high sugar content trait from this variety to other varieties [3]. Further, there are inherent limitations to increase the sugar content by using conventional hybridization. Therefore, alternative is to induce mutations for high sugar content and yield or to transfer high sugar gene utilizing the transgenic techniques. Considering the future demand for sugarcane, there is a need for development of varieties and ultimately feedback to breeder by impact analysis on sugarcane varieties grown by the farmers with objectives to study the impact of university released variety of Sugarcane crop on farmers and to obtain the constraints faced and suggestions made by the farmers.

II. METHODOLOGY

The study was conducted purposively in the Hatkanangle, Radhanagari and Bhudharghar tahsils of Kolhapur district (M.S) which comes under College Development Block, College of Agriculture, Kolhapur. Twenty villages having maximum area under sugarcane from above tahsils were selected purposively and list of the sugarcane growers was obtained from concern Agriculture Assistant of College Development Block. From each selected villages 6 respondents were selected randomly. The respondents were interviewed with the help of structured interview schedule personally. All 120 respondents were interviewed for this study. The personal, social and economic characteristic of respondents was studied. The knowledge and adoption of innovations/recommendations and the extent of impact of university released variety of Sugarcane crop on farmers were studied. The constraints in adoption of technologies and suggestions of respondents for efficient use of innovations were also studied.

Ex-Post Facto Design was used. The data were tabulated and processed through the primary and secondary tables. The statistical tools like frequency, percentages, and means of the averages was used for interpreting the data and inferences are drawn. For the study of impact base year was 2010-2011.

III. RESULTS AND DISCUSSION

Impact on Social Status

It was observed that in the base year majority of respondents had educational status up to primary education but in the year 2015-16 this percentage was reduced to 65.00 per cent and slight increase in per cent educational status upto secondary & higher secondary, under graduate. Due to increase in annual income in between 2.51 to 5.00 lakh (42.50 per cent) respondents progressed the education upto post graduate (5.00 per cent) and occupational education (1.67 per cent) in the year 2015-16. It was also observed that slight increase in nuclear family having small size of family was observed. Regarding subsidiary occupation like dairy was increased up to 26.67 per cent from 2.50 per cent. Expenditure and saving efficiency of respondents were increased from 65.00 per cent to 85.00 per cent and 53.33 per cent to 89.00 per cent respectively.

Table 1. Impact of sugarcane varieties on socio-economic status of respondents

Sr No	Particulars	2010-11 (n=120)		2015-16 (n=120)	
		Freq	%	Freq	%
1	Education				
	Primary	93	77.50	78	65.00
	Secondary & Higher secondary	17	14.17	22	18.33
	Under Graduate	07	5.83	12	10.00
	Post graduate	03	2.50	06	5.00
	Type of Family				
	Joint	43	35.83	48	40.00
	Nuclear	77	64.17	72	60.00
2	Family size				
	Small (below 4 members)	70	58.33	72	60.00
	Medium (5-7 members)	18	15.00	16	13.33
	Big (Above 7 members)	32	26.67	32	26.67
3	Occupation				
a	Main occupation				
	Agriculture	120	100.0	120	100.0
	Dairy	-	-	-	-
b.	Subsidiary occupation				
	Agric. + Wages	06	5.00	02	1.67
	Agric. +Service	-	-	05	4.17
	Dairy	03	2.50	32	26.67
4.	Land				
	Land under sugarcane (ha)				
	Marginal (Below 1.00)	92	76.67	95	79.17
	Small (1.01 to 2.00)	18	15.00	22	18.33
	Medium (2.01 to 5.00)	10	8.33	03	2.50
	Big (Above 5.01)	00	00	00	00
5	Annual income (Rs.)				
	Below 2.5 lakh	88	73.33	58	48.33
	2.51 to 5.00 lakh	28	23.33	51	42.50

	Above 5.01 lakh	04	3.33	11	9.17
6	Increase in expenditure efficiency	78	65.00	102	85.00
7	Saving efficiency	64	53.33	107	89.17

Impact on Household Properties

Impact on household properties and its nature is depicted in table 2 and observed that all the respondents had their own home in the both the year of study. Previously, 40.83 per cent of cement concrete home was observed in 2010-11 but was increased in year 2015-16 upto 48.33 per cent. Home with attached toilet and attached kitchen facilities was cent per cent in the year 2015-16. Previously, the recreational facility was less as compared to 2015-2016. By increase in income of respondents, purchasing new home efficiency was increased by 13.33 per cent.

Table 2. Impact of sugarcane varieties on household properties of respondents

Sl	Particulars	2010-11 (n=120)		2015-16 (n=120)	
		Freq.	%	Freq.	%
1	Impact on household				
	Own	120	100.0	120	100.0
	Rental	00	00	00	00
2	Type of house				
	Simple	21	17.50	12	10.00
	Cement concrete	49	40.83	58	48.33
	Big house	50	41.67	58	48.33
3.	Nature of construction				
	Kacha construction	18	15.00	10	8.33
	Pacca construction	27	22.50	54	45.00
	Attached toilet	94	79.17	120	100.00
	Separate kitchen	24	20.00	120	100.00
4	Impact on wealth				
a	Ancientary home	120	100.0	120	100.0
b	Purchased home	05	4.17	21	17.50
5	Animal components				
	Animals- Below 2	01	0.83	06	5.00
	3 to 5	02	1.67	17	14.17
	Above 6	-	-	09	7.50
6	Television	94	79.17	120	100.0
7	Refrigerator	44	36.67	72	60.00
8	LIC Policy	02	1.67	14	11.67
9	Saving scheme	01	0.83	03	2.50
10	Fixed deposit	07	5.83	23	19.17
11	Vehicles				
	Two wheeler	19	15.83	94	79.17
	Four wheeler (car, Jeeps)	17	14.17	32	26.67

Nature of Indebtness

Capital obtained from various funding agencies by respondents is presented in Table 3. In both the year of study, Majority (72.50 per cent) of respondents fulfill their fund requirement from Primary Agri. Credit Society and 97.50 per cent of respondents were obtaining short term loan for crop. In the year 2010-2011, 34.17 per cent of respondents burrowed loan in between Rs. 41,001 to 80,000/- and 42.50 per cent of respondents burrowed amount of Rs. Above Rs. 80,000/- in the year 2015-2016. All burrower repaid their loan in time.

Table 3. Distribution of respondents according to their nature of indebtedness

Sl	Particulars	2010-2011 (n=120)		2015-2016 (n=120)	
		Freq.	%	Freq.	%
1. Source of loan					
a	Nationalized bank	09	7.50	09	7.50
b	Co-operative bank	21	17.50	21	17.50
c	Primary Agri. Credit Soc.	87	72.50	87	72.50
d	Money lenders	00		00	
2. Type of loan					
a	Short term	117	97.50	117	97.50
b	Medium term	-		-	
c	Long term	-		-	
3. Purpose of loan					
a	Crop	117	97.50	117	97.50
b	Land development	-		-	
c	Personal	-		-	
d	Home	-		-	
4. Loan amount (Rs)					
a	Below 40,000/-	39	32.50	32	26.67
b	41000 - 80,000/-	41	34.17	34	28.33
c	Above 80,000/-	37	30.83	51	42.50
5. Nature of repayment					
a	In time	117	97.50	117	97.50
b	Late	-		-	

Labours Incurred for Sugarcane Crop

All the respondents were used hired and family labours in preparatory tillage and various costs incurred as per given in table 4. In the year 2010, family and hired labours were below 40 required for preparatory tillage.

The positive impact on area & production of rice was observed in Bangladesh [4]. Also the production variability in world cereal production increased since the rapid adoption of modern technology [5]. Instability in Indian total food grain production has increased due to the widespread adoption of the improved seed-fertilizer intensive technologies since the mid 1960s [6].

Table 4. Impact on labours incurred for sugarcane crop

Sl	Particulars	2010-2011(n=120)		2015-2016(n=120)	
		Freq.	%	Freq.	%
1. Preparatory tillage					
Labour quantity					
Hired					
	Below 40	90	75.00	120	100.0
	41-60	30	25.00	-	-
	Above 60	-	-	-	-
Family					
	Below 40	120	100.0	120	100.0
	41-60	-	-	-	-
	Above 60	-	-	-	-
Labour cost (Rs)					
	Below 10000/-	120	100.0	-	-
	10001 -15000/-	-	-	120	100.0
	Above 15,001/-	-	-	-	-
2 Planting					
Labour quantity					
Hired					
	Below 40	118	98.33	120	100.0
	41-60	-	-	-	-
	Above 60	-	-	-	-

Family					
	Below 40	115	95.83	120	100.0
	41-60	-	-	-	-
	Above 60	-	-	-	-
Labour cost (Rs)					
	Below 10000/-	118	98.33	97	80.83
	10000 -15000/-	-	-	23	19.17
	Above 15,001/-	-	-	-	-
3 Weeding					
Labour quantity					
Hired					
	Below 20	117	97.50	120	100.0
	20-40	-	-	-	-
	Above 40	-	-	-	-
Family					
	Below 20	117	97.50	120	100.0
	20-40	-	-	-	-
	Above 40	-	-	-	-
Labour cost (Rs)					
	Below 6000/-	117	97.50	120	100.0
	6000 -12000/-	-	-	-	-
	Above 12,001/-	-	-	-	-
4 Gap filling					
Labour quantity					
Hired					
	Below 10	66	55.00	49	40.83
	10-20	-	-	-	-
	Above 20	-	-	-	-
Family					
	Below 10	43	35.83	120	100.0
	10-20	-	-	-	-
	Above 20	-	-	-	-
Labour cost (Rs)					
	Below 3000/-	66	55.0	51	42.50
	3000-6000/-	-	-	30	25.00
	Above 6,001/-	-	-	-	-
5 Fertilize application					
Labour quantity					
Hired					
	Below 10	103	85.83	103	85.83
	10-20	-	-	-	-
	Above 20	-	-	-	-
Family					
	Below 10	119	99.17	115	95.83
	10-20	-	-	-	-
	Above 20	-	-	-	-
Labour cost (Rs)					
	Below 3000/-	120	100.0	-	-
	3000-5000/-	-	-	120	100.0
	Above 5,001/-	-	-	-	-
6 Crop protection					
Labour quantity					
Hired					
	Below 10	51	42.50	47	39.17
	10-20	-	-	-	-
	Above 20	-	-	-	-
Family					
	Below 10	90	75.00	90	75.00
	10-20	-	-	-	-
	Above 20	-	-	-	-
Labour cost (Rs)					
	Below 3000/-	90	75.00	-	-
	3001-5000/-	-	-	90	75.00
	Above 5,001/-	-	-	-	-
7 Irrigation					
Labour quantity					
Hired					
	Below 10	36	30.00	31	25.83
	10-20	11	9.17	10	8.33
	Above 20	21	17.50	18	15.00
Family					
	Below 10	59	49.17	60	50.00

	10-20	20	16.67	20	16.67
	Above 20	10	8.33	14	8.33
Labour cost (Rs)					
	Below 3000/-	20	16.67	20	16.67
	3001-6000/-	27	22.50	35	29.17
	Above 6,001/-	01	0.83	02	1.67

Impact on Total Income

Majority of respondents were belonged below Rs.2,00,000/- in the previous year (73.33 per cent) and 2015-16 (48.33 per cent). Less per cent of respondents had total income of above Rs 5,00,001/-

Table 5. Impact of sugarcane varieties on total income (Rs)

Sr No	Particulars	2010-2011		2015-2016	
		Freq.	%	Freq.	%
1	Below 2,00,000/-	88	73.33	58	48.33
2	2,00,001 to 5,00,000/-	28	23.33	51	42.50
3	Above 5,00,001/-	04	3.33	11	9.17

Impact on Area & Production of Sugarcane

It is revealed from tables 6 that increase in area (164.3 per cent) & production (180.8 per cent) over base year was maximum in CoM-0265 variety followed by Co-86032. The decrease in area and production of Co-92005 was observed in the year 2015-16. That means Co-92005 variety of sugarcane was replaced by CoM-0265 and Co-86032.

Table 6. Impact on cultivable area and production of sugarcane

Sl	Particulars	2010-2011		2015-2016		Increase in area (%)	Increase in production (%)
		Area (ha)	Production (t/ha)	Area (ha)	Production (t/ha)		
1	Co-86032	25.3	4425	50.5	9967	99.6	125.2
2	CoM-0265	17.6	3625	46.5	10180	164.3	180.8
3	Co-92005	40.9	6367	31.5	5285	77.0	-81.3

Impact on Utilization Pattern

Impact on utilization pattern is depicted in table 7. It was observed that maximum amount of Rs. Above 5,00,000/- was utilized by respondents on housing (63.33 per cent) in year 2015-16. Also the utilization on education above 10001/- was increased from 22.50 to 35.00 in given study year. It was also observed that respondents spending habit above Rs. 2001/- on social programme was increased in 2015-16 as compared to base year 2010-2011. The less amount below Rs. 1000/- was utilized by maximum respondents and it was 85.83 per cent in year 2010-11 and 80.83 per cent in the year 2015-16. Previously, investment in farm development & purchase of farm machineries above Rs. 10,00,000/- was nullifies but after that it was 6.67 per cent [7].

Table 7. Impact on utilization pattern

Sl	Particulars	2010-11		2015-16	
		Freq	%	Freq	%
1	Food				
	below 50000/-	78	65.00	58	48.33
	50001 to 1,00,000/-	24	20.00	37	30.83
	Above 1,00,000/-	18	15.00	25	20.83

2	Housing				
	below 200000/-	18	15.00	10	8.33
	20001 to 5,00,000/-	60	50.00	34	28.33
	Above 5,00,000/-	42	35.00	76	63.33
3	Education				
	below 10000/-	93	77.50	78	65.00
	10001 to 20,000/-	24	20.00	34	28.33
	Above 20,001/-	3	2.50	8	6.67
4	Social programmes				
	below 2000/-	93	77.50	15	12.50
	2001 to 3000/-	17	14.17	74	61.67
	Above 3001/-	10	8.33	31	25.83
5	Health				
	below 1000/-	103	85.83	97	80.83
	1001 to 2000	15	12.50	14	11.67
	Above 2001/-	2	1.67	9	7.50
6	Investment in farm development & purchase of farm development				
	below 500000/-	10	8.33	8	6.67
	500001 to 1000000/-	7	5.83	16	13.33
	Above 1000001/-	0	0.00	8	6.67

Constraints

More than 90.00 per cent of respondents were faced the constraints of, high initial investment of drip assembly and mechanization was not possible.

Table 8. Distribution of respondents according to constraints

Sl	Particulars	Freq.	%
1	High initial investment of drip assembly	113	94.17
2	Mechanization for harvesting is not possible due to high initial investment	110	91.67
3	Less land holding limits mechanization	107	89.17
4	High fertilizer cost	105	87.50
5	High cost of labour	103	85.83
6	Lack of timely availability of labour	100	83.33

Suggestions

Table 9 showed that respondents suggested less duration varieties, small size harvester (97.50 per cent each), co-operative farming and 100% subsidy on drip assembly installment (94.17 per cent).

Table 9. Suggestions for high adoption of technology

Sl.	Particulars	Freq.	%
1	Cultivar should be of less duration for Adjali season	117	97.50
2	Harvesters should be of small size	117	97.50
3	Co-operative sugar industries should made available harvester	116	96.67
4	Govt. should give 100% subsidy on drip irrigation	113	94.17
5	Group farming to overcome the less land holding problem	113	94.17

CONCLUSIONS

- All the respondents had agriculture as their main occupation and dairy (96.67 per cent)
- Previously 40.83 per cent of cement concrete home was observed in 2010-11 but was increased in year 2015-16 by 7.5 per cent.
- Majority (72.50 per cent) of respondents fulfill their fund requirement from Primary Agri. Credit Society

- Majority of respondents were belonged below Rs. 2,00,000/- in the year 2010-2011 (73.33 per cent) and 2015-16 (48.33 per cent).
- Increase in area (164.3 per cent) & production (180.8 per cent) over base year was maximum in CoM-0265 variety followed by Co-86032.
- It was also observed that respondents spending habit above Rs. 2001/- on social programme was increased in 2015-16 as compared to base year 2010-2011.
- More than 90.00 per cent of respondents were faced the constraints of high initial investment of drip assembly and mechanization was not possible.
- Majority of the respondents suggested growing of short duration intercrop (88.00 per cent), need of short duration varieties of sugarcane in *adsali* planting (80.67 per cent), and common agril. Intercultural implements (79.33 per cent) and need of mechanization (46.00 per cent).

RECOMMENDATION

As less land holding of sugarcane growers observed, group farming should be advisable. For that extension functionaries create awareness among the farmers.

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