



Research Article

CHALLENGES TO ADOPTION OF SUGARCANE PRODUCTION TECHNOLOGY IN BALRAMPUR DISTRICT OF UTTAR PRADESH, INDIA

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Abstract: Sugarcane cultivation in Uttar Pradesh touched a new high with the average cane production reaching 815 quintals per hectare in 2020-21. In the last fiscal, the average cane production was to the tune of 811 quintals per hectare. Sugarcane significantly contributes to the socio-economic development of the Balrampur's Farmers. The largest sugarcane growing states-Uttar Pradesh, Maharashtra, Karnataka, Tamil Nadu, and Gujarat contribute more than 85% of the total sugar production in India. The present study was carried out, in the year 2021-22, with the objective to identify the challenges in the adoption of sugarcane production technology by interviewing 316 sugarcane growers from twenty-four different villages of the command area of Tulsipur and Gainsari, (Uttar Pradesh). The research variable constraint was operationalized as the difficulties faced by sugarcane growers in the adoption of sugarcane production technology. The constraints encountered by most of the respondents in the adoption of sugarcane production technology were low price is given by Government, Tedious procedure for getting a loan, Payment by the factory through instalments so it is not profitable, high cost of pesticides, the inadequacy of irrigation water at the required time, non-availability of labor for intercultural operations, high cost of fertilizers, non-availability of good quality manure and lack of knowledge about the spraying of insecticides. Non-availability of a contact office near the village and transportation of sugarcane sets were also the constraints faced by the sugarcane growers. A timely and regular supply of inputs at cheaper rates, with a regular supply of irrigation water, and ensuring remunerative price to sugarcane were some of the suggestions made by sugarcane growers.

Keywords: Sugarcane, Farmers, Production, Adoption, Technology

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Introduction

Sugarcane is a tropical, perennial grass that forms lateral shoots at the base to produce multiple stems, typically 3 to 4 m (10 to 13 ft.) high and about 5 cm (2 in) in diameter. The stems grow into cane stalk, which when mature, constitutes around 75% of the entire plant. Sugarcane is a cash crop, but it is also used as livestock fodder. The sugarcane genome is one of the most complex plant genomes known, mostly due to interspecific hybridization and polyploidization. Sugarcane can be grown in a variety of soil types, including highly fertile, well-drained mollisols, heavy cracking vertisols, infertile acid oxisols and ultisols, peaty histosols, and rocky andisols. Both plentiful sunshine and water supplies increase cane production. As a result, desert countries with good irrigation systems, like Egypt, have become some of the highest-yielding sugarcane-cultivating places on the planet. Sugarcane utilizes 9% of all potash fertilizers produced around the globe. Sugarcane production is the most structured farming sector, which is directly linked to the sugar industry and plays an important role in India's economic life. Sugarcane growers play an important role in the agricultural and industrial economies of India's rural areas. It is a feeder for agricultural industries such as sugar and is in rural areas. The sector has functioned as a vehicle for advancing rural areas' progressive trends. The most notable feature of this sector is that it serves as a link between the factory and the growers, whose interests and well-being are inextricably linked.

Sugarcane is grown by farmers either as a main crop or as a cash crop within a diversified portfolio. For smallholders in the study region, those who own 2–5 acres, sugarcane continues to be the main crop. They are characterized by the continuous growth of sugarcane with and without ratooning. For these farmers, the extension services provided by the sugarcane company are crucial to keeping sugarcane farming a viable activity.

In the last 20 years, some farmers have shifted away from sugarcane growing, partially due to improved opportunities in nonfarm industries and partly due to younger generations leaving agriculture. Many farmers have moved to grow rice and other crops to meet the food security needs of their families. These trends are a concern for the sugarcane company as they reduce the supply of raw cane, reduce the company's economies of scale, and make it difficult for the company to reach its goal of keeping the factory running for at least 300 days in a year to obtaining optimal productivity.

The primary issue for sugarcane growers is that there is no relationship between the price of the raw material, sugar cane, and the completed item, sugar. The price of cane paid to farmers in practically all the world's main sugar-producing countries is determined by the amount of sugar realized. The primary issue that canes growers face is meeting the high expense of cultivation. This issue is exacerbated by the sugar mills' high statutory price for the cane. The high cost of cultivation and the low price imposed on cane supply are not the only issues confronting cane growers; marketing and finance issues are also becoming increasingly serious.

Material and Methods

The study was conducted in Tulsipur and Gainsari block of Balrampur district of Uttar Pradesh which was purposively selected, because it served a great deal of convenience for the research worker in terms of accessibility, ease of rapport building, time, money, and efforts. Twenty four villages were selected purposively from the selected blocks. A list of entrepreneurs was made from each village. A total of 316 respondents were selected for the study by using simple random sampling method.

Constraints were operationalized as the difficulties faced by the sugarcane growers in getting an enhanced level of yield and sugar recovery. The constraints were delineated under the heads of situational, financial, and technological. An attempt was also made to ascertain the suggestions of the sugarcane growers to overcome the constraints.

The data pertaining to the objective were collected with the help of a pre-structured interview schedule. Frequencies and percentages were worked out to identify the different constraints experienced by sugarcane growers.

Results and Discussions

From the table [Table-1] it is evident that 51.58 per cent respondents were in middle age group young age group, followed by 26.58 per cent respondents were in old age group whereas 21.84 per cent respondents were in young age group, whereas the data regarding education 23.42 per cent respondents were completely illiterate while 7.28 per cent respondents were also illiterate but they can read and write, while 15.51 per cent respondents were primary school passed and 16.77 per cent respondents were Junior High School whereas 17.40 per cent respondents were in High School. 13.61 per cent respondents were having education up to Intermediate level and only 6.01 per cent respondents were graduate and above level. It can be derived from the above data that maximum numbers of farmers belong to the poor educational background but they are improving their educational status in the study area. Similar findings were also reported by Roy et al. (2013) [1].

Table-1 Socio-economic distribution of the respondents

SN	Categories	Frequency	Percentage
1.	Age		
I	Young (Up to 35)	69	21.84
II	Middle (36 to 55)	163	51.58
III	Old (Above 55)	84	26.58
2.	Education		
I	Illiterate	74	23.42
II	literate (Can read and write)	23	7.28
III	Primary	49	15.51
IV	Junior High School	53	16.77
V	High School	55	17.40
VI	Intermediate	43	13.61
VII	Graduate and above	19	6.01
3.	Marital Status		
I	Unmarried	16	5.06
II	Married	280	88.60
III	Widow/Widower	13	4.13
VI	Divorcee	7	2.22
4.	Occupation		
I	Agriculture	228	72.15
II	Agriculture + Animal husbandry	49	15.51
III	Agriculture + Business	28	8.86
IV	Agriculture + Service	11	3.48
5.	Farming Experience		
I	0-5 years	70	22.15
II	6 – 10 years	152	48.10
III	Above 10 years	94	29.75
6.	Land holding		
I	Up to 1 ha. (Marginal)	160	50.63
II	1 – 2 ha. (Small)	112	35.44
III	Large (Above 2 ha.)	44	13.93
7.	Annual income		
I	Low(up to Rs. 75,000)	146	46.20
II	Medium (Rs. 75,001 to 1,50,000)	108	34.17
III	Large (above Rs. 1,50,000)	62	19.62
IV	Large (Above 2 ha.)	44	13.93

The data contained in the above table and it is evident that 88.60 per cent respondents were married, 5.06 per cent were unmarried, 4.13 per cent were Widow/Widower and 2.22 per cent were divorcees. Similar findings were also reported by Asha et al. (2020) [2]. The data presented in table revealed that regarding occupation 72.15 per cent of the respondents were engaged in agriculture as their main occupation for their livelihood, followed by 15.51 and 8.86 per cent of them were engaged in agriculture + business and 3.48 per cent

respondents engaged in agriculture + service as their main occupation respectively. The results of the present study are consistent with the results of Bhosale et al. (2014) [3], whereas above table shows that regarding farming experience 22.15 per cent respondents were 0-5 years farming experience whereas 48.10 per cent respondents were 6-10 years' experience while 29.75 per cent 10 years and above farming experience category. Above similar findings also reported by Shirur et al. (2017) [4]. Above table it is evident that 50.63 per cent respondents were marginal farmers whereas 35.44 per cent respondents were small farmers while 13.93 per cent respondents were from belongs to large farmers group. The data revealed that from the above table 46.20 per cent respondents were in annual income group of up to Rs.75000/- whereas 34.17 per cent of respondents were in the annual income group of Rs. 75001/- to 1,50,000 while 19.62 per cent respondents were in the monthly income group of above Rs.1,50,000. Thus, the table reveals that most respondents were enjoying better remunerations, resulting in their higher status in the families as well.

The above table depicts the social participation of the farmers 37.04 per cent respondents were regularly attending Cooperative society, 61.70 per cent were occasionally visiting village panchayat, while 56.96 per cent were never visited Cultural Organization. It was found that 33.86 per cent beneficiaries were regularly visited social organization for information, 54.74 per cent of respondents occasionally visited social organization while 53.48 per cent were never visited religious Organization to collect the information. It was also found that 31.96 per cent beneficiaries were regularly visited village panchayat for information, 40.82 per cent were occasionally visited Cooperative society while 22.15 per cent were never visited cooperative society to collect the agricultural information. It is clear from the above table that 28.48 per cent respondents were regularly attended educational organization, 34.81 per cent were occasionally visited cultural organization for information, while 16.77 per cent were never visited educational organization for information. It is also evident from the table that 8.22 per cent respondent regularly attend cultural organizations, followed by 19.30 per cent occasionally attended religious organizations, while 6.32 per cent of respondents never attended village panchayat to gather the required information. Similar findings are also evident from Geeta et al. (2021) [5] whereas, the data contained that 62.65 per cent respondents were regularly listening Radio for information, 27.84 per cent were occasionally listening Radio while 9.49 per cent were never listen Radio to collect the information. It was also found that 55.37 per cent respondents were regularly seeing television for information, 25.00 per cent were occasionally seeing television while 19.62 per cent were never seeing television to collect the information. It was also found that 18.35 per cent respondents were regularly reading Agricultural journal/Magazine for information, 24.05 per cent were occasionally reading Agricultural journal/Magazine while 57.59 per cent were never read Agricultural journal/Magazine to collect the agricultural information. It is clear from the table that 13.29 per cent respondents were regularly organizing demonstrations on their fields, 66.13 per cent were occasionally organizing demonstrations while 20.56 per cent were never organizing demonstrations on their fields. It is also evident from the table that 35.44 per cent respondents were regularly participating in exhibition, 37.65 per cent were occasionally participating in exhibitions while 26.89 per cent were never participate in agricultural exhibitions. It was also found that 25.00 per cent respondents were regularly reading folder/leaflet/pamphlets for information, 43.03 per cent were occasionally reading folder/leaflet/pamphlets while 31.96 per cent were never read folder/leaflet/pamphlets to collect the information. Similar findings also reported by Ahmed P. et al. (2016) [6]. It is also evident from the above table that 43.98 per cent respondents were regularly meeting with Village Development Officer in the study area whereas 40.82 per cent respondents meeting with VLW often while 15.18 per cent never meet with Village Development Officer of the village. It was found that in the study area, 22.46 per cent respondents were regularly meeting with A D O while 48.73 per cent meet him often and 28.79 per cent never meet with A D O of their village. 11.39 per cent respondents were meeting with Block Development Officer regularly while 51.89 per cent met with him on often basis whereas 36.70 per cent never met with B D O of their block. In case of Subject Matter Specialists, 34.49 per cent respondents met with them regularly, 37.65 per cent met him on often basis while 28.48 per cent never met with them.

SN	Name of Social Organization	Social Participation					
		Regular		Occasional		Never	
		Frequency	%	Frequency	%	Frequency	%
1	Cooperative Society	117	37.04	129	40.82	70	22.15
2	Village Panchayat	101	31.96	195	61.7	20	6.32
3	Social Organization	107	33.86	165	52.21	44	13.92
4	Cultural Organization	26	8.22	110	34.81	180	56.96
5	Religious Organization	86	27.21	61	19.3	169	53.48
6	Educational Organization	90	28.48	173	54.74	53	16.77

SN	Name of sources	Social Participation					
		Regular		Occasional		Never	
		Frequency	%	Frequency	%	Frequency	%
1	Radio	198	62.65	88	27.84	30	9.49
2	Television	175	55.37	79	25	62	19.62
3	News Paper/ journal/Magazine	58	18.35	76	24.05	182	57.59
4	Demonstration	41	13.29	209	66.13	65	20.56
5	Exhibition	112	35.44	119	37.65	85	26.89
6	Folder/leaflet/pamphlets	79	25	136	43.03	101	31.96

SN	Personal Contact	Social Participation					
		Regular		Occasional		Never	
		Frequency	%	Frequency	%	Frequency	%
1	Village Development Officer	139	43.98	129	40.82	48	15.18
2	Additional Development Officer	71	22.46	154	48.73	91	28.79
3	Block Development Officer	36	11.39	164	51.89	116	36.7
4	Subject Matter Specialists	109	34.49	119	37.65	90	28.48
5	District Agriculture Officer	41	12.97	168	53.16	107	33.86

Table-2 Distribution of the respondents according to their Constraints in the adoption of sugarcane production technology

SN	Categories	Frequency	Percentage	Rank
1.	Situational Constraints			
I	Non-availability of inputs in time	214	67.72	IV
II	High cost of inputs	202	63.92	V
III	High labor wages	187	59.17	VIII
IV	Shortage of labors	198	62.65	VI
V	Shortage of Fertilizers in the market	225	71.20	III
VI	Heavy winds in Oct/Nov lodges sugarcane	155	49.05	X
VII	Inadequacy of irrigation water at proper time	146	46.20	XI
VIII	Non-available contact office near to the village	189	59.81	VII
IX	Transportation problem of sugarcane sets	120	37.97	XII
X	Non-availability of equipment at the Village Level	230	72.78	II
XI	Non-availability of good quality manure	245	77.53	I
XII	Biased treatment from factory officers for harvesting and crushing	171	54.11	IX
2.	Technological constraints			
I	Lack of knowledge about the use of water and its critical stages in the application	137	43.35	V
II	Lack of knowledge about pest control	247	78.16	II
III	Lack of technical guidance	256	81.01	I
IV	Lack of training at the village level	229	72.46	III
V	Lack of exposure to mass media and information etc.	221	69.93	IV
3.	Financial constraints			
I	High cost of sugarcane sets at sugarcane seed set plot	202	67.72	VII
II	Lack of finance to purchase sugarcane sets, fertilizers and other inputs	223	70.56	VI
III	High cost of pesticides	254	80.37	IV
IV	High cost of fertilizers	245	77.53	V
V	Payment by factory through instalments so it is not profitable	261	82.59	III
VI	Tedious procedure for getting loan	265	83.86	II
VII	Low price given by factory	121	38.29	VIII
VIII	Low price given by Government	285	90.18	I

12.97 per cent respondents met with the D A O of their district regularly, 53.16 per cent met him often basis whereas 33.86 never met with him. Similar findings were also reported by Mariammal *et al.* (2017) [7]. Constraints were operationalized as the difficulties faced by the sugarcane growers in getting an enhanced level of yield and sugar recovery. The constraints were delineated under the heads of situational, financial, and technological. An attempt was also made to ascertain the suggestions of the sugarcane growers to overcome the constraints. The above table indicated that regarding situational constraints, there were major situational constraints faced by the sugarcane growers. High cost of inputs, non-availability of inputs in time, shortage of fertilizers in the market, non-availability of equipment at the village level, non-availability of good quality manure, shortage of labor, non-availability of contact office near to the village, high labor wages, biased treatment

from factory officers for harvesting and crushing, Heavy winds in Oct/Nov lodges sugarcane, etc. It is clear from the above table the twelve important technological constraints faced by the respondents. Similar findings were also reported by Girei *et al.* (2012) [8], whereas the data contained in the above table revealed that there were five important technological constraints faced by the respondents among them, Lack of knowledge about the use of water and its critical stages in the application, Lack of knowledge about pest control, Lack of technical guidance, Lack of training at the village level, Lack of exposure to mass media and information, etc. while the data revealed that eight important financial constraints as faced by the sugarcane growers among them, low price is given by the government, tedious procedure for getting a loan, Payment by factory through instalments so it is not profitable and high cost of pesticides and fertilizers, etc.

Similar findings were also reported by Singh *et al.* (2009) [9].

Conclusion

It is concluded from the research findings that sugarcane growers had a medium to high level of socio-economic background although sugarcane was the main crop of the study area, the farmers faced many problems regarding sugarcane production. Consequently, these problems in turn cause low productivity of the crop due to which the area under sugarcane cultivation is decreasing which affects the socio-economic conditions of the farmers.

Application of research: The farmers of the study area also called the increase in prices of farm inputs a big threat to sugarcane production and demanded an equivalent change in prices of canes by the government so that they can take an equal return. Sugar factories across the country are not able to make payment for the sugarcane purchased from the farmers and are suffering.

Research Category: Agricultural Extension and Communication

Abbreviations: ADO-Additional development officer
BDO- Block development officer, DAO- District Agriculture officer

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Study area / Sample Collection: Balrampur, Uttar Pradesh

Cultivar / Variety / Breed name: Sugarcane

Conflict of Interest: None declared

Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.

Ethical Committee Approval Number: Nil

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