



Technological Gain in Sugarcane Cultivation through Contract Farming in Odisha

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ABSTRACT

Contract farming, an agreement between farmers and processing firms for the production and supply of agricultural products under forward agreements, at predetermined prices. It also transfer technological knowledge and skills in a way that is profitable for both the contracting firms and contracted grows. This study was conducted in Dhenkanal and Nayagarh district of Odisha with a sample size of 90 contract sugarcane growers selected randomly from each selected districts aggregating 180 samples for the purpose of investigation. The study revealed that the contract sugarcane growers had deficiency on disease, pest and nutrient management. Low level of adoption was observed on use of implements, application of recommended dose of fertilizers, use of herbicides and management of ratoon crops. Socio-economic attributes such as education, social participation, extension contact, cosmopolitans, land holding had positive influence in increasing the knowledge level of the respondents. It was therefore, suggested that the contracting sugar industries should organize capacity building programmes to enrich the knowledge and adoption level of the sugarcane growers for quality production benefiting both the contracted farmers and contracting firms.

Key Words : Adoption, Contract farming, Knowledge, Sugarcane.

INTRODUCTION

Contract farming is an agreement between the farmers and a sponsor established ahead of the growing season for the production and supply of agricultural produce with a specific quantity, quality and date of delivery at a price fixed in advance. The contract assured farmers for sale of produce, extending credit, services and inputs from the purchaser or contracting agency (Kiresur *et al*, 2002). It develops markets and brings the transfer of technological skills in a way that has to be profitable for both the purchaser and farmers (Ponnusamy and Gupta, 2003). This approach would have considerable potential in countries where small scale agriculture continued to be wide spread. It facilitates the introduction of production factors like seeds, inputs, technological package and guidance by the contracting farms (Kumar and Kumar, 2008) and has immense potential in farm diversification and employment opportunity (Biswas *et al*, 2011). Contract farming in sugarcane cultivation

undertaken by various sugar factories in Odisha during early nineties is gaining popularity year after year. Quality production is the main intervention for the sustainability of contract farming. Therefore, the growers should have a knowledge and skill competency on latest developments to ensure quality production (Kumar, 2002). Hence, an attempt was made to assess the technological gain of the sugarcane growers through contract farming.

MATERIALS AND METHODS

Sakti Sugar Ltd. Dhenkanal has introducing contract farming approach on sugarcane cultivation in the districts of Dhenkanal, Anugul, Jajpur and Kendraparain in Odisha. Similarly; Nayagarh Sugar Complex Ltd., Nayagarh has enrolled sugarcane growers under contract farming in the district of of Nayagarh, Khurda, Puri and Jagatsinghpur. The district Nayagarh under Nayagarh Sugar Complex Ltd and Cuttack under Shakti Sugar Ltd, Dhenkanal were selected randomly for the study.

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Table 1. Involvement in sugarcane cultivation under contract farming.

Sr. No.	Period	Nayagarh District (n = 90)		Cuttack District (n = 90)		Total (n = 180)	
		Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
1	Last 3 year	20	22.22	21	23.33	41	22.78
2	Last 5 year	62	68.89	56	62.22	118	65.56
3	Last 7 year	6	6.67	9	10.00	15	8.33
4	Last 10 year	2	2.22	4	4.45	6	3.33

The list of farmers involved under contract farming in sugarcane cultivation was collected from both the sugarcane factories. A sample of 90 sugarcane growers from each selected districts were randomly selected covering total sample size of 180 for the purpose of investigation. Preference of cultivating sugarcane, numbers of years under contract farming, area under contract farming, important agronomic practices, knowledge level and extent of adoption were selected as the variables for the study. The data were collected personally with a semi-structure schedule pretested earlier. Appropriate statistical measures such as percentage, mean score and regression analysis were employed to analyze the results.

RESULTS AND DISCUSSION

In Odisha, Nayagarh Sugar Complex Ltd. established during 1989 and Shakti Sugar Ltd. in 1994. Both the sugar factories introduced contract farming in sugarcane cultivation since their establishment. It was observed (Table 1) that majority of respondents in Nayagarh (66.89%) and in Cuttack (62.22%) districts were under contract farming since last five years i.e. from 2008 onwards. Only 22.22% in Nayagarh district and 23.33%

in Cuttack district were involved under contract farming since 2010. It was, therefore, apprehended that the respondents had good association for contract farming. Contract farming system usually motivates farmers for more coverage due to assured procurement with remunerative price. The data (Table 2) revealed that 69.45 per cent of the respondents were cultivating sugarcane in an area of within 0.20 ha. Since the respondents were mostly marginal (50.56%) and small farmers (49.44%), it is concluded that the respondents were covering good area under sugarcane which indicate the benefits of the contract farming.

Preference of the respondents in cultivating sugarcane under contract farming

The data collected on scale point of less, same and better than other crops were analyzed with score value of 1, 2 and 3, respectively. As observed from (Table 3), the respondents of both Nayagarh and Cuttack district were almost of similar opinion. Relative advantage, profitability, compatibility sustainability, simplicity and predictability were the most preferred criteria in cultivating sugarcane in comparison to other crops. It indicate that the respondent had affinity towards cultivation of sugarcane may be due to contract farming system.

Table 2. Area covered on sugarcane under contract farming.

Sr. No.	Area (ha)	Nayagarh district (n = 90)		Cuttack district (n = 90)		Total (n = 180)	
		Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
1	Less than 0.20	60	66.67	65	72.22	125	69.44
2	Up to 0.40	20	22.22	16	17.78	36	20.00
3	Up to 0.60	7	7.78	6	6.67	13	7.23
4	Up to 0.80	3	3.33	3	3.33	6	3.33

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Table 3. Preference of cultivating sugarcane.

Sr. No.	Preference	Nayagarh District (n = 90)		Cuttack District (n = 90)		Total (n = 180)	
		Mean Score	Rank	Mean Score	Rank	Mean Score	Rank
1.	Relative advantage	2.91	I	2.96	I	2.94	I
2.	Compatibility	2.57	IV	2.60	II	2.59	III
3.	Simplicity	2.62	II	2.32	V	2.47	V
4.	Divisibility	1.89	VII	1.92	VIII	1.91	IX
5.	Observability	1.84	IX	1.87	IX	1.86	X
6.	Predictability	2.28	V	2.24	VI	2.26	VI
7.	Profitability	2.61	III	2.59	III	2.60	II
8.	Stability	1.99	VI	1.92	VIII	1.96	VII
9.	Sustainability	2.57	IV	2.49	IV	2.53	IV
10.	Equitability	1.88	VIII	2.00	VII	1.94	VIII

(Maximum Obtainable Score – 3)

Knowledge Level

The data collected on scale point of fully known, partially known and not known on various aspects of sugarcane cultivation were analyzed with score value of 3, 2 and 1, respectively. It was observed (Table 4) that the respondents of both Nayagarh and Cuttack district had better knowledge about suitability of soil type and selection of seed cane. Significant gaps observed in time of planting (47.33%), diseases of sugarcane (38.33%), pests of sugarcane (34.67%), variety (30.00%), method of planting (27.00%), nutrient management (25.33%) and treatment of seed cane (25.33%) indicating that the respondents had not adequate knowledge about sugarcane cultivation.

Extent of adoption

Practices were also collected on scale point of regularly, occasionally and not adopted and analyzed by putting score value of 3, 2 and 1, respectively. The findings revealed (Table 5) that the respondents of both the districts had better adoption of except use of implements, recommended fertilizers and manures, herbicide application, removal of water shoots, post-harvest management for ratoon crops and proper time of harvest.

It indicates the respondents of both the district were continuously growing sugarcane; they might have adopted these practices with their past experience.

Regression analysis

It is basically an approach to analyze the causal relationships between a set of causal factors and set of consequent factors. It has been observed that the best fitted regression equation could explain only 15.40% of the total variance in influencing the knowledge level of the respondents. Therefore, stepping wise regression analysis was made to locate the causal factors enhancing the knowledge level. It was observed (Table 6) that education, social participation, extension contact, cosmopolitans, holding size and use of implements exhibited positive influence in enhancing knowledge level of the respondents on sugarcane cultivation under contract farming. Sharma (2016) also reported that the farmers in the age group of 20-30 yr were found to be more interested in acquiring trainings, demonstrations and exposure visits and acquired high level of knowledge as compared to the elder group of more than 40 years of age.

Table 4. Knowledge about Sugarcane cultivation

Sr.No.	Knowledge	Nayagarh District (n = 90)		Cuttack District (n = 90)		Total (n = 180)	
		Mean Score	Gap (%)	Mean Score	Gap (%)	Mean Score	Gap (%)
1	Suitable soil type	2.90	3.33	2.87	4.33	2.89	3.67
2	Variety	2.13	29.00	2.07	31.00	2.10	30.00
3	Time of planting	1.64	45.33	1.52	49.33	1.58	47.33
4	Method of planting	2.21	26.33	2.17	27.67	2.19	27.00
5	Selection of seed cane	2.92	2.67	2.90	3.33	2.92	2.67
6	Treatment of seed cane	2.42	19.33	2.42	19.33	2.42	19.33
7	Fertilizer and manure	2.23	25.67	2.25	25.00	2.24	25.33
8	Pests of sugarcane	2.03	32.33	2.01	33.00	1.96	34.67
9	Diseases of sugarcane	1.86	38.00	1.84	38.67	1.85	38.33
10	Management practices	2.96	1.33	2.96	1.33	2.96	1.33

(Maximum obtainable score-3)

Table 5. Extent of adoption of practices in sugarcane cultivation.

Sr. No.	Practice	Nayagarh district (n=90)		Cuttack district (n=90)		Total (n=180)	
		Mean Score	Gap (%)	Mean Score	Gap (%)	Mean Score	Gap (%)
1	Use of implements	2.02	32.67	2.08	30.67	2.05	31.67
2	Good varieties	2.93	2.33	2.90	3.33	2.92	2.67
3	Seed cane treatment	2.73	9.00	2.80	6.67	2.77	7.67
4	Proper planting	2.86	4.67	2.90	3.33	2.88	4.00
5	Optimum plant population	2.74	8.67	2.73	9.00	2.74	8.67
6	Recommended fertilizers and manure	2.23	25.67	2.30	23.33	2.27	24.33
7	Herbicide application	1.63	45.67	1.61	46.33	1.62	46.00
8	Earthing up	3.00	0.00	3.00	0.00	3.00	0.00
9	Plant protection measure	2.76	8.00	2.80	6.67	2.78	7.33
10	Tying of canes	2.87	4.33	2.91	3.00	2.89	3.67
11	Proper time of harvest	2.50	16.67	2.51	16.33	2.51	16.33
12	Post harvest management	2.19	27.00	2.30	23.33	2.25	25.00
13	Removal of water shoots	1.30	56.67	1.84	38.67	1.57	47.67
14	Water management	2.90	3.33	2.90	3.33	2.90	3.33

(Maximum obtainable score-3)

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Table 6. Stepping wise regression analysis of socio-economic variables influencing knowledge level.

Sr. No.	Variable	Beta	Adj R2	R2	t Value	Probability
1.	Education X3	5.742	0.408	0.694	3.726	0.001
2.	Social participation X7	7.148	0.492	0.701	3.641	0.011
3.	Extension Contact X8	3.679	-0.504	0.723	4.607	0.005
4.	Cosmopolitaness X9	6.914	-0.571	0.806	2.912	0.011
5.	Holding size X11	7.646	-0.610	0.703	2.925	0.001
6.	Use of implements X12	2.164	0.519	0.604	3.458	0.016

CONCLUSION

It was concluded that respondents stated cultivation advantage, profitability, compatibility, sustainability and predictability as the benefits of sugarcane over other crops. Most of the respondents were cultivating sugarcane since last five years with average area of around 0.20 ha. They have better knowledge about suitable soil and selection of seed cane. Considerably deficiencies were observed towards knowledge on time and method of planting, disease and pest management, variety, seed cane treatment and nutrient management. Similarly, low adoption were observed on use of implements, recommended fertilizers and manure, herbicide application, removal of water shoots and management of ratoon crops. Education, social participation, extension contact, cosmopolitans, holding size and use of implements used by the respondents had positive influence in increasing their knowledge level. The findings, therefore suggested that the contracting sugar industries have to organize adequate capacity building programmes to enrich the knowledge and adoption level of the farmers for better production for the benefit of the contracting firms and contracted growers.

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