Adoption Level and Constraints in Sugarcane Production Technologies in Vizianagaram District

G. S. Roy[1]; P. Gurumurthy[2]; P. Venkata Rao[3]

[1]*Scientist (TOT), District Agricultural Advisory and Transfer of Technology Center, Vizianagaram, Andhra Pradesh, India, E-mail* sroygoka@gmail.com

[2]*Senior Scientist (Crop Production) & Head, District Agricultural Advisory and Transfer of Technology Center, Vizianagaram, Andhra Pradesh, India, E-mail* peddintigurumurthy@gmail.com

[3]*Scientist (TOT), District Agricultural Advisory and Transfer of Technology Center, Vizianagaram, Andhra Pradesh, India, E-mail* venkyp75@gmail.com

ABSTRACT: In Vizianagaram district of Andhra Pradesh Sugarcane is cultivating in 20,865 ha with average productivity of 56.2 t ha^{-1} (Anonymous 2012). The yield level of sugarcane which is comparatively low at present in Vizianagaram district of Andhra Pradesh need to be increased substantially. Higher sugarcane production can be achieved by adoption of all the recommended technologies by large number of farmers. Adoption of sugarcane production technology was studied during 2012-13 at Vizianagaram district of Andhra Pradesh. Majority of the respondents (44%) studied were found to be medium level adopters. Adoption of correct dosage of fertilizers and manures as also the recommended variety was the highest (75 and 65% resp.) followed by seed treatment with fungicides (61%), plant protection (53%) and weedicide application (52%). The least adoption was for recommended nursery practices and plant population (8%, and 4% resp.). Majority of the farmers showed medium level of overall adoption of recommended technology. Weedicide application, pest and disease management in nursery maintaining plant population in main field were not adopted by the majority of the farmers. 'Non availability of high yielding varieties', High cost of labour' 'Lack of conviction in the new technology' and 'Weak extension activities at the village level were the major constraints faced by the farmers.
Keywords: Adoption; Constraints; Sugarcane Production Technology

1. Introduction

Sugarcane is the world's largest commercial crop and is grown in over 110 countries; an estimated 1,683 million metric tons were produced worldwide which amounts to 22.4% of the total world agricultural production by weight (FAO, 2009). India ranks second in cane area and sugar production after Brazil. The states of Uttar Pradesh, Maharashtra, Karnataka, Tamil Naidu and Andhra Pradesh together produce nearly 90 per cent of the cane and sugar in the country. Andhra Pradesh ranks fifth in sugar cone area of the country with a share of 4.83 per cent. Andhra Pradesh with its area of 0.22 Mha, ranks fifth in sugarcane area of the country with a

share of 4.83 per cent. The average production of Andhra Pradesh is 20.30 Mt, which is 5.83 per cent of the total production of the country. In Andhra Pradesh, the major sugarcane growing districts are Chittoor, Krishna, Visakhapatnam, Vizianagaram and Srikakulam. The crop is cultivated both under irrigated and rainfed situations. The cane produced in Vizianagaram district is being supplied to two sugar factories viz., Sri Vijaya Rama Gajapathi Cooperative Sugars Ltd, Bheemasinghi and Parry Sugars, Sankili and NCS Sugars Lachchyya peta, besides sizable quantity (28%) subjected for jaggery preparation.

The productivity of the sugarcane crop was 56.2 t ha^{-1} in Vizianagaram the district (Anonymous 2011) which was very low as compared to other sugarcane growing districts in the state. The yield level of sugarcane which is comparatively low at present need to be increased substantially. Higher sugarcane production can be achieved by adoption of all the recommended technologies by large number of farmers. In general, recommended sugarcane technologies are not adopted by all the farmers at a time and also to full extent. In this context the study was conducted with the objective to ascertain adoption level of recommended sugarcane technologies by the farmers, to find out the relationship between socio-personal and psychological traits and adoption of sugarcane production technologies and to delineate the constraints experienced by the farmers.

2. Material and Methods

The study was conducted during 2012-13 at one village each of Jami, Pusapatirega, Cheepuripalli, Therlam and Seethanagaram mandals of Vizianagaram district in Andhra Pradesh. A sample of 120 sugarcane growing farmers was drawn using proportionate random sampling technique. Based on the judged opinion, twelve recommended sugarcane technologies were selected for studying level of adoption by the farmers. Personal interviews were conducted using a pre tested structured interview schedule. Multiple regression coefficients of socio-personal and psychological traits was analyzed as per the procedure given by Panse and Sukhatme (1978).

3. Results and Discussion

Adoption of Recommended rice technologies: Majority of the respondents (44.17 per cent) were found to be low adopters, followed by medium (37.50 per cent) and high (18.33 per cent) adopters (Table 1). Farmers with more economic resources alone could adopt more production technologies. A majority of the respondents, 81.66 and 75.83 adopted Propping and earthing-up

practices, respectively. Among the respondents, least adoptions levels were found with use of machines for harvesting and intercultivation (5.00%), use of trico-cards for control of early shoot borer, set treatment with fungicides (27.5%), suitable high yielding varieties (28.33), timely harvesting (30.83) and proper ratoon management (34.16).

In case of recommended plant population, only 17.50 per cent of respondents adopted the recommended plant population. The reason was that most of the farmers were not prepared to take risk and also were of the view that excess number of seedling get higher yield. Weedicide application adopted by 31.66 per cent of respondents. Lack of conviction of the practice, non-availability of trained labour and high cost of inputs contributed to moderate adoption of this practice. Manure and fertilizer application was adopted as per the recommendation by 47.50 per cent of the respondents. Plant protection measures (pests & disease management) were adopted by less than half of the respondents (44.16%). Similar results were also reported by Gowda et al (2011) and Ramalakshmidevi et al (2013)

Personal characteristics and level of adoption: Results revealed (Table 3) that twelve independent variables were taken together explained the variation to the extent of 68.60 percent, indicating that these variables were contributing to the adoption of rice production technology by 68.60 percent. Remaining 31.40 percent of the variation may be due to other variables which were not included in the study. The t-test of the significance indicated that coefficient of regression were highly significant for education (B=0.9709) and land holding (B=0.5992) and significant for economic motivation (B=0.1504). So it can be predicted that one unit change in the independent variable of education, land holding and economic motivation leads to corresponding change of 0.9709, 0.5992 and 0.1504, respectively in adoption level of sugarcane production technology. Other variable like material possession, farm power,, extension contact, mass-media exposure and socio-economic status were non- significant and exerted positive influence on the adoption level of sugarcane production technology. Variables like age, family size, scientific orientation and risk preference were negatively contributing to the adoption of rice production technology. The first two variables related to the education and land holding of the farmers while the third economic motivation was completely psychological. Hence, it was very important for extension officials to

modify these variable in a manner so that farmers could be able to increase their adoption level of improved sugarcane production technology. Similar findings were reported by *Sheriff (2006)*.

Constraints in adoption: Non-availability of labour during peak operations was the most important constraint reported by 80.33 per cent of the respondents. Labour become increasingly scarce for agricultural operations, more so in case of sugarcane crop for which trained labour are required. Seventy five percentages of respondents opined that non availability of machinery like planters and harvesters. Occurrence of heavy weed growth ranked as the second important constraint by 67.5 per cent of the respondents. Weed growth was considered as one of the main factors responsible for declining rice yield in these areas. In addition, lack of knowledge, non-availability of weed control chemicals and equipment, high cost of inputs, lack of trained labour were the main reason for non-adoption of recommended weed management technologies.

Non-availability of suitable high yielding varieties was the most important constraint reported by 65.0 per cent of the respondents. High yielding variety seeds were reportedly not available in time. Besides these were also not available in adequate quantity to fulfill their needs. The cost of sugarcane seed material was very high due to high production cost and non-availability of subsidy.

Heavy pest and disease incidence was an important constraint mentioned by 50.83 per cent of the respondents. Some of the respondents faced heavy damage due to early shoot borer, whip smut and red rot in their crop. High cost of the high yielding variety seeds was expressed as a constraint by 45.33 per cent of the respondents. Most of the respondents reported that they were not having proper seed material for future use. It was also found that limited quantity of high yielding variety seed material produced and marketed by the Sugar cane Research station at Anakapalle and were priced higher. Most of the respondents thought that the adoption of new practices required specialized skills and knowledge, new implements and more labour.

High cost of inputs as a constraint was expressed by 60.00 per cent of the respondents. In addition sometimes due to shortage of input, the traders were selling their inputs at high cost. *Veeraswamy et al. (2003)* reported similar constraints perceived by the farmers of Orissa. Lack of reasonable support price was reported by 50.83 per cent of the respondents.

Lack of conviction in new technology was expressed by 35.00 per cent of the respondents.

Most of the respondents were not convinced about the merits of some of the costly sugarcane technologies and did not adopt them as they were unsure of proportionate increase in production. Lack of awareness and knowledge about certain sugarcane technologies was the response given by 46.66 per cent of the respondents with regards to adoption of recommended sugarcane technologies in their farm.

Weak extension activities at village level were reported by 62.5 per cent of the respondents. At present only mandal level Agricultural extension officers are present, for every information they have to visit the office at mandal head quarters. The respondents reported that the personnel of the State Department of Agriculture were not taking adequate efforts to create awareness among various sections of the respondents regarding sugarcane technologies stating reason of Sugar factories of the vicinity would look after it, however the sugar factory doesnot have sufficient staff to cater the extension needs of farmers.

Lack of competitive market for sugarcane as a constraint was expressed by 68.33 per cent of the respondents. The entire farming community in the study area depended on Sugar factory for the purchase of their produce. Due to the absence of competitive market, farmers sell their produce for lower price. Insufficient training programmes reported by 40.00 per cent of the respondents caused misunderstanding on actual potential and utility of the recommended practices. Lack of transport facilities was reported by 29.17 per cent of the respondents. A large number of farmers who live in interior villages spend more money on transport of their produce to reach sugar factories. Similar constrains of Sugarcane cane production also reported by Rama Rao (2012).

4. Conclusion

Majority of the farmers showed low level of overall adoption of recommended technology. Use of machinery, recommended plant population and use of trico-cards for control of early shoot borer, set treatment with fungicides, weedcide applications, use of high yielding varieties and timely harvests were not adopted by the majority of the farmers. 'Non availability of high yielding varieties', High cost of labour', Non availability of machinery like planters and harvesters' 'Lack of conviction in the new technology' and 'Weak extension activities at the village level were the major constraints faced by the farmers. Therefore, it was necessary to intensify the extension efforts to increase their

knowledge level and adoption of recommended rice technologies, which would help in increasing the yield of sugarcane at farm level.

References

[1]. Anonymous 2011, Hand book of Statistics Vizianagaram district – 2012: p - 71

[2]. Gowda, T.A., Babu, C.R., Naidu, G.R and Rao, V.S. 2011. Profile characteristics of sugarcane growers in Mandya district of Karnataka. The Andhra Agricultural Journal. 58(2) :236-239

[3]. Panse, V.G and Sukhatme, P.V. 1978. Statistical Methods for Agricultural Workers. ICAR. New Delhi. Pp,199-211.

[4]. Ramalakshmidevi, S. Satyagopal, P. V., Sailaja V. and Prasad S.V. 2013 Extent of Adoption and its Influence on Impact Indicators of Sugarcane Production Technologies International journal of science research 2 (12): 10-13

[5]. Rama Rao I.V.Y 2012 Efficiency, Yield Gap and Constraints Analysis in Irrigated vis-a-vis Rainfed Sugarcane in North Coastal Zone of Andhra Pradesh. Agricultural Economics Research Review Vol. 25(1): 167-171.

[6]. Rao, S.R. 2006. The booklet on 'About North Coastal Zone' Regional Agricultural Research Station (RARS), Acharya NG Ranga Agricultural University, Anakapalle, pp.2-3

[7]. Roy, S. 2005. A study on the sustainability of Sugarcane cultivation in Vishakhapatnam district of Andhra Pradesh. Ph.D. (Ag.) Thesis submitted to Acharya N G Ranga Agricultural University, Hyderabad

[8]. Sheriff, A.K. (2006). Sustainable agriculture appropriate of Homestead farming in Kerala. Unpub. Ph. D. Thesis, Annamalai University, Tamil Nadu.

[9]. Veerasamy. S., Satpathy.C. and Rao G.A. (2003). Constraints of Rice production in Orissa. Indian J Ext. Edu. **33** (142) : 58-63.

Table 1. Distribution of respondents according to the overall adoption of recommended Sugarcane production technologies (N=120)

Adoption Level	N	%age
Low	53	44.17
Medium	45	37.50
High	22	18.33

Table 2. Adoption of recommended Sugarcane production technologies.(N=120)

Recommended technologies	N	percentage
Suitable high yielding varieties	34	28.33
Optimum seed rate	45	37.50
Proper planting material (sets from 6 months aged cane)	49	40.83

Set treatment with fungicides	33	27.50
Weedicide application	38	31.66
Optimum spacing of 60 cm between rows	59	49.17
Recommended plant population	21	17.50
Earthing up practice	91	75.83
Pest disease management	53	44.16
Use of tricho cards for control of early shoot borer	21	17.50
Maintaining optimum Plant population	51	42.50
Propping and supporting	98	81.66
Recommended dose of manures and fertilizer application	57	47.50
Proper ratoon management	41	34.16
Use of machines for intercultivation and harvesting	6	5.00
Timely harvesting	37	30.83

Table 3. Multiple regression coefficients of socio-personal and psychological traits.

S. No.	Socio-personal & Psychological traits	Regression Coefficient	t-value
1.	Age	- 0.050	- 0.96
2.	Education	0.970**	7.22
3.	Family size	- 0.220	- 0.32
4.	Land holding	0.599**	2.93
5.	Material Possession	0.023	0.27
6.	Farm Power	0.067	0.86
7.	Scientific Orientation	- 0.083	- 0.88
8.	Social-Economic Status	0.054	0.48
9.	Mass Media Exposure	0.046	0.65
10.	Extension Contact	0.112	1.58
11.	Economic Motivation	0.150	2.11
12.	Risk Preference	- 0.085	- 0.99

* Significant at 0.05 level of probability

**Significant at 0.01 level of probability $R^2 = 0.686$

Table 4. Constraints faced by the farmers in adoption of rice production technologies (N=120)

Constraints	N	%age	Rank
Bio-physical constraints			
Non-availability of suitable high yielding varieties	78	65.00	II
High cost of HYV seeds	54	45.33	V
Complexity of new practices	58	48.33	IV
Heavy weed growth	81	67.50	I
Pest and disease incidence	61	50.83	III

Socio-economic constraints			
High cost of inputs	72	60.00	II
High cost and scarcity of labour	97	80.33	I
Non-availability of trained labour	65	54.17	III
Technological constraints			
Lack of awareness of technologies	56	46.66	II
Lack of conviction	42	35.00	III
Non-availability of sugarcane planters, harvesters and intercultivation machines	91	75.83	I
Institutional constraint			
Weak extension at village level	75	62.5	III
Insufficient training programmes	48	40.00	V
Lack of competitive market	82	68.33	I
Lack of transport facilities	35	29.17	VI
Non-availability of institutional credit facilities	81	67.5	II
Lack of subsidy for inputs	69	57.50	IV

A Brief Author Biography of Authors:

First author	Name	G.S. Roy	
	Academic Qualifications	BSc (Ag.)	Andhra Pradesh Agricultural University
		MSc(Ag.) Agril. Extension	Acharya N.G Ranga Agricultural University
		Ph D, Agril. Extension	Acharya N.G Ranga Agricultural University
	Professional Experience	Scientist (TOT)	Krishi Vigyan Kednra, RK Bai, Vizianagarm District, ANGRAU, AP
		Scientist (TOT)	District Agricultural Advisory and Transfer of Technology Centre (DAATTC), Vizianagarm, ANGRAU, AP

Second author	Name	P. Gurumurthy	
	Academic Qualifications	BSc (Ag.)	Andhra Pradesh Agricultural University
		MSc(Ag.), Soil Science	Andhra Pradesh Agricultural University
		Ph D, Soil Science	Acharya N.G Ranga Agricultural University
	Professional Experience	Assistant Professor (Soil Science)	Agricultural College, Naira,Srikakulam District, ANGRAU, AP
		Senior Scientist (Crop Production) & Coordinator	District Agricultural Advisory and Transfer of Technology Centre (DAATTC), Vizianagarm, ANGRAU

Third author	Name	P. Venkata Rao	
	Academic Qualifications	BSc (Ag.)	Andhra Pradesh Agricultural University
		MSc(Ag.) Agril. Extension	Andhra Pradesh Agricultural University
		Ph D, Agril. Extension	Acharya N.G Ranga Agricultural University
	Professional Experience	Scientist (TOT)	District Agricultural Advisory and Transfer of Technology Centre (DAATTC), Vizianagarm, ANGRAU, AP