RESEARCH PAPER	Agriculture	Volume : 4 Issue : 2 Feb 2014 ISSN - 2249-555X					
Stat OF Applica Provide the state	Technological Knowledge and Adoption Behaviour of Sugarcane Growers of Surguja District, Chattisgarh, South East Central India						
KEYWORDS	Sugarcane, Extension, Farming technology, Cultivation, Knowledge, Adoption, Behaviour, Farmers						
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Professor. Department Gandhi Kr	t of Agricultural Extension. Indira ishi Vishwavidyalaya.	Research scholar. Department of Agricultural Extensior Indira Gandhi Krishi Vishwavidyalaya. Raipur 492012. * is correspondent author					
ABSTRACT The present study was conducted in six sugarcane growing villages of Surgaja district and data were collected from 130 respondents through interview scheduled during 2009-10. The result reveals that the maximum irrigated area was under badi/ upland situation which is best and suitable for sugarcane cultivation. The overall extent of knowledge and adoption level of respondents towards production technology had medium level. Maximum and high level							

knowledge and adoption level of respondents towards production technology had medium level. Maximum and high level of technological gap was zinc sulphate application followed by compost use, disease and pest control, wrapping of plant and soil treatment. The traditional attitude, lack of technical knowledge of respondents, grazing by domestic and wild animal, lack of marketing facilities, wrong application of insecticide and severe problem of termite was the major problems of sugarcane cultivation.

Introduction

India is one of the most promising sugarcane producing countries in the world. In Surguja district, sugarcane production area is very limited (724ha) in pervious decade, but recently some of the blocks of district increasing and farmers adopt as commercial crop under upland farming situation. Although enough viable and adoptive technologies have been developed but many of these have not reached to the growers level. Moreover, they are unaware of the technology available and properly not adopted. Hence, the present research study was under taken with the following two objectives:

- To study the socio-economic attributes of respondents and their level of Knowledge and adoption of sugarcane production technology.
- To find out the adoption gap between recommended technology and actual adoption level of sugarcane crop among the respondents.

Materials and Methods

Out of total 19 blocks of Surguja districts, Surajpur, Pratappur & Lundra blocks were randomly selected, due to having maximum sugarcane area. Two sugarcane growing villages of each blocks and total six villages were randomly selected i.e., Kalyanpur (V1), Podipa (V2), Khadganwa (V3), Kerta (V4), Batwahi (V5), Lamgaon (V6). A list of sugarcane growers of each selected village was prepared and 20% of total sugarcane growers were randomly selected. Finally 130 sugarcane growers had considered as respondents and data was collected through interview scheduled during 2009-10. This particular study was the very first of its kind in Chhattisgarh.

Results and Discussions Socio-economic attributes

study indicates that the maximum per cent of respondents were belonging under young age group, up to higher secondary school certificate level of education, scheduled tribe caste, joint family system, male dominated population having small size of land holding, no social participation in any organization, low level of contact with extension personal, medium level of sugarcane growing experience and obtained sugarcane seed from own village. The occupied area of respondents have maximum percentage in low land bundhed farming situation in total but having maximum percent of irrigated area was under badi/upland situation which is best and suitable for sugarcane cultivation (Anon., 2003).

Sugarcane production technology knowledge

The data presented in Table -1 indicated that majority, 66.93 percent of respondents were belonging under medium level of sugarcane production technology knowledge followed by high level (17.69%) and low level of technical knowledge (15.38%). Maximum percentage (72.73%) medium level of knowledge respondents had observed under marginal size of land holding. The overall level of knowledge of respondents and their size of landholding was found non significant. Among 12 practices of sugarcane production knowledge level of respondent were observing in high level extent of knowledge (76-100%) under land preparation (92.30%) followed by harvesting (88.84%), earthing of sugarcane plant field (84.80%) and irrigation schedule (80%). Similarly, under medium level of knowledge (51-75%) of respondent were found under sowing time (71.92%) followed by method of sowing (67.50%), Nitrogen application (64.61%), phosphorous (64.23%), seed treatment (63.65%), compost application (60.38%), soil treatment (60%), wrapping of plant (58.84%) and improved seed (56.11%). In category of low level of knowledge (0-50%) respondents were observing under the practices as weed control (48.84%) followed by insect control (46.34%), Potash application (39.23%) and disease control (38.65%). The overall technical knowledge of respondents was observed as medium level (62.24%). About 38 percent overall technical knowledge gap may be required for minimising through training and demonstration to the growers.

Sugarcane production technology Adoption

Majority (73.85%) of respondents were belonging under medium level of adoption in overall technology followed by low level (13.85%) and high level (12.30%) of adoption (Table- 1). The overall trend of adoption of each categories of size of holding was similarly observed and no significant variation was found Maximum score (776) was observed under semi-medium level of adoption followed medium level (650), low level (545), Nil level (329) and high level (85). High level of adoption among respondent were observing under land preparation (7.6.5%) practice only. Medium level of extent of adoption of technology among respondents had harvesting (74.04%), followed by earthing (64.42%), sowing time (63.27%), method of sowing (59.04%), seed treatment (54.42%), Irrigation (54.04%), phosphorous application (52.3%), improved seed (50.38%) and nitrogen application 50.19 percent respectively. Incase of semi medium level adoption (26-50%) of respondents was notice under weed control followed by soil treatment, wrapping, insect and dis-

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Volume : 4 | Issue : 2 | Feb 2014 | ISSN - 2249-555X

ease control. In low level of extent of adoption (1-25%) of respondents was observed under potash application followed by compost/FYM and zinc sulphate application in sugarcane. The overall extent of adoption of sugarcane practices was fair as 45.44 percent .Similar finding were also observed by Wasnik (1995). Hence, technological improvement should be popularised and there is a need to develop extension linkage in the study area. Adoption gap in different practices of sugarcane cultivation of respondents have been found in similar results on expected & observed score i.e., (0-100). High level of adoption gap of respondents were recording in zinc sulphate application (85.38%) followed by compost application (84.65%), disease control (76.15%), potash application (74.61%), insect control(70%), wrapping of plants (54.61%) and soil treatments (51.53%) respectively incase of medium level of adoption gap of respondents observed in all practices except land preparation practices. The overall majority of respondent were belonging under medium level of adoption gap (58.93%) followed by high level of gap (37.35%) and low level of adoption gap (3.72%).

Table-1: Distribution of respondents and their	knowledge and adoption level wit	h technological gap under different prac-
tices of sugarcane cultivation.		

S. No Practice tailed Score Net No Hark Score Net No High Score High Score Medium (c, 75) Low (c, 75) Medium (c, 75) Low (c, 75) Low (c, 75) Medium (c, 75) Low (c, 25) 2 Soil treatment 312 60.00 M4 181 34.81 C2 $\binom{67}{(5,13)}$ (d7.69) (c, 25) 3 Improved seed 297 57.11 M9 262 50.38 B2 $\binom{31}{(3,07)}$ (76.15) (00) 4 Sowing time 374 71.92 M1 329 63.27 B3 $\binom{04}{(20,17)}$ (76.15) (00) 03 5 Seed treatment 331 63.65 M5 283 54.42 B5 27 (10) (11) (11) (11) (10, 10) (11, 61) (0.76) 7 Application of FYM & fertilizer 71 10	S. No	Practice	Ob- tained Score	Knowl- edge %	Rank level	Ob- tained Score	Adoption %	Rank level	Technological gap		
Image: constraint of the second system of the second system of the second system of the system of									High	Medium	Low
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3 Improved seed 297 57.11 M9 262 50.38 B2 31 99 7 4 Sowing time 374 71.92 M1 329 63.27 B3 (3.84) (76.15) (00) 5 Seed treatment 331 63.65 M5 283 54.42 B5 (20.76) (76.92) (2.30) 6 Method of sowing 351 67.50 M2 308 59.23 B4 13 (10) (89.23) (0.76) 7 Application of FYM & fertilizer 110 (14.61) (0.76) (15.3) 6. Nitrogen 336 64.61 M3 261 50.19 B9 33 (73.07) (74.61) (23.0) 6. Phosphorous 334 64.23 M4 272 52.31 B7 (30.0) (73.07) (74.61) (23.0) 6. Potash 204 39.23 L3 123 23.65	2						34.81		(51.53)	(47.69)	(0.76)
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4 Sowing time 374 71.92 M1 329 63.27 $B3$ (0.47) 121 05 5 Seed treatment 331 63.65 M5 283 54.42 B5 27 (100) $(03,7)$ (2.30) 6 Method of sowing 351 67.50 M2 308 59.23 B4 13 $(116 - 01)$ (0.76) 7 Application of FYM & fertilizer (0.76) (2.30) (14.61) (0.76) (0.76) 8. Compost /FYM 314 60.38 $M6$ 83 15.96 $D2$ (14.61) (0.76) b. Nitrogen 336 64.61 $M3$ 261 50.19 $B9$ (23.07) (74.61) (2.30) c. Phosphorous 334 64.23 M4 272 52.31 $B7$ 30 00 d. Potash 204 39.23 L3 123 23.65	3	Improved seed	297	57.11	M9	262	50.38	B2	(23.84)	(76,15)	(00)
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6 Method of sowing 351 67.50 M2 308 59.23 B4 10 11 11 11 11 11 11 11 11 11 11 11 11 11 11 1									13	116	01
Application of FYM & fertilizer (10) (11)	6	Method of sowing	351	67.50	M2	308	59.23	B4	(10)	(80 23)	(0.76)
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a.b.c. <td>a</td> <td>Compost /FYM</td> <td>314</td> <td rowspan="2">60.38</td> <td rowspan="2">M6</td> <td rowspan="2">83</td> <td>15.96</td> <td>D2</td> <td>110</td> <td>19</td> <td>01</td>	a	Compost /FYM	314	60.38	M6	83	15.96	D2	110	19	01
b.Nitrogen33664.61M326150.19B9 $\stackrel{33.3}{(25.38)}$ 9502c.Phosphorous33464.23M427252.31B7 $\stackrel{30.2}{(25.38)}$ (73.07)(1.53)d.Potash20439.23L312323.65D1 $\stackrel{97}{(74.61)}$ (25.38)(0.00)e.Zinc sulphate17233.07L57213.85D3 $\stackrel{111}{(18.38)}$ (1.3.84)(0.76)8.Inter culturea.Weed control25448.84L120238.84C1 $\stackrel{64.61}{(46.92)}$ (52.30)(0.76)b.Earthing44184.80H333564.42B2 $\stackrel{07}{(75.38)}$ (11409(5.38)(B7.69)(6.92)(5.38)(B0.76)(3.84)10.Wrapping of plant30658.84M817934.42C3 $\stackrel{71}{(55.38)}$ (80.76)(3.84)11.Plant protectiona.Insect control24146.34L216331.54C4 $\stackrel{91}{(70.00)}$ $\stackrel{38}{(29.23)}$ 0112.Harvesting46288.84H238574.04B1 $\stackrel{02}{(15.33)}$ (31.79)(3.72)13.Total582.662.24M425245.44C $\stackrel{87}{(37.35)}$ (37.9)(37.2)							13.70		(84.61)	(14.61)	(0.76)
Integen<	h	Nitrogen	336	64.61	M3	261	50.19	B9	33	95	02
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c.InterpretedsSet </td <td>C</td> <td>Phosphorous</td> <td rowspan="2">334</td> <td rowspan="2">64.23</td> <td rowspan="2">M4</td> <td rowspan="2">272</td> <td rowspan="2">52.31</td> <td rowspan="2">B7</td> <td>30</td> <td>9</td> <td>03</td>	C	Phosphorous	334	64.23	M4	272	52.31	B7	30	9	03
d. Potash 204 39.23 L3 123 23.65 D1 97 33 00 e. Zinc sulphate 172 33.07 L5 72 13.85 D3 111 18 01 8. Inter culture 172 33.07 L5 72 13.85 D3 111 18 01 8. Inter culture 254 48.84 L1 202 38.84 C1 61 68 01 (0.76) b. Earthing 441 84.80 H3 335 64.42 B2 07 114 09 (6.92) 9. Irrigation 416 80.00 H4 281 54.04 B6 20 105 05 (3.84) 10. Wrapping of plant 306 58.84 M8 179 34.42 C3 71 (42.30) (3.07) (3.07) 11. Plant protection 241 46.34 L2 163 31.54 C4 91 38 01 (29.23) (0.76)	C.	i nosphorous							(23.07)	(74.61)	(2.30)
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e. Zinc sulphate 172 33.07 L5 72 13.85 D3 111 (85.38) 18 (13.84) 01 (0.76) 8. Inter culture	u.		204	57.25		123	23.05		(74.61)	(25.38)	(0.00)
e. 2.11c supprate 172 33.07 13 72 13.03 103 (85.38) (13.84) (0.76) 8. Inter culture Weed control 254 48.84 L1 202 38.84 C1 61 68 01 (0.76) b. Earthing 441 84.80 H3 335 64.42 B2 07 114 09 (6.92) 9. Irrigation 416 80.00 H4 281 54.04 B6 20 105 05 (3.84) 10. Wrapping of plant 306 58.84 M8 179 34.42 C3 71 55 04 (11. Plant protection 241 46.34 L2 163 31.54 C4 91 38 01 (0.76) a. Insect control 241 46.34 L2 163 31.54 C4 91 38 01 (0.76) (0.76) (0.76) (0.76) (0.76) (0.76) (0.76) (0.76) (0.76) (0.76) (0.76)<		Zine culphoto	172	22.07	15	72	12.95	2	111	18	01
8. Inter culture a. Weed control 254 48.84 L1 202 38.84 C1 61 (46.92) 68 (52.30) 01 (0.76) b. Earthing 441 84.80 H3 335 64.42 B2 07 (5.38) 114 09 (87.69) (6.92) 9. Irrigation 416 80.00 H4 281 54.04 B6 20 (15.38) 105 05 10. Wrapping of plant 306 58.84 M8 179 34.42 C3 71 (54.61) 55 (42.30) 04 (3.07) 11. Plant protection 241 46.34 L2 163 31.54 C4 91 (70.00) 38 (29.23) (0.76) b. Disease control 201 38.65 L4 140 27.12 C5 99 (76.15) 30 (23.07) 01 (0.76) 12. Harvesting 462 88.84 H2 385 74.04 B1 02 (1.53) (85.38) (13.07) 12. Harvesting 462 88.84 H2 385 74.04 B	e.		172	33.07	LJ	12	13.05	03	(85.38)	(13.84)	(0.76)
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b.Earthing44184.80H3335 64.42 B2 07 (5.38) 114 (87.69) 09 (6.92)9.Irrigation41680.00H4 281 54.04 B6 20 (15.38) 105 (80.76) 05 (3.84)10.Wrapping of plant 306 58.84 M8 179 34.42 $C3$ 71 	a.	Weed control	254	48.84	L1	202	38.84	C1	61	68	
b.Earthing44184.80H3335 64.42 B2 07 114 09 9.Irrigation41680.00H4281 54.04 B6 20 105 05 10.Wrapping of plant306 58.84 M8 179 34.42 C3 71 55 04 11.Plant protectiona.Insect control241 46.34 L2 163 31.54 C4 91 38 01 b.Disease control201 38.65 L4 140 27.12 C5 99 30 01 12.Harvesting 462 88.84 H2 385 74.04 B1 02 111 17 Total 5826 62.24 M 4252 45.44 C 874 1379 87 (3.72)			-						(46.92)	(52.30)	(0.76)
P. Irrigation 416 80.00 H4 281 54.04 B6 20 (15.38) (87.69) (80.76) (6.92) (3.84) 10. Wrapping of plant 306 58.84 M8 179 34.42 C3 71 (54.61) 55 (42.30) 04 (3.07) 11. Plant protection 241 46.34 L2 163 31.54 C4 91 (70.00) 38 (29.23) 01 (0.76) b. Disease control 201 38.65 L4 140 27.12 C5 99 (76.15) 30 (23.07) 01 (0.76) 12. Harvesting 462 88.84 H2 385 74.04 B1 02 (1.53) (23.07) (0.76) 12. Total 5826 62.24 M 4252 45.44 C 874 (37.35) 1379 (58.93) 87 (3.72)	b.	Earthing	441	84.80	НЗ	335	64.42	B2	07	114	09
9. Irrigation 416 80.00 H4 281 54.04 B6 20 105 05 10. Wrapping of plant 306 58.84 M8 179 34.42 C3 71 55 04 11. Plant protection 241 46.34 L2 163 31.54 C4 91 38 01 b. Disease control 201 38.65 L4 140 27.12 C5 99 30 01 12. Harvesting 462 88.84 H2 385 74.04 B1 02 111 17 15.38 179 45.24 45.44 C5 99 30 01 01 12. Harvesting 462 88.84 H2 385 74.04 B1 02 111 17 (15.39) (28.23) (13.07) (3.07) (13.07) (3.07) (3.07) (3.07) 12. Harvesting 462 88.84 H2 385 74.04 B1 02 111 17 </td <td></td> <td>20.09</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>(5.38)</td> <td>(87.69)</td> <td>(6.92)</td>		20.09							(5.38)	(87.69)	(6.92)
Indextern	9	Irrigation	416	80.00	H4	281	54.04	B6	20	105	05
10. Wrapping of plant 306 58.84 M8 179 34.42 C3 71 55 04 11. Plant protection		lingution							(15.38)	(80.76)	(3.84)
Interprise of plant Correction Interprise of plant Correction Interprise of plant Int	10	Wrapping of plant	306	58.84	M8	179	34.42	C3	71	55	04
11. Plant protection a. Insect control 241 46.34 L2 163 31.54 C4 91 38 01 b. Disease control 201 38.65 L4 140 27.12 C5 99 30 01 12. Harvesting 462 88.84 H2 385 74.04 B1 02 111 17 (15.3) (85.38) (13.07) 13.07) 13.07) 13.07) 13.07)	10.		000	00.01	1010		01112		(54.61)	(42.30)	(3.07)
a. Insect control 241 46.34 L2 163 31.54 C4 91 38 01 b. Disease control 201 38.65 L4 140 27.12 C5 99 30 01 12. Harvesting 462 88.84 H2 385 74.04 B1 02 111 17 (1.53) (85.38) (13.07) 13.07) 87 13.07) 87 Total 5826 62.24 M 4252 45.44 C 874 1379 87	11	Plant protection									
a. Insect control 241 46.34 L2 163 31.54 C4 91 38 01 b. Disease control 201 38.65 L4 140 27.12 C5 99 30 01 12. Harvesting 462 88.84 H2 385 74.04 B1 02 111 17 (1.53) (85.38) (13.07) 13.07) 13.07) 13.07) 13.07)	L		1	<u>Γ</u>		1				1	1
Disease control 201 38.65 L4 140 27.12 C5 99 30 01 12. Harvesting 462 88.84 H2 385 74.04 B1 02 111 17 Total 5826 62.24 M 4252 45.44 C 874 1379 87 (37.35) (58.93) (3.72) 02 1379 87	a	Insect control	241	46.34	12	163	31 54	C4	91	38	01
b. Disease control 201 38.65 L4 140 27.12 C5 99 30 01 12. Harvesting 462 88.84 H2 385 74.04 B1 02 111 17 (1.53) (85.38) (13.07) (13.07) (13.07) (13.07) Total 5826 62.24 M 4252 45.44 C 874 1379 87 (58.93) (3.72) (3.72) (3.72) (3.72) (3.72) (3.72)	u.		L T I		<u> </u>	100	51.54	0.	(70.00)	(29.23)	(0.76)
D. Disease control 201 30.05 L4 140 27.12 C5 (76.15) (23.07) (0.76) 12. Harvesting 462 88.84 H2 385 74.04 B1 02 111 17 Total 5826 62.24 M 4252 45.44 C 874 1379 87 (37.35) (58.93) (3.72) (3.72) (3.72) (3.72)	h	Disease control	201	38.65	11.4	1/0	27 12	C5	99	30	01
12. Harvesting 462 88.84 H2 385 74.04 B1 02 (1.53) 111 (85.38) 17 (13.07) Total 5826 62.24 M 4252 45.44 C 874 (37.35) 1379 (58.93) 87 (3.72)	<u>р.</u>		201	55.05			27.12		(76.15)	(23.07)	(0.76)
Total 5826 62.24 M 4252 45.44 C 874 (37.35) 1379 (58.93) 87 (3.72)	12.	Harvesting	462	88.84	H2	385	74.04	B1	02	111	17
Total 5826 62.24 M 4252 45.44 C 874 (37.35) 1379 (58.93) 87 (3.72)									(1.53)	(85.38)	(13.07)
101 101		Total	5826	62.24					874	1379	87
			1020	02.24		7232			(37.35)	(58.93)	(3.72)

Conclusion

Study can be concluded that the overall extent of knowledge of sugarcane of respondents had under medium level and overall extent of adoption level was also similar. Maximum and high level of technological gap among sugarcane growers had under zinc sulphate application followed by compost application, disease control, Potash application, insect control, wrapping of plant and soil treatment. Under medium level of adoption gap majority of respondents were observed in all practices of sugarcane cultivation, except land preparation. The overall majority of respondents were belonging under medium level of adoption gap followed by high level and low level of adoption gap.

Future suggestions

For minimizing the adoption gap of sugarcane technology among respondents of study area, increasing the technical knowledge and changing the traditional attitude of farmers through training – demonstration and enhancing the social participation of respondents and activating the extension system. Minimize the grazing problem and facilitate the marketing of sugarcane by the opening of sugar factory of study area.

Acknowledgement

I express my heartfelt gratitude, respect and indebtedness to Prof. Dr. P.K. Jaiswal for allowing me to be a part of this study.



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