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Technological adoption behavior of sugarcane cultivators in flood affected area

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Abstract **-** The study was undertaken in year 2014-2015 indicates that all the sugarcane cultivators were completely adopted the practices like soil, mature sugarcane sets of 9-11 month age. All sugarcane cultivators obtained sometimes information from their relatives followed by friends. There were complete adoption of recommended practices like ridges and furrows method of planting as well as irrigation method, application of FYM, broadcasting method fertigation, fertilizer application. Lack of tolerant variety of sugarcane and unavailability of sugarcane sets in time due to failure of transportation facility in flood was the constraints faced by all sugarcane cultivators. The constraint like *adsali* season is not possible.

Key words **- Adoption, Flood affected area and Sugarcane**

I . INTRODUCTION

Sugarcane is major commercial crop of the country and occupies 5.05 m ha area. According to the Department of Agriculture, Cooperation and Farmers welfare, area under sugarcane crop in 2017-18 was 49.71 lakh hectares in India which is almost similar to that of last 2016-17 (45.64 lakh ha). Similarly, Maharashtra, have a 9.18 lakh ha area during same year. Kolhapur district is said to be a major sugarcane growing district having 1,46,295 ha area and average productivity 93.2 t/ha. Sugarcane is a suitable crop for Maharashtrian 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 [1]. Sugarcane is a long duration crop and faces various problems and natural calamities like flood.

Flood during rainy season responsible for reduced cane 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. During the rainy season, plants could suffer from both flood and drought during a single rainy season. Furthermore, changing from sugarcane field to sugarcane production may increase the flood risk and cause problems for cane growers. Sugarcane has four growth phases: germination and emergence, tillering and canopy establishment, grand growth and maturation or ripening may increase the flood risk and cause problems for cane growers [2], particularly in the Kolhapur district of Maharashtra during the rainy season. The conditions prevailing in this region are an example of such an extreme environment since the highly water-saturated soils exclude oxygen, one of the fundamental requirements for plant life. Oxygen starvation in these soils arises from an imbalance between the slow diffusion of gases in water compared with air and the rate that oxygen is consumed by micro-organisms and plant roots [3]. Various sugarcane technologies were adopted by farmers to obtain the higher yield of sugarcane crop. Therefore, this study was undertaken to study the sugarcane technology in flood affected area by farmers and to obtain the constraints faced and suggestions made by the farmers.

II. METHODOLOGY

The study is conducted in Shirol and *Hatkanangle tahsils* of *Kolhapur* district. In all 11 villages from *Shirol* and *Hatkanangle tahsils* were selected randomly. From these selected villages, 10 sugarcane cultivators from each village were selected randomly. The sugarcane cultivators were interviewed with the help of structured interview schedule personally. In all 110 sugarcane cultivators were interviewed for this study. The adoption of sugarcane technologies was studied. The constraints in adoption of technologies and suggestions of sugarcane cultivators were also studied. 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.

III. RESULTS AND DISCUSSION

1. Sources of information: The various sources of information through Personal, Group and Mass contact methods are given in Table 1. The data indicated that half per cent and more than half per cent of sugarcane cultivators were always obtaining information through Agril. Assistant of Agril. University and Agril. Assistant of state department respectively. Sugarcane cultivators were always obtained information from agricultural exhibitions (07.27 per cent) agricultural publications (08.18 per cent) while more than half per cent of sugarcane cultivators sometimes obtained information from radio, television, newspapers, agricultural publications and agricultural exhibitions.

Table 1. Distributions of sugarcane cultivators in flood affected area according to the sources of information.

Sr	Sources of information	Sugarcane cultivators (n=110)		
		Always	Sometimes	Never
A	**Personal contact method**			
1	Agril. Asstt. of Agril. University	55 (50.00)	24 (21.82)	31 (28.18)
2	Agril. Asstt. of state department	60 (54.55)	28 (25.45)	22 (20.00)
3	Gram sevak	29 (26.36)	55 (50.00)	26 (23.64)
4	Agril. Supervisor	02 (01.82)	81 (73.64)	27 (24.54)
5	Agril. officer	--	79 (71.82)	31 (28.18)
6	Relatives	--	110 (100.0)	--
7	Friends	08 (07.27)	102 (92.73)	--
8	Progressive farmers	30 (27.27)	80 (72.73)	--
9.	Local leaders	29 (26.36)	59 (53.64)	22 (20.00)
10	Scientists from Agril. University	30 (27.27)	73 (66.36)	07 (06.37)
B	**Group contact method**			
1.	Crop demonstrations	35 (31.82)	17 (15.45)	58 (52.73)
2.	Subject Matter Specialists	09 (08.18)	94 (85.45)	07 (06.37)
3.	Farm visit	08 (07.27)	102 (92.73)	--
4.	Study tour	92 (83.64)	10 (09.09)	08 (07.27)
C	**Mass contact method**			
1.	Radio	19 (17.27)	91 (82.73)	--
2.	Television	16 (14.54)	91 (82.73)	03 (02.73)
3.	Newspapers	46 (41.82)	59 (53.64)	05 (04.54)
4	Agril. Publications	(08.18)		
5.	Agril. Exhibitions	08 (07.27)	55 (50.00)	47 (42.73)
6.	Farmers rallies	55 (50.00)	29 (26.36)	26 (23.64)

(Figures in Parenthesis indicates percentages)

2. Adoption : The data from the Table 2 revealed that all the sugarcane cultivators were completely adopted the practices like soil, mature sugarcane sets of 9-11 month age, ridges and furrows method of planting as well as irrigation method, application of FYM, broadcasting method fertigation, fertilizer application at various time of sugarcane crops viz; at time of planting, 10 % recommended dose of N, 6-8 weeks after planting, 12 to 16 weeks after planting and at earthing up but very few per cent of sugarcane cultivators were partially adopted the total recommended dose of fertilizers[4].

Table 2. Distributions of sugarcane cultivators in flood affected area according to the adoption.

Sl	Technologies	Adoption (n=110)		
		Complete	Partial	No
1.	**Soil** i. Medium	-	-	110 (100.00)
	ii.Deep	110 (100.00)	-	-
2.	**Planting season** Adsali (15 July- 15 Aug)	-	04 (03.64)	106 (96.36)
	Preseasonal- (15Oct- 15 Nov)	106 (96.36)	-	04 (03.64)
	Suru (15-Dec- 15 Feb)	-	-	110 (100.00)
3.	**Selection of seed material** Mature (9-11 months)	110 (100.00)	-	110 (100.00)
	Immature (Below 9 month)	-	-	110 (100.00)
	Over mature (Above 11 month)	-	-	110 (100.00)
4.	**Selection of seed sets** Single eye bud	-	-	110 (100.00)
	Two eye bud	96 (87.27)	-	14 (12.73)
	Three eye bud	14 (12.73)		96 (87.27)
	Seedlings in polythene bag	-	-	110 (100.00)
5	**System of planting** Ridged & furrows	110 (100.00)	-	-
	Flat beds	-	-	110 (100.00)
	Trench method	-	-	110 (100.00)

	Paired row	-	-	110 (100.00)
6.	**Seed rate per hectare** Single eye bud- 12000 sets	-	-	110 (100.00)
	Two eye bud- 10000 sets	96 (87.27)	-	14 (12.73)
	Three eye bud- 8000 sets	14 (12.73)	-	96 (87.27)
7	**Seed treatment** a)Chemical-Bavistin+ Malathion	64 (58.18)	-	46 (41.82)
8.	**Selection of variety**			
	a) Adsali			
	i. CO-740	-	-	110 (100.00)
	ii.COM-88121 (Krishna)	-	-	110 (100.00)
	iii. CO-86032 (Nira)	04 (03.64)	-	106 (96.36)
	b**) Preseasonal**			
	i. CO-740	-	-	110 (100.00)
	ii. CO-7219 (Sanjivani)	-	-	110 (100.00)
	iii.COM-88121 (Krishna)	-	-	110 (100.00)
	iv.CO–8014 (Mahalakhsmi)	-	-	110 (100.00)
	v. CO-86032 (Nira)	106 (96.36)	-	04 (03.64)
	vi.CO-94012 (Phule savitri)	-	-	
	vii. COM 265	-	-	
	c) Suru			
	i. CO-419	-	-	110 (100.0)
	ii. CO-740	-	-	110 (100.0)
	iii. CO-7219	-	-	110 (100.0)
	iv. CO-7125	-	-	110 (100.0)
	v. COM 0265	-	-	110 (100.0)
	d**) use of tall variety**			
	i. Com-86032	110 (100.00)	-	-
	ii. Phule 265	-	-	110 (100.0)
9	**Water management** i. Ridges & furrows	110 (100.00)	-	-
	ii. Drip	-	-	110 (100.0)
	iii. Sprinkler	-	-	110 (100.0)
	iv. Raingun	-	-	110 (100.0)
10	**Fertilizer management** a) Organic fertilizer	110 (100.00)	-	-
	b) **Inorganic Fertilizers**			
	Adsali N:P : K (Kg/ha) Total 400 : 170 : 170	-	04 (3.64)	106 (96.36)
	Preseasonal N:P:K (Kg/ha) Total 340 : 170 : 170	98 (89.09)	08 (7.27)	04 (03.64)
	Suru N : P : K (Kg/ha) Total 250 : 115 : 115	-	-	110 (100.0)
	c) Time of fertigation			
	At planting -10 % of recommended dose of N & Half P + Half K	110 (100.00)	-	-
	6-8 weeks after planting- 40 % of recommended dose of N	110 (100.00)	-	-
	12-16 weeks after planting- 10 % of recommended dose of N	110 (100.00)	-	-
	At earthing up -40 % of recommended dose of N & Half P + Half K	110 (100.00)	-	-
11	**Use of micronutrients**			
	Ferrous sulphate	27 (24.55)	-	83 (75.45)
		27 (24.55)	-	83 (75.45)
	Zinc sulphate	27 (24.55)	-	83 (75.45)
		27 (54.55)	-	83 (75.45)
	Mangense sulphate			
	Borax			
12	**Methods of fertigation**			
	Broadcasting	110 (100.00)	-	-
	Drilling	-	-	110 (100.00)
	Microirrigation	-	-	110 (100.00)
	Crow bar	-	-	110 (100.00)
13	**Pest management**			
	White woolly aphids Control: *Conobathra aphidivera/ Crysoperla carni*	-	-	110 (100.00)
	White grub Control :Chloropyriphos	-	-	110 (100.00)
	. Army worm Control : Cypermethrin	-	-	110 (100.00)
14	**Production (t/ha)**			
	Adsali (156-200)	-	04 (03.37)	106 (96.36)
	Preseasonal (122-139)	25 (22.73)	81 (73.64)	04 (03.37)
	Suru (98-115)	-	-	110 (100.00)

3. **Constraints:** It is revealed from Table No 3 that all the sugarcane cultivators in flood affected area focused the constraints of lack of tolerant variety of sugarcane and unavailability of sugarcane sets in time due to failure of transportation facility in flood. Large majority (85.45 per cent) of sugarcane cultivators faced the constraints of late

harvesting of sugarcane in flood affected area by sugar factory. The reason quoted by the sugarcane cultivators behind the harvesting was of less recovery and also the growth of tillering from eye bud. The constraint like adsali season is not possible was faced by 78.18 per cent of sugarcane cultivators followed by lack of guidance regarding making of sugarcane seedlings in polythene bag (65.45 per cent) and Suru season is not possible due to less height of sugarcane crop during flood period (62.73 per cent).

Table No. 3 Distribution of sugarcane cultivator in flood affected area according to constraints faced by them

Sl.	Constraints	No. of sugarcane cultivators (n= 110)	Percentage
1	Lack of tolerant variety to standing water	110	100.00
2	Unavailability of sugarcane sets in time due to failure of transportation facility in flood	110	100.00
3	Late harvesting of sugarcane in flood affected area by sugar factory.	94	85.45
4	Adsali season is not possible due to flood	86	78.18
5	Lack of guidance regarding making of sugarcane seedlings in polythene bag	72	65.45
6	Suru season is not possible due to less height of sugarcane crop during flood period.	69	62.73

4. Suggestions : Suggestions made by sugarcane cultivators in flood affected area to overcome the constraints are tabulated in Table No. 4. It was observed from Table 4 that all the respondents suggested tall growing variety, tolerant variety to standing water should be evolve and technical guidance of making sugarcane seedling in polythene bags should require.

Table No. 4 Distribution of sugarcane cultivators in flood affected area according to suggestions made by them.

Sl.	Particulars	No. of sugarcane cultivators (n= 110)	Percentage
1	Introduction of tall growing variety.	110	100.00
2	Tolerant variety of sugarcane to flood should be evolve.	110	100.00
3	Technical guidance of sugarcane seedlings should require.	110	100 .00

IV. CONCLUSIONS

- All sugarcane cultivators obtained sometimes information from their relatives followed by friends (92.73 per cent).
- All the sugarcane cultivators were completely adopted the recommended practices of sugarcane.
- Lack of tolerant variety of sugarcane and unavailability of sugarcane sets in time due to failure of transportation facility in flood was the constraints faced by all sugarcane cultivators.
- The constraint like adsali season is not possible was faced by 78.18 per cent of sugarcane cultivators followed by lack of guidance regarding making of sugarcane seedlings in polythene bag (65.45 per cent) and Suru season is not possible due to less height of sugarcane crop during flood period (62.73 per cent).

Recommendation-As the adsali and suru season is not possible it is recommended that for adoption of pre seasonal planting of sugarcane in flood affected area the extension agency should organize the various extension programmes.

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