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## Impact of different farmers traits on the adoption of sugarcane production technology in western Uttar Pradesh

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### Abstract

Sugarcane is one of the important commercialized crops in India. This provides raw material to sugar industry. This crop has forward linkages to many other industries. The payment by the industry to the farmers provides consistent income to them. This has crucial role in their socio-economic development. Uttar Pradesh is the front runner in sugar cane and sugar production in India. The Hapur and Muzaffarnagar districts of Uttar Pradesh have been selected for collecting 200 samples. Twenty independent variables were chosen with seven sugarcane cultivators under modern practices. Six independent variables *viz.* education of farmer, extension contact, and exposure to media, proneness to change, profitability and know-how of technology was highly effective for bridging the gap in technology that showed actual production practices in vogue. Area of a particular district provides information about ground reality, input for the future development of the area.

**Keywords:** Sugarcane, technology gap, farmers, variables, coefficient of correlation

### Introduction

Sugarcane is an important commercial crop and the main source of the sugar production in the country. Sugarcane covers whole of the country among of which Uttar Pradesh accounts for a lion's share in area 47.97% and production (48.46%) as was in 2017-18. Productivity was 80.e T/ha. Uttar Pradesh is the country's largest sugarcane growing state. Total area under sugarcane cultivation was 27.40 lakh hectares (2020-21) in Uttar Pradesh. The production of sugar cane in 2020-21 was reported at 22.32 crore tones during the crushing season. With technological breakthrough and India's average productivity of 82.4 T/ha in spite of partial adoption of approved package of practices. Here present practices are compared with different farmer's traits in Hapur and Muzaffarnagar district of U.P. Sugarcane (*saccharum sp.*) was found as the main source of sugar in India. This also holds as prominent cash crop among the cash crops of India. Sugarcane is related to the family of genus *saccharum*, which is related to the family Gramineae. India is the second runner up just after the Brazil in terms of sugarcane production and productivity. Agriculture is an

important pillar of a developing economy. A large amount of population is still dependent on agriculture for their survival in the world. In the world sugar production the sugarcane accounts contributes around 80 percent, which is followed by sugar from sugar beet. Sugar component in the sugarcane stalk is around 11 to 16 percent fibre, 12 to 16 percent sugars, and around 70 percent water. The cultivation and production of sugarcane is important source of employment and livelihood in India. Around 50 million farmers and 3-5 lakh skilled and unskilled laborers are engaged in cultivation of sugarcane and sugar industries and its allied industries. In India, the sugarcane cultivation ranges from Punjab to Kanyakumri nevertheless Uttar Pradesh, Maharashtra, Tamil Nadu, Gujarat are major producers in India. India accounts about 18 percent of world's sugarcane production. Western Uttar Pradesh is considered as cane heart land of the state and socio economic condition of the western Uttar Pradesh is largely depend upon sugarcane production. Western part of the state forms the core of sugarcane production in the country. Amongst 38 farming systems prevalent in the

western Uttar Pradesh region, sugarcane–livestock–cereals–fodder has been found the major system being followed by a majority of the farmers.

**Materials and Methods**

The study was conducted in major sugarcane growing districts of western Uttar Pradesh. The present study was based on primary data collected from the famers of Simbhawali block from district Hapur and block Khatauli from district Muzaffarnagar. Two villages were selected randomly in each block whose total two hundred respondents (i.e., 20% of total sample) were selected through random sampling technique. Further, total 20 independent variables were chosen along with seven dependent variables among the package of adopted practices. Association between independent and dependent variables was tested through Pearson's coefficient of correlation as given below.

$$r = \frac{N\sum ZXY - (\sum X)(\sum Y)}{\sqrt{[N\sum ZX^2 - (\sum X)^2][N\sum Y^2 - (\sum Y)^2]}}$$

**Where,**

N = Number of observations being correlated.

$\sum XY$  = Sum of products x and Y

XY = the variables being correlated

$\sum X$  = Summation of overall the cell entries of the first variables.

$\sum Y$  = Summation of overall the cell entire soft hesecondvariables.

$\sum X^2$  = Sum of all squared value so feach cell of the firs variables.

$\sum Y^2$  = Sum of all squared values of each cell of the second variables.

The twenty independent variable were selected for the present study are given below (1) Age (2) Education (3) Family education (4) Socio-economic status (5) Social participation (6) Farm size (7) Faragmentation of holding (8) Farm pauer (9) Domestic material possession (10) Extension contact (11) Mass media exposure (12) Risk orientation (13) irrigation potential (14) investment orientation (15) Aspiration (16) Change proneness (17) profitability of technology (18) Practicability of technology (19) complexity of technology (20) Knowledge of technology.

**Table 1:** Association of farmers traits with technological gap of different practices of sugarcane

S. No.	Variables	Production R-values for technological gap of practices						
		Variety	Seed rate	Sowing operation	Fertilizer	Irrigation	Weed	Plant Protection
1.	Age	+0.049	+0.113	+0.30	+0.019	+0.008	+0.014	+0.04
2.	Education	-0.289**	-0.278**	-0.225*	-0.218*	-0.201*	-0.273**	-0.252*
3.	Family Education	-0.085	-0.015	-0.030	-0.130	+0.154	0.013	-0.053
4.	S.E.S. (Socio-Eco Status)	+0.061	0.109	0.017	0.092	-0.028	+0.19	-0.020
5.	Social Participation	-0.031	-0.045	-0.081	0.014	-0.012	-0.12	-0.058
6.	Farms Size	-0.278**	-0.249*	-0.117	-0.373**	0.041	-0.107	-0.020
7.	Fragmentation of holdings	-0.084	-0.030	-0.051	-0.082	-0.189	-0.004	-0.018
8.	Farm Power	-0.199*	-0.027	-0.205*	-0.213*	-0.275**	-0.219*	-0.158
9.	Domestic Material Possession	-0.190	0.040	-0.120	-0.380**	-0.275	-0.070	-0.057
10.	Extension contract	-0.251*	-0.211*	-0.275**	-0.305**	-0.141	-0.284**	-0.237**
11.	Mass Media Exposure	-0.201*	-0.281**	-0.208*	-0.251*	-0.249*	-0.240*	-0.280**
12.	Risk Orientation	0.022	-0.079*	-0.042	-0.107	-0.272**	0.091	-0.209*
13.	Irrigation Potential	-0.091	-0.080	-0.020	-0.009	-0.133	+0.038	0.129
14.	Investment Orientation	-0.254**	-0.283**	-0.218*	-0.258**	-0.002	-0.224*	-0.205*
15.	Aspiration	0.084	-0.079	-0.141	-0.102	-0.202	0.077	0.033
16.	Change Proneness	-0.198*	-0.223*	-0.221*	-0.203*	0.097	-0.213*	-0.271**
17.	Profitability of Tech.	-0.283**	-0.215*	-0.247*	-0.283*	-0.020	-0.217*	-0.281**
18.	Practicability of Tech.	-0.209*	-0.034	-0.038	-0.025	-0.213*	-0.097	-0.012
19.	Complexity of Tech.	+0.104	+0.079	+0.034	+0.122	-0.022	+0.088	+0.37
20.	Knowledge of Technology	-0.222*	-0.212*	-0.212*	-0.283**	+0.188*	-0.228**	-0.227*

\*Significantat0.05levelofsignificance

\*\*Significantat0.01levelofsignificance.

**Farmers Traits**

- X<sub>2</sub> Education
- X<sub>6</sub> Farm Size
- X<sub>8</sub> Farm Power
- X<sub>9</sub> Domestic Material Possessions
- X<sub>10</sub> Extension Contact
- X<sub>11</sub> Mass Media Exposure
- X<sub>12</sub> Risk Orientation
- X<sub>14</sub> Investment orientation
- X<sub>17</sub> Profitability of Technology
- X<sub>18</sub> Practicability of technology
- X<sub>19</sub> Complexity of technology

X<sub>20</sub> Knowledge of technology

**Results and recommendations**

Uttar Pradesh is the largest producer of sugarcane in India. Uttar Pradesh alone produced 45 percent of total sugarcane in India (2016-2017). Technological gap in sugarcane production technology in relation to its attributes are given in table showed that technological gap of sugarcane production varieties was negatively and significantly influenced by the independent variables as education of the farmers, farm size and power, extension contracts, mass-media exposure, investment orientation, change proneness,

profitability, practicability and knowledge of technology. An association between seed rate of test varieties and farm power as also utilization of technology was observed of 20 variables examined eight significantly influenced the technological gap for seed rate.

The negative but significant association of farmers' education, farm power, extension contact mass-media exposure, investment orientation, change proneness, profitability and knowledge of technology as planting know how was observed. These variables for assistance to the farmers in the coming following planting operation, as per recommendations which ultimately leads to reduction to the technological gap. The use of chemical fertilizers in sugarcane crop and its adoption was influenced by the farmers technical knowhow, farm size, farm power, extension contact, mass-media exposure, change proneness to change, 10 out of 20 variables could exert its influence on know how for fertilizer use in sugarcane crop.

The technological gap in application of irrigation and weed control showed the common negative and significant association. However, the investment orientation was negatively and significantly associated with weed control only and not irrigation as a practice. Similarly the farmers technological gap in plant protection was found negatively influenced by limited education and risk it was positively significant with the education of the farmers and complexity of technology with the irrigation, age of the farmers, family education and complexity of technology was positively associated while that remaining independent variable were found negatively significant with the technological gap in the irrigation. In case of sowing operation eight variables found negatively significant while that only two independent variables were found positively significant i.e. age of the farmers and complexity of technology. Therefore, to meet out technological gap in practices of sugarcane technology the work should be done on the significant independent variable like age and education of the farmers, size of farm, extension contact, media exposure, profitability of technology and knowledge of the technology.

### Conclusion

Results showed that out of 140 'r' values (20 independent and 7 dependent variables), 59 'r' values were significant. Basic technological gaps of practices noticed were variety and fertilizer (10 'r' values significant for each practice) seed rate, planting methods, weed control and plant protection (8 'r' values significant in each case) and irrigation (7 'r'-values significant). Further, it is also observed that extension contacts heavily influenced sugarcane production technology. Education was imperative for technological developments among farmers. Farmer education found significant among all the parameters of the technological gap. Mass media exposure also influenced significantly for adoption of sugarcane production technology. socio-economic status and social participation seemed non-significant among all the dependent variables. knowledge of technology was found as a key factor which is directly affected to all the variables like seed rate, sowing operation, fertilizer, irrigation, weed control and plant protection.

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