# A Study on the Relationship between Grower Characteristics and Adoption of Sugarcane Practices

Manish Mavaliya[1*], Dr. Jahanara[2], Balram Chopra[3]

[*1]M.Sc, Department of Agricultural Extension and Communication, Sam Higginbottom University of Agriculture, Technology & Sciences, Prayagraj, Uttar Pradesh, India
[2]Professor, Department of Agricultural Extension and Communication, Sam Higginbottom University of Agriculture, Technology & Sciences, Prayagraj, Uttar Pradesh, India
[3]Department of Agricultural Extension and Communication, Sam Higginbottom University of Agriculture, Technology & Sciences, Prayagraj, Uttar Pradesh, India
*Corresponding Author

Received:- 12 April 2025/ Revised:- 19 April 2025/ Accepted:- 27 April 2025/ Published: 30-04-2025


***Abstract—*** *The study was conducted in Sri Ganganagar district of Rajasthan, selecting Sri Ganganagar and Sri Karanpur tehsils due to their extensive sugarcane cultivation. With support from agriculture and revenue officials, five major sugarcane-growing villages from each tehsil were identified, totaling ten villages. A categorized list of small, marginal, and large farmers was prepared with help from village Patwaris and agricultural supervisors. From this, 120 sugarcane growers were randomly selected to serve as respondents for the investigation. The study found that 58.33per cent of respondents had a medium level of adoption, 25per cent had a high level, and 16.66per cent had a low level. The highest adoption was seen in practices requiring less expertise, such as recommended spacing (80.83per cent) and harvesting methods (80per cent). However, lower adoption was observed in seed treatment (38.33per cent) and soil treatment for disease prevention (36.67per cent). A significant positive relationship was found between annual income and landholding, while age, education, family type, and size showed no significant impact on adoption.*

***Keywords— Adoption levels, sugarcane farmers, recommended practices, correlation and factors influencing adoption.***

## I. INTRODUCTION

Agriculture is the backbone of the Indian economy, employing nearly two-thirds of the country's workforce and contributing 16.1per cent to the Gross Domestic Product (GDP). Despite a gradual decline in its share of GDP, agriculture remains vital due to its vast geographical coverage occupying around 43per cent of India's land area—and its role in ensuring food security, economic growth, and rural development. Among the diverse array of crops cultivated in India, sugarcane (*Saccharum officinarum* L.) holds a prominent position as one of the most significant commercial crops, with wide applications ranging from sugar production to bio-based industries. Contributes approximately 60per cent to the global sugar production, with India being one of the top producers. It is cultivated primarily in tropical and sub-tropical regions, making large parts of India including the northern plains and southern plateau ideal for its growth. It serves as a raw material for producing white sugar, jaggery (gur), and khandsari, and is also consumed directly through juice and chewing. The sugar industry, being a significant agro-based sector, contributes to employment, rural development, and foreign exchange savings. Over time, sugarcane has become a key cash crop, offering considerable economic opportunities to Indian farmers. Historically, the productivity of sugarcane in India has shown a steady increase from 56 tonnes per hectare in 1950–51 to 74.4 tonnes per hectare in 2017–18 due to advancements in production technologies, improved varieties, and better agronomic practices. Despite these gains, the actual yields are still far below the potential yield, which is more than double the current national average of 5.82 tonnes/ha. The yield gap is attributed to various constraints including climatic variability, suboptimal adoption of modern technologies, poor pest and disease management, inefficient marketing systems, and socio-economic challenges. A notable concern is the limited adoption of the recommended package of practices developed by research institutes. While extensive research has generated viable and productive sugarcane technologies, many innovations remain confined to research stations, with minimal transfer to the field level. This gap between technology development and adoption is particularly evident in states like Rajasthan, where sugarcane cultivation though geographically suitable and productive in districts such as Sriganganagar,

Bundi, and Chittorgarh faces numerous agronomic and institutional challenges. For sustainable improvement in sugarcane production and productivity, it is critical to evaluate the level of adoption among farmers, the level of knowledge of improved practices, and the constraints impeding technology diffusion. Understanding these dynamics will not only help optimize production but also uplift the socio-economic status of sugarcane growers, contribute to rural livelihoods, and enhance national sugar output. This study, therefore, seeks to assess the current status of sugarcane cultivation practices, analyze adoption barriers, and provide actionable insights for researchers, extension workers, and policymakers to realign strategies for effective technology dissemination and industry modernization.

## II. RESEARCH METHODOLOGY

The current research was carried out in the Sri Ganganagar district of Rajasthan, which comprises a total of ten tehsils. Among these, Sri Ganganagar and Sri Karanpur tehsils were purposively selected based on having the largest area dedicated to sugarcane cultivation. To identify the study locations, a detailed list of prominent sugarcane-producing villages within the selected tehsils was compiled with assistance from officials in the revenue and agriculture departments. From this list, five villages in each tehsil were chosen, focusing on those with the highest sugarcane cultivation area, resulting in a total of ten villages selected for the study. For respondent selection, a categorized list of small, marginal, and large sugarcane farmers was developed with the support of the local village Patwaris and agricultural supervisors. Based on this classification, a sample of 120 sugarcane growers was selected to participate in the study, ensuring representation from various farm sizes and socio-economic backgrounds. To assess adoption, responses were recorded on a three-point scale (fully, partially, not adopted) with scores of 3, 2, and 1. The adoption gap was calculated by subtracting the mean score from 100per cent. The study aimed to examine the relationship between personal attributes (age, education, landholding, family size, and family type) and the adoption of improved sugarcane production technology using correlation analysis at 5% and 1% significance levels.

## III. RESULTS AND DISCUSSION

### 3.1 Adoption level:

As shown in Table 1, out of 120 most of the respondents (58.33per cent) had a medium level of adoption, followed by 25per cent with a high level and 16.66per cent with a low level. This indicates that the majority of farmers adopted the recommended practices to a moderate extent. Fewer farmers showed either high or low adoption. These findings are in line with the results reported by Maraddi (2006) and Joshi et al. (2007–08).

**TABLE 1**
**DISTRIBUTION OF RESPONDENTS ON THE BASIS OF THEIR ADOPTION LEVEL**

| Adoption level | Frequency | Percentage |
|---|---|---|
| **Low (22-27)** | 20 | 16.66 |
| **Medium (28-33)** | 70 | 58.33 |
| **High (34-37)** | 30 | 25.00 |
| **Total** | **120** | **100.00** |

### 3.2 Extent of adoption of respondents about improved sugarcane cultivation technology:

The study assessed the adoption levels of 17 key practices among sugarcane growers, as shown in Table 2. The mean and mean percentage scores for each practice were calculated, along with the adoption gaps. The results revealed that the highest adoption was observed in practices requiring less specialized skills, such as using recommended spacing (80.83per cent), recommended harvesting methods (80per cent), and following the recommended seed rate (78.33per cent). On the other hand, practices with lower adoption included proper seed treatment (38.33per cent), soil treatment for disease prevention (36.67per cent), timely fertilizer application (30.83per cent), and micro-nutrient doses (17.5per cent). These low adoption rates were attributed to factors such as lack of knowledge and the high cost of inputs like micro-nutrients, which hindered farmers from fully implementing these practices. These findings align with previous studies by Maraddi (2006) and Teeluck et al. (2007).

**TABLE 2**

**EXTENT OF ADOPTION OF RESPONDENTS ABOUT IMPROVED SUGARCANE CULTIVATION TECHNOLOGY.**

| S. No | Practice | Frequency | Percentage | Rank |
|---|---|---|---|---|
| **1.** | Adopting improved sugarcane varieties | 84 | 70 | VII |
| **2.** | Using proper soil treatment to prevent the soil born diseases | 44 | 36.67 | XV |
| **3.** | Following recommended seed rate | 94 | 78.33 | III |
| **4.** | Using recommended spacing (*i.e*. PXP, RXR) | 97 | 80.83 | I |
| **5.** | Following recommended depth of sowing | 89 | 74.16 | V |
| **6.** | Using proper seed treatment to prevent the seed borne diseases | 46 | 38.33 | XIV |
| **7.** | Using recommended time of sowing | 83 | 69.17 | VIII |
| **8.** | Following recommended method of sowing | 77 | 64.16 | IX |
| **9.** | Using nitrogenous fertilizers as per Recommendation | 85 | 70.83 | VI |
| **10.** | Using phosphatic fertilizers as per Recommendation | 57 | 47.5 | XIII |
| **11.** | Using recommended doses of micro-nutrients | 21 | 17.5 | XVII |
| **12.** | Timely fertilizer application as per Recommendation | 37 | 30.83 | XVI |
| **13.** | Adoption of herbicides for weed control | 60 | 50 | XII |
| **14.** | Using recommended irrigation management | 91 | 75.83 | IV |
| **15.** | Using recommended insecticides, their concentration and time of spray | 70 | 58.33 | X |
| **16.** | Using recommended fungicides, their concentration and time of application | 63 | 52.5 | XI |
| **17.** | Using recommended harvesting methods | 96 | 80 | II |

### 3.3 Relationship between selected variables of sugarcane growers and their level of adoption of recommended package of practices:

The study examined the relationship between various factors of sugarcane growers (age, education, income, land holding, family size, family type) and their adoption of recommended practices using the coefficient of correlation (r). The results, as shown in Table 3, indicate a significant positive relationship between annual income and land holding with the level of adoption, at a 5% significance level. However, there was no significant relationship between age, education, family type and family size with the adoption of practices. Based on these findings, the null hypotheses for these factors were rejected, and the alternate hypotheses were accepted, indicating these factors did not significantly affect adoption. Similar conclusions were reported by Singh et al. (2008).

**TABLE 3**

**RELATIONSHIP BETWEEN SELECTED VARIABLES OF SUGARCANE GROWERS AND THEIR LEVEL OF ADOPTION OF RECOMMENDED PACKAGE OF PRACTICES**

| S.No. | Independent variables | Correlation coefficient (r) |
|---|---|---|
| 1. | Age | 0.093 NS |
| 2. | Education | 0.044 NS |
| 3. | Annual income | 0.255** |
| 4. | Land holding | 0.522** |
| 5. | Family size | 0.032 NS |
| 6. | Family type | 0.016 NS |

***** Correlation is significant at the 0.05 level of probability NS= non-significant***

- **Age and Adoption**: There was no significant relationship (r = 0.093) between the farmers' age and their adoption of practices. Therefore, age did not influence the adoption process.
- **Education and Adoption**: Education also showed no significant relationship (r = 0.044) with adoption levels. Despite farmers' education, extension contact appeared to play a more important role in the adoption process.
- **Annual Income and Adoption**: A positive and significant relationship (r = 0.255**) was found between annual income and adoption. As farmers' income increased, their ability to purchase necessary inputs for farming improved, leading to higher adoption levels.
- **Land Holding and Adoption**: Land holding had a positive and significant relationship (r = 0.522**) with adoption. Farmers with larger land holdings had more resources and information, facilitating greater adoption.
- **Family Size and Adoption**: No significant relationship (r = 0.032) was observed between family size and adoption, indicating that family size had little influence on the adoption process.
- **Family Type and Adoption**: Similarly, family type showed no significant effect (r = 0.016) on adoption, as the adoption process is an individual decision.

## IV. CONCLUSION

The study concluded that most sugarcane farmers in the area had a medium level of adoption of recommended practices, with fewer adopting high or low levels. While simple practices showed good adoption, more specialized techniques faced barriers like knowledge gaps and high input costs. Additionally, income and landholding size positively influenced adoption, while factors such as age, education, and family size had no significant effect. These findings highlight the need for targeted interventions to improve adoption of advanced practices.

## REFERENCES

[1] Joshi, P.J., Chouhan, N.B. and Patel, K.F. (2007-08). Knowledge level of farmers about modern practices of cotton cultivation in Bhal area. Gujarat Journal of Extension Education 18-19: 65-67.

[2] Marradi G. N. (2006). analysis of sustainable cultivation practices followed by sugarcane growers in Karnataka state, P.hd. Thesis Univ. of Agril. Sci., Dharwad (India).

[3] Nagaraja MV. (2002). A study on knowledge of improved cultivation practices of sugarcane and their extent of adoption by farmers in Bhadra command area in Davanagere district, Karnataka state. Ph. D. Thesis, University of Agricultural Sciences, Dharwad.

[4] Pawar PP, Jadale UD, Shinde CB, Kale PV. (2005). Adoption of improved production technology on sugarcane farmers in Western Maharashtra. Cooperative Sugar;36(10):805-812.

[5] Singh, M.P., Sharma, B.K., Singh, S.P., Naval Singh and Surender Kumar. (2008). Indicators influencing production gap of sugarcane and wheat crops in Western Uttar Pradesh. *Journal of Farming Systems Research & Development* 14(1):78- 83.

[6] Teeluck, Rar, K.S. (2007). Problems and prospects of cotton cultivation in Srigangangar district of Rajasthan. M.Sc. (Ag.) Thesis, submitted to Maharana Pratap University of Agriculture and Technology, Udaipur.