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Relationship between the selected independent variables of sugarcane growers and their level of knowledge about recommended package of practices

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Abstract

The study was conducted in the Sri Ganganagar district of Rajasthan, with Sri Ganganagar and Sri Karanpur tehsils selected due to their extensive sugarcane cultivation. With assistance from agricultural and revenue officials, five major sugarcane-growing villages from each tehsil were identified, making a total of ten villages. A categorized list of small, marginal, and large farmers was prepared with the help of village Patwaris and agricultural supervisors. From this list, 120 sugarcane growers were randomly selected as respondents for the investigation. The findings revealed that out of 120 respondents, the majority (58.34per cent) fell into the medium knowledge level group, while 19.16per cent were in the low knowledge group, and the remaining 22.5per cent possessed a high level of knowledge. The highest knowledge was observed in irrigation management (MPS 87.26), followed by harvesting (MPS 85.67). However, lower knowledge levels were noted in plant protection (MPS 69.97) and time of sowing (MPS 63.78). A significant positive relationship was found between annual income and landholding, whereas age, education, family type, and family size showed no significant impact on the knowledge level of farmers.

Keywords: Knowledge levels, sugarcane farmers, recommended practices, correlation and factors influencing knowledge

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 knowledge of modern technologies, poor pest and disease management, inefficient marketing systems, and socio-economic challenges. A notable concern is the limited knowledge 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 knowledge 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 knowledge 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 knowledge barriers, and provide actionable insights for researchers, extension workers, and policymakers to realign strategies for effective technology dissemination and industry modernization.

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 level of knowledge, responses were recorded on a two score was assigned to each correct answer and one score to each incorrect answer. The study aimed to examine the relationship between personal attributes (age, education, landholding, family size, and family type) and the level of

knowledge of improved sugarcane production technology using correlation analysis at 5% and 1% significance levels.

Results and Discussion

Knowledge level

According to Table 1, out of 120 majority of respondents 58.34 per cent fell in medium level knowledge group whereas 19.16 per cent sugarcane growers were observed in low level knowledge group and remaining 22.5 per cent respondents possessed high level of knowledge about recommended production technology of sugarcane. These findings are in line with the results reported by Maraddi (2006) [2] and Joshi *et al.* (2007-08) [1].

Table 1: Distribution of respondents on the basis of their level of knowledge

Knowledge level	Ferquency	Percentage
Low (12-14)	23	19.16
Mediu (15-16)	70	58.34
High (17-18)	27	22.50
Total	120	100.00

Extent of knowledge of respondents about improved sugarcane cultivation technology

The knowledge of farmers was assessed across eleven key sugarcane cultivation practices, as shown in Table 2. Mean percent scores (MPS) were calculated to evaluate their understanding of each practice. Results showed highest knowledge in irrigation management (MPS 87.26), followed by harvesting (85.67), soil treatment (74.85), and weed control (73.74). However, farmers had lower knowledge in plant protection (69.97), time of sowing (63.78), and use of high-yielding varieties (61.93). These findings suggest that while farmers are well-informed about basic practices, they lack awareness of some critical improved techniques. Similar trends were noted by earlier researchers. These findings align with previous studies by Maraddi (2006) [2] and Joshi *et al.* (2007-08) [1].

Table 2: Extent of knowledge of respondents about improved sugercane cultivation technology.

S. No	Practice	Percentage	Rank
1.	Use of high yielding varieties	61.93	XI
2.	Soil and field preparation	71.26	VII
3.	Soil treatment	74.85	III
4.	Seed treatment	72.16	VI
5.	Time of sowing	63.78	X
6.	Shoots with 3 buds setts & recommended method of sowing	73.11	V
7.	Fertilizer application	70.85	VIII
8.	Irrigation management	87.26	I
9.	Weed management	73.74	IV
10.	Plant protection measures	69.97	IX
11.	Harvesting	85.67	II

Relationship between selected variables of sugarcane growers and their level of knowledge 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 level knowledge about

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 knowledge, at a 5% significance level. However, there was no significant relationship between age, education, family type and family size with the

knowledge about 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 knowledge. Similar conclusions were reported by Maraddi (2006)^[2] and Teeluck *et al.* (2007)^[8].

Table 3: Relationship between selected variables of sugarcane growers and their level of knowledge of recommended package of practices

S.No.	Independent variables	Correlation coefficient (r)
1.	Age	0.080 NS
2.	Education	0.048 NS
3.	Annual income	0.258**
4.	Land holding	0.515**
5.	Family size	0.022 NS
6.	Family type	0.016 NS

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

Age and Knowledge: The analysis revealed no significant correlation between farmers' age and their level of knowledge regarding recommended practices ($r=0.080$). This suggests that age does not play a determining role in influencing knowledge.

Education and Knowledge: Education also exhibited an insignificant relationship with knowledge levels ($r = 0.048$). This indicates that formal education alone may not significantly enhance knowledge, and that extension services likely have a greater impact.

Annual Income and Knowledge: A positive and statistically significant relationship was observed between annual income and knowledge level ($r=0.258^{**}$). Higher income likely enables farmers to invest in better inputs and access information, thereby enhancing their knowledge.

Land Holding and Knowledge: A strong and significant positive correlation was found between land holding and knowledge level ($r=0.515^{**}$). Farmers with larger land holdings typically possess greater resources and exposure, which contribute to better knowledge acquisition.

Family Size and Knowledge: The relationship between family size and knowledge level was found to be insignificant ($r=0.022$), indicating that the number of family members does not affect a farmer's knowledge.

Family Type and Knowledge: Likewise, the type of family structure showed no significant impact on knowledge level ($r=0.016$), suggesting that whether a family is nuclear or joint has little to no influence on farmers' knowledge.

Conclusion

The study revealed that most sugarcane farmers had moderate knowledge of recommended practices, with strong understanding of irrigation and harvesting but limited awareness of advanced techniques like plant protection and sowing. Income and land holding positively influenced knowledge levels, while age, education, and family factors showed no significant impact.

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