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Knowledge level of sugarcane growers about recommended production technology in Western Maharashtra

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Abstract

Sugarcane (*Saccharum officinarum* L.) is one of the most important commercial crops of Western Maharashtra, a region that contributes substantially to the state's sugar economy, yet farm-level productivity continues to lag behind the region's potential largely on account of gaps between recommended production technology and its uptake by growers. The present study was undertaken to assess the knowledge level of sugarcane growers about recommended sugarcane production technology in Kolhapur and Solapur districts of Western Maharashtra. An ex-post-facto research design was followed and a total of 240 sugarcane growers were selected through a multi-stage random sampling procedure covering four tehsils (Hatkanagale and Shirol of Kolhapur district and Madha and Pandharpur of Solapur district) and sixteen villages therein. Data were collected through a structured and pre-tested interview schedule covering eleven recommended practices, namely use of high yielding varieties, soil and field preparation, soil testing, seed treatment, time of sowing, seed rate and method, fertilizer application, irrigation management, weed management, plant protection measures and harvesting and were analysed using frequency, percentage, mean, standard deviation and mean per cent score (MPS). Knowledge scores were used to classify respondents into low, medium and high knowledge categories based on mean and standard deviation. The findings revealed that a majority of the growers (62.50%) possessed a medium level of knowledge, followed by high (21.25%) and low (16.25%) knowledge categories, with an overall mean knowledge score of 77.96 and standard deviation of 10.84. Practice-wise analysis showed that knowledge was highest for soil testing (MPS 83.42) and irrigation management (MPS 80.30), while knowledge regarding time of sowing (MPS 65.65) and use of high yielding varieties (MPS 67.69) remained comparatively low. The study concludes that although most sugarcane growers have attained a reasonably satisfactory level of knowledge of production technology, specific practice-related gaps persist and these should be addressed on a priority basis through need-based training and extension interventions to help growers move toward complete and balanced adoption of recommended sugarcane production technology.

Keywords: Sugarcane growers, knowledge level, production technology, mean per cent score, Western Maharashtra

Introduction

Sugarcane (*Saccharum officinarum* L.) is among the most important commercial crops cultivated across the globe and is the world's largest crop in terms of quantity of production. Belonging to the bamboo family of plants, sugarcane was introduced into India by Austronesian traders around 1200 to 1000 B.C. and India is widely regarded as the original home of *Saccharum officinarum*. India today is the second-

highest producer of sugarcane in the world after Brazil and the crop forms the raw material base for the second largest agro-based industry in the country after textiles.

Western Maharashtra, comprising the Pune and Kolhapur revenue divisions, accounts for a substantial share of the state's area, production and sugar recovery from sugarcane. Kolhapur region in particular is one of the most concentrated sugarcane growing tracts of Maharashtra

owing to its favourable soil and agro-climatic conditions, registering among the highest sugar recovery rates in the state. Despite this favourable production base, the extent to which growers possess adequate knowledge of the recommended package of practices, spanning varietal selection, soil and field preparation, seed treatment, time and method of sowing, fertilizer and irrigation management, weed and pest management and harvesting, continues to vary widely and directly influences the productivity realised at the farm level.

Knowledge is widely recognised in extension science as a necessary precursor to adoption of any agricultural technology; a grower cannot be expected to adopt a practice correctly unless he first possesses adequate and accurate knowledge of it. Several workers have reported a predominance of medium knowledge levels among sugarcane growers in different parts of the country, while some studies have reported high knowledge levels, indicating considerable regional variation that is influenced by local extension efforts, socio-economic conditions and the profile characteristics of growers. However, published, location-specific evidence on the knowledge status of sugarcane growers in the Kolhapur-Solapur belt of Western Maharashtra, an area of considerable significance to the state's sugar economy, remains limited.

Against this background, the present investigation was undertaken with the specific objective of assessing the knowledge level of farmers about sugarcane production technology in Western Maharashtra and of identifying the practice-wise strengths and gaps in that knowledge so that extension efforts can be targeted more effectively.

Materials and Methods

The present investigation was carried out following an ex-post-facto research design in Western Maharashtra during 2024-25. Western Maharashtra comprises the Pune and Kolhapur revenue divisions; one district from each division was purposively selected on the basis of the highest area and production under sugarcane, giving Solapur (Pune division) and Kolhapur (Kolhapur division) as the districts of study. From each selected district, two tehsils having the highest area and production under sugarcane were identified, namely Hatkanagale and Shirol from Kolhapur district and Madha and Pandharpur from Solapur district. From each of the four selected tehsils, six villages were selected at random on the basis of area and production under sugarcane cultivation and from each selected village ten sugarcane growers were selected at random, constituting a final sample of 240 respondents for the study.

Data were collected through personal interview using a structured and pre-tested interview schedule, developed in line with the objectives of the study and administered by the researcher himself. The schedule elicited information on the profile characteristics of the respondents together with their knowledge of eleven recommended sugarcane production practices, namely use of high yielding varieties, soil and field preparation, soil testing, seed treatment, time of sowing, seed rate and recommended method of sowing, fertilizer application, irrigation management, weed management, plant protection measures and harvesting. Knowledge of each respondent was measured on the basis of the number of correct responses given against each

recommended practice. The overall knowledge score obtained by each respondent was used to categorise growers into low, medium and high knowledge groups on the basis of the mean and standard deviation of the knowledge scores of the sample as a whole. For each individual practice, the extent of knowledge among respondents was expressed as a mean per cent score (MPS), computed as the percentage of the mean obtained score to the maximum possible score for that practice and practices were subsequently ranked in descending order of their MPS values to identify areas of relative strength and weakness in growers' knowledge. Data so generated were subjected to statistical analysis using frequency, percentage, mean, standard deviation and mean per cent score and are presented in tabular form in the following section.

Results

The overall knowledge level of the sugarcane growers regarding recommended production technology, along with the practice-wise extent of knowledge, is presented in Tables 1 and 2, respectively.

Table 1: Overall level of knowledge of sugarcane growers about recommended production technology (n = 240)

Sr. No.	Category of knowledge	f	%
1	Low (< 67.12)	39	16.25
2	Medium (67.13 - 88.79)	150	62.50
3	High (> 88.80)	51	21.25
	Total	240	100.00

Mean = 77.96; Standard Deviation = 10.84

Data presented in Table 1 reveal that a majority of the sugarcane growers (62.50%) belonged to the medium knowledge category, followed by the high knowledge category (21.25%) and the low knowledge category (16.25%). The overall mean knowledge score of the respondents was 77.96 with a standard deviation of 10.84, indicating that most growers possessed a fairly satisfactory, though not comprehensive, understanding of the recommended package of sugarcane production practices.

Table 2: Practice-wise knowledge of sugarcane growers about recommended production technology (n = 240)

Sr. No.	Practice	MPS	Rank
1	Use of high yielding varieties	67.69	X
2	Soil and field preparation	76.15	VI
3	Soil testing	83.42	I
4	Seed treatment	71.98	VIII
5	Time of sowing	65.65	XI
6	Seed rate and recommended method	77.32	IV
7	Fertilizer application	70.81	IX
8	Irrigation management	80.30	II
9	Weed management	76.57	V
10	Plant protection measures	74.42	VII
11	Harvesting	79.48	III

Table 2 shows that among the eleven recommended practices studied, growers possessed the highest level of knowledge about soil testing (MPS 83.42), followed by irrigation management (MPS 80.30), harvesting (MPS 79.48), seed rate and recommended method of sowing (MPS 77.32) and weed management (MPS 76.57). Knowledge

regarding soil and field preparation (MPS 76.15), plant protection measures (MPS 74.42), seed treatment (MPS 71.98) and fertilizer application (MPS 70.81) was found to be at a moderately high level. In contrast, growers' knowledge was comparatively lower with respect to use of high yielding varieties (MPS 67.69) and time of sowing (MPS 65.65), which occupied the last two ranks among the practices studied.

Discussion

The predominance of medium knowledge level observed among sugarcane growers in the present study is broadly in agreement with the findings of Rangarao (2016)^[7], Archana (2021)^[1] and Khandre *et al.* (2022)^[4], who also reported that the majority of sugarcane growers fell in the medium knowledge category with respect to recommended trash management and production practices. However, the finding is at variance with that of Prasad (2016)^[6], Dhakad *et al.* (2018)^[2] and Jaya and Vasanthakumar (2020)^[3], who reported that a higher proportion of sugarcane growers possessed high knowledge levels in their respective study areas. Such variation across studies may be attributed to differences in agro-climatic setting, the intensity and reach of extension and training activities, cropping history of the region and the socio-economic and educational profile of the sample of growers covered under each study.

The comparatively higher knowledge observed for soil testing and irrigation management in the present study may be explained by the sustained promotional efforts of sugar factories, soil testing laboratories and the Krishi Vigyan Kendras operating in the Kolhapur-Solapur belt, which routinely conduct soil-testing camps and irrigation-scheduling demonstrations for sugarcane growers given the direct and visible bearing of these practices on cane yield and juice recovery. Harvesting, being closely linked to the maturity indices communicated by sugar factories for scheduling cane supply, also recorded a relatively high MPS, suggesting that market-linked information channels are an effective route for practice-specific knowledge dissemination.

On the other hand, the comparatively lower knowledge recorded for use of high yielding varieties and time of sowing points to a genuine gap in the dissemination of varietal information and agro-climatically appropriate sowing schedules. This is consistent with the emphasis placed by several earlier workers, including Sharma *et al.* (2016)^[8] and Lonkar *et al.* (2021)^[5] in the context of varietal preference studies, on the need for stronger institutional communication regarding newly released, high yielding and region-specific varieties. Because varietal choice and correct timing of sowing exert a strong influence on eventual yield and ratoonnability of the crop, these two practices merit priority attention in future extension programming for the study area.

Taken together, the results suggest that while the general extension and institutional environment surrounding sugarcane cultivation in Western Maharashtra has succeeded in building a reasonably sound knowledge base among growers for several core practices, a more balanced, practice-specific strategy is required to close the residual gaps, particularly for varietal knowledge and sowing time, if the region's productivity potential is to be more fully

realised.

Conclusion

The study concludes that a majority of the sugarcane growers of Kolhapur and Solapur districts of Western Maharashtra possessed a medium level of knowledge of recommended sugarcane production technology, with knowledge being strongest for soil testing, irrigation management and harvesting and weakest for use of high yielding varieties and time of sowing. There is a clear need to design and deliver targeted, practice-specific training programmes, demonstrations and extension literature, particularly on varietal information and recommended sowing schedules, so as to bridge existing knowledge gaps and thereby facilitate more complete and technically sound adoption of the recommended sugarcane production technology in the region.

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