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**RL Kadam**

SMS, Department of Extension  
Education, KVK Badnapur,  
Jalna, Maharashtra, India

**RD Ahire**

Associate Dean and Principal,  
College of Agriculture, Badnapur  
Dist. Jalna, Maharashtra, India

**FR Tadavi**

SMS, Department of Animal  
Husbandry and Dairy Science,  
KVK Badnapur, Dist. Jalna,  
Maharashtra, India

**RK Behera**

Assistant Professor, IAS,  
SOADU, Bhubaneswar, Odisha,  
India

## Constraints & suggestions perceived by the sugarcane growers towards sustainable cultivation practices

**RL Kadam, RD Ahire, FR Tadavi and RK Behera**

### Abstract

Sugarcane plays a crucial role in various aspects of daily life and industry, offering nutritional and economic benefits to countries. Consequently, ensuring its production becomes a prime consideration. The current study aims to enhance sugarcane production by identifying and addressing important constraints faced by farmers. For this purpose, an ex-post facto research design was employed. The study revealed several significant constraints encountered during the adoption of sustainable cultivation practices in sugarcane. These included high costs of complex fertilizers, labor charges, inadequate availability of required earthworm quantity, and the absence of recovery-based pricing. In response, farmers offered valuable suggestions, such as providing credit at lower interest rates and on time, reducing the cost of complex fertilizers, and conducting demonstrations or on-farm testing of different sustainable cultivation practices to showcase their effectiveness. The findings of this paper hold potential to contribute to the nation's growth and benefit policy-makers in making informed decisions to enhance the production and sustainability of sugarcane farming.

**Keywords:** sustainable, sugarcane, farmers, constraints, suggestions

### Introduction

Even in the present day, the adage "India lives in its villages" remains relevant. A significant proportion of its 1.3 billion population continues to reside in rural areas, with agriculture as their primary source of livelihood (Behera *et al.* 2018) [12]. Sugarcane is an important crop on a global scale, due to its numerous dietary and commercial applications (Thibane *et al.*, 2023) [4]. Sugarcane holds significant importance due to its strategic position and versatile applications in various aspects of daily life and industry, providing nutritional and economic benefits to countries (Owino, 2019 & Tena *et al.*, 2016) [5, 6]. Sugarcane holds a paramount position among industrial crops globally, primarily grown in subtropical and tropical regions across the world (Zulu *et al.*, 2019) [7]. Sugarcane, a vital cash crop widely cultivated in numerous countries, plays a pivotal role in meeting the global demand for sugar and its by-products. Sugarcane (*Saccharum* sp. hybrids) is a very productive C<sub>4</sub> grass that is primarily used to make sugar and, more recently, ethanol, a sustainable transportation fuel (Altpeter and Oraby, 2010) [1]. However, traditional practices associated with sugarcane farming have often led to environmental degradation, soil depletion, and socio-economic challenges, necessitating a shift towards sustainable cultivation practices. Sustainable agriculture, characterized by its focus on long-term environmental, economic, and social viability, has emerged as a promising solution to address the pressing issues posed by conventional farming methods.

The successful transition to sustainable cultivation practices heavily relies on the active participation and buy-in of the primary stakeholders in the sugarcane industry—the growers themselves. Understanding the constraints faced by sugarcane growers in adopting sustainable practices and their suggestions for overcoming these challenges is crucial in devising effective strategies for promoting sustainability within the sector. To achieve self-sufficiency in food production and meet the growing demand, India must focus on estimating yield gaps, constraints and promoting sustainable intensification in agricultural systems (Behera *et al.*, 2023 and Jha *et al.*, 2022) [10, 11].

From earlier study it was found that majority of the respondents (81.67 percent) expressed a strong agreement with the economic constraint of facing high input costs in sugarcane cultivation. Similarly, in the socio-cultural aspect, most respondents (74.16 percent) strongly agreed with the challenge of continuously adopting traditional practices (Kumar *et al.*, 2020) [8].

**Corresponding Author:**

**RL Kadam**

SMS, Department of Extension  
Education, KVK Badnapur,  
Jalna, Maharashtra, India

Regarding technical constraints, a significant number of respondents (85.00 percent) acknowledged a lack of knowledge about insect pests. Moreover, a vast majority (90.84 percent) faced challenges related to the unavailability of improved implements and spraying instruments in rural areas. Additionally, the lack of juice extractors at the village level was reported as a constraint in post-harvest processes by a majority of respondents (88.33 percent). The primary challenges encountered by sugarcane respondents included insufficient water supply (87.50%), followed by the unavailability of labor (81.67%), delays in obtaining credit (76.67%), irregular electricity supply (75.00%), high labor wages (74.16%), low prices (58.33%), and expensive inputs (45.83%). Sugarcane growers also confronted issues such as insufficient credit (35.00%), a lack of technical guidance (25.83%), transportation problems (21.67%), high loan interest rates (15.83%), and inadequate subsidies (09.17%) (Lavanya *et al.*, 2019)<sup>[9]</sup>.

This research paper aims to explore the perceived constraints encountered by sugarcane growers in their endeavor to embrace sustainable cultivation practices. Additionally, it seeks to shed light on the valuable suggestions and insights offered by growers to overcome these constraints. By closely examining the perspectives of these key stakeholders, we can gain valuable insights into the complexities of sustainable farming adoption and identify potential pathways towards a more sustainable sugarcane industry.

The outcomes of this study will be of significant relevance to policymakers, agricultural extension services, and industry stakeholders seeking to implement targeted interventions and support mechanisms to promote sustainable cultivation practices within the sugarcane sector.

## Material and Methods

The study adopted an ex-post facto research design. Ahmednagar district in Maharashtra, which leads in both sugarcane area and production, was purposively chosen for the investigation. Among the district's fourteen tahsils, Newasa (47140 ha), Rahuri (15285 ha), Sangamner (9282 ha), and Kopargaon (3252 ha) were identified as having the highest area and production of sugarcane, and consequently, they were selected for the study. Using a random selection process, five villages were chosen from each of the four tahsils, resulting in a total of 20 villages for the study. From each selected village, nine respondents were chosen, making a

total sample size of 180 respondents.

## Results and Discussion

### Constraints faced during adoption of sustainable cultivation practices in sugarcane

Table 1 reveals that all respondents faced significant constraints, with a hundred percent of them citing issues such as the exorbitant cost of complex fertilizers and the unavailability of required quantities of fertilizers. Additionally, ninety percent of respondents expressed concerns about the unavailability of the required quantity of earthworms. Moreover, respondents noted that adhering to a proper harvest schedule based on maturity time for different varieties was not followed, and there was a scarcity of sufficient quantities of Farm Yard Manure (FYM) on the farm. Furthermore, they reported problems with a heavy woolly aphid incidence and the lack of adherence to recovery-based pricing. The survey also indicated that non-availability of labor and high labor charges, as well as the lack of awareness about the benefits of biofertilizers, were significant issues. Furthermore, respondents highlighted the labor-intensive nature of various sustainable cultivation practices and the absence of timely credit facilities as additional challenges. Among the respondents, 71.11 percent and 52.78 percent opined that the labor-intensive nature of sustainable cultivation practices and the non-availability of timely credit facilities, respectively, were major problems faced.

Similar constraints were reported by Lahoti *et al.* (2010)<sup>[2]</sup>. They stated that the constraints faced by farmers during adoption of sugarcane production technology are irregular electricity supply, expensive pesticides, insufficient irrigation water when needed, difficulty in finding labor for intercultural operations, high fertilizer costs, limited availability of quality manure, and lack of knowledge about insecticide spraying. Additionally, sugarcane growers faced issues with the absence of a nearby contact office and difficulties in transporting sugarcane sets. Patel and Vyas (2014)<sup>[3]</sup> also reported that majority of sugarcane growers encountered several constraints in their cultivation practices. High costs of farm inputs emerged as the most prevalent issue, followed by a shortage of labor, unavailability of plant protection appliances, and a lack of knowledge about disease control. Additionally, fluctuations in prices and delays in obtaining inputs were also cited as significant challenges.

**Table 1:** Constraints encountered during adoption of sustainable cultivation practices in sugarcane

Sr. No.	Constraints faced by sugarcane growers	Sugarcane growers (n=180)	
		Frequency	Percent
(I.)	Economic Factors		
1.	High cost of complex fertilizers	180	100.00
2.	Recovery based pricing is not followed	148	82.22
3.	Non-availability of credit facilities in-time	95	52.78
4.	Non-availability of labour	137	76.11
5.	High labour charges	162	90.00
6.	Non-availability of sufficient quantity of FYM on the farm	155	86.11
7.	Non-availability of required quantity of earthworms	162	90.00
(II.)	Social Factors		
7.	Lack of awareness about biofertilizers	132	73.33
8.	Proper schedule of harvest not followed for different varieties	156	86.67
9.	High labour intensive nature of various sustainable cultivation practices	128	71.11
(III.)	Environmental Factors		
10.	Pest/disease resistant incidence is more	98	54.45
11.	Irregularity in rainfall and increase in atmospheric temperature	175	97.22
12.	Depletion of ground water	165	91.67

### Suggestions expressed by sugarcane growers to overcome the constraints in adoption of sustainable cultivation practices in sugarcane

The data presented in Table 2 underscores the suggestions put forth by sugarcane growers. Considering the constraints they face, the primary suggestion voiced was the provision of credit at lower interest rates and within the required timeframe. Another crucial recommendation was to reduce the cost of complex fertilizers. Furthermore, growers emphasized the need for conducting demonstrations showcasing the efficacy of different sustainable cultivation practices in sugarcane. To enhance the industry's efficiency, it was suggested that sugar factories must adhere to a proper schedule for varietal harvesting. Additionally, organizing training programs on sustainable cultivation practices in sugarcane was deemed essential. The growers also proposed providing pest and disease-resistant varieties through sugar factories and research stations/Krishi Vigyan Kendras (KVKs). To foster knowledge-sharing and awareness, the growers advocated for conducting group discussions, Krishimela (agricultural fairs), and exposure trips for sugarcane farmers to demonstrate the benefits of various sustainable cultivation practices. Moreover, they

recommended establishing a sugarcane growers club and holding regular meetings with scientists and progressive farmers to facilitate collaborative learning and progress. Similar suggestions were reported by Lahoti *et al.* (2010) [2]. To overcome the constraints, the sugarcane growers provided insightful suggestions. They emphasized the importance of timely and affordable inputs supply, consistent electricity provision, and ensuring remunerative prices for sugarcane. These suggestions aim to facilitate a smoother transition to sustainable cultivation practices, making the adoption process more feasible and economically viable for growers. Patel and Vyas (2014) [3] also reported that sugarcane growers offered valuable suggestions to address these constraints and promote sustainable farming. They emphasized the need for the supply of production inputs at subsidized rates, the establishment of village information centers or kiosks in each village, and government purchase of produce at reasonable rates. Furthermore, easy accessibility to plant protection appliances was highlighted as a crucial factor in enhancing cultivation efficiency and productivity. Implementing these suggestions can go a long way in improving the overall agricultural landscape and ensuring a more sustainable and prosperous future for sugarcane growers.

**Table 2:** Suggestions as expressed by sugarcane growers to overcome the constraints in adoption of sustainable cultivation practices in sugarcane

Sr. No.	Suggestions	Sugarcane growers (n=180)	
		Frequency	Percentage
1.	Providing credit at lower interest rate and at required time	180	100.00
2.	Cost of complex fertilizers should be reduced	180	100.00
3.	Conduct demonstrations/on-farm testing on different sustainable cultivation practices in sugarcane to show their efficacy at farmers field	168	93.33
4.	Proper schedule of varietal harvesting must be followed by sugar factories	154	85.56
5.	Organize training programmes on sustainable cultivation practices in sugarcane	148	82.22
6.	Provide pest and disease resistant varieties through sugar factories and research stations/KVKs	148	82.22
7.	Conduct as many as group discussions, field days, exhibitions and exposure trip to sugarcane growers to convince the benefit of various sustainable cultivation practices	142	78.89
8.	Establish sugarcane growers club and conduct regular meetings with scientist and progressive farmers	128	71.11

### Conclusion

In conclusion, this research sheds light on the significant constraints perceived by sugarcane growers in their pursuit of sustainable cultivation practices. The study's findings underscore the multifaceted challenges posed by factors such as the high costs of complex fertilizers, labor charges, insufficient availability of necessary earthworm quantities, and the lack of recovery-based pricing mechanisms. These constraints collectively impede the seamless adoption of sustainable practices and, by extension, hinder the growth and sustainability of sugarcane farming.

However, the study also showcases the resilience and resourcefulness of sugarcane farmers, as they provide valuable suggestions to address these challenges. The recommendations put forth by the farmers, including facilitating access to affordable credit, reducing the expenses associated with complex fertilizers, and implementing on-farm demonstrations of sustainable cultivation techniques, demonstrate a keen understanding of the practical measures that can mitigate the constraints.

The implications of this research extend beyond the agricultural sector. The insights gained from this study have the potential to inform policy-makers and stakeholders about the intricacies of sugarcane cultivation and the impediments faced by growers. Informed by these findings, policymakers can craft strategies that promote sustainable practices,

improve resource allocation, and create an enabling environment for sugarcane farmers to thrive.

As countries continue to grapple with the challenge of ensuring food security and sustainable agricultural practices, this research serves as a stepping stone towards enhancing sugarcane production. By acknowledging the constraints and embracing the suggested solutions, stakeholders can collectively work towards the advancement of both the agricultural sector and the overall socio-economic landscape. In conclusion, this study contributes valuable insights that can guide the formulation of policies aimed at bolstering sugarcane cultivation. By addressing the identified constraints and heeding the recommendations of the farmers, we can pave the way for a more sustainable and productive future for sugarcane farming, benefiting not only the growers but also the larger society.

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