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Constraints Faced by Sugarcane Growers and Future Prospects for Technology Promotion in the Lucknow Division of Uttar Pradesh

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ABSTRACT
Sugarcane is a vital cash crop in Uttar Pradesh, contributing significantly to the livelihoods of rural farmers and the regional economy. However, despite advancements in production technologies, their adoption remains limited among growers. This study was conducted to identify the major constraints faced by sugarcane farmers in adopting improved production technologies and to explore the future prospects for technology promotion in the Lucknow Division. Primary data were collected from 320 respondents across two districts—Lakhimpur Kheri and Lucknow—using a pre-tested interview schedule. The analysis was carried out using the Mean Percentage Score (MPS) to rank constraints and assess the level of agreement on potential future interventions. The findings of the study highlighted several key constraints affecting sugarcane technology adoption. The most prominent issues included a lack of interaction with extension agents and progressive farmers or agricultural universities (Mean Percent Score [MPS] = 90.00), limited motivation and awareness regarding modern agricultural practices (MPS = 85.00), and the absence of effective leadership among progressive farmers to guide others (MPS = 74.92). Additionally, low profitability due to inadequate Fair and Remunerative Price (MPS = 86.25) and a shortage of labour during critical farming operations (MPS = 84.22) were also significant barriers. District-specific challenges were also observed. In Lakhimpur Kheri, the high cost of both manual and mechanized harvesting was reported as a major constraint (MPS = 88.59). Conversely, in Lucknow, the lack of nearby sugar mills or local crushers emerged as a primary concern (MPS = 88.13). With regard to future prospects, respondents strongly supported the revision of FRP policies (MPS = 95.47) and the establishment of local sugarcane processing units in Lucknow (MPS = 99.06) as critical interventions. The study concludes that enhancing the adoption of sugarcane production technology in the region requires a multifaceted approach. This should include policy-level reforms, the strengthening of extension services, and the development of localized value chains to ensure sustainable and inclusive agricultural growth.

Introduction:

Sugarcane (*Saccharum officinarum*) stands as a cornerstone in the world of agriculture, boasting not only a rich history but also a pivotal role in global economies. With its origins deeply rooted in Southeast Asia, this tall perennial grass has transcended geographical boundaries to become a leading source of sweetness on a global scale. Its economic significance is underscored by its widespread cultivation and the integral role it plays in the sugar industry. Sugarcane is grown in countries located between 36.7° N and 31.0° S latitudes, spanning tropical to subtropical zones.

Sugarcane belongs to the family Gramineae (Poaceae), class Monocotyledonae, order Glumaceae, sub-family Panicoideae, tribe Andropogoneae, and sub-tribe Saccharinae. The genus Saccharum comprises five principal species:

1. Saccharum officinarum
2. S. sinense
3. S. barberi
4. S. robustum

5. S. spontaneum

Among these, the first three (S. officinarum, S. sinense, and S. barberi) are cultivated species, while S. robustum and S. spontaneum are considered wild types. Of the cultivated varieties, S. officinarum is the most important, primarily due to its high sucrose content and widespread cultivation across India.

Cultivated sugarcane can be broadly classified into two groups:

- The thin, hardy North Indian types (S. barberi and S. sinense)
- The thick, juicy noble canes (S. officinarum) ***(Source: farmer.gov.in)***

Sugarcane cultivated in about 26.5 million hectares in more than 90 countries globally, with production of about 1.9-2.0 billion tones in recent years. Brazil was the leading producer in terms of acreage and sugarcane production, followed by India and China. **(FAO STAT)**

Broadly there are two distinct agro-climatic regions of sugarcane cultivation in India, viz., tropical and subtropical. In India, sugarcane cultivation extends across most of the country—from approximately 8.0° N to 33.0° N—excluding cold, high-altitude regions like Kashmir Valley and Himachal Pradesh. In India Sugarcane cultivated in about 5.74 million hectares and produced a record more than 453.15 million tonnes (MT) sugarcane during the 2023-24 sugar season. Uttar Pradesh is the leading producer of sugarcane in India, with an area of 23.17 lakh hectares and a production of approximately 188 million tonnes, followed by Maharashtra and Karnataka. However, in terms of productivity, Tamil Nadu ranks first with 106.73 tonnes per hectare, followed by Karnataka and Maharashtra. ***(Source- E&S, DAC -2nd Adv. Est.-2023-24)***

Sugarcane and the sugar industry constitute a significant sector in Uttar Pradesh. During the crushing season of 2024–25, a total of 122 sugar mills were operational in the state. The total sugarcane area in the state is 29.51 lakh hectares, with a productivity of 832 quintals per hectare. In the crushing season 2024–25, the sugar recovery rate has been estimated at 9.67% with the diversion of cane juice and B-heavy molasses for direct ethanol production, and at 10.68% without such diversion. ***(https://upcane.gov.in)***

Research Methodology :

The present study was conducted in the Lucknow division of Uttar Pradesh, which is one of the 18 administrative divisions of the state. Lucknow division was purposively selected due to its highest sugarcane production among all divisions. It comprises six districts, out of which Lakhimpur Kheri and Lucknow were purposively chosen based on their maximum and minimum sugarcane production, respectively. From each district, four blocks were randomly selected, followed by the random selection of four villages per block, totaling 32 villages. Finally, 10 respondents were randomly selected from each village, making a total sample of 320 respondents, equally distributed between the two districts.

Data were collected using a pre-structured interview schedule, incorporating a five-point continuum scale to record the responses of the sugarcane growers. To identify the most critical constraints within each category, the Mean Percentage Score (MPS) was calculated, which facilitated the ranking of constraints based on their perceived severity. The MPS was computed using the following formula:

$$\mathbf{MPS}=\left(\frac{\textit{Total Score Obtained by respondents}}{\textit{Maximum Obtainable Score}}\right)\times \mathbf{100}$$

'Z' test (Standard Normal Deviate Test)

This test was applied to detect significant differences between two sample means in a large number of samples (n> 30). The formula for the 'Z' test is as follows:

$$Z = \frac{\bar{X}_{1-}\bar{X}_2}{\sqrt{\left(\frac{\sigma_1^2}{n_1}+\frac{\sigma_2^2}{n_2}\right)}}$$

Where,

X_1 = Mean of First Sample

X_2 = Mean of Second Sample

σ_1 = Standard deviation of first sample

σ_2 = Standard deviation of Second sample

n_1 = Size of the first sample

n_2 = Size of the second sample

Result and discussion:

1.1 Distribution of respondents according to the level of constraints faced in sugarcane cultivation.

Sugarcane cultivators were categorized into low, medium, and high constraints based on their scores to understand the challenges they faced in implementing recommended technologies.

Table 1: Distribution of farmers is based on the level of constraints they face in Sugarcane cultivation**.** **n=320**

S.No.	Category	Respondents						
		Lakhimpur kheri		Category	Lucknow		Total	
		f	%		*f*	%	*f*	%
1	Low (Up to 79)	22.00	13.75	Low (Up to 77)	31.00	19.38	53.00	16.56
2	Medium (80-88)	113.00	70.63	Medium (78-86)	107.00	66.88	220.00	68.75
3	High (89 & above)	25.00	15.63	High (87 & above)	22.00	13.75	47.00	14.69
Total		**160**	**100**	**Total**	**160**	**100**	**320**	**100**

f = Frequency, % = percent, Mean: 83.61, S.D:4.63, Min: 71.00, Max: 94 (Lakhimpur Kheri) Mean: 81.50, S.D: 4.66, Min: 70.00 Max: 91 (Lucknow)

The data presented in Table 1, reveals that in Lakhimpur district, the majority of respondents (70.63%) faced medium-level constraints in sugarcane cultivation. A smaller proportion of respondents, 15.63%, experienced high-level constraints, while only 13.75% of the 160 respondents reported facing low-level constraints in the adoption of sugarcane production technologies. Similarly, in Lucknow district, 66.88% of respondents were found to be in the medium constraint category, followed by 19.38% who encountered low-level constraints. Only 13.75% of the respondents in this district reported high-level constraints while adopting improved sugarcane production practices. Considering both districts together, out of the total 320 respondents surveyed, a substantial majority—68.75%—reported facing medium-level constraints. High-level constraints were faced by 14.69% of the respondents, while 16.56%

encountered low-level constraints in the adoption of sugarcane cultivation technologies. These findings indicate that medium-level constraints were predominant among sugarcane growers across both districts.

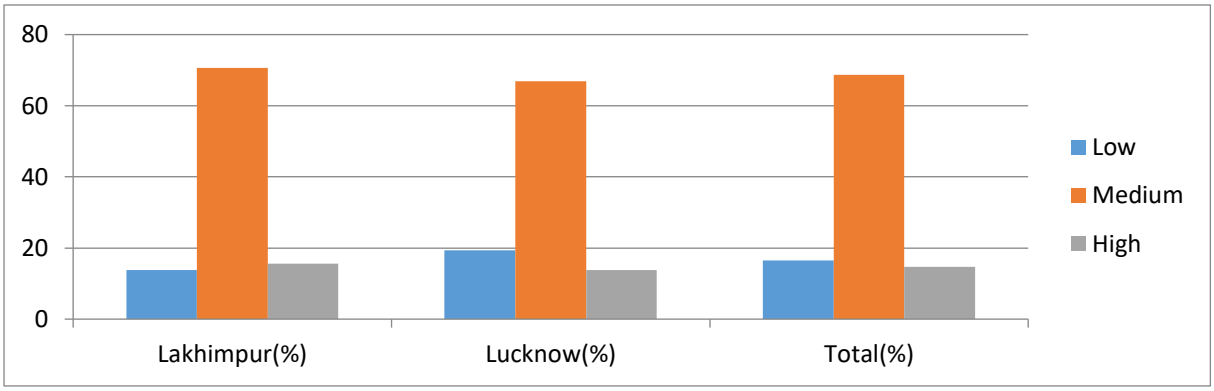

Fig 1: Distribution of farmers according to level of constraints faced by them in Sugarcane cultivation.

1.2 Aspect-Wise Constrains Perceived By the Sugarcane Growers.

Table 2: Constraints regarding knowledge perceived by the sugarcane growers.

S. No.	(A) Constraints regarding knowledge	Parameter					
		Lakhimpur		Lucknow		Total	
		MPS	RANK	MPS	RANK	MPS	RANK
1.	Lack of contact with extension agents/ progressive farmers/ agricultural universities.	88.28	**I**	91.72	**I**	90.00	**I**
2.	Lack of contact with officials from the sugar mill or cane supervisor.	19.84	VI	76.25	**II**	48.05	V
3.	Low interest in recommended technologies.	35.63	V	38.75	VI	37.19	VI
4.	Limited mass media exposure.	43.44	IV	53.44	V	48.44	IV
5.	Lack of proper guidance and consulting.	56.41	**III**	57.66	IV	57.03	**III**
6.	Non-availability of desired technology.	73.91	**II**	71.88	**III**	72.89	**II**

MPS = Mean Percent Score

According to the data in Table 2, the most severe constraint reported by sugarcane growers in both Lakhimpur Kheri and Lucknow districts was the ***"Lack of contact with extension agents/progressive farmers/agricultural universities"***, with mean percent scores (MPS) of 88.28 and 91.72, respectively, ranking it first in both districts. This constraint also received the highest combined MPS of 90.00, making it the top-ranked issue overall. The second most critical constraint as per total MPS (72.89) was ***"Non-availability of desired technology"***, ranked second in Lakhimpur Kheri (MPS 73.91) and third in Lucknow (MPS 71.88). The third major issue was ***"Lack of proper guidance and consulting"***, with MPS values of 56.41 in Lakhimpur Kheri and 57.66 in Lucknow, earning it the third and fourth rank respectively. On the other hand, ***"Limited mass media exposure"*** was given fourth rank overall with a combined

MPS of 48.44, though it held the fourth rank in Lakhimpur and fifth in Lucknow. Interestingly, ***"Lack of contact with officials from the sugar mill or cane supervisor"*** showed a sharp difference between districts, receiving a low MPS of 19.84 and rank VI in Lakhimpur but a significantly higher MPS of 76.25 in Lucknow, where it was ranked second. Lastly, the constraint ***"Low interest in recommended technologies"*** was ranked sixth overall with the lowest MPS of 37.19, and was consistently placed at the bottom by farmers in both districts (Lakhimpur MPS 35.63, Lucknow MPS 38.75).

Table 3: Constraints Perceived by Sugarcane Growers in the Adoption of Improved Sugarcane Production Technologies:

S. No.	(B) Constraints regarding Adoption	Parameter					
		Lakhimpur		Lucknow		Total	
a.	Personal constraints	MPS	RANK	MPS	RANK	MPS	RANK
1.	Lack of scientific knowledge about sugarcane cultivation practices.	88.13	**II**	72.81	III	80.47	III
2.	Inadequate Scientific and risk orientation among the farming community.	85.31	**III**	82.03	**I**	83.67	II
3.	Limited motivation and awareness to adopt modern agricultural approaches.	88.28	**I**	81.72	II	85.00	**I**
b.	**Social constraints**						
1.	Difficulty in protecting crops from stray animals due to weak social vigilance or support.	57.97	II	25.00	II	41.48	II
2.	Lack of effective leadership among progressive farmers to guide others.	87.19	**I**	62.66	**I**	74.92	**I**

MPS = Mean Percent Score

According to the data in Table 3, Under the ***personal constraints*** category, the most serious issue identified by respondents was ***"Limited motivation and awareness to adopt modern agricultural approaches."*** This constraint was ranked first overall, with a total Mean Percent Score (MPS) of 85.00, based on district-level MPS values of 88.28 in Lakhimpur Kheri (ranked I) and 81.72 in Lucknow (ranked II). The second most prominent constraint was ***"Inadequate scientific and risk orientation among the farming community,"*** which was assigned the third rank in Lakhimpur Kheri (MPS 85.31) and first rank in Lucknow (MPS 82.03), resulting in an overall MPS of 83.67 and a second overall rank. ***"Lack of scientific knowledge about sugarcane cultivation practices"*** received a total MPS of 80.47 and was placed third overall. It was ranked second in Lakhimpur (MPS 88.13) and third in Lucknow (MPS 72.81). Farmers should be motivated through campaigns, exposure visits, and awareness programs to build scientific mindset and confidence in adopting sugarcane technology. Among ***social constraints***, ***"Lack of effective leadership among progressive farmers to guide others"*** was the most prominent issue. It secured the first rank in both Lakhimpur Kheri (MPS 87.19) and

Lucknow (MPS 62.66), resulting in the highest combined MPS of 74.92. The second major ***social constraint*** was ***"Difficulty in protecting crops from stray animals due to weak social vigilance or support."*** This issue was consistently ranked second in both districts, with MPS scores of 57.97 in Lakhimpur and 25.00 in Lucknow. The overall MPS for this constraint stood at 41.48, placing it at second in the social constraint category. Social interventions like village leadership groups, community vigilance, and training model farmers can help tackle challenges through collective crop protection.

Table 4: Economic constraints perceived by the Sugarcane growers

S. No.	Constraints regarding Adoption	Parameter					
		Lakhimpur		Lucknow		Total	
c.	Economic constraints	MPS	RANK	MPS	RANK	MPS	RANK
1.	Delayed payments from sugar mills create financial stress and hinder reinvestment in the next cropping cycle.	2.03	V	3.44	V	2.73	V
2.	Low profitability due to inadequate Fair and Remunerative Price (FRP) discourages expansion of sugarcane cultivation.	90.00	**II**	82.50	**I**	86.25	**I**
3.	High irrigation costs due to expensive diesel and electricity charges make sugarcane farming less viable.	83.44	IV	62.50	IV	72.97	IV
4.	Scarcity of agricultural labor during peak seasons increases dependence on costly mechanization.	92.19	**I**	70.00	**II**	81.09	**II**
5.	Lack of subsidies on input purchases (e.g. fertilizers, pesticides) makes it difficult to invest in quality resources.	87.50	**III**	63.75	**III**	75.63	**III**

MPS = Mean Percent Score

According to the data in Table 4, Among the ***economic constraints***, the most severe issue identified by the respondents was ***"Scarcity of agricultural labor during peak seasons increases dependence on costly mechanization,"*** with the highest overall MPS of 81.09, ranked first in Lakhimpur Kheri (92.19) and second in Lucknow (70.00). The second most serious constraint was ***"Low profitability due to inadequate Fair and Remunerative Price (FRP),"*** which received an overall MPS of 86.25, ranking first overall, despite being ranked second in Lakhimpur (90.00) and first in Lucknow (82.50). Next, ***"Lack of subsidies on input purchases (e.g., fertilizers, pesticides)"*** emerged as the third most important issue, with a total MPS of 75.63, ranked third in both districts. ***"High irrigation costs due to expensive diesel and electricity charges"*** was ranked fourth overall (MPS 72.97), highlighting a pressing issue for marginal and small farmers. The least concerning issue as per respondents was ***"Delayed***

payments from sugar mills," which scored a very low MPS of 2.73, and was ranked fifth in both districts—possibly indicating recent improvement in payment timelines.

Table 5: Technological constraints perceived by the Sugarcane growers

S. No.	Constraints regarding Adoption	Parameter					
		Lakhimpur		Lucknow		Total	
d.	Technological constraints	MPS	RANK	MPS	RANK	MPS	RANK
1.	Non-availability of recommended high-yielding varieties.	43.59	XI	43.28	VI	43.44	XI
2.	Lack of access to soil testing laboratories for proper fertilizer application.	75.47	VI	55.31	V	65.39	V
3.	Limited access to improved agricultural implements for land preparation and sowing.	76.09	V	71.72	**II**	73.91	**III**
4.	Scarcity of labor during critical operations such as sowing, weeding, and harvesting.	94.84	**I**	73.59	**I**	84.22	**I**
5.	Unavailability of fertilizers and pesticides at the required time.	92.66	**II**	37.97	VIII	65.31	VI
6.	Lack of awareness regarding balanced fertilizer use and integrated weed management.	77.19	IV	58.75	IV	67.97	IV
7.	Heavy infestation of weeds and limited availability of weed control equipment.	67.19	IX	33.75	X	50.47	IX
8.	Inadequate and irregular irrigation facilities due to poor rainfall and unreliable electricity.	71.56	VIII	35.00	IX	53.28	VIII
9.	High cost of diesel and electricity for operating irrigation pumps.	87.34	**III**	62.50	**III**	74.92	**II**
10.	Severe infestation by major insect pests (e.g., Pyrilla, Top borer, Wooly aphid) and rodents.	62.50	X	30.00	XI	46.25	X
11.	Incidence of serious diseases such as Red Rot, Grassy Shoot Disease, and Smut affecting crop yield.	73.28	VII	40.00	VII	56.64	VII

MPS = Mean Percent Score

According to the data in Table 5, the most serious ***technological constraint*** reported by sugarcane growers was "***Scarcity of labor during critical operations such as sowing, weeding, and harvesting,"*** which received the highest overall Mean Percent Score (MPS) of 84.22, and was ranked first in both Lakhimpur Kheri (MPS 94.84) and Lucknow (MPS 73.59). The second most critical issue was ***"High cost of diesel and electricity for operating irrigation pumps,"*** which secured an overall MPS of 74.92 and was consistently ranked third in both Lakhimpur (87.34) and Lucknow (62.50). ***"Limited access to improved agricultural implements for land preparation and sowing"*** ranked third overall, with an MPS of 73.91, based on high ratings from both Lakhimpur (76.09; Rank V) and Lucknow (71.72; Rank II). Next came ***"Unavailability of fertilizers and pesticides at the required time,"*** which earned an overall MPS of 65.31 and was ranked fourth, though it showed variation between Lakhimpur (Rank II) and Lucknow (Rank VIII). ***"Lack of access to soil testing laboratories for proper fertilizer application"*** followed with a total MPS of 65.39, placing it fifth overall. Other moderately ranked constraints included, ***"Lack of awareness regarding balanced fertilizer use and integrated weed management"*** (MPS 67.97, Overall Rank VI), ***"Incidence of serious diseases such as Red Rot, Grassy Shoot Disease, and Smut"*** (MPS 56.64, Overall Rank VII), and ***"Inadequate and irregular irrigation facilities due to poor rainfall and unreliable electricity"*** (MPS 53.28, Overall Rank VIII). The lower-ranked constraints were: ***"Heavy infestation of weeds and limited availability of weed control equipment"*** (MPS 50.47, Overall Rank IX), ***"Severe infestation by major insect pests and rodents"*** (MPS 46.25, Rank X), and ***"Non-availability of recommended high-yielding varieties"*** (MPS 43.44, Rank XI). To tackle technological challenges, timely input supply, affordable mechanization, custom hiring centers, better irrigation, pest advisories, and soil testing must be ensured to boost sugarcane productivity.

Table 6: Harvesting & Marketing constraints perceived by the Sugarcane growers

S. No.	Constraints regarding Adoption	Parameter					
		Lakhimpur		Lucknow		Total	
e.	**Harvesting constraints**	**MPS**	**RANK**	**MPS**	**RANK**	**MPS**	**RANK**
1.	Non-availability of labor or harvester at the time of harvesting.	87.50	II	89.69	**I**	88.59	**I**
2.	High cost of manual/ mechanized harvesting.	88.59	**I**	83.44	III	86.02	II
3.	Lack of proper transportation facilities.	4.38	III	84.69	**II**	44.53	III
f.	**Marketing constraints**						
1.	Non-availability of sugar mill or local crushers.	0.00	III	88.13	**I**	44.06	**I**
2.	Long-distance transportation issues.	5.94	**I**	80.78	**II**	43.36	II
3.	Lack of local processing units.	2.66	II	72.81	III	37.73	III

MPS = Mean Percent Score

According to the data in Table 6, The most significant constraint under ***Harvesting*** category was ***"Non-availability of labor or harvester at the time of harvesting,"*** which secured the first rank overall with a total Mean Percent Score (MPS) of 88.59. It was also ranked first in Lucknow (MPS 89.69) and second in Lakhimpur (MPS 83.44). The second key constraint was ***"High cost of manual/ mechanized harvesting,"*** which received an MPS of 86.02 in total, ranked second overall, and was ranked first in Lakhimpur (88.59) and third in Lucknow (83.44). The third constraint, ***"Lack of proper transportation facilities,"*** scored significantly lower with an overall MPS of 44.53, despite a high rating from Lucknow (84.69, Rank II) but a very low score from Lakhimpur (4.38, Rank III), resulting in a third overall rank. In the ***marketing constraints*** category, the most severe issue reported by the respondents was ***"Non-availability of sugar factories or local crushers,"*** which received the highest overall MPS of 44.06, ranked first. It was noted as a major issue in Lucknow (MPS 88.13, Rank I), while Lakhimpur scored it 0.00 (Rank III), showing regional disparity. ***"Long-distance transportation issues"*** was the second most important constraint (MPS 43.36, Rank II), ranked second in Lucknow (80.78) and first in Lakhimpur (5.94). ***"Lack of local processing units"*** was considered the least severe constraint (MPS 37.73, Rank III), based on relatively lower MPS scores in both districts (Lakhimpur: 2.66, Rank II; Lucknow: 72.81, Rank III). In comparison between the two districts, harvesting and marketing constraints showed notable variation in intensity. In Lakhimpur Kheri, the major harvesting concern was the high cost of manual/mechanized harvesting, while marketing issues were relatively minimal, with very low MPS values indicating better local market access. On the other hand, Lucknow farmers faced serious challenges in both areas, especially the non-availability of labor during harvest and lack of nearby sugar factories or crushers, leading to higher transportation costs and post-harvest delays. Overall, while harvesting constraints were significant in both districts, marketing constraints were more severe and prominent in Lucknow, suggesting a need for targeted interventions in processing and market infrastructure.

2.1. Comparison of constraints between sugarcane growers of Lakhimpur Kheri and Lucknow.

The 'Z' test was used to compare the perceived constraints of sugarcane growers in Lakhimpur Kheri and Lucknow, with the results presented in table 7.

Hypotheses

H0: There is no significant difference in constraints perceived by the sugarcane growers of Lakhimpur Kheri and Lucknow.

H1: There is significant difference in constraints perceived by the sugarcane growers of Lakhimpur Kheri and Lucknow.

Table 7: Comparison of constraints perceived by sugarcane growers in Lakhimpur Kheri and Lucknow regarding the adoption of pea production technology.

S. No.	District name	Mean	S.D	'Z' value
1.	**Lakhimpur Kheri**	83.61	4.63	4.06
2.	**Lucknow**	81.50	4.66	

**** Significant at 1 percent level**

The data presented in Table 7 reveals that the overall mean score of perceived constraints was higher in Lakhimpur Kheri (83.61) compared to Lucknow (81.50). The Z-test was applied to determine whether this difference was statistically significant. The calculated Z-value (4.06) exceeds the critical value at the 1% level of significance, indicating a highly significant difference in the perception of constraints between sugarcane growers of the two districts. This suggests that farmers in Lakhimpur Kheri perceived the constraints more severely than those in Lucknow.

Table 8: Future Prospects for the Promotion of Improved Sugarcane Production Technologies.

S. No.	Statement on future Prospects	Parameter					
		Lakhimpur		Lucknow		Total	
		MPS	RANK	MPS	RANK	MPS	RANK
1.	Strengthen extension services through regular field visits and training programs.	57.81	VII	74.38	X	66.09	VIII
2.	Improve coordination between farmers and sugar mill officials.	23.44	XII	87.81	**III**	55.63	IX
3.	Promote mass media and ICT tools for timely dissemination of information.	43.44	IX	60.63	XIII	52.03	XI
4.	Organize awareness campaigns to increase interest in recommended technologies.	75.94	IV	75.94	VIII	75.94	V
5.	Establishment of rural knowledge centers or information kiosks.	74.38	V	81.88	VI	78.13	IV
6.	Ensure availability of high-yielding varieties and certified in-furrow application.	56.56	VIII	85.63	V	71.09	VII
7.	Offer timely and adequate payments to farmers by sugar mills.	3.13	XV	15.94	XV	9.53	XV
8.	Revise FRP policies to ensure fair returns to farmers.	95.00	**I**	95.94	**II**	95.47	**I**
9.	Provide subsidies on key inputs like fertilizers and pesticides.	80.94	**II**	85.94	IV	83.44	**II**
10.	Facilitate access to soil testing and pest diagnosis facilities.	38.75	X	61.25	XII	50.00	XII
11.	Promote irrigation infrastructure with solar-powered or low-cost systems.	78.13	**III**	79.06	VII	78.59	**III**

12.	Support farm mechanization through Custom Hiring Centers (CHCs).	69.06	VI	75.31	IX	72.19	VI
13.	Develop local sugarcane processing and value addition units.	10.63	XIV	99.06	**I**	54.84	X
14.	Improve rural road and transport networks for better market access.	14.38	XIII	22.81	XIV	18.59	XIV
15.	Launch farmer-led groups or cooperatives for collective marketing and input purchase.	26.56	XI	64.69	XI	45.63	XIII

MPS = Mean Percent Score

According to the data in Table 8, the most highly rated future prospect by respondents from both districts was ***"Revise FRP policies to ensure fair returns to farmers,"*** which secured the highest overall Mean Percent Score (MPS 95.47) and was ranked 1st in Lakhimpur Kheri (95.00) and Lucknow (95.94) ranked 2nd . This indicates a strong demand from farmers for better pricing policies to make sugarcane cultivation more profitable. The second most promising measure was ***"Provide subsidies on key inputs like fertilizers and pesticides,"*** with an overall MPS of 83.44 and ranked 2nd overall. It received high support in both districts (Lakhimpur: 80.94, Rank II; Lucknow: 85.94, Rank IV), showing that cost reduction through subsidies is a key priority. ***"Promote irrigation infrastructure with solar-powered or low – cost systems"*** came in third (MPS 78.59), ranked III in Lakhimpur and VII in Lucknow, addressing sustainability and affordability. Finally, Lucknow farmers prioritized processing infrastructure, coordination with mills, and information-based support (ICT and awareness) more than Lakhimpur growers. In contrast, Lakhimpur farmers showed a strong preference for basic needs like FRP policy reform, irrigation development, and input subsidies, highlighting a relatively greater concern for economic and infrastructural fundamentals.

Conclusion:

It is concluded that sugarcane growers in the study area face multiple constraints in adopting improved sugarcane production technology, including inadequate scientific knowledge, limited motivation, high input costs, labor shortages, and poor access to mechanization and infrastructure. Technological issues such as lack of access to improved implements, irregular irrigation facilities, and pest/disease outbreaks further hinder adoption. The constraints varied slightly between districts, with Lakhimpur Kheri showing more concern for financial and resource-based challenges, while Lucknow farmers emphasized infrastructural and coordination issues. The study suggests that to promote sugarcane technology adoption, it is essential to revise FRP policies to ensure fair returns, provide input subsidies, strengthen irrigation and mechanization support, and improve access to high-yielding varieties and soil testing services. Establishing local sugarcane processing units, improving coordination with sugar mills, and organizing regular training and awareness programs can also enhance the adoption of improved practices and ensure sustainable sugarcane production in the region.

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