



Constraints in Adopting Improved Cauliflower Cultivation Practices in Hardoi, Uttar Pradesh

Aman Verma^{1*}, Adesh Kumar Verma², Amrit Warshini³, R.K. Doharey⁴, Gaurav Kumar⁵ and Vineeta Chandra⁶

^{1,3}Ph.D. Scholar, ⁴Professor & HOD, Department of Extension Education, Acharya Narendra Deva University of Agriculture & Technology, Kumarganj, Ayodhya, Uttar Pradesh, India

²Assistant Professor, Department of Agricultural Extension, Kulbhaskar Ashram Post Graduate College, Prayagraj, Uttar Pradesh, India

⁵Assistant Professor, Department of Extension Education, Manglayatan University, Jabalpur, Madhya Pradesh, India

⁶Ph.D. Scholar, Department of Agricultural Extension Education, Centurion University of Technology and Management, Odisha, India

*Corresponding author email id: aman.mainext@gmail.com

HIGHLIGHTS

- The farmers' most perceived constraints in recommended cauliflower cultivation practices were "More infestation of insect pests and diseases".
- The significant economic constraints faced by cauliflower growers were "High cost of insecticide and pesticides" and "High cost of equipment".
- The significant infrastructural constraints in the adoption of recommended cultivation practices of cauliflower were "Lack of storage facilities" and "High decrease in price at harvesting time".
- The significant credit-oriented constraints perceived by farmers were "Non-availability of credit" and "delay in sanctioning".

ARTICLE INFO

Keywords: Cauliflower cultivation, Farmer constraints, Disease-resistant varieties, Economic constraints, Pest Management, Economic Barriers, Credit Accessibility, Sustainable Farming.

<https://doi.org/10.48165/IJEE.2025.612RN02>

Conflict of Interest: None

Research ethics statement(s):

Informed consent of the participants

ABSTRACT

The study examined the constraints faced by cauliflower growers in adopting recommended cultivation practices in Hardoi district, Uttar Pradesh, during the Rabi season of 2021–22. Through multistage random sampling method selected 120 farmers across five blocks and ten villages. The results identified significant technical challenges, including "More infestation of insect pests and diseases" (2.60 MS), reported by 79.16% of farmers, and "Lack of disease-resistant varieties" (2.59 MS). Economic barriers such as "High cost of insecticides/pesticides" (2.54 MS) and infrastructural issues like "Lack of storage facilities" (2.52 MS) were also prominent. Credit constraints, led by "Non-availability of credit" (2.18 MS), further compounded farmers' difficulties. The least significant constraints included "Lack of knowledge about seed treatment" (1.47 MS) and "High cost of irrigation" (1.57 MS). The study concludes that addressing these challenges through enhanced pest management strategies, introducing disease-resistant varieties, and improved economic and infrastructural support could bolster cauliflower cultivation. Such interventions are crucial for improving farmer productivity, ensuring sustainability, and fostering regional agricultural development.

INTRODUCTION

India ranks second globally in producing fruits and vegetables, following China. Among the diverse crops cultivated, cauliflower

(*Brassica oleracea* L. var. botrytis) is prominent in the Brassicaceae family. It is a vital horticultural crop valued for its nutritional content and versatility in culinary uses. Originating in the Mediterranean region, cauliflower was introduced to India during

the British colonial period in the 19th century and has since become a staple in Indian diets. It is rich in vitamin C, vitamin K, dietary fibre, and essential minerals such as calcium, magnesium, phosphorus, and potassium, making it an essential component of a balanced diet (ShunCy, 2023).

Vegetables are vital for public health, contributing significantly to a balanced and nutritious diet. The Indian Council of Medical Research (ICMR) recommends a daily intake of at least 400 grams of vegetables and fruits, accounting for 8 per cent of daily calorie intake (National Institute of Nutrition, n.d.). Despite its nutritional and economic importance, cauliflower cultivation in India is fraught with challenges that restrict its productivity and profitability. Farmers frequently encounter technical, economic, infrastructural, and credit-related barriers that limit their ability to adopt recommended practices. These constraints include pest infestations, high input costs, inadequate storage facilities, and limited access to credit (Gupta et al., 2020). Globally, cauliflower and broccoli cultivation spans approximately 1.34 million hectares, with a production of about 25.2 million tonnes, averaging 18.8 tonnes per hectare (Numerical, 2021). In India, cauliflower cultivation is significant, with major producing states including West Bengal, Madhya Pradesh, Bihar, Gujarat, and Haryana. Uttar Pradesh ranks ninth, with an area of 19,411 hectares and a production of 451,852 tonnes in 2022–23 (Numerical, 2023). Despite its prominence, cauliflower cultivation faces numerous challenges, particularly in regions like Uttar Pradesh, where traditional practices and limited resources often hinder the adoption of improved methods.

The present study investigates the constraints cauliflower growers face in the Hardoi district of Uttar Pradesh, a region with a subtropical climate conducive to Brassicaceae cultivation. This study employs a multistage random sampling approach and a structured interview schedule to identify and analyze these challenges. The findings provide actionable insights to policymakers and extension workers to devise targeted interventions for alleviating these barriers. By addressing the identified constraints, the study seeks to enhance farmer productivity, promote sustainable practices, and contribute to the overall agricultural development of the region.

METHODOLOGY

This study was conducted in the Hardoi district of Uttar Pradesh, India, during the Rabi season of 2021-22. Hardoi has a subtropical climate suitable for cauliflower cultivation in central Uttar Pradesh. A multistage random sampling technique was employed to select respondents. Five blocks within the district were randomly chosen, followed by selecting ten villages from these blocks using simple random sampling with proportional allocation based on village size. Finally, a sample of 120 cauliflower-growing farmers, each cultivating at least half a bigha (0.125 acres) of land, was randomly selected from these villages through proportional allocation. Primary data were collected through personal interviews using a pre-tested, structured interview schedule. The data were coded, tabulated, and analyzed using the Statistical Package for Social Sciences (SPSS) software. Constraints faced by farmers in adopting recommended practices were ranked based on the mean scores obtained for each constraint using a four-point rating scale.

RESULTS

The data in Table 1 revealed that the constraint “More infestation of insect-pests and diseases” (2.60 MS) was the most significant technical constraint perceived by farmers. This issue was identified to a high extent by 79.16 per cent of farmers, to a medium extent by 8.33 per cent, to a low extent by 6.67 per cent, and not at all by 5.83 per cent, placing it at the top rank among technical constraints. The second most significant constraint, “Lack of disease-resistant varieties” (2.59 MS), was reported by 77.5 per cent of farmers to a high extent, by 10 per cent to a medium extent, by 6.67 per cent to a low extent, and not at all by 5.83 per cent. The third-ranked constraint was “Lack of technical guidance” (2.47 MS), followed by “Heavy weed infestation” (2.29 MS) in fourth place. “Lack of knowledge about proper seed rate” (2.19 MS) and “Difficulty in intercultural operations” (2.15 MS) were ranked fifth and sixth, respectively. “Lack of knowledge about spacing” (2.00 MS) ranked seventh, while “Lack of knowledge about seed treatment” (1.47 MS) was the least significant constraint. Only

Table 1. Constraints in adoption of recommended cultivation practices of cauliflower

S. No.	Constraint	MS	Rank	Overall Rank
Technical constraints				
1.	Difficulty in inter-culture operations	2.15	6	15
2.	Lack of technical resistant guidance	2.47	3	6
3.	More infestation of insect-pests & disease	2.60	1	1
4.	Heavy weed infestation	2.29	4	8
5.	Lack of disease resistant varieties	2.59	2	2
6.	Lack of knowledge about proper seed rate	2.19	5	12
7.	Lack of knowledge about seed treatment	1.47	8	28
8.	Lack of knowledge about spacing	2.0	7	19
Economic constraints				
1.	High cost of HYVs	2.16	5	14
2.	High cost of insecticides and pesticides	2.54	1	3
3.	High cost of chemical fertilizers	2.24	4	10
4.	High cost of fungicide	2.03	6	18
5.	High cost of weedicide	2.47	3	6
6.	High cost of irrigation	1.57	8	27
7.	High cost of equipment	2.49	2	5
8.	Higher electricity charges	1.9	7	22
Infrastructural constraints				
1.	Non-availability of seedling	1.84	7	23
2.	Lack of pure insecticides	2.27	3	9
3.	Less availability of irrigation water	1.95	6	21
4.	Lack of transportation	1.96	5	20
5.	Market distance is more	2.20	4	11
6.	Lack of electricity at right time	1.74	8	26
7.	Lack of storage facilities	2.52	1	4
8.	High decrease in price at harvesting time	2.40	2	7
Credit Oriented Constraints				
1.	Non-availability of credit	2.18	1	13
2.	Inadequacy of credit	2.07	3	27
3.	Unauthorized changes	1.76	4	24
4.	Delay in sanctioning	2.09	2	16
5.	Nepotism and favoritism in providing credit	1.75	5	25

16.67 per cent of farmers perceived this issue to a high extent, 25.83 per cent to a medium extent, 45.83 per cent to a low extent, and 11.67 per cent did not face this constraint. These findings align with Anamika et al., (2023) & Kumari et al., (2022).

The constraint “High cost of insecticides/pesticides” (2.54 MS) was farmers’ most significant economic challenge. This issue was perceived to a high extent by 75 per cent of farmers, to a medium extent by 10.83 per cent, to a low extent by 7.5 per cent, and not at all by 6.67 per cent, earning it the top rank among economic constraints. The second-ranked constraint, “High cost of equipment” (2.49 MS), was reported by 73.33 per cent of farmers to a high extent, 4.67 per cent to a medium extent, 5.83 per cent to a low extent, and 9.16 per cent not at all. “High cost of weedicide” (2.47 MS) was ranked third, followed by “High cost of chemical fertilizers” (2.24 MS) in fourth place. “High cost of HYVs” (2.16 MS) was ranked fifth, while “High cost of fungicide” (2.03 MS) and “High electricity charges” (1.90 MS) were ranked sixth and seventh, respectively. The constraint with the lowest rank was “High cost of irrigation” (1.57 MS), perceived to a high extent by 28.33 per cent of farmers, to a medium extent by 13.33 per cent, to a low extent by 40.83 per cent, and not at all by 17.5 per cent. These findings align with those of Gupta et al., (2023) & Roy et al., (2022).

“Lack of storage facilities” (2.52 MS) was the most significant infrastructural constraint, as it was perceived to a high extent by 75 per cent of farmers, to a medium extent by 10.83 per cent, to a low extent by 5.83 per cent, and not at all by 8.3 per cent. This constraint ranked first among infrastructural challenges. The second-ranked constraint was “High decrease in price at harvesting time” (2.40 MS), perceived to a high extent by 71.16 per cent of farmers, to a medium extent by 9.16 per cent, to a low extent by 6.67 per cent, and not at all by 12.5 per cent. The third rank was awarded to “Lack of pure insecticides” (2.27 MS), while “Market distance is more” (2.20 MS) was ranked fourth. “Lack of transportation” (1.96 MS) was awarded the fifth rank, followed by “Less availability of irrigation water” (1.95 MS) in sixth place. The constraint “Non-availability of seedlings” (1.84 MS) was ranked seventh. The least significant constraint was “Lack of electricity” (1.74 MS), perceived to a high extent by 19.16 per cent of farmers, to a medium extent by 46.67 per cent, to a low extent by 23.33 per cent, and not at all by 18.33 per cent. The high cost of establishing cold storage facilities might explain the prominence of the “Lack of storage facilities” issue. Similar findings were reported by Das et al., (2014) & Kumari et al., (2022).

The constraint “Non-availability of credit” (2.18 MS) was the most significant credit-oriented challenge faced by farmers. It was perceived to a high extent by 60.50 per cent of farmers, to a medium extent by 24.16 per cent, to a low extent by 20 per cent, and not at all by 5.8 per cent, earning it the top rank among credit-related constraints. “Delay in sanctioning” (2.09 MS) was ranked second, perceived to a high extent by 35 per cent of farmers, to a medium extent by 43.33 per cent, to a low extent by 17.5 per cent, and not at all by 4.16 per cent. The third-ranked constraint was “Inadequacy of credit” (2.07 MS), followed by “Unauthorized changes” (1.76 MS) in fourth place. The least significant constraint was “Nepotism and favouritism in providing credit” (1.75 MS), perceived to a great

extent by 21.67 per cent of farmers, to a medium extent by 38.33 per cent, to a low extent by 33.33 per cent, and not at all by 6.67 per cent. These findings align with Kumar et al., (2020) & Sabu et al., (2024).

DISCUSSION

The multifaceted constraints identified in cauliflower cultivation can be attributed to several interconnected factors, as revealed through both survey data and farmers’ insights. During the field survey, farmers frequently reported that pest infestation (2.60 MS) was a significant challenge. Several farmers expressed frustration over the limited effectiveness of pesticides, which has increased their reliance on costly chemical solutions. This finding aligns with broader trends observed in Uttar Pradesh and other cauliflower-growing regions, where Brassica crops are highly susceptible to pests and diseases due to changing climate patterns (Yadav et al., 2018; Gupta et al., 2020). The lack of disease-resistant varieties (2.59 MS) further aggravates the issue, with farmers highlighting the scarcity of resilient seeds, a challenge also reflected at the regional level due to slow cultivar development. The high cost of agricultural inputs, particularly pesticides and insecticides (2.54 MS), emerged as a recurring issue. Farmers noted that rising input costs reduce their profit margins, forcing them to limit pesticide application or opt for lower-quality alternatives. This trend mirrors broader market inefficiencies, driven by import dependencies and fluctuating chemical prices (Kumar et al., 2020; Kumar et al., 2023). The inadequate storage facilities (2.52 MS) were frequently cited as a significant infrastructural constraint. Many farmers shared that due to the perishable nature of cauliflower, they were often compelled to sell their produce immediately after harvest, even at lower prices, due to the lack of cold storage options. This situation reflects the larger issue of insufficient rural storage infrastructure in India, which continues to hinder farmers’ bargaining power.

Furthermore, the price fluctuations at harvest time (2.40 MS) were highlighted as a significant challenge, with farmers expressing concerns over low farmgate prices and limited access to formal market linkages. This issue is exacerbated by the absence of efficient value chains and organized procurement systems, making smallholder farmers vulnerable to market volatility (Kumari et al., 2022). Credit constraints (2.18 MS) further compound the challenges, with farmers struggling to access loans due to complex documentation and limited rural banking reach. These constraints are interconnected, as high input costs and storage issues reduce profitability, making farmers more dependent on credit. Addressing these challenges requires holistic interventions such as better seed access, improved storage infrastructure, and streamlined credit facilities (Kumar & Nain, 2012).

CONCLUSION

Farmers primarily struggle with pest infestations, high input costs, inadequate storage facilities, and limited access to credit, which hinder their ability to adopt sustainable farming practices. These findings emphasize the need for targeted interventions, such as improved technical support, affordable input options, and better

credit facilities, to enhance the adoption of recommended practices and ensure sustainable cauliflower cultivation. Addressing these constraints can lead to increased productivity and profitability for farmers, thereby contributing to the region's overall agricultural development. The study reaffirms the importance of providing farmers with the necessary resources and support to overcome these challenges and improve agricultural practices.

REFERENCES

- Agriculture Review. (2023). *Top 10 cauliflower producing states in India*. <https://agriculturereview.com/web-stories/top-10-cauliflower-producing-states-in-india>
- Anamika, Ghalawat, S., Goyal, M., Malik, J. S., & Bishnoi, D. K. (2023). Constraints faced by tomato growers at production and marketing level in Haryana. *Indian Journal of Extension Education*, 59(2), 142-145.
- Das, L., Nain, M. S., Singh, R., & Burman, R. R. (2014). Constraints in marketing of fruits as perceived by the fruit growers and NERAMAC in Assam. *Journal of Community Mobilization and Sustainable Development*, 9(2), 114-117.
- GK Today. (n.d.). *India's rank in fruit and vegetable production*. <https://www.gktoday.in>
- Gupta, B. K., Mishra, B. P., Singh, V., Patel, D., & Singh, M. P. (2020). Constraints faced by vegetable growers in adoption of IPM in Bundelkhand region of Uttar Pradesh. *Indian Journal of Extension Education*, 56(4), 92-97.
- Healthline. (n.d.). *The top 8 health benefits of cauliflower*. <https://www.healthline.com/nutrition/benefits-of-cauliflower>
- Kumar, A., Singh, S., Paliwal, G., Singh, A. K., & Chaurasia, S. (2020). Analysis of constraints faced by vegetables growers in production of rabi Season vegetables. *Indian Journal of Extension Education*, 56(4), 181-185.
- Kumar, P., & Nain, M. S. (2012). Technology use pattern and constraint analysis of farmers in Jammu district of Jammu and Kashmir state of India. *Journal of Community Mobilization and Sustainable Development*, 7(2), 165-170
- Kumar, S., Nain, M. S., Sangeetha, V., & Satyapriya. (2023). Determinants and constraints for adoption of zero budget natural farming (ZBNF) practices in farmer field school, *Indian Journal of Extension Education*, 59(4), 135-140. <https://doi.org/10.48165/IJEE.2023.59427>
- Kumari, N., Chahal, P., & Malik, J. S. (2022). Analysis of marketing facilities available for tomato growers of Haryana. *Indian Journal of Extension Education*, 58(2), 86-90.
- Kumari, N., Chahal, P., Maurya, A. S., Bano, N., & Dhanwal, S. (2022). Adoption level association of farmers regarding recommended tomato production technology practices in Haryana. *Indian Research Journal of Extension Education*, 22(4), 68-72.
- Ministry of Agriculture & Farmers Welfare, Government of India. (2022). *Economic Survey 2021-22: Agriculture and allied sectors*. <https://www.indiabudget.gov.in>
- Ministry of Agriculture & Farmers Welfare, Government of India. (2022). *Annual Report 2021-22: Agriculture's contribution to industries*. <https://agriwelfare.gov.in>
- National Institute of Nutrition. (n.d.). *Director's desk*. <https://www.nin.res.in/directordesk.html>
- Numerical. (2021). *Top 10 cauliflower and broccoli producing countries in the world - production and area under cultivation [2019]*. <https://numerical.co.in/numerons/collection/60a8fe49190ebb1700cdda1c>
- Numerical. (2023). *Top 10 cauliflower producing states in India [2022-23]*. <https://numerical.co.in/numerons/collection/66a04870374180c2ac1845f4>
- Oxford English Dictionary. (n.d.). *Definition of cauliflower*. <https://www.oed.com>
- Pareek, J., Girdhar, A., Kumar, M., & Goyal, N. (2024). Constraints Faced by the Farmers in Production and Marketing of Cauliflower in Haryana, India. *Asian Journal of Agricultural Extension, Economics & Sociology*, 42(5), 249-254. <https://doi.org/10.9734/ajaees/2024/v42i52434>.
- Roy, P., & Ghosh, S. (2022). Constraints faced by pineapple growers in Tripura. *Indian Journal of Extension Education*, 58(2), 140-143.
- Sabu, P. J., & Roy, D. (2024). Constraints faced by paddy farmers in Kerala: An empirical analysis in Palakkad. *Indian Journal of Extension Education*, 60(4), 136-139.
- ShunCy. (2023). *Why is cauliflower colonial? Unpacking the historical origins of a cruciferous vegetable*. <https://shuncy.com/article/why-is-cauliflower-colonial>
- Trading Economics. (2022). *India - Employment in agriculture (% of total employment)*. <https://tradingeconomics.com>
- WebMD. (n.d.). *Cauliflower: Nutrition & health benefits*. <https://www.webmd.com/food-recipes/health-benefits-cauliflower>
- Yadav, S., Godara, A. K., Nain, M. S., & Singh, R. (2018). Perceived constraints in production of Bt cotton by the growers in Haryana. *Journal of Community Mobilization and Sustainable Development*, 13(1), 133-136.