



# International Journal of Research in Agronomy

E-ISSN: 2618-0618  
P-ISSN: 2618-060X  
© Agronomy  
NAAS Rating (2026): 5.20  
[www.agronomyjournals.com](http://www.agronomyjournals.com)  
2026; SP-9(7): 264-267  
Received: 11-04-2026  
Accepted: 15-05-2026

**Sweety**  
Department of Agricultural  
Economics, Acharya Narendra  
Deva University of Agriculture and  
Technology, Kumarganj, Ayodhya,  
Uttar Pradesh, India

**Supriya**  
Department of Agricultural  
Economics, Acharya Narendra  
Deva University of Agriculture and  
Technology, Kumarganj, Ayodhya,  
Uttar Pradesh, India

**Catherine M Peter**  
Department of Agricultural  
Economics, Acharya Narendra  
Deva University of Agriculture and  
Technology, Kumarganj, Ayodhya,  
Uttar Pradesh, India

**Diksha**  
Department of Agricultural  
Economics, Acharya Narendra  
Deva University of Agriculture and  
Technology, Kumarganj, Ayodhya,  
Uttar Pradesh, India

**Pranshi**  
Department of Agricultural  
Economics, Acharya Narendra  
Deva University of Agriculture and  
Technology, Kumarganj, Ayodhya,  
Uttar Pradesh, India

**Corresponding Author:**  
**Sweety**  
Department of Agricultural  
Economics, Acharya Narendra  
Deva University of Agriculture and  
Technology, Kumarganj, Ayodhya,  
Uttar Pradesh, India

## Production and marketing constraints in lentil farming: Evidence from Ghazipur District, Eastern Uttar Pradesh

Sweety, Supriya, Catherine M Peter, Diksha and Pranshi

DOI: <https://www.doi.org/10.33545/2618060X.2026.v9.i7Sd.6042>

### Abstract

This study examined the major production and marketing constraints affecting lentil farmers in Ghazipur district of Eastern Uttar Pradesh using Garrett's ranking technique. Multistage sampling design was used to select the lentil farmers for primary data collection, which was analysed to identify and prioritize major constraints experienced across farm sizes. The results showed that adverse weather conditions, particularly untimely rainfall and frost, emerged as the most severe production constraint with a Garrett score of 75, high cost of critical inputs (quality seeds and fertilizers) followed with 60, then limited access to institutional credit ranked third with 40. Crop losses due to pests and diseases had a ranking score of 30 and inadequate technical knowledge about modern agricultural practices scored 24 occupying fourth and fifth positions respectively. When it came to marketing front, high fluctuation in prices and low market prices at harvesting period were identified as major constraints with the highest Garrett score of 77. Exploitative middlemen who charged high commission had 63, inadequate storage and cold room facilities scored 54, high transport got 46, lack of local processing centres scored 37, with limited real-time market information access coming last with a score of 23. The findings suggest that lentil productivity and profitability is challenged by both production and marketing bottlenecks. Strengthened climate-resilient practices, improved access to affordable inputs and credit, investment in local storage and processing facilities, enhanced market transparency and expanded digital marketing systems can improve competitiveness and sustainability of lentil farming in the study area.

**Keywords:** Lentil production, constraints, lentil marketing, Ghazipur, Garrett ranking

### 1. Introduction

Lentil (*Lens culinaris* Medik.) is among the oldest grown pulse crops and occupy major position globally in terms of agriculture because its nutrition value is high, economically important and ecologically beneficial. It is rich in protein, dietary fibre, vitamins, and essential minerals and so lentils contains key source of affordable nutrition, especially in developing countries where plant-based protein forms a substantial component of day-to-day diets. In addition to its contribution towards household food and nutrition security, lentil growing is associated with enhancing soil fertility through biological nitrogen fixing, improving soil structure and reducing dependence on artificial nitrogen fertilizers which makes it integral component of cropping system sustainability, Singh *et al.*, (2026) <sup>[14]</sup>. Therefore, promoting lentil production aligns with the broader goal of climate-resilient agriculture, sustainable intensification and environmental conservation.

India is the largest producer, consumer and importer of pulses globally, an indication of persistent gap between domestic production and increased demand. Among pulse crops, lentil occupies a significant share of the rabi cropping system, particularly in the Indo-Gangetic Plains, where it is cultivated under rainfed as well as irrigated conditions, Singh *et al.*, (2026) <sup>[14]</sup>. Despite continuous technological advancements, the productivity of lentil in India remains below its attainable potential due to numerous agronomic, institutional, and market-related constraints, Anderson *et al.*, (2022) <sup>[1]</sup>. Enhancing lentil productivity is thus becoming a national priority to improve nutritional security, reduce import dependence and increase farmers' income. Studies have emphasized on expanding the adoption of improved varieties, modern crop management practices and efficient marketing systems to enhance competitiveness of the lentil

sector, Singh *et al.*, (2016) <sup>[12]</sup>.

Uttar Pradesh is one of the leading lentil-producing states in India and plays a crucial role in the country's pulse production. Within the state, Ghazipur district, situated in eastern alluvial plains, possess favourable climatic conditions suitable for lentil growing after kharif rice harvesting. Nevertheless, lentil farmers in the district continue to experience relatively low productivity and unstable farm incomes amidst availability of improved production technologies, Anderson *et al.*, (2022) <sup>[1]</sup>. Cluster front line demonstrations conducted by krishi vigyan kendra (KVK), Ghazipur demonstrated that improved varieties and recommended crop management practices can increase grain yield, profits and returns from investment. However, the adoption of these technologies remains constrained by inadequate access to quality seed, limited awareness of improved production practices, and institutional bottlenecks, Singh *et al.*, (2022) <sup>[13]</sup>.

Agricultural production decisions are majorly influenced by multiple interrelated constraints operating along the entire value chain, Gautam *et al.*, (2023) <sup>[3]</sup> and Verma *et al.*, (2025) <sup>[19]</sup>. Production-related challenges such as climate variability, untimely rainfall, rising input prices, pest and disease incidence, inadequate irrigation, shortage of quality seed, limited access to institutional credit, and weak extension support reduces production efficiency and discourage technology adoption, Singh *et al.*, (2025) <sup>[11]</sup> and Dogra *et al.*, (2016) <sup>[2]</sup>. Equally important are post-harvest and marketing constraints, including price volatility, inadequate storage infrastructure, high transportation costs, dependence on market intermediaries, limited processing facilities, poor market intelligence, and weak bargaining power. These constraints increase transaction costs, reduce producers' share of consumer prices, and ultimately diminish farm profitability, Supriya *et al.*, (2025) <sup>[17]</sup> and Ghimire *et al.*, (2026) <sup>[4]</sup>. Previous studies conducted in Uttar Pradesh have consistently reported that unfavourable weather conditions, inadequate production resources, limited marketable surplus, poor access to reliable market information, and unstable market prices constitute major barriers to profitable lentil cultivation, Singhvi, (2020) <sup>[15]</sup>.

An effective understanding of farmers' perceptions regarding these constraints is essential for designing evidence-based interventions. Garrett Ranking Technique has emerged as one of the most reliable approaches for prioritizing production and marketing problems because it converts farmers' subjective rankings into quantitative scores, thereby enabling researchers and policymakers to identify the most critical issues requiring immediate attention, Gupta *et al.*, (2025) <sup>[5]</sup> and Sujitha *et al.*, (2025) <sup>[16]</sup>. Unlike simple frequency analysis, Garrett ranking provides a more robust prioritization framework by accounting for the relative importance assigned by respondents, making it particularly suitable for agricultural constraint analysis, Verma *et al.*, (2025) <sup>[19]</sup>.

Several studies have examined lentil production technologies and improvement of productivity in Uttar-Pradesh, few have simultaneously analysed both production and marketing constraints at the district level in Eastern Uttar Pradesh using a systematic prioritization technique. Moreover, localized evidence from Ghazipur district remains limited despite its importance in regional pulse production. Understanding district-specific constraints is crucial because socio-economic conditions, institutional arrangements, market access, and

climatic characteristics vary considerably across regions which calls for context-specific policy interventions. Against this backbone, this current study entitled "production and marketing constraints in lentil farming: insights from Garrett ranking analysis in Ghazipur District of Eastern Uttar Pradesh" seeks to identify and prioritize major production and marketing constraints experienced by lentil farmers. The findings will give empirical evidence for policymakers, extension agencies, research institutions and value chain stakeholders to formulate targeted interventions for improvement of productivity, strengthen market efficiency, enhance farmers' income as well as promotion of sustainable development of the lentil enterprise in Eastern Uttar Pradesh.

## 2. Methodology

The research was carried out in Ghazipur district of Eastern Uttar Pradesh among Lentil growers. The study focused Bhanwarkol, Mohammadabad and Jakhania selected for their significant production of lentils. Through random sampling, 120 respondents were chosen (2\*6\*10). Farmers in each village were categorized as Marginal (<1 ha), Small (1-2 ha), or Medium (2-10 ha). The study aimed to identify factors affecting lentil growers. Primary data was collected through direct observation, interviews and in-depth discussions with key informants and elders. Supplementary information was obtained from District Headquarters, District Statistical Office, published reports, websites of Department of Agriculture and Farmer Welfare, National Horticulture Board and District Horticulture Office.

### 2.1 Garrett's Ranking Technique

This method was utilised because it enabled the respondents to rank all factors based on their ability. The resulting ranking was then converted into a score value using the following formula: (Gupta *et al.*, 2025 and Sujitha *et al.*, 2025) <sup>[5, 16]</sup>.

$$\text{Percent Position} = \frac{100(R_{ij} - 0.5)}{N_j}$$

Where:

$R_{ij}$  = Rank given to the  $i$ -th constraint by the  $j$ -th respondent

$N_j$  = Total number of constraints ranked by the  $j$ -th respondent

The percentage position was converted to score by consulting Garrett and Woodworth (1969) table. Then, the scores for each individual were summed for each factor, and the total and mean values were calculated. Factor with the highest mean value was considered the most severe.

## 3. Results and Discussion

### 3.1 Production Constraints among Lentil Farmers

The Garrett ranking analysis (table 1) revealed that adverse weather conditions, particularly untimely rainfall and frost ranked first with Garrett score of 75, an indication that it was the most critical production constraint faced by lentil farmers in Gazipur. This is because one of the major characteristics of lentils is their high sensitivity to climatic fluctuations during flowering and pod development stages, and so the unexpected rainfall or frost will reduce plant growth, increase flower shedding, encourage disease infestation or ultimately lower grain yield, Tiwari *et al.*, (2018) <sup>[18]</sup>.

**Table 1:** Production Constraints among Lentil Farmers

| Particular (Production Constraints)                           | Percentage Position | Garrett's Ranking Technique | Rank |
|---------------------------------------------------------------|---------------------|-----------------------------|------|
| Adverse weather/climate (Untimely rain/frost)                 | 10                  | 75                          | I    |
| High cost of critical inputs (Quality seeds & fertilizers)    | 30                  | 60                          | II   |
| Lack of timely availability of institutional credit           | 50                  | 40                          | III  |
| Crop damage due to pests and diseases (Wilting/Rust)          | 70                  | 30                          | IV   |
| Lack of technical knowledge about modern package of practices | 90                  | 24                          | V    |

Quality seeds and fertilizer were costing high and they emerged second most production constraint after scoring 60. This can be attached to the fact that increase in input prices, increase production costs and may discourage small and marginal farmers from adopting improved technologies or applying recommended fertilizer doses. Out of the total number of constraints limitation in accessing credit ranked third with a score of 40, indicating that affordable agricultural finance is crucial in quality inputs purchase and adoption of improve agricultural technologies, Singh *et al.*, (2022) <sup>[13]</sup>.

Damages due to pests and diseases, especially wilt and rust, ranked fourth with a score of 30. This is attached to the fact that diseases are known to cause substantial yield losses in lentil-growing regions if not well managed, Tiwari *et al.*, (2018) <sup>[18]</sup>. Then lack of technical knowledge about modern practices received a score of 24 and ranked fifth. Though ranked least of all production constraints, limited knowledge remains a key factor that can limit production. This is because farmers with limited access to extension services may be unaware of improved varieties, balanced nutrient management, optimum sowing practices, and integrated crop management techniques, Dogra *et al.*, (2016) <sup>[12]</sup> and Matsepe *et al.*, (2025) <sup>[7]</sup>.

### 3.2 Marketing Constraints among Lentil Farmers

Regarding marketing constraints (table 2), high price fluctuations and low market prices during the harvest season emerged as the most severe challenge. Lentil farmers often sell immediately after harvest due to urgent cash requirements, loan repayment obligations, and inadequate storage facilities. The simultaneous arrival of produce in markets creates excess supply, resulting in depressed prices and reduced farm incomes,

Ghimire *et al.*, (2026) <sup>[4]</sup>. This finding highlights the need for effective price stabilization policies, warehouse receipt systems, and minimum support price mechanisms to protect farmers from seasonal price volatility.

The dominance of market intermediaries and high commission charges ranked second among marketing constraints. Farmers frequently depend on commission agents and traders due to limited direct access to wholesale markets, weak bargaining power, and insufficient market information. As a result, intermediaries capture a substantial share of marketing margins, reducing producers' net returns. Strengthening farmer producer organizations and promoting direct marketing channels could improve farmers' bargaining position and increase their share of consumer prices, Yirga *et al.*, (2019) <sup>[20]</sup>.

The lack of specialized storage and cold warehousing facilities ranked third, indicating that post-harvest infrastructure remains inadequate in Gazipur. Without proper storage facilities, farmers are unable to delay sales until prices improve, forcing distress sales immediately after harvest. Investment in modern storage infrastructure would reduce quantitative and qualitative losses while enabling farmers to benefit from favourable market prices, Sah *et al.*, (2024) <sup>[10]</sup>.

High transportation costs were identified as the fourth most important marketing constraint. Poor rural infrastructure, increasing fuel prices, and long distances to regulated markets contribute to higher marketing costs, thereby reducing farmers' profitability, Yirga *et al.*, (2019) <sup>[20]</sup> and Zeb *et al.*, (2021) <sup>[21]</sup>. Improvements in rural road networks and collective transportation arrangements through farmer groups could lower transaction costs and enhance market access.

**Table 2:** Marketing Constraints among Lentil Farmers

| Particular (Marketing Constraints)                                  | Percentage Position | Garrett's Ranking Technique | Rank |
|---------------------------------------------------------------------|---------------------|-----------------------------|------|
| High price fluctuations and lower market price during harvest       | 8.40                | 77                          | I    |
| Malpractices and high commissions by market intermediaries          | 25.00               | 63                          | II   |
| Lack of specialized storage and cold-warehousing facilities         | 41.70               | 54                          | III  |
| High transportation costs from farm-gate to regulated markets       | 58.40               | 46                          | IV   |
| Absence of processing units (Dal Mills) at the local district level | 75.00               | 37                          | V    |
| Lack of real-time market information regarding prices and demand    | 91.70               | 23                          | VI   |

The absence of local processing units, such as dal mills, ranked fifth. Processing facilities add value to agricultural commodities and generate additional income opportunities for farmers, Kumar *et al.*, (2026) <sup>[6]</sup>. The lack of local processing infrastructure compels producers to sell raw produce at relatively lower prices, while value addition occurs elsewhere, Rashid *et al.*, (2010) <sup>[9]</sup> and Sah *et al.*, (2024) <sup>[10]</sup>. Establishing decentralized processing units could stimulate rural employment and strengthen local value chains, Peter *et al.*, (2025) <sup>[8]</sup>.

Finally, lack of real-time market information regarding prices and demand ranked sixth. Although farmers considered it relatively less severe than other marketing challenges, limited access to timely market intelligence still constrains informed marketing decisions. Expansion of mobile-based market information services, digital agricultural platforms, and

extension-led market advisory systems would enhance price transparency and improve farmers' marketing efficiency, Singhvi, (2020) <sup>[15]</sup>.

### Limitations of the study

The study was confined to lentil farmers in Ghazipur district of Eastern Uttar Pradesh. Therefore, findings reflect socio-economic, institutional and climatic conditions specific to the study area and generalization to other lentil-producing regions with different farming systems, market structures and resource ownership may not be possible.

Garrett's ranking technique prioritizes farmers' perceived production and marketing constraints but it doesn't quantify the magnitude of their impact on lentil productivity, profitability or farm income. Also the analysis identified importance of

constraints without establishing causal relationship or measuring their economic effects which opens a gap for further studies in this field.

### Policy implications and recommendations

This research study recommends strengthening application of climate-smart agricultural practices, ensure quality seeds and affordable inputs are availed on time, expand institutional financing, improve local storage and transport infrastructure, strengthen farmer producer organizations and enhance access to real-time market information. This will aid in reduction of production risks, improve farmers' bargaining power, minimize post-harvest losses and increase profits of lentil farmers in Eastern Uttar Pradesh.

### Conclusion

The results in overall demonstrate that lentil farmers in Gazipur face interconnected production and marketing constraints that altogether limit productivity, profitability and livelihood resilience. To address these constraints, it requires an integrated strategy that combines climate-smart agricultural practices, affordable access to quality inputs and institutional finance, strengthened extension services and improved rural infrastructure. Such interventions will contribute towards increased lentil production, improved farm incomes and enhanced sustainability of pulse cultivation in the study area

### Competing Interests

The authors declared that they have no conflict of interest. They have, rather, professional and personal interest to see success in advancement of Lentil growing through training on climate-smart agricultural practices and access to high yielding varieties.

### References

1. Anderson E, Singh R, Stein D, Sturla K. What are the barriers to pulse cultivation in India? Evidence from a randomized controlled trial. Unpublished manuscript. 2022.
2. Dogra A, Sarkar A, Saha P, Hassan AW. Livelihood analysis of lentil (*Lens culinaris*) farmers in Chandauli district of Uttar Pradesh. *Indian J Agric Sci*. 2016;86(7):884-890.
3. Gautam D, Dhakal SC, Kattel RR, Khanal NP. Strengthening the competitiveness of the lentil seed system of Nepal: A value chain approach. *J Agribus Rural Dev*. 2023;67(1):63-77.
4. Ghimire B, Dhakal SC, Marahatta S, Bastakoti RC. Empirical analysis of value chain and marketing margin determinants in Nepalese lentil sector. *Cogent Bus Manag*. 2026;13(1):2620170.
5. Gupta S, Omar I, Yadav DN, Yadav U. Growth and performance of Kisan Credit Card Scheme in Sultanpur district of Uttar Pradesh, India. *J Exp Agric Int*. 2025;47(6):420-431.
6. Kumar P, Srivastava AB, Peter CM, Omar I. Cost efficiency and profitability: A relative advantage analysis of pigeonpea and sugarcane cultivation. *J Food Legumes*. 2026;39(1):130-137.
7. Matsepe MS, Rai A, Peter CM. Extension and advisory services strategies to address gender issues. *Stud Agric*. 2025;1:82-88.
8. Peter CM, Supriya M, Kumar P. Sustainable socioeconomic development via mango fruit value chain: A comprehensive review on Kenya and India. *J Appl Biol Agric*. 2024;1:1-15.
9. Rashid S, Yirga C, Behute B, Lemma S. Pulses value chain in Ethiopia: Constraints and opportunities for enhancing exports. Addis Ababa: International Food Policy Research Institute; 2010.
10. Sah U, Verma P, Pal J, Singh V, Katiyar M, Dubey SK, *et al*. Pulse value chains in India—Challenges and prospects: A review. *Legume Res*. 2024;47(7).
11. Singh HL, Kumar P, Omar I, Manaswini N, Peter CM, Dhar U. Comparative study for major crops in Rajasthan, India. *Plant Arch*. 2025;25(1).
12. Singh NP, Praharaj CS, Sandhu JS. Utilizing untapped potential of rice fallow of East and North-east India through pulse production. *Indian J Genet Plant Breed*. 2016;76(4):388-398.
13. Singh O, Singh DK, Singh A, Singh RP, Pandey S, Bajpai AK. Increasing productivity of lentil (*Lens culinaris*) using improved varieties under alluvial soil of Uttar Pradesh by cluster front line demonstrations. *Legume Res*. 2022;45(4):492-496.
14. Singh PN, Pipil S, Srivastava PK, Verma SK. Phenological coherence and yield variability of Rabi crops under short-term climatic and socio-environmental disturbance in eastern Uttar Pradesh. *Field Crops Res*. 2026;342:110472.
15. Singhvi S. Improving farmers' and consumers' welfare in agricultural supply chains via data-driven analytics and modeling: From theory to practice. Cambridge (MA): Massachusetts Institute of Technology; 2020.
16. Sujitha T, Supriya AK, Shakya IO, Peter CM, Yadav U. Income inequality and constraints analysis of MGNREGA beneficiaries in rural households. [Publication details unavailable].
17. Supriya, Singh HL, Kumar P, Omar I, Manaswini N, Peter CM, *et al*. Comparative study for major crops in Rajasthan, India. 2025.
18. Tiwari N, Ahmed S, Kumar S, Sarker A. Fusarium wilt: A killer disease of lentil. In: *Fusarium—Plant diseases, pathogen diversity, genetic diversity, resistance and molecular markers*. 2018.
19. Verma A, Doharey RK, Warshini A, Meena NR. A Garrett's ranking approach to identifying constraints in sustainable crop residue management in Central Uttar Pradesh. *Econ Aff*. 2025;70(3):213-220.
20. Yirga C, Rashid S, Behute B, Lemma S. Pulses value chain potential in Ethiopia: Constraints and opportunities for enhancing exports. *Gates Open Res*. 2019;3:276.
21. Zeb I, Kumar S, Athar M. A study of various constraints in lentil production and marketing in district Lakhimpur (Kheri) of Uttar Pradesh. *Asian J Agric Ext Econ Soc*. 2021;39(11):528-532.