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A study on the constraints faced by mustard growers: A study of Mirzapur district of eastern Uttar Pradesh

¹Kavita Patel, ²Supriya, ¹Deep Narayan, ³Arvind Patel, ⁵Sadhna Baghel, ⁴Nikhil Yadav and ¹Anamika Yadav

¹PG Scholar, Department of Agricultural Economics, Acharya Narendra Deva University of Agriculture and Technology, Kumarganj, Ayodhya, Uttar Pradesh, India

²Associate Professor, Department of Agricultural Economics, Acharya Narendra Deva University of Agriculture and Technology, Kumarganj, Ayodhya, Uttar Pradesh, India

³Ph.D. Scholar Department of Genetics and Plant Breeding, Banaras Hindu University, Varanasi, Uttar Pradesh, India

⁴PG Scholar Department of Agricultural Extension, Chandra Bhanu Gupta P.G College of agriculture B.K.T (University of Lucknow), Uttar Pradesh, India

⁵Ph.D. Scholar, Department of Agricultural Economics, Acharya Narendra Deva University of Agriculture and Technology, Kumarganj, Ayodhya, Uttar Pradesh, India

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Corresponding Author: Supriya

Abstract

Mustard (*Brassica juncea* L.) is an economically important rabi oilseed crop that occupies a significant place in the agricultural economy of Mirzapur district, Uttar Pradesh. Despite favourable production potential, growers in the district continue to face a range of constraints that limit their adoption of improved cultivation technologies, thereby holding back productivity and farm incomes. This study was undertaken in Mirzapur district during 2024-25 with the aim of identifying and prioritising the constraints experienced by mustard cultivators through Garrett's Ranking Technique. A sample of 120 respondents was drawn using a multistage random sampling design from two contrasting blocks - Haila, a high mustard-producing area, and Narayanpur, a low-producing area - with two villages selected from each block and 30 respondents interviewed per village. Primary data were gathered through structured interview schedules and examined using frequency distribution along with Garrett's Ranking Technique. The findings indicate that inadequate knowledge of high-yielding varieties (Average Percentage Score 69.17, Rank I) was perceived as the most severe constraint, followed by the high price of improved seed (64.90, Rank II), limited awareness of seed treatment methods (63.86, Rank III), weak economic capacity of growers (62.14, Rank IV), delayed access to farm inputs (52.52, Rank V), scarcity of high-yielding seed in the local market (46.63, Rank VI), costly plant protection inputs (40.37, Rank VII), inadequate irrigation infrastructure (36.92, Rank VIII), poor marketing arrangements (35.10, Rank IX), and unfavourable produce prices at harvest (33.40, Rank X). The study recommends strengthening KVK-led extension outreach, improving seed and input supply chains, and extending institutional financial support to raise mustard productivity in the district.

Keywords: Forest dwellers, rehabilitation, relocation, tiger reserves, livelihood security, protected areas, binomial logistic regression, Garrett ranking

Introduction

Mustard (*Brassica juncea* L.), an oilseed crop of the Brassica genus, is the third-largest crop of edible oil in the world after palm and soybean oil (Gogoi, 2023). Its seed contains 28-32% oil and 28-36% protein, with a favourable fatty-acid composition (Sonvanee *et al.*, 2016), and the crop underpins rural livelihoods by supplying edible oil, livestock feed, and farm income^[8, 14].

Globally, Canada is the leading mustard producer with a 23.32% share, followed by the European Union (22.97%) and China (18.54%), while India ranks fourth with a 13.99% share (USDA Oilseeds, 2025)^[17]. World production stood at about 85.77 million tonnes in 2024-25 and is estimated to have risen to nearly 95.51 million tonnes in 2025-26 (Kumar

et al., 2025; USDA, 2026). India's productivity of 1,470 kg/ha, however, remains well below the world average of 2,144 kg/ha and the European Union's 3,000-3,500 kg/ha, pointing to considerable scope for improvement (USDA, 2025)^[17, 18].

In India, mustard contributes nearly 28-30% of total oilseed production and about 25% of domestic edible-oil output, with *Brassica juncea* L. accounting for more than 80% of the country's rapeseed-mustard area and production (ICAR-DRMR, 2023)^[9]. Even so, India continues to import 55-60% of its edible-oil requirement (DES, 2024)^[11]. National production increased from 6.8 million tonnes in 2015-16 to about 12.61 million tonnes in 2024-25 - a rise of nearly 85% - driven largely by improved varieties and better agronomic

practices although area and productivity continue to fluctuate from year to year (DA&FW, GOI, 2025) ^[5].

Among Indian states, Rajasthan leads mustard cultivation with 3.49 million hectares and 5.42 million tonnes of production (productivity 1,552 kg/ha), followed by Uttar Pradesh, the second-largest producer, with 1.63 million hectares, 2.41 million tonnes of production, and productivity of 1,474 kg/ha (Anonymous, 2025). Uttar Pradesh as a whole cultivates mustard on about 14.23 lakh hectares, producing 15.60 lakh tonnes at an average productivity of 1,483 kg/ha, supported by the fertile Indo-Gangetic plains and a well-developed irrigation network (IGrain India, SEA, 2024-25). Eastern Uttar Pradesh, in particular, holds considerable potential for productivity improvement through wider adoption of high-yielding varieties such as Narendra Ageti Rai-4, Pusa Mustard-25, Varuna, and Kranti (Bhanu *et al.*, 2019) ^[3].

Mirzapur district, situated in the Vindhyan agro-climatic zone of Eastern Uttar Pradesh, is dominated by small and marginal farmers who typically follow mixed cropping systems (KVK, Mirzapur). The district records mustard production of about 4,202 tonnes with a comparatively modest productivity of around 1,230 kg/ha (UPDES, 2023). Mustard production in the region has fluctuated due to environmental and socio-economic challenges, affecting

farmers' livelihoods and agricultural stability. Therefore, analysing its trends and growth is essential for developing effective policies to promote sustainable farming, strengthen food security, and enhance farmers' incomes (Dubey *et al.*, 2025) ^[7].

2. Materials and methods

The study was conducted in Mirzapur district of Uttar Pradesh during the 2024-25 agricultural year using a multistage sampling design for the selection of respondents. In the first stage, Haila and Narayanpur blocks were purposively selected to represent, respectively, high and low mustard-producing areas. In the second stage, two villages were randomly selected from each block, namely Kotar and Mahugarh from Haila block, and Jalalpur Mafi and Nekahara from Narayanpur block. In the final stage, 30 mustard-growing farmers were randomly selected from each village, giving an overall sample of 120 respondents (2 blocks x 2 villages x 30 respondents). Primary data were collected through personal interviews using a pre-tested structured schedule, while secondary data were obtained from the Krishi Vigyan Kendra (KVK), the Department of Agriculture, and other relevant government publications. The data so collected were compiled, tabulated, and analysed using appropriate statistical tools to fulfil the objective of the study.

Table 1: Sampling Procedure

State	District	Block	Villages	Respondents
Uttar Pradesh	Mirzapur	Haila	Kotar, Mahugarh	60 (30 each)
		Narayanpur	Jalalpur Mafi, Nekahara	60 (30 each)
		Total: 2 Blocks	4 Villages	120

Measurement of Constraints - Garrett's Ranking

Technique: Respondents were asked to rank ten pre-identified constraints to the adoption of improved mustard cultivation practices. The list of ten constraints was drawn from earlier literature and refined through pilot testing. Each respondent assigned ranks from 1 (most important) to 10 (least important) to the constraints. The rank data were then analysed using Garrett's Ranking Technique, in which every rank is converted into a percent position using the following expression:

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

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 percent position values were converted into Garrett scores using Garrett's conversion table; the scores corresponding to ranks 1st to 10th are 82, 70, 63, 58, 52, 48, 42, 36, 30 and 24, respectively. For each constraint, the total Garrett score was obtained by multiplying the number of respondents assigning a particular rank by the corresponding Garrett value and summing across all ranks. Dividing this total by the number of respondents ($N = 120$) gave the Average Percentage Score. Constraints were then arranged in descending order of their Average Percentage Score; with Rank I assigned to the constraint having the highest score.

3. Results and discussion

The Garrett scores (frequency), Average Percentage Scores, and ranks obtained for all ten constraints are presented in Table 2.

Table 2: Constraints Faced by Mustard Growers as per Garrett's Ranking Technique

S.No.	Constraints	Frequency	Score	Rank
1	High cost of improved seeds	78	64.90	II
2	Low market price of produce at the time of harvesting	40	33.40	X
3	Lack of knowledge about high-yielding varieties	83	69.17	I
4	Non-availability of irrigation facilities at the required time	44	36.92	VIII
5	Lack of knowledge about seed treatment	76	63.86	III
6	Lack of a proper marketing facility in the area	42	35.10	IX
7	Poor economic condition of mustard growers	75	62.14	IV
8	High cost of plant protection measures	48	40.37	VII
9	Untimely availability of agricultural inputs in the locality	63	52.52	V
10	Lack of non-availability of high-yielding seed varieties	56	46.63	VI

Inadequate knowledge about high-yielding mustard varieties emerged as the most critical constraint, securing Rank I with the highest Average Percentage Score of 69.17. A large proportion of mustard growers in Mirzapur continue to sow traditional local varieties instead of improved high-yielding types such as Pusa Bold, Varuna, Kranti, and RH-749, which are capable of giving 20-30% higher yields. This knowledge gap is closely linked to weak extension delivery and the limited outreach of Krishi Vigyan Kendras (KVKs) in the district, where only around 30% of farmers regularly participate in training programmes.

The high cost of improved seed was ranked second (Average Percentage Score 64.90). Certified seed of improved varieties is priced considerably higher than farm-saved or local seed and is often not available at subsidised rates through official channels in Mirzapur - a constraint felt acutely by the district's predominantly small and marginal farming community. Limited awareness of seed treatment practices was ranked third (63.86). Treating seed with fungicides or bio-agents is important for guarding against soil-borne diseases such as *Alternaria* blight and *Sclerotinia* rot, but awareness and adoption of this practice remain low among the respondents.

Weak economic condition of mustard growers was ranked fourth (62.14). Since improved mustard cultivation requires input costs of Rs. 20,000 to Rs. 25,000 per hectare, many smallholders find this beyond their means, which discourages full adoption of recommended packages. Delayed availability of agricultural inputs in the locality was ranked fifth (52.52); fertilizers, pesticides, and certified seed are often not available locally at the right time, forcing farmers to travel to distant markets, which raises costs and delays critical field operations.

Non-availability of high-yielding seed varieties in local markets was ranked sixth (46.63), reflecting gaps in the seed-supply chain. The high cost of plant protection measures was ranked seventh (40.37); managing pests such as aphids and diseases through chemical or biological IPM measures requires expenditure that many farmers cannot sustain without financial support. Inadequate irrigation facilities at critical growth stages were ranked eighth (36.92), pointing to infrastructural gaps, particularly for timely pre-sowing and post-sowing irrigation that is important for mustard establishment.

Weak marketing infrastructure in the area was ranked ninth (35.10); the absence of regulated mandis, grading facilities, and linkage with e-NAM in Mirzapur leaves farmers dependent on intermediaries and often results in sales below the minimum support price. Unfavourable market prices at the time of harvest were ranked tenth (33.40), suggesting that although price realisation is a genuine concern, respondents perceived it as less restrictive than knowledge-, input-, and finance-related barriers. These findings broadly agree with Kumar *et al.*, who reported knowledge deficiency (85%) and input scarcity (80%) as leading constraints among mustard growers in the neighbouring Jaunpur district, and with Singh *et al.*, who identified complexity of technology and inadequate technical guidance as major constraints among pulse growers in Mirzapur district.

4. Conclusion: This study shows that mustard growers in Mirzapur district of Uttar Pradesh face a wide-ranging and

interconnected set of constraints spanning knowledge gaps, economic limitations, input-supply bottlenecks, and marketing difficulties. Application of Garrett's Ranking Technique identified inadequate knowledge about high-yielding varieties (Rank I, Average Percentage Score 69.17) and the high cost of improved seed (Rank II, 64.90) as the most pressing constraints, closely followed by limited knowledge of seed treatment and weak economic capacity of growers. These findings underline the need to strengthen the agricultural extension system through regular KVK-led training programmes, farmer field schools, and doorstep advisory services aimed at promoting adoption of improved varieties and sound crop management. At the same time, developing FPO-managed input depots would help ensure timely and affordable supply of certified seed, fertilizers, and pesticides, addressing supply-chain constraints. Extending financial support through Kisan Credit Card (KCC) facilities, PM-KISAN benefits, and input subsidies under PKVY is important for easing the economic burden on marginal and small farmers. Integrating Mirzapur's agricultural markets with the e-NAM platform and ensuring MSP-linked procurement would help reduce marketing-related constraints and improve farmer incomes. Implementation of these measures has the potential to meaningfully raise mustard productivity towards 25 quintals per hectare, improve farmer livelihoods, and support Uttar Pradesh's broader mustard production goals.

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Competing interests

The authors have declared that they have no competing interests.

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