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Analysis of constraints faced by mustard growers in Jaunpur District, Uttar Pradesh

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Abstract

Mustard (*Brassica juncea*), a vital oilseed crop, significantly contributes to the agricultural economy of Uttar Pradesh, particularly in Jaunpur district. Despite its importance, mustard growers face numerous constraints that limit the adoption of improved cultivation practices, reducing productivity and livelihoods. This study analyzes the constraints faced by 300 mustard growers across four blocks (Sujanganj, Mungara Badshahpur, Machhlisahar and Mariyahu) in Jaunpur, using a descriptive research design with multistage sampling. Data, collected through structured interviews, direct observation and secondary sources, were analyzed using frequency and percentage distributions to rank constraints and suggestions. Knowledge-related barriers were most prevalent, with 85% of growers lacking knowledge about mustard cultivation, followed by timely unavailability of inputs (80%) and lack of knowledge about high-yielding varieties (75%). Economic constraints (65%) and irrigation delays (50%) further hinder adoption. Seven suggestions, led by enhancing extension services (90%), were proposed. The study recommends KVK-led training, FPO-managed input depots and PMKSY-funded irrigation to achieve yields of 25 quintals/ha, promoting sustainable agriculture in Jaunpur.

Keywords: Mustard cultivation, constraints, Jaunpur, extension services, input supply, economic barriers, irrigation, market access

1. Introduction

Mustard (*Brassica juncea*) is a cornerstone of India's oilseed sector, supporting edible oil production and farmer livelihoods. India ranks second globally in rapeseed and mustard area (15.2%) and fourth in production (9.5%), with 8.17 million tons produced from 6.69 million hectares in 2010–11 (FAOSTAT, 2018) ^[1]. In Uttar Pradesh, Jaunpur district (25°24' to 26°12' N, 82°7' to 83°5' E) is a key contributor to the state's 11.19% share of national mustard output, leveraging its agro-climatic suitability and agrarian economy. As a rabi crop, mustard fits well into local cropping patterns, requiring minimal water and thriving on marginal lands, making it ideal for small and marginal farmers.

Despite its potential, mustard growers in Jaunpur face significant barriers to adopting improved practices, such as high-yielding varieties (e.g., Pusa Bold), integrated pest management (IPM) and timely irrigation, which can increase yields by 20–30% (Yadav and Mishra 2018) ^[6]. These constraints, spanning knowledge deficits, economic challenges and infrastructure limitations, reduce productivity and perpetuate socio-economic challenges. Understanding these barriers is critical for designing interventions to enhance mustard yields and support India's goal of reducing edible oil imports.

This study, titled “Analysis of Constraints Faced by Mustard Growers in Jaunpur District, Uttar Pradesh,” aims to identify and rank the constraints faced by 300 mustard

growers and propose actionable solutions. The objectives are:

1. To ascertain the constraints faced by mustard growers in adopting improved cultivation practices.
2. To propose suggestions to address these constraints, enhancing productivity and livelihoods.

The study draws on data from a broader investigation into mustard cultivation, focusing on constraints and solutions to inform policymakers, extension agents and agricultural organizations, promoting sustainable agriculture in Jaunpur.

2. Methodology

2.1 Research Design

A descriptive research design was employed to systematically identify and analyze constraints faced by mustard growers. This design is suitable for fact-finding studies, providing detailed insights into specific phenomena with robust interpretation. The study combined quantitative (frequency, percentage) and qualitative (ranking, contextual analysis) approaches to ensure a comprehensive understanding of constraints and suggestions.

2.2 Sampling Procedure

A multistage sampling technique ensured representativeness across Jaunpur's agrarian landscape. Jaunpur district, spanning 4,038 km², was selected due to its prominence in mustard production and proximity to Krishi Vigyan Kendras

(KVKs). The district was chosen for its agricultural significance and researcher familiarity. From Jaunpur's 21 blocks, four-Sujanganj, Mungara Badshahpur, Machhlisahar and Mariyahu-were purposively selected based on their high mustard cultivation area. Within these

blocks, 16 villages (four per block) were identified and a list of mustard growers was compiled with assistance from agriculture supervisors. A total of 300 growers were randomly selected, with 75 respondents per block, proportionate to village size.

Table 1: Sampling Procedure

State	District	Block	Villages	Respondents
Uttar Pradesh	Jaunpur	Sujanganj	Deepakpur, Ramnagra, Dewapur, Sabeli	75
		Mungara Badshahpur	Sohansa, Kamalpur, Kodahu, Rampur	75
		Machhlisahar	Tajuddinpur, Tateehara, Sonhara, Kunwarpur	75
		Mariyahu	Rajamalpur, Mokampur, Belva, Pali	75
Total	1	4	16	300

2.3 Data Collection

Data were collected using a structured interview schedule, pre-tested on non-sample farmers to ensure clarity. The schedule captured constraints in adopting improved practices, covering knowledge, economic, infrastructure and market barriers. Direct observation during field visits and secondary data from KVK reports and government publications supplemented primary data. Interviews were conducted personally, with respondents informed of the study's objectives to ensure objective responses.

2.4 Measurement of Constraints and Suggestions

Constraints were measured by asking respondents to identify barriers to adopting practices like high-yielding varieties, seed treatment and IPM. A list of 15 constraints was developed based on literature and pilot testing. Respondents indicated applicable constraints and frequencies were calculated. Constraints were ranked by percentage prevalence. Seven proposed solutions were similarly ranked by frequency and percentage of endorsement.

2.5 Statistical Analysis

Data were analyzed using frequency and percentage distributions to rank constraints and suggestions, calculated as:

$$P = \frac{X}{N} \times 100$$

Where:

- (P): Percentage
- (X): Frequency of respondents reporting a constraint/suggestion
- (N): Total respondents (300)

Ranks were assigned in descending order, with Rank I indicating the most prevalent constraint/suggestion. Descriptive analysis linked constraints to socio-economic and institutional factors.

2.6 Limitations

1. The study covered 300 growers in four blocks, potentially missing perspectives from other blocks.
2. Self-reported data may introduce bias, mitigated by pre-testing.
3. The study focused on general constraints, lacking comparative analysis with specific grower subgroups.

4. The cross-sectional design limits trend analysis.

3. Results and Discussion

The study revealed significant constraints faced by 300 mustard growers in Jaunpur district, with knowledge-related barriers being the most prevalent. A staggering 85% of growers (255 respondents) reported a lack of knowledge about mustard cultivation practices, such as optimal fertilizer doses (100:75 kg/ha NP), which can reduce yields by 15–20% (Yadav *et al.* 2024) ^[9]. This reflects limited access to training, as only 30% engage with KVK programs, often due to time constraints and low extension outreach in remote areas like Sahson. Similarly, 75% (225 growers) lacked awareness of high-yielding varieties like Pusa Bold or Jair Kisan, which offer 20–30% higher yields, a gap exacerbated by inadequate hands-on training (Yadav and Mishra 2018) ^[7]. Knowledge about seed treatment, critical for preventing diseases like *Alternaria* blight, was absent among 70% (210 growers), further limiting productivity. Supply chain issues were also prominent, with 80% (240 growers) facing timely unavailability of inputs like fertilizers and pesticides, forcing reliance on distant markets and increasing costs by 30% (Kumar *et al.* 2023) ^[2]. Non-availability of high-yielding seeds affected 60% (180 growers), a challenge noted in Mathura, where hybrid seed shortages constrain adoption. Economic barriers were significant, with 65% (195 growers) citing poor economic conditions, particularly among marginal farmers (32.66% of the sample), who struggle to afford inputs costing 20,000–25,000/ha (Medhi *et al.* 2017) ^[4]. The high cost of plant protection measures, such as pesticides like Indofil M-45, deterred 55% (165 growers) from adopting IPM, aligning with findings in Punjab (Yadav *et al.* 2024) ^[9]. Infrastructure constraints Faced by Mustard Growers further Unreliable electricity for water pumping affected 44% (132 growers), increasing reliance on costly diesel pumps (40.66% of irrigation costs). Market and policy challenges included low produce prices ($\leq 6,000$ /quintal) for 35.66% (107 growers) and lack of proper markets for 30.66% (92 growers), as Jaunpur's exclusion from e-NAM platforms limits sales. High insect pest incidence impacted 24.66% (74 growers), manageable with IPM but constrained by knowledge and cost. Poor government procurement policies affected 20.33% (61 growers), reducing incentives, while scattered land holdings, reported by 15.33% (46 growers), limited mechanization. The finding align with previous research by (Yadav *et al.* 2024) ^[9].

Table 2: Constraints Faced by Mustard Growers

Sr. No.	Constraints	Frequency	Percentage	Rank
1	Non-availability of irrigation in time	150	50.0	VIII
2	Timely unavailability of inputs at locality	240	80.0	II
3	Lack of proper market in the area	92	30.66	XII
4	Lack of knowledge about seed treatment	210	70.0	IV
5	Unavailability of electricity for water lifting from well and tubewell	132	44.0	IX
6	Poor economic conditions of mustard growers	195	65.0	V
7	Low price of produce at time of harvesting	107	35.66	XI
8	High insect pest incidence	74	24.6	XIII
9	Lack of knowledge about high yielding varieties	225	75.0	III
10	High cost of improved seeds	126	42.0	X
11	Lack of knowledge about mustard cultivation	255	85.0	I
12	Non-availability of high yielding seeds	180	60.0	VI
13	Poor produce procurement policy of government	61	20.33	XIV
14	High cost of plant protection measures	165	55.0	VII
15	Scattered landholding	46	15.33	XV

To address these constraints, growers endorsed seven suggestions, with 90% (270 respondents) prioritizing enhanced extension services through KVK and ATMA training, which could increase adoption by 30% (Narpat 2004) ^[5]. Improving input supply chains, supported by 85.66% (257 growers), via FPO-led depots and PM-KISAN subsidies, could reduce delays by 40%. Strengthening irrigation infrastructure, supported by 75.33% (225 growers), with PMKSY-funded solar tubewells, could ensure irrigation for 60% of farmers, boosting yields by 10–

15%. Enhancing market access, backed by 72.33% (217 growers), through e-NAM integration and MSP at 6,000/quintal, could raise incomes by 15%. Promoting IPM, supported by 65.33% (196 growers), could reduce pest losses by 20%, while land consolidation, endorsed by 60.33% (181 growers), Financial assistance, endorsed by 27.33% (82 growers), through KCC loans and PKVY subsidies, would cover 27.33% of input costs. (Kumar *et al.* 2023) ^[2]

Table 3: Suggestions to Address Constraints

Sr. No	Suggestion	Frequency	Percentage	Rank
1	Provide financial support	82	27.00	VII
2	Improve input supply chains	257	85.66	II
3	Promote integrated pest management (IPM)	196	65.33	V
4	Enhance market access	217	72.33	IV
5	Enhance extension services	270	90.00	I
6	Strengthen irrigation infrastructure	226	75.33	III
7	Facilitate land consolidation	181	60.33	VI

The dominance of knowledge-related barriers (85–70%) highlights the critical role of extension services, with only 30% of growers accessing KVK training, compared to 40% in other crops (Yadav *et al.* 2024) ^[9]. Supply chain inefficiencies align with Mathura, where input delays increase costs by 30 per cent. Economic constraints are pronounced among marginal farmers, who face input costs of 20,000–25,000/ha (Medhi *et al.* 2017) ^[4]. Irrigation delays, noted in Meerut, disrupt mustard's water needs, while market exclusion from e-NAM reduces returns. The suggestions leverage schemes like PM-KISAN and PMKSY, with KVK training potentially increasing knowledge by 25%, FPO depots reducing delays by 40% and e-NAM raising incomes by 15%, addressing the interplay of constraints to enhance adoption.

4. Conclusion

Mustard growers in Jaunpur face significant constraints, primarily knowledge deficits (85%), input unavailability (80%) and economic barriers (65%), compounded by irrigation (50%) and market challenges (35.6%). These limit adoption of improved practices, reducing yields. Proposed solutions-enhancing extension services (90%), improving input supply (85.66%) and providing financial support

(27.33%) offer a roadmap leveraging KVKs, FPOs and government schemes. These interventions can increase yields to 25 quintals/ha, promoting sustainable agriculture and livelihoods in Jaunpur.

5. Future Scope

Future research should conduct longitudinal studies to track constraint resolution over 5–10 years. Comparative analyses of grower subgroups (e.g., by land holding) could identify specific barriers. Evaluating digital extension tools like Meghdoot for knowledge dissemination, studying climate variability's impact on cultivation and investigating FPO roles in input and market access would further inform interventions to enhance adoption and productivity.

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