

# Farmer-centric evaluation of constraints, attitudes, and strategic pathways for scaling improved wheat production technologies

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## ABSTRACT

Improved wheat production technologies are under-adopted by farmers in many regions, largely due to a lack of comprehensive research on socio-economic, cultural, institutional, and psychological factors influencing decision-making processes. This lack of integrative frameworks creates a critical gap in designing sustainable, farmer-centric pathways for scaling up these technologies. In this background present study was conducted during 2022-23 to know the attitude, constraints and strategic pathway of adoption of recommended wheat production practices among wheat cultivating farmers of the Lakhimpur Kheri district of Uttar Pradesh. The result revealed that less than half (43.3%) of the wheat growers had high favorable attitude towards wheat cultivation followed by 32.5 and 24.1 percent had medium and low favorable attitudes towards wheat cultivation technology, respectively. The rank of order for constraints revealed that high cost of farm power implement and diesel with MPS 93.33 ranked I, followed by high charge of electricity for tube well with MPS 90.83 ranked II and high cost of insecticides and fungicides with MPS 85.83 ranked III. The suitable approach for the safeguard of crop against animals with MPS 95.83 ranked I, followed by government should focus on providing proper supply of electricity with MPS 89.16 ranked II and government should provide insurance for wheat crop with MPS 85.00 were ranked III.

**Keywords:** Attitude, adoption, constraints, farmers, wheat production technology

## INTRODUCTION

Wheat (*Triticum aestivum*) plays a vital role as a global cereal crop, feeding around two billion people—nearly 36% of the world's population. It surpasses rice and maize in both cultivated area and total production, making it the most widely grown cereal crop. As a major source of carbohydrates, wheat also provides essential vitamins, minerals, and lipids. When complemented with

animal or legume proteins, wheat-based diets become highly nutritious. The country's wheat cultivation spans approximately 31.4 million hectares, yielding around 110.55 million tonnes, with an average productivity of 3.52 tonnes per hectare (DAC & FW, 2023). As of the 2022–23 agricultural year, Uttar Pradesh remains India's leading wheat-producing state. According to data from the Ministry of Agriculture and Farmers Welfare, the state cultivated wheat over approximately 10.19 million hectares, yielding about 38.07 million tonnes. This results in an average productivity of 3,735 kilograms per hectare. In comparison, the national average wheat productivity for the same period was around 3,410 kilograms per hectare, with a total production of approximately 104 million tonnes across 30.46 million hectares

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(FWADD, 2023). Despite the availability and dissemination of improved wheat production technologies—including high-yielding varieties (HYVs), precision nutrient and water management, conservation agriculture, and ICT-based advisories—the adoption rate remains suboptimal, particularly among small and marginal farmers. Technological interventions have largely focused on yield maximization and input efficiency (Jat *et al.*, 2020), often neglecting the socio-psychological, economic, and institutional dynamics that shape farmers' decision-making. While significant progress has been made in wheat research and technology development, existing literature predominantly emphasizes biophysical performance. There is limited empirical evidence examining the farmer's perspective on constraints, attitudes, and enabling conditions necessary for large-scale adoption. Studies have often overlooked critical variables such as farmer perceptions, risk aversion, trust in extension services, cultural norms, and market access—all of which significantly affect adoption behavior (Patel *et al.*, 2020). Furthermore, there is a scarcity of region-specific, farmer-driven frameworks that translate these insights into actionable and scalable strategies. We hypothesize that farmer attitudes, perceived constraints, and institutional support systems do not significantly influence the adoption and scaling of improved wheat production technologies. Farmer attitudes, perceived constraints, and institutional support systems significantly influence the adoption and scaling of improved wheat production technologies. This study was therefore conducted with the objective of to assess the attitudes, constraints and strategic pathways for scaling improved wheat production technologies in Lakhimpur district, Uttar Pradesh, aiming to support more effective technology transfer and improved wheat productivity.

#### MATERIALS AND METHODS

An exploratory research design was employed for the present study to assess the attitude, constraints and strategic pathway in adoption of wheat production practices among wheat growers. The study was conducted during the agricultural year 2022–23 in the Mohammdi and Mitauli

blocks of Lakhimpur Kheri district, Uttar Pradesh, which were purposively selected based on their significant wheat cultivation area. A total of 12 villages were selected using a stratified random sampling method to ensure adequate representation across both blocks. From these selected villages, 120 wheat growers were chosen using a simple random sampling technique, ensuring equal representation and minimizing sampling bias. Primary data was collected using a pre-tested and structured interview schedule developed in accordance with the objectives of the study. The schedule included items designed to assess the farmers' level of knowledge and adoption of recommended wheat production technologies. Additionally, a separate section was incorporated to evaluate the attitudes of farmers toward wheat cultivation practices. To analyse the attitude and constraints faced by farmers and to suggest strategic pathways for improvement, suitable statistical tools were applied. These tools facilitated meaningful interpretation and ensured the reliability and validity of the results.

#### RESULTS AND DISCUSSION

##### Socio-demo graphic profile of the respondents

The results (Table 1) indicated that 45.00% of the respondents belonged to the middle age group (39–70 years), and 84.16% were literate, with 36.66% having intermediate-level education. A majority (44.16%) were from the Other Backward Caste (OBC) category, and 90.00% were married. Most respondents (60.84%) had less than one hectare of land, while 23.33% and 10.00% were small and medium landholders, respectively. Nuclear families accounted for 73.33%, and 53.33% belonged to the small family size category. Regarding income, 43.33% fell into the medium annual income group (Rs. 68,001–3,95,999). About 35.84% had membership in one organization. In terms of psychological traits, 53.33% showed medium economic motivation, 49.16% had medium scientific orientation, and 51.67% had medium risk orientation. The mean score for risk orientation was 23.23, ranging from 16 to 30. These findings align with those of Panchbhai *et al.* (2017), Jose *et al.* (2019), Gupta *et al.* (2021), and Upadhyay *et al.* (2021), who reported similar demographic and

socio-economic trends.

### Attitude of farmers towards wheat cultivation

The results revealed that (Table 2) out of the total respondents, the higher number of wheat growers 43.3 percent showed favourable attitude towards wheat cultivation followed by, moderate favourable attitude 32.5 percent and unfavourable attitude 24.16 percent towards wheat cultivation. The findings of the study are in line with the study of Singh *et al.* (2014) who reported

that more than half of the farmers (56.3%) had favourable and most favourable attitude towards improved technology of wheat cultivation, 20.3 per cent small farmers had unfavourable and most unfavourable attitude, while 23.3 per cent farmers showed neutral attitude towards improved technology of wheat cultivation. Thus, from the foregoing explanation, it may be concluded that majority of small farmers (79.6%) had favourable attitude towards improved technology of wheat cultivation. Sharma *et al.* (2005) also ob-

**Table 1. Distribution of respondents on the basis of Socio-demographic profile (n=120)**

| Sl. No. | Variables              | Category                            | f   | %    |
|---------|------------------------|-------------------------------------|-----|------|
| 1.      | Age                    | Young age (below 38)                | 15  | 12.5 |
|         |                        | Middle age (39 to 68)               | 64  | 53.3 |
|         |                        | Old age (above 69)                  | 41  | 34.1 |
| 2.      | Education              | Illiterate                          | 19  | 15.8 |
|         |                        | Literate                            | 101 | 84.1 |
|         |                        | Can read and write only             | 08  | 06.6 |
|         |                        | Primary school                      | 10  | 08.3 |
|         |                        | Middle school                       | 11  | 09.1 |
|         |                        | High school                         | 18  | 15.0 |
|         |                        | Intermediate                        | 44  | 36.6 |
|         |                        | Graduate & Post graduate            | 29  | 24.1 |
| 3.      | Caste                  | General caste                       | 25  | 20.8 |
|         |                        | Other backward caste                | 53  | 44.1 |
|         |                        | Scheduled caste                     | 42  | 35.0 |
| 4.      | Marital Status         | Married                             | 108 | 90.0 |
|         |                        | Unmarried                           | 12  | 10.0 |
| 5.      | Land Holding           | Marginal farmers (below 1)          | 73  | 60.8 |
|         |                        | Small farmers (1.01 to 2.00)        | 28  | 23.3 |
|         |                        | Medium farmers (2.01 to 3.00)       | 12  | 10.0 |
|         |                        | Large farmers (above 3.01 ha.)      | 07  | 05.8 |
| 6.      | Family Type            | Nuclear family                      | 88  | 73.3 |
|         |                        | Joint family                        | 32  | 26.6 |
| 7.      | Size of Family         | Small (below 4)                     | 64  | 53.3 |
|         |                        | Medium (5 to 9)                     | 37  | 30.8 |
|         |                        | Large (above 10)                    | 19  | 15.8 |
| 8.      | Annual Income          | Small (below 68000)                 | 43  | 35.8 |
|         |                        | Medium (68001 to 395999)            | 52  | 43.3 |
|         |                        | High (above 396000)                 | 25  | 20.8 |
| 9.      | Social Participation   | No participation                    | 32  | 26.6 |
|         |                        | Participation in one organization   | 43  | 35.8 |
|         |                        | Participation in two organization   | 29  | 24.1 |
|         |                        | Participation in > two organization | 16  | 13.3 |
| 10.     | Economic motivation    | Low (below 14)                      | 23  | 19.6 |
|         |                        | Medium (15 to 18)                   | 64  | 53.3 |
|         |                        | High (above 19)                     | 33  | 27.0 |
| 11.     | Scientific Orientation | Low (below 15)                      | 36  | 30.0 |
|         |                        | Medium (16 to 17)                   | 59  | 49.1 |
|         |                        | High (above 19)                     | 25  | 20.8 |
| 12.     | Risk orientation       | Low (below 19)                      | 39  | 32.5 |
|         |                        | Medium (20 to 26)                   | 62  | 51.6 |
|         |                        | High (above 27)                     | 19  | 15.8 |

**Table 2. Distribution of respondents according to attitude of farmers towards wheat cultivation (n=120)**

| Sl. No. | Categories                                            | f   | %     |
|---------|-------------------------------------------------------|-----|-------|
| 1.      | Unfavorable attitude towards wheat cultivation        | 29  | 24.1  |
| 2.      | Moderate favorable attitude towards wheat cultivation | 39  | 32.5  |
| 3.      | Highly Favorable attitude towards wheat cultivation   | 52  | 43.3  |
|         | Total                                                 | 120 | 100.0 |

served this type of results in their investigation.

### Constraints faced by the farmers in wheat production technology

The findings revealed that (Table 3) the rank of order for constraints viz., high cost of farm power implement and diesel with MPS 93.33 ranked I, followed by high charge of electricity for tube well with MPS 90.83 ranked II, high cost of insecticides and fungicides with MPS 85.83 ranked III, lack of technical know-how about soil and seed treatment with MPS 84.16 ranked IV, high cost of herbicides which is difficult to afford with MPS 82.50 ranked V, unavailability of improved varieties of seed at the time of sowing with MPS 79.16 ranked VI, lack of information about fertility status of soil with MPS 75.83 ranked VII, lack of knowledge of weed control through herbicides with MPS 72.50 ranked VIII, lack of credit facilities with MPS 67.50 ranked IX, minimum support prices for wheat fixed up by the government should be remunerative with MPS 64.16 ranked X, lack of soil testing facility at nearby places with MPS 60.83 ranked XI, commission agents directly purchase the wheat on low price during the sea-

son with MPS 55.00 ranked XII, lack of suitable equipment for threshing with MPS 49.16 ranked XIII and scarcity of labour with MPS 42.50 ranked XIV respectively. The scores value for each constraints indicates that the seriousness of constraints caused by low adoption of technology. The findings of the study are in line with the study of Singh *et al.* (2021) that lack of knowledge and marketing facilities were the major constraints face by members of SHG. The findings of the study are in conformity with the study of Singh *et al.* (2012) that the varieties of constraints were responsible for low adoption of wheat production technology. The findings of the study are in accordance with the study of Singh *et al.* (2020).

### Suggestion of suitable strategy for increasing wheat production in the study area

The results envisages on suggestive measures (Table 4) for better wheat production, the majority of the respondents suggested that the points viz., suitable approach for the safeguard of crop against animals with MPS 95.83 ranked I, followed by government should focus on providing proper supply of electricity with MPS 89.16 ranked II,

**Table 3. Distribution of respondents according to constraints (n=120)**

| Sl. No. | Constraints                                                                        | MPS  | Rank |
|---------|------------------------------------------------------------------------------------|------|------|
| 1.      | Lack of technical know-how about soil and seed treatment                           | 84.1 | IV   |
| 2.      | Unavailability of improved varieties of seed at the time of sowing                 | 79.1 | VI   |
| 3.      | Lack of information about fertility status of soil                                 | 75.8 | VII  |
| 4.      | Lack of soil testing facility at nearby places                                     | 60.8 | XI   |
| 5.      | Lack of knowledge of weed control through herbicides                               | 72.5 | VIII |
| 6.      | High cost of farm power implement and diesel                                       | 93.3 | I    |
| 7.      | Lack of credit facilities                                                          | 67.5 | IX   |
| 8.      | High cost of herbicides which is difficult to afford                               | 82.5 | V    |
| 9.      | High cost of insecticides and fungicides                                           | 85.8 | III  |
| 10.     | Minimum support prices for wheat fixed up by the government should be remunerative | 64.1 | X    |
| 11.     | High charge of electricity for tube well                                           | 90.8 | II   |
| 12.     | Lack of suitable equipment for threshing                                           | 49.1 | XIII |
| 13.     | Commission agents directly purchase the wheat on low price during the season       | 55.0 | XII  |
| 14.     | Scarcity of labour                                                                 | 42.5 | XIV  |

MPS = Mean per cent Score

**Table 4. Suggestive strategy for increasing wheat production and to overcome the constraints faced by farmers (n=120)**

| Sl. No. | Suggestive measures                                         | MPS  | Rank |
|---------|-------------------------------------------------------------|------|------|
| 1.      | Suitable approach for the safeguard of crop against animals | 95.8 | I    |
| 3.      | Government should provide risk coverage for wheat crop      | 63.3 | V    |
| 4.      | Government should provide insurance for wheat crop          | 85.0 | III  |
| 5.      | Government should provide proper marketing facility         | 80.0 | IV   |
| 6.      | Government should provide proper supply of electricity      | 89.1 | II   |

MPS= Mean Per cent Score

government should provide insurance for wheat crop with MPS 85.00 ranked III, government should provide proper marketing facility with MPS 80.00 ranked IV and government should provide risk coverage for wheat crop with MPS 63.33 ranked V respectively. Availability of recommended varieties of wheat needs to be ensured. Cost of seed should be made reasonable to encourage small and marginal farmers for wheat cultivation. The problem of low price of produce at the time of harvesting was expressed as most important problem by the wheat growers. To overcome this problem, it is suggested that government should timely declare the minimum support price of wheat, which will help the cultivators for getting reasonable price of their produce. It is also recommended that government and semi-government agencies should purchase the production of the wheat at reasonable rate directly from the cultivators so that farmers could get maximum benefit by selling the product of the crop.

## CONCLUSION

The study underlines the importance of a holistic, farmer-centric approach in promoting technology adoption. Strengthening extension services, enhancing access to quality inputs, improving market linkages, and ensuring timely credit support are key strategic interventions needed. Furthermore, awareness campaigns and hands-on training can significantly influence farmers' attitudes and bridge the gap between research and field-level application. By aligning technological advancements with farmers' needs and capacities, and by addressing their constraints systematically, the scalability and sustainability of improved wheat production practices can be greatly enhanced. This approach not only ensures better productivity but also contributes meaningfully to national food security and rural livelihood development.

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