



Training Needs Assessment of Oilseed Farmers for Improved Production Technology in Lucknow District, Uttar Pradesh

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HIGHLIGHTS

- Seed rate and insect pest management were the major areas for training need.
- The majority of farmers prefer the practical training method mainly in their field.
- Farmers prefer May to August or September to December for the training before the time of sowing.
- Method demonstration was most preferred training method for training.

ARTICLE INFO

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ABSTRACT

Agriculture plays an important role in India's economic growth, and oilseed crops contribute significantly to nutritional security and farm income. The study was conducted in the Mall block of Lucknow district to assess the training needs of oilseed growers. A total of 125 farmers from five villages were selected randomly for the study, and data were collected through personal interviews with the help of a structured interview schedule. Training needs were analysed using total weighted mean score (TWMS) and the training need index (TNI). The findings revealed that seed rate and insect-pest management were the most needed training areas, followed by field preparation and use of manures and fertilisers. Farmers showed a strong preference for field-based training, with farmers' fields emerging as the most suitable venue (TNI: 88.89%). Morning and the May–December period were identified as the most preferred training times, as the majority of oilseed crops were sown in this period, and farmers need training just before sowing. Among training methods, method demonstration was highly favoured. The study highlights the need-based, location-specific training programs to enhance the adoption of improved oilseed production technologies and increase productivity.

INTRODUCTION

India's vegetable oil economy ranks fourth, after the USA, China, and Brazil (Kaur and Singh, 2023; Tripathi et al., 2023; Bhoi et al., 2026). As oilseeds are the main source of vegetable oil, the residue left over after extraction is high in protein (Lomascolo et al., 2012; Arrutia et al., 2020). Oilseed crops in India are

predominantly cultivated under rainfed ecosystems, relying mainly on limited winter showers and conserved monsoonal rainfall (Vaidya et al., 2026). The oilseed sector accounts for 14.3% of the Gross Cropped Area in India, 3% of GNP, and 10% of the value of all agricultural commodities (nmoop.gov.in). Approximately 5–6% of the world's oilseed crop comes from India. In the economic year 2023–2024, approximately 5.44 million tones of oil meals, oilseeds,

and minor oils were exported, valued at Rs. 29,587 crore. In May 2025, India’s oilseed production hit a record high of 42.609 million tonnes (MT). Approximately 72% of the total oilseed area is cultivated by marginal and small farmers under rainfed conditions (Bhoi et al., 2026). Nine primary oilseed crops make up around 8% of India’s agricultural exports, 14.3% of the country’s annual gross cultivated land, and 12–13% of its dietary energy. India is the world’s top producer of castor, safflower, sesame, and Niger, followed by groundnuts, rapeseed-mustard, linseed, and soybeans (nmeo.dac.gov.in). Global oilseed production is projected to reach a record high of approximately 692 million tonnes in the 2025-26 marketing year, reflecting a 2.2% increase of nearly 15 million tonnes compared to the previous year (Veerapathiran et al., 2025). More than 77% oilseed production in the county comes from the key oilseed producing state of Rajasthan, Madhya Pradesh, Maharashtra, and Gujarat (nmeo.dac.gov.in). In 2022- 2023, India produced 41.35 million tonnes of oilseeds, giving back a significant rise of 3.39 MT as compared to the past year (PIB, 2023). Over the year, the global market for vegetable oils has grown steadily; estimates for 2024-2025 show a 2% increase in production to gain 228 MT³. Major improvements in soybean, palm, and rapeseed oil production are anticipated to fuel this growth, with sunflower seed oil output also exhibiting small growth (USDA, 2024). The different agro-climatic regions of the country can support the cultivation of these oilseeds under both rainfed and irrigated farming systems (Meena et al., 2023). The production and productivity of oilseeds differ significantly among the states, with some states leading in the cultivation area and others significantly in terms of production due to higher yield levels (Poornasree & Ponnarasi, 2025). Madhya Pradesh has the largest area under cultivation, totaling 7.29 Mha; Rajasthan (4.97 Mha), Maharashtra (4.58 Mha), Gujarat (2.97 Mha), and Uttar Pradesh (1.20 Mha) came next. With roughly 21.42% of the country’s total production, Madhya Pradesh and Rajasthan have the highest production. Despite being a huge producer of oilseed crops in the world, India imports about half of its demand because of a changing lifestyle in dietary patterns and enhanced per capita income (Sarkar et al., 2025). For this study it tried to identify the training needs of farmers regarding the improved production technology of oilseed production practices.

METHODOLOGY

The Study was carried out in the Mall block in the district of Lucknow, during 2019-2020. For the investigation, 5 villages were randomly selected from the Mall block: Imiliha, Sahmau Naubasta, Atri, and Ahinder Aaumau. 25 oilseed growers were selected from each village, for a total of 125 Oilseed growers in the investigation in the study. The Primary Data was collected through direct and personal interviews using pre-tested structured interview schedule from oilseed growers. A 4-point rating scale was used to evaluate the oilseed growers’ comments in order to determine their training needs. Most Needed, Needed, Least Needed, and Not Needed by assigning a score of 3,2,1, and 0, respectively, and to assess the Venue of training of farmers in oilseed cultivation practices using 3 continuum scale, Most Prefer, Prefer, and Not Prefer appoint a score of 2,1, and 0, respectively. The total weighted mean score (TWMS) was used to rank each category (Sangameswaran et al.,

2022). The rank for perceived training needs was determined by adding the overall weighted mean score, which gave an extensive understanding of their training requirements (Nain & Kumar, 2001; Wason et al., 2012; Singh et al., 2021; Sanarmeswaran et al., 2022; and Patil et al., 2024).

$$TWMS = \frac{\text{Total number of MN+N+LN+NN}}{(\text{No. of MN} \times 3) + (\text{No. of N} \times 2) + (\text{No. of LN} \times 1) + (\text{No. of NN} \times 0)}$$

Where, NN: Not Needed, LN: Least Needed; N: Needed; MN: Most Needed

Furthermore, Training Needs and place of training of the oilseed growers were calculated based on the Training Need Index (TNI), which was compounded with the help of the following formula (Patil & Kokate, 2011). The TNI method helps quantify the intensity of training needs based on the responses of the oilseed growers.

$$TNI = \frac{\text{Total Obtained Score}}{\text{Maximum Obtained Score}} \times 100$$

Based on the obtained TNI per cent values, the different training areas and training venues were ranked in descending order to determine the priority for organizing a training programme for oilseed farmers.

RESULTS

The findings drawn regarding the determined objectives of the study are based on preferences for place, size of the training group, method, and follow-up activities as recognized by the oilseed growers, using applicable statistical techniques. It has been observed that most farmers showed little interest in training programs; hence, motivational activities should be initiated among farmers through quality input management. The training should emphasize methods of sowing, field preparation, plant protection measures, the use of manures and fertilizers, and post-harvest techniques, as these are the main areas.

The training needs of farmers with regard to oilseed production practices were collected using the Training Need Index (TNI) and the Training Weighted Mean Score (TWMS). The results in Table 1 indicate that the Insects and Pests Management and Seed Rate recorded the highest training needs, with TWMS of 0.341 and TNI

Table 1. Training Needs of Farmers in Oilseed Production Practices

Training Needs Area	Degree of Training Needs		
	Mean Score	TWMS*	TNI (%)**
Insects and Pests Management	2.93	0.341	97.78
Seed Rate	2.93	0.341	97.78
Field Preparation	2.82	0.355	93.89
Use of Manures and Fertilizers	2.78	0.359	92.78
Method of Sowing	2.60	0.385	86.67
Seed Treatment	2.45	0.408	81.67
Disease management	2.38	0.42	79.44
Weed Management	2.35	0.426	78.33
Harvesting	2.27	0.441	75.56
Post-Harvest technology	2.00	0.500	66.67

** TNI: Training Need Index *TWMS: Total Weighted Mean Score

of 97.78%, acquire first place. Field Preparation ranked second with a mean score of 2.82 and TNI of 93.89 per cent, followed by use of manures and fertilisers, which ranked third with a TWMS of 0.359 and TNI of 92.78 per cent.

The training need for the Method of Sowing was moderate, with a TWMS of 0.385 and a TNI of 86.67 per cent, placing it at the fourth rank. Followed by Seed Treatment, ranked fifth with a TWMS of 0.408, TNI of 81.67%, Weed Management was ranked seventh with a mean score of 2.35 and TNI of 78.33%, Disease Management secured the sixth rank with a TWMS of 0.420 and a TNI of 79.44%, Harvesting secured the eighth rank with a TWMS of 0.441 and TNI of 75.56 per cent, and the least training need was observed in Post-Harvest Technology, which obtained a TWMS of 0.500, and a TNI of 66.67 per cent, ranking ninth rank.

The results in Table 2 indicate that Farmers' Field was perceived as the most preferred venue for training, securing first place with TWMS of 0.56 and TNI of 88.89%. Followed by Village School, which was ranked second (TWMS of 0.58 and TNI of 86.11%), Village Panchayat secured the third rank (TWMS 0.60 and TNI of 83.33%), Block Headquarters ranked fourth (TWMS 0.77 and TNI of 65.00%), and Degree College received a lower preference, securing the fifth rank with a TWMS of 1.58 and TNI of 31.67%, and Research Farm, which ranked sixth with a TWMS of 2.14 and TNI of 23.33%.

Table 2. Place of training of Farmers in Oilseed Production Practices

Venue of Training	Venue Preference		
	Mean Score	TWMS*	TNI % **
Farmers Field	1.78	0.56	88.89
Village School	1.72	0.58	86.11
Village Panchayat	1.67	0.60	83.33
Block Headquarters	1.30	0.77	65.00
Degree College	0.63	1.58	31.67
Research Farm	0.47	2.14	23.33

** TNI: Training Need Index *TWMS: Total Weighted Mean Score

Table 3 shows that most of the oilseed growers (62.40%) preferred that training on oilseed production technology be conducted in the morning hours of the day, while only (09.60%) of the farmers prefer training to be conducted at any time of the day.

Table 3. Oilseed growers' preferences for the time of training

Time of Training	Frequency	Percentage
<i>Preference for the time of the Day</i>		
Morning	78	62.40
Afternoon	20	16.00
Evening	15	12.00
Any time of day	12	09.60
<i>Preferences for training day of the week</i>		
Sunday	17	13.60
Saturday- Sunday	32	25.60
Any day	76	60.80
<i>Preferences for the month of the year</i>		
May to August	73	58.40
September to December	52	41.60

The table also shows that most farmers prefer any day (60.80%) of training, followed by Saturday and Sunday (25.60%), and only Sunday (13.60%) of training. Whereas most of the farmers (58.40%) preferred that may to august month of the training, and (41.60%) of farmers preferred September to December month of training. Other months of years not preferred by the farmers for training.

From various methods of extension teaching (Table 4) majority of farmers prefer Method demonstration (92.00%) was the most preferred training method among the oilseed growers, followed by result demonstration (86.40%), and field visit (71.20%), Group Discussion (65.00%), On-farm trials (57.60%) whereas, Printed literature and Video Lecture were the least preferred methods of training.

Table 4. Preference Training Methods

Training Methods	Percentage
Method Demonstration	92.00
Result Demonstration	86.40
Field Visit	71.20
Group Discussion	65.00
On-farm trials	57.60
Lecture	48.00
Printed literature	44.00
Video Lecture	46.40

DISCUSSION

The findings on the Training Needs of farmers for oilseed production technology revealed that seed rate and insect and pest management were the most important training needs, with the highest TNI (97.78%) and lowest TWMS (0.341), thereby securing the top rank similar study was found in (Barman et al., 2013). This suggests that farmers are not sufficiently informed about the optimal seed rate and efficient insect and pest management practices, both of which are important determinants of oilseed crop productivity (Rathore et al., 2019). The growing challenges posed by pest incidence, climate variability, and inappropriate pesticide use, which call for focused extension interventions, are also reflected in the prominence of pest management as a training need.

The selection of a suitable training venue has a significant impact on farmers' effectiveness, participation, and knowledge retention. The results show that Farmers 'Field (TNI: 88.89% and TWMS: 0.56) was the most preferred venue for conducting the training programme (Tankodara et al., 2019). Farmers' preferences toward experiential learning environments, field-based, where they can directly perceive and highlight enhanced oilseed production techniques in actual fields, are highlighted by this strong preference. Such environments enable higher adoption rates, which improve the contextual relevance, immediate application, and practical comprehension (Nain & Trikha, 2009; Tamlinson & Rhiney, 2018).

The triumph of oilseed production technology training programs greatly depends on how effectively they work with farmers' schedules and available work hours. These are all principal components that influence learning outcomes and participation. Based on the results, the majority of oilseed farmers (62.40%) would prefer the morning time of training. 16 per cent of farmers prefer

to have it in the afternoon, and 12 per cent of farmers prefer it in the evening of training (Abebe et al., 2022). Farmers were typically more attentive, active, and accessible before they started their regular work in agriculture, which typically gets busier later in the day, which could explain their strong preference for morning sessions. By lowering weariness and improving comprehension, morning sessions generate a positive learning environment. Farmers are open to flexible scheduling as long as the training is beneficial and accessible, as evidenced by the 60.80% of them who stated they would be okay with any day of instruction. This indicates that some farmers are more willing to engage because they have less labour to perform or find it easier to work on the weekends. The range of responses indicates that flexibility is possible, but knowledgeable scheduling that considers labour requirements and local farming schedules is required. In case of periodic preference, the majority of oilseed farmers (58.40%) choose training from May to August (Srivastava & Shrivastava, 2023). This indicates that farmers favour training during specific phases of the agricultural cycle, particularly when they can immediately apply the knowledge they have acquired to crop production processes. Since most oilseed crops are sown between May and August and September and December, the oilseed growers primarily select these seasons for oilseed production training. The early stages of crop growth and preparation, when decisions about crop management, input use, and sowing are essential, may also correlate with the oilseed growers' desire for training in advance of sowing. Different researches reported context-specific preferences for different aspects of training (Kher et al., 2004; Bhagat & Nain, 2005; Kumar et al., 2007; Nath et al., 2025)

The study found that technique demonstration was the most widely used training technique among oilseed growers (92.00%) (Husin et al., 2026). This highlights the need of experiential learning, where farmers may observe and apply improved farming practices directly. This method speeds up the adoption of new technologies, increases confidence, and improves skill acquisition. Result demonstration (86.40%) was also strongly favoured, suggesting that farmers place a high importance on observable results and the relative benefits of better practices over conventional ones. This supports the idea that when farmers can clearly see the advantages of innovations in actual field settings, they are more likely to adopt them (Yadav et al., 2025).

CONCLUSION

The study concluded that oilseed growers show significant training needs, particularly in seed rate and insect-pest management, which ranked highest based on TNI and TWMS values. Other important areas include field preparation and the use of manures and fertilizers, showing gaps in essential crop management practices. Farmers showed a strong liking toward practical and field-oriented learning, with farmers' fields identified as the most preferred training venue. Morning hours and the May–December period were found to be most suitable for organizing training programs, to secure better participation. Among training methods, method demonstration and result demonstration were highly preferred, highlighting the importance of experiential learning approaches.

DECLARATIONS

Ethics approval and informed consent: Informed consent was sought from the respondents and their organisations regarding the study during the course of the data collection.

Conflict of interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest. The author declares that they have thoroughly reviewed, revised, and edited the content as needed. The authors take full responsibility for the final content of this publication.

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