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Knowledge level of turmeric growers about recommended cultivation practices

¹Kajal Barman, ²Pabitra Kumar Das, ³Indrajit Barman, ¹Hrishikesh Bhuyan, ¹Archita Jaharisa, ¹Nitul Das, ¹Prarthana Talukdar, ¹Anannya Aishworya Das and ¹Priyakhi Bhuyan

¹M.Sc. Scholar, Department of Extension Education, Assam Agricultural University, Assam, India

²Professor, Department of Extension Education, Assam Agricultural University, Assam, India

³Assistant Professor, Department of Extension Education, Assam Agricultural University, Assam, India

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Corresponding Author: Kajal Barman

Abstract

This study assessed the knowledge level of turmeric growers regarding recommended cultivation practices in the Lower Brahmaputra Valley Zone of Assam. A multistage sampling technique was used to select 160 respondents from Barpeta and Baksa districts. Data were collected through personal interviews using a structured knowledge test comprising 22 items related to recommended practices. The knowledge scores were categorized into low, medium and high levels based on mean and standard deviation. The findings revealed that the majority of respondents (48.75%) had a medium level of knowledge, followed by 46.88 per cent with low knowledge, and only 4.38 per cent with high knowledge. Growers showed good awareness of basic agronomic practices such as mulching, irrigation, planting time and harvesting. However, knowledge was significantly low in critical areas like nutrient management, fertilizer application and pest and disease control. The results indicate the presence of considerable knowledge gaps, particularly in scientific and improved cultivation practices. Therefore, there is a need for targeted extension interventions and training programmes to enhance growers' knowledge, promote adoption of recommended practices and ultimately improve productivity and income from turmeric cultivation.

Keywords: Turmeric cultivation, knowledge level, farmers, recommended practices, Assam, lower Brahmaputra valley zone, extension services, productivity, adoption, spice crops

Introduction

Turmeric (*Curcuma longa* L.), popularly known as "Indian saffron," is one of the most important and ancient spice crops cultivated in India (Prasad & Aggarwal, 2011)^[8]. It holds immense economic, cultural and medicinal significance and has long been an integral part of Indian agriculture. The term turmeric is derived from the Latin word *terra merita*, meaning "meritorious earth," referring to its distinctive yellow colour. India is the largest producer, consumer and exporter of turmeric, contributing nearly 80 per cent of global production and is therefore often regarded as the "goldmine of India" (Koushal *et al.*, 2024)^[5].

In recent years, turmeric has emerged as a high-value commercial crop with increasing demand in both domestic and international markets (Nair, 2019)^[6]. India continues to dominate global turmeric trade, with exports contributing significantly to the agricultural economy (Anonymous, 2025a)^[1]. The crop is widely cultivated across several states, including Assam, where it is gaining importance as a profitable cash crop. The expansion of turmeric cultivation reflects a shift towards market-oriented agriculture (Pingale & Gharat, 2025)^[7].

However, the productivity and profitability of turmeric depend largely on the adoption of recommended scientific cultivation practices. Growers' knowledge plays a crucial role in this adoption, and inadequate knowledge often

results in lower yield and quality (Khawale & Chinchmalatpure, 2023)^[4]. Therefore, assessing the level of knowledge of the growers about recommended turmeric cultivation practices is crucial for identifying existing gaps and developing effective extension strategies to enhance productivity and increase their income.

Objective

To assess the knowledge level of turmeric growers about recommended cultivation practices.

Research Methodology

The study was conducted in the Lower Brahmaputra Valley Zone of Assam, which was selected purposively due to its significant area and production of turmeric. A multistage sampling design was followed for the selection of respondents. Out of the thirteen districts in the zone, two districts, namely Barpeta and Baksa, were selected randomly. From each district, one agricultural sub-division (Barpeta and Mushalpur) was selected, followed by the random selection of one ADO circle from each sub-division, namely Sorbhog and Subankhata. Further, two AEA elakas were selected from each ADO circle, making a total of four elakas. From each elaka, two villages were selected randomly, resulting in a total of eight villages for the study. A list of turmeric growers was prepared for each selected

village with the help of Agricultural Extension Assistants (AEAs). Finally, a sample of 160 respondents was selected using proportionate-cum-random sampling (probability proportionate to size) technique to ensure proper representation of the population. Data were collected through personal interviews and face-to-face interaction using a structured research schedule.

A knowledge test was developed to measure the level of knowledge of growers about recommended turmeric cultivation practices, following the procedure suggested by Das (1991) [3]. Initially, 46 items (questions) were collected from packages of practices, bulletins of Assam Agricultural University, Jorhat, and the Department of Agriculture, Government of Assam, along with expert consultation. The preliminary selection of items was made based on the following criteria suggested by Bhalara and Hayal (1988) [2] and Singh and Gill (1988) [9]: (i) items should promote thinking rather than rote memorization, (ii) items should differentiate well-informed growers from less informed ones, (iii) items should cover all important aspects of recommended practices, and (iv) items should have an appropriate difficulty level. Based on these criteria, 29 items were selected for the raw knowledge test. The items were framed as objective-type questions and subjected to item analysis using responses from 30 growers outside the sample area. Each correct response was assigned a score of 1 and incorrect response 0. Based on total scores, respondents were grouped, and item analysis was carried out using three indices:

Item Difficulty Index (P)

$$P = \frac{\text{Number of correct responses}}{\text{Total number of respondents}} \times 100$$

Item Discrimination Index ($E_{1/3}$)

$$E_{1/3} = \frac{(S_1 + S_2) - (S_5 + S_6)}{N/3}$$

Where, S_1, S_2, S_5, S_6 are the frequencies of correct answers in groups G_1, G_2, G_5 and G_6 respectively, and N is the total number of respondents.

Biserial Correlation Coefficient (r_b)

$$r_b = \frac{\bar{X}_p - \bar{X}_q}{S_t} \times \frac{pq}{Z}$$

Where, $\bar{X}_p$ = mean score of the higher group; $\bar{X}_q$ = mean score of the lower group; p = proportion of cases in the higher group; q = proportion of cases in the lower group; Z = ordinate of the unit normal curve at the point of division; and S_t = standard deviation of the total sample.

Items with P values between 20-85, $E_{1/3}$ values between 0.20-0.80, and significant r_b values at 5 per cent level were retained. Accordingly, 22 items were selected for the final test.

The knowledge score ranged from 0 to 22. Based on mean ($\bar{X}$) and standard deviation (SD), respondents were categorized into low (below $\bar{X} - 1SD$), medium ($\bar{X} \pm 1SD$), and high (above $\bar{X} + 1SD$) levels of knowledge.

Results and Discussion

A perusal of Table 1 revealed that respondents possessed varying levels of knowledge regarding recommended turmeric cultivation practices. A very high proportion of respondents had knowledge about basic practices such as mulching (98.75%), irrigation interval and planting time (97.50%), depth of planting (95.00%), soil type and harvesting time (94.38%), and earthing-up (93.13%). A considerable number were also aware of spacing (89.38%) and FYM application (66.88%), while comparatively fewer respondents knew about seed rhizome quantity (61.25%) and improved varieties (14.38%).

However, knowledge was very low regarding nutrient management and plant protection practices. Only a small percentage of respondents knew about urea application (4.38%), its timing (3.75%), and the recommended dose and application of SSP and MOP along with pest control measures (3.13%). Similarly, very few respondents were aware of disease management practices such as control of leaf spot, prevention of rhizome rot, and seed treatment measures (2.50%).

Table 1: Items wise response of respondents on the knowledge test about recommended turmeric cultivation practices

SN	Items	Correct	Incorrect
1.	Name at least one high-yielding/improved variety of turmeric recommended for your area.	23 (14.38)	137 (85.63)
2.	What is the recommended period for planting of turmeric?	156 (97.50)	4 (2.50)
3.	What type of soil texture is most suitable for turmeric cultivation?	151 (94.38)	9 (5.63)
4.	What depth should rhizomes be planted in turmeric cultivation?	152 (95.00)	8 (5.00)
5.	What is the recommended row-to-row spacing for turmeric cultivation?	143 (89.38)	17 (10.63)
6.	What is the recommended plant-to-plant spacing for turmeric cultivation?	143 (89.38)	17 (10.63)
7.	How much seed rhizome is required per bigha in turmeric cultivation?	98 (61.25)	62 (38.75)
8.	How much FYM is recommended per bigha in turmeric cultivation?	107	53

		(66.88)	(33.13)
9.	How much N/urea is recommended per bigha in turmeric cultivation?	7 (4.38)	153 (95.63)
10.	How much P ₂ O ₅ /single superphosphate (SSP) is recommended per bigha in turmeric cultivation?	5 (3.13)	155 (96.88)
11.	How much K ₂ O/muriate of potash (MOP) is recommended per bigha in turmeric cultivation?	5 (3.13)	155 (96.88)
12.	At what time urea should be applied in turmeric cultivation?	6 (3.75)	154 (96.25)
13.	At what time phosphatic fertilizer (SSP) should be applied in turmeric cultivation?	5 (3.13)	155 (96.88)
14.	At what time potassic fertilizer (MOP) should be applied in turmeric cultivation?	5 (3.13)	155 (96.88)
15.	How often should irrigation be applied during dry spells in turmeric cultivation?	156 (97.50)	4 (2.50)
16.	Which materials can be used for mulching in turmeric cultivation?	158 (98.75)	2 (1.25)
17.	When first earthing-up is performed in turmeric cultivation?	149.00 (93.13)	11 (6.88)
18.	What control measures should be taken against infestation of pest in turmeric cultivation?	5 (3.13)	155 (96.88)
19.	What control measures should be taken against leaf spots in turmeric cultivation?	4 (2.50)	156 (97.50)
20.	What prophylactic measures should be taken to prevent rhizome rot in turmeric cultivation?	4 (2.50)	156 (97.50)
21.	What chemicals should be used to treat seed rhizome against rhizome rot?	4 (2.50)	156 (97.50)
22.	When is turmeric ready for harvest?	151 (94.38)	9 (5.63)

*Figures within parentheses indicate percentage

It is evident from Table 2 that majority of respondents (48.75%) had a medium level of knowledge, followed by 46.88 per cent with low knowledge, while only 4.38 per cent had a high level of knowledge. The mean score (10.18)

indicated an overall medium level of knowledge among the respondents. The coefficient of variation (31.19) suggested that the respondents were relatively homogeneous in terms of their knowledge level.

Table 2: Distribution of respondents according to level of knowledge about recommended turmeric cultivation practices

Category	Score Range	Frequency	%	Mean	S.D.	C.V.
Low level of knowledge	0-7	75	46.88	10.18	3.17	31.19
Medium level of knowledge	8-13	78	48.75			
High level of knowledge	14-22	7	4.38			
Total		160	100.00			

Conclusion

The findings of the study indicate that the majority of turmeric growers possessed a medium level of knowledge regarding recommended turmeric cultivation practices, while a substantial proportion still had low knowledge and only a very few exhibited high knowledge levels. The average knowledge score further confirms that growers are moderately informed, though not adequately equipped with complete scientific information. The relatively homogeneous distribution of knowledge suggests that similar knowledge gaps prevail among most respondents. A detailed analysis revealed that growers had good knowledge of basic agronomic practices such as mulching, irrigation, planting time, spacing, and harvesting. However, their knowledge was considerably low in critical areas like nutrient management, use of fertilizers, and plant protection measures, including pest and disease control. This imbalance indicates that while growers are familiar with traditional and commonly practiced methods, they lack awareness of improved and scientific practices that directly influence productivity and crop health.

Therefore, there is a need for focused extension interventions, capacity-building programmes, and training initiatives to enhance growers' knowledge, particularly in technical aspects of turmeric cultivation, to improve yield, quality, and overall farm income.

Policy Implications

The findings highlight the need for targeted policy interventions to strengthen growers' knowledge of recommended turmeric cultivation practices, particularly in nutrient management and plant protection. Government agencies and extension systems should prioritize need-based training programmes, demonstrations focusing on scientific practices. Strengthening the role of extension personnel, ensuring timely dissemination of technical information and promoting the use of locally suitable improved varieties are essential. Policies should also support capacity building through collaboration with research institutions and provide easy access to quality inputs and advisory services. Such interventions will help bridge knowledge gaps, enhance adoption of improved practices, and ultimately improve

productivity and income of turmeric growers.

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Conflict of Interest

All authors of this paper confirm that there are no conflicts of interest to declare.

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