



Assessment of Farmers Knowledge Level on Turmeric Cultivation Practices

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Turmeric (*Curcuma longa*), one of the oldest known medicinal plants, has been used for centuries due to its significant health benefits. Curcumin, the primary bioactive compound found in turmeric, belongs to the Zingiberaceae family and is well-documented for its antibacterial, antifungal, renal, and hepatoprotective properties. This study was conducted in the Kodumudi block of Erode District, Tamil Nadu, due to its extensive turmeric cultivation. A sample of 120 farmers was selected to assess their knowledge of recommended turmeric cultivation technologies. The results indicated that the turmeric growers possessed a medium level of knowledge regarding the recommended practices for turmeric cultivation. The research employed an analytical approach to assess farmers' understanding of key practices including main field preparation, planting techniques, nutrient management, and pest and disease control. The findings reveal that while growers displayed

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strong knowledge in areas such as seasonal practices, irrigation, and spacing, there were significant gaps in their understanding of rhizome treatment, micronutrient application, and pest management. Specifically, knowledge about managing pests such as rhizome scales, leaf rollers, and shoot and root borers was notably lacking. The study highlights the need for targeted training and educational programs to address these gaps, particularly in pest identification and control measures. By enhancing farmers' knowledge in these critical areas, the study aims to improve turmeric cultivation practices and contribute to the sustainability of turmeric farming in Erode District.

Keywords: Turmeric cultivation; technologies; knowledge level and erode district.

1. INTRODUCTION

India is the world's greatest producer and user of turmeric. It is also known as the "Kingdom of Spices". A plant with a very long history of therapeutic usage is turmeric. Turmeric, which is a vivid yellow colour, is often referred to as "Indian saffron". The herbaceous perennial plant *Curcuma longa*, a member of the family Zingiberaceae, and a native of tropical South Asia, produces turmeric. India generates almost the entire turmeric crop in the world and uses 80% of it. Indian turmeric is regarded as the most significant in the world due to its natural properties and high level of the vital bioactive component curcumin. In terms of production, consumption, and exports, India dominates the turmeric market. Around 11 lakhs tonnes of turmeric are produced worldwide each year. In terms of both production and area, Erode district is in first place in the state. Since turmeric is an input-intensive crop and it drains nutrients more quickly, it is essential that one knows about and apply improved production techniques. Adopting these novel approaches is crucial to maintaining the soil's fertility and enhancing turmeric production potential. The improved practices in turmeric cultivation are main field preparation, season and varieties, seed material and seed rate, rhizome treatment, spacing, nutrient management, weed management, irrigation, inter cultivation, pest management, disease management, harvesting post-harvest management and processing needs to be adopted to obtain better productivity. Even though the fact that a number of turmeric practices have been identified and recommended to maximize production, cultivators are not implementing the improved and recommended cultivation practices for turmeric. Therefore, the study will aid in the development of strategies for closing the adoption gap and how to reach the unreached

farmers by extension staff, other line departments, and policy makers [1,2].

Considering this context, the current study is entitled on "Assessment of Farmers Knowledge Level on Turmeric Cultivation Practices" was carried out to know the knowledge level of turmeric farmers with the specific objective is to know the knowledge level of turmeric growers on recommended turmeric cultivation practices [3].

2. MATERIALS AND METHODS

The current investigation employed an "Ex-post facto" research design, deemed suitable as the phenomenon or event had already taken place. The study was conducted in the Erode district of Tamil Nadu, which leads in both the area under turmeric cultivation and its production. Erode turmeric is renowned for its unique qualities, having received "Geographical Indication" (GI) status. The district comprises fourteen blocks: Erode, Modakkurichi, Perundurai, Kodumudi, Chennimalai, Ammapettai, Anthiyur, Bhavani, Gobichettipalayam, Nambiyur, Sathyamangalam, T.N. Palayam, Bhavanisagar, and Talavadi. Among these, Kodumudi block was selected for the research due to its extensive area under turmeric cultivation. Kodumudi block consists of 24 revenue villages, from which five villages such as Vengampur, Punjai Kollanali, Unjalur, Kollathupalayam, and Kodumudi were chosen based on their large turmeric farming populations. A proportionate random sampling method was used to select 120 turmeric growers from the five villages. Data collection was carried out through a well-structured, pre-tested interview schedule, and a knowledge test was administered to assess the turmeric growers' knowledge level. The data were analyzed using appropriate metrics, including Mean, Standard Deviation, Frequency and Percentage [4].

3. RESULTS AND DISCUSSION

3.1 Knowledge Level of Turmeric Growers on the Recommended Technologies

The knowledge level of farmers reflects their awareness of new advancements and their understanding of how these technologies work. For farmers adopting new technologies in turmeric cultivation, their level of knowledge provides valuable insights and recommendations. Therefore, a study was conducted to assess the respondents' knowledge, and the findings are presented in this section [5].

3.2 Overall Knowledge Level of Turmeric Growers

Knowledge plays a crucial role in the adoption of turmeric cultivation practices. To assess the understanding of turmeric growers, a knowledge test was conducted. Based on the cumulative frequency method, respondents were categorized into low, medium, and high knowledge levels. The necessary data to evaluate the overall knowledge of respondents regarding turmeric cultivation technology were gathered and are presented in Table 1.

The data reveal that a majority of the respondents (56.67 per cent) fall under the medium knowledge category, indicating that more than half of the turmeric growers have a moderate understanding of the recommended cultivation technologies. A significant portion (29.17 per cent) of respondents possess a low level of knowledge, suggesting that nearly one-third may require additional information or training to enhance their awareness of modern practices. Only 14.16 per cent of the respondents are classified as having a high level of knowledge, demonstrating that a small fraction of farmers has a comprehensive understanding of the advanced technologies in turmeric cultivation. These findings suggest a need for targeted interventions to improve the knowledge levels of those in the low and medium categories. These findings are consistent with the general knowledge levels of farmers, as reported by Altalb [6].

3.3 Practice – Wise Knowledge Level of the Respondents on Recommended Turmeric Technologies

The respondents' practice-wise knowledge level was determined in order to get a comprehensive

understanding of their level of expertise. Table 2 presents the practice-wise knowledge level of the respondents on particular technologies related to the cultivation of turmeric.

3.3.1 Main Field Preparation

A significant number of respondents (66.24 per cent mean) had a good understanding of main field preparation practices, with 63.33 per cent aware of field preparation techniques and 69.16 per cent familiar with the spacing for ridges and furrow [7].

3.3.2 Season and Varieties

Knowledge on recommended seasons for turmeric cultivation was excellent, with 100 per cent of respondents aware of the proper seasons. Similarly, 94.16 per cent understood the duration of the variety resulting in a high mean percentage of 97.08 per cent.

3.3.3 Seed Material and Seed Rate

The average knowledge level was moderate (60.83 per cent) with 43.33 per cent knowing how to select rhizomes for planting and 78.33 per cent familiar with the recommended seed rate for finger rhizomes [8].

3.3.4 Rhizome Treatment

Respondents' knowledge was relatively low in this area, with a mean percentage of 39.16 per cent for chemical treatments, 29.58 per cent for bio-agent treatments, and 41.66 per cent for rhizome treatment against diseases, indicating a need for further awareness in these practices. The mean knowledge level of the rhizome treatment with bio-agents was found to be 29.58 per cent. The knowledge level of the bio-agents used for rhizome treatment was found to be 32.50 per cent followed by the quantity of azospirillum/phosphobacteria needed for the rhizome treatment was 26.66 per cent.

3.3.5 Spacing

From the Table 1, The high percentage (83.74 per cent) of respondents were knowledgeable about recommended spacing and the depth for planting rhizomes, showing strong awareness of these critical practices. This result is consistent with the findings of Selvakumar (2011).

Table 1. Distribution of respondents according to their overall knowledge level on recommended turmeric cultivation technologies

(n = 120)			
S. No.	Category	Number of respondents	Per cent
1.	Low	35	29.17
2.	Medium	68	56.67
3.	High	17	14.16
Total		120	100.00

Table 2. Distribution of respondents according to their practice wise knowledge on recommended turmeric technologies

(n=120)			
S.No	Technologies	Number of respondents	Per cent
I.	Main field preparation		
1.	Preparation of main field under turmeric cultivation	76	63.33
2.	Spacing for ridges and furrows	83	69.16
	Mean Percentage		66.24
II.	Season and Varieties		
1.	Recommended seasons for turmeric cultivation	120	100
2.	Duration of the variety	113	94.16
	Mean Percentage		97.08
III.	Seed material and seed rate		
1.	Selection of rhizome for planting	52	43.33
2.	Recommended seed rate for finger rhizome	94	78.33
	Mean Percentage		60.83
IV.	Rhizome treatment		
a.	Rhizome treatment with chemicals		
1.	Chemical used for rhizome treatment	56	46.66
2.	Quantity of chemical used for rhizome treatment for per kg of rhizome	38	31.66
	Mean Percentage		39.16
b.	Rhizomes treatment with bio-agents		
1.	Bio-agents used for rhizome treatment	39	32.50
2.	Quantity of azospirillum/phosphobacteria is needed for rhizome treatment	32	26.66
	Mean Percentage		29.58
c.	Rhizomes treatment against diseases		
1.	The chemical used for rhizome treatment to prevent rhizome rot	57	47.50
2.	Method of rhizome treatment to prevent rhizome rot	43	35.83
	Mean Percentage		41.66
V.	Spacing		
1.	Recommended spacing for turmeric planting	104	86.66
2.	Depth of the rhizomes to be dibbled in soil	97	80.83
	Mean Percentage		83.74
VI.	Nutrient Management		
a.	Basal fertilizer application		
1.	Recommended quantity of FYM is to be applied	85	70.83
2.	Recommended quantity of neem cake or groundnut cake is to be applied	52	43.33
3.	Recommended quantity of urea is to be applied	78	65.00
4.	Recommended quantity of superphosphate is to be applied	43	35.83
5.	Recommended quantity of potash is to be applied	39	32.50
6.	Recommended quantity of ferrous sulphate /zinc sulphate is to be applied	23	19.16
7.	Recommended quantity of azospirillum/phosphobacteria is to be	36	30.00

S.No	Technologies	Number of respondents	Per cent
	applied		
	Mean Percentage		42.37
b.	Top dressing		
1.	Recommended number of split doses for top dressing	45	37.50
2.	Recommended time for top dressing	76	63.33
3.	Recommended quantity of urea has to be applied on 30 th day	63	52.50
4.	Recommended quantity of potash has to be applied on 30 th day	54	45.00
5.	Recommended quantity of urea has to be applied on 60 th day	45	37.50
6.	Recommended quantity of potash has to be applied on 60 th day	39	32.50
7.	Recommended quantity of urea has to be applied on 90 th day	43	35.83
8.	Recommended quantity of potash has to be applied on 90 th day	40	33.33
9.	Recommended quantity of urea has to be applied on 120 th day	37	30.83
10.	Recommended quantity of potash has to be applied on 120 th day	41	34.16
	Mean Percentage		40.24
c.	Micronutrient application		
1.	Recommended micronutrients to be applied	56	46.66
2.	Recommended quantity of micronutrients is to be applied.	38	31.66
	Mean Percentage		39.16
VII.	Weed management		
1.	Recommended number of weeding are to be done	96	80.00
2.	Recommended time of first weeding is to be done	83	69.16
3.	Recommended time of second weeding is to be done	74	61.66
4.	Recommended time of third weeding is to be done	67	55.83
5.	Recommended weed control methods	78	65.00
	Mean Percentage		66.32
VIII.	Irrigation		
1.	Recommended number of irrigation for turmeric is to be done	115	95.83
IX.	Inter cultivation		
1.	Practice of intercropping in turmeric	107	89.16
2.	Crops to be grown as inter crops in turmeric	98	81.66
3.	Recommended times of earthing up are to be done	85	70.83
4.	Recommended time for first earthing up is to be done	81	67.50
5.	Recommended time for second earthing up is to be done	78	65.00
	Mean Percentage		74.83
X.	Pest management		
1.	Two major pests in turmeric crop	55	45.83
a.	Rhizome scale		
1.	The symptoms of rhizome scales	47	39.16
2.	The control measures for rhizome scales	40	33.33
	Mean Percentage		36.24
b.	Leaf roller		
1.	The symptoms of leaf roller	51	42.50
2.	The control measures for leaf roller	38	31.66
	Mean Percentage		37.08
c.	Shoot and root borer		
1.	The symptoms of shoot and root borer	45	37.50
2.	The control measures for shoot and root borer	37	30.83
	Mean Percentage		34.16
XI.	Disease management		
1.	Two major diseases in turmeric crop	89	74.16
a.	Rhizome rot		
1.	The symptoms of rhizome rot	94	78.33
2.	The control measures for rhizome rot	75	62.50
	Mean Percentage		70.41

S.No	Technologies	Number of respondents	Per cent
b.	Leaf blotch		
1.	The symptoms of leaf blotch	66	55.00
2.	The recommended chemical for controlling leaf blotch	58	48.33
	Mean Percentage		51.66
XII.	Harvesting		
1.	The recommended time for harvesting	98	81.66

3.3.6 Nutrient Management

- **Basal Fertilizer Application:** Knowledge was moderate with 42.37 per cent of respondents knowledgeable about the recommended application of fertilizers like FYM, neem cake, urea, and other inputs.
- **Top Dressing:** Knowledge was low, with a mean percentage of 40.24 per cent, suggesting respondents need more guidance on split doses and proper timing for nutrient applications.
- **Micronutrient Application:** Knowledge was limited, with an average of 39.16 per cent, highlighting a lack of awareness regarding the application of micronutrients.

3.3.7 Weed Management

The mean knowledge level of the weed management among the turmeric farmers was found to be 66.32 per cent. The knowledge level of the turmeric farmers on recommended number of weeding was 80.00 per cent and the recommended time for first, second, third weeding were 69.16 per cent, 61.66 per cent, 55.83 per cent respectively. Because of their exposure to dealer shops, higher education, and cutting-edge farming fields, a significant portion of farmers possess knowledge of chemical weed control tactics due to their substantial agricultural expertise.

3.3.8 Irrigation

Nearly all respondents (95.83 per cent) were well-informed about the recommended number of irrigations for turmeric. Their years of expertise growing turmeric may be the reason for their high degree of understanding [9].

3.3.9 Inter cultivation

Respondents had a strong understanding (mean percentage of 74.83 per cent), with high awareness of intercropping practices, crops

suitable for intercropping, and the timing of earthing-up operations.

3.3.10 Pest management

Knowledge about pest management was relatively low, with an average of 36.24 per cent for rhizome scale, 37.08 per cent for leaf roller, and 34.16 per cent for shoot and root borer. This indicates a need for further education on pest symptoms and control measures [10].

3.3.11 Disease management

Knowledge on disease management was moderate to high. A mean percentage of 70.41% of respondents were aware of the symptoms and control measures for rhizome rot, while 51.66% knew about leaf blotch management.

3.3.12 Harvesting

The majority of respondents (81.66%) had a high degree of awareness on the ideal harvesting time. These are the main, frequently employed methods in the turmeric crop because they acknowledge that this stage impacts the quality of the turmeric. It's possible that their years of experience growing turmeric contributed to their high degree of understanding.

4. CONCLUSION

The analytical study on the knowledge level of turmeric growers in Erode District, Tamil Nadu, highlights a detailed understanding of various aspects of turmeric cultivation. While respondents showed strong awareness in areas such as recommended seasons, varieties, irrigation practices, and spacing, there were significant gaps in other critical areas. Specifically, while knowledge of main field preparation and seasonal practices was robust, understanding of rhizome treatment, micronutrient application, and pest management was less comprehensive. In particular, the study revealed that while respondents had moderate knowledge about pest management, there were

notable deficiencies in recognizing and controlling key pests such as rhizome scales, leaf rollers, and shoot and root borers. This indicates an urgent need for focused educational programs and practical guidance to improve farmers' skills in pest identification and control.

Overall, the findings emphasize the necessity of addressing these knowledge gaps through targeted training initiatives. Enhancing farmers' understanding, especially in pest management and nutrient application, will help optimize turmeric cultivation practices and support the sustainability of turmeric farming in the region.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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