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# Analysis of Turmeric Cultivation Practices among Farmers in Erode District

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Research Article

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## ABSTARCT

Turmeric (*Curcuma longa L.*) cultivation plays a pivotal role in the agricultural landscape of Erode district, known for its significant contribution to the regional economy. This study aims to analyze the diverse cultivation practices employed by farmers engaged in turmeric cultivation across Erode district. The research utilizes a quantitative approach, surveying 150 farmers selected through purposive sampling. Structured questionnaires gather data on demographic characteristics, landholding size, cultivation techniques (including land preparation, seed selection, irrigation methods, fertilization, pest and disease management), yield levels, market access, and perceived challenges. Percentage analysis and Chi-square tests are employed to analyze the data, examining associations between variables such as education level and adoption of modern practices, farm size and irrigation methods, and market access and use of improved turmeric varieties. The findings are expected to provide insights into current cultivation practices, identify challenges faced by farmers, and suggest strategies to enhance productivity and sustainability in turmeric cultivation in Erode district.

**Keywords:** Turmeric cultivation; Erode district; Farming practices; Quantitative analysis; Agricultural sustainability

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## INTRODUCTION

Turmeric (*Curcuma longa L.*) holds significant agricultural and economic importance in Erode district, Tamil Nadu, India. Known as the "Turmeric city" or "Yellow city," Erode district is renowned for its robust cultivation of turmeric, contributing substantially to both local livelihoods and the regional economy [1]. This aromatic spice is not only a staple in culinary traditions but also holds medicinal and cultural significance, driving its demand both domestically and globally. The cultivation practices employed by farmers in Erode district play an essential role in determining the yield, quality and sustainability of turmeric production. Understanding these practices is essential for optimizing agricultural productivity and addressing the challenges faced by farmers in the region. Factors such as land preparation techniques, seed selection, irrigation methods, fertilization practices, pest and disease management strategies and harvesting techniques influence the success of turmeric cultivation in this area. Despite its economic importance, turmeric cultivation in Erode district faces various challenges, including fluctuating market prices, water scarcity, pest outbreaks and limited access to modern agricultural technologies [2]. Innovations in farming practices, such as the adoption of drip irrigation systems and organic farming methods, have been introduced to mitigate these challenges and enhance sustainability. This study aims to conduct a comprehensive analysis of turmeric cultivation practices among farmers in Erode district. By examining the methods, challenges, and innovations utilized by local farmers, this research seeks to provide valuable insights into current practices and identify opportunities for improvement. The findings are expected to contribute to the development of strategies that promote sustainable agricultural practices, enhance productivity and improve the socio-economic well-being of turmeric farmers in Erode district.

### Statement of the problems

Turmeric (*Curcuma longa L.*) cultivation in Erode district, Tamil Nadu, faces multifaceted challenges despite its significant economic importance. The sustainability and productivity of turmeric farming are influenced by various factors, including traditional practices, access to modern agricultural technologies, market dynamics and environmental conditions. Understanding these challenges is important for devising effective strategies to enhance turmeric cultivation practices and improve the livelihoods of farmers in the region. Key issues include:

**Environmental sustainability:** Issues such as water scarcity, soil degradation and climate variability impact the long-term sustainability of turmeric cultivation practices. Adapting to changing environmental conditions while maintaining productivity remains a critical challenge.

**Market fluctuations and economic viability:** Turmeric farmers in Erode district face volatility in market prices, affecting their income and economic stability. Fluctuations in demand and market access further complicate economic planning and investment in cultivation.

**Socio-economic impacts:** The socio-economic well-being of turmeric farmers, including income levels, livelihood security and access to social services, is influenced by the profitability and sustainability of their cultivation practices.

**Technological access and adoption:** Limited access to advanced agricultural technologies such as efficient irrigation systems, mechanized farming equipment and pest management tools hinders productivity and resource management among farmers.

**Traditional *vs.* modern practices:** The coexistence of traditional farming methods alongside modern agricultural practices poses challenges in optimizing yield, quality and sustainability of turmeric cultivation.

Addressing these challenges requires a thorough analysis of current turmeric cultivation practices among farmers in Erode district. By identifying the root causes and implications of these challenges, this study aims to provide actionable insights and recommendations to promote sustainable agricultural development and enhance the resilience of turmeric farming communities in the region.

## Objective of the study

**To analyze innovations and adaptations:** Identify innovative practices and adaptations implemented by farmers to overcome challenges and improve the efficiency, sustainability and profitability of turmeric cultivation.

**To assess yield levels and factors influencing yield:** Evaluate the yield levels achieved by farmers and identify the factors that contribute to variations in turmeric yield, such as cultivation practices, soil fertility management, weather conditions and pest/disease prevalence.

**To examine challenges faced by farmers:** Investigate the challenges encountered by turmeric farmers in Erode district, including but not limited to market fluctuations, water scarcity, pest outbreaks, labor shortages and access to resources and technology.

**To explore socio-economic impacts:** Understand the socio-economic impacts of turmeric cultivation on farmers' livelihoods, income generation and overall well-being in Erode district.

**To identify current cultivation practices:** Explore and document the various techniques and methods employed by farmers in Erode district for turmeric cultivation, including land preparation, seed selection, planting techniques, irrigation practices, fertilization methods, pest and disease management strategies and harvesting practices.

**To recommend strategies for improvement:** Based on the findings, formulate recommendations and strategies to enhance turmeric cultivation practices, promote sustainable agriculture and support the socio-economic development of turmeric farmers in Erode district.

These objectives aim to provide a comprehensive understanding of the current state of turmeric cultivation practices in Erode district, addressing both the challenges faced by farmers and the potential opportunities for improvement and sustainable development in the sector.

## Scope of the study

This study focuses on analyzing turmeric cultivation practices among farmers in Erode district, Tamil Nadu, India. The scope of the study includes:

**Geographical focus:** The research will be conducted specifically in Erode district, known for its significant production of turmeric. Different regions within the district will be considered to capture variations in cultivation practices.

**Participants:** The study will involve 150 turmeric farmers selected through purposive sampling from various parts of Erode district. Farmers of different demographics, farm sizes and socio-economic backgrounds will be included to ensure diversity in perspectives.

## Cultivation practices

**Methods:** Exploration of various methods and techniques employed by farmers for turmeric cultivation, including land preparation, seed selection, planting practices, irrigation methods, fertilization techniques, pest and disease management strategies and harvesting practices.

**Innovations:** Examination of innovative practices adopted by farmers to address challenges and improve efficiency and sustainability in turmeric cultivation.

## Data collection

**Quantitative data:** Structured surveys will gather quantitative data on demographic characteristics, landholding sizes, cultivation practices, yield levels, market access and economic aspects.

**Qualitative data:** In-depth interviews will provide qualitative insights into farmers' experiences, challenges faced and perceptions regarding turmeric cultivation.

### Analysis

**Percentage analysis:** Utilization of percentage analysis to determine the prevalence of different cultivation practices among farmers.

**Chi-square analysis:** Application of Chi-square tests to explore associations between variables such as education level and adoption of modern practices, farm size and irrigation methods and market access and use of improved turmeric varieties.

## Significance

The study aims to provide valuable insights into the challenges and opportunities in turmeric cultivation in Erode district.

Findings will contribute to the development of strategies to enhance productivity, sustainability and socio-economic well-being of turmeric farmers in the region.

By focusing on these aspects, the study endeavors to offer a comprehensive understanding of turmeric cultivation practices in Erode district, facilitating informed decisions and interventions for agricultural development and improvement in the livelihoods of farmers.

## Review of the related study

Turmeric (*Curcuma longa L.*) cultivation in Erode district, Tamil Nadu, India, holds significant economic and cultural importance, contributing substantially to the regional agricultural sector. This review synthesizes existing literature on turmeric cultivation practices, challenges, innovations and socio-economic impacts among farmers in Erode district.

**Cultural and economic significance:** Turmeric is deeply ingrained in the cultural and culinary traditions of South India. Its economic significance stems from its use in food processing, pharmaceuticals, cosmetics and traditional medicine industries [3]. Erode district, recognized as a prominent turmeric cultivation hub, benefits from its strategic geographical location and conducive agro-climatic conditions for turmeric farming [4,5].

**Cultivation practices:** Various cultivation practices influence turmeric production in Erode district. These include land preparation techniques, seed selection based on local varieties, planting methods (rhizome planting), irrigation strategies (traditional flood irrigation *vs.* modern drip irrigation), fertilizer application (organic *vs.* chemical) and pest and disease management practices [6]. Farmers often integrate traditional knowledge with modern agricultural techniques to optimize yield and minimize production risks [7].

**Challenges in turmeric cultivation:** Turmeric farmers in Erode district encounter several challenges that affect productivity and profitability. Common challenges include:

***Market volatility:*** Fluctuations in turmeric prices due to global market trends and domestic demand-supply dynamics.

***Water scarcity:*** Limited availability of water for irrigation purposes, exacerbated by seasonal variations and inadequate water management practices.

***Pest and disease management:*** Issues related to pest outbreaks and diseases, requiring effective pest management strategies to mitigate crop losses.

***Technological access:*** Unequal access to modern agricultural technologies and resources among smallholder farmers, hindering productivity improvements.

**Innovations and adaptations*:*** Farmers in Erode district have adopted various innovative practices to overcome these challenges and enhance productivity. Examples include the adoption of Integrated Pest Management (IPM) techniques, organic farming practices, use of bio-fertilizers and adoption of efficient irrigation systems like drip irrigation. These innovations aim to improve resource efficiency, reduce production costs and enhance crop resilience to environmental stresses.

**Socio-economic impacts:** The socio-economic well-being of turmeric farmers in Erode district is influenced by the profitability and sustainability of their cultivation practices. Studies indicate that successful turmeric cultivation contributes to income generation, employment opportunities and rural development, thereby improving the overall quality of life for farming communities.

**Conclusion:** This review underscores the complexity of turmeric cultivation in Erode district, highlighting the interplay between traditional practices, modern innovations, socio-economic factors and environmental challenges. By addressing these aspects, future research and development efforts can focus on promoting sustainable agricultural practices, enhancing farmer resilience and ensuring the long-term viability of turmeric cultivation in the region.

## Cultivation practice

Turmeric, known for its significant economic and cultural importance in the region, is cultivated through several key practices.

**Harvesting and post-harvest practices:** Turmeric is harvested carefully after 7-9 months, depending on variety and growth conditions. Post-harvest processing includes curing the rhizomes, drying them in the sun and polishing to enhance market appeal.

**Irrigation practices:** Depending on rainfall patterns, farmers employ various irrigation methods such as drip irrigation or traditional flood irrigation to ensure consistent moisture levels during different growth stages.

**Land preparation and soil management:** Farmers typically prepare well-drained, loamy soils rich in organic matter. Land is plowed and leveled to ensure optimal soil structure and water retention.

**Market access and value addition:** Farmers often participate in local markets or through cooperatives to sell their produce. Value addition through processing turmeric into powder or oil extracts is gaining popularity for higher returns.

**Nutrient management:** Application of organic manures and balanced fertilizers based on soil testing is common practice. This helps maintain soil fertility and enhances yield.

**Planting and spacing:** Turmeric rhizomes are planted during the monsoon season in rows or pits at appropriate spacing to facilitate growth and development.

**Variety selection:** Selection of suitable turmeric varieties adapted to the local agro-climatic conditions is important. Varieties that exhibit resistance to diseases and pests prevalent in the area are preferred.

**Weed and pest management:** Manual weeding and application of organic pesticides are preferred over chemical methods to minimize environmental impact and ensure product quality [8].

## MATERIALS AND METHODS

### Research design

The study is structured within the context of agricultural productivity, aiming to explore how various factors influence the cultivation of turmeric.

**Objective:** To analyze and compare turmeric cultivation practices among 150 farmers in Erode district using percentage analysis and Chi-square analysis.

**Approach:** The study will employ a quantitative research design with structured surveys.

### Sampling

**Sampling technique:** Purposive sampling will be used to select 150 farmers actively engaged in turmeric cultivation across different regions of Erode district.

**Sample size justification:** The sample size of 150 ensures adequate representation and statistical power to analyze the data using percentage and Chi-square analysis.

### Data collection

**Structured surveys:** A structured questionnaire will be administered to collect data. The survey will include sections on:

- Demographic information (age, education, landholding size).
- Cultivation practices (land preparation, seed selection, planting methods, irrigation, fertilization, pest and disease management).
- Yield levels and factors influencing yield.
- Market access and challenges faced in turmeric cultivation.

### Data analysis

**Percentage analysis:** The data collected from the surveys will be analyzed using percentage analysis to determine the prevalence of different cultivation practices among farmers.

**Chi-square analysis:** Chi-square analysis will be employed to examine the association between categorical variables, such as:

- Education level and adoption of modern cultivation practices.
- Farm size and use of irrigation methods.
- Market access and adoption of improved turmeric varieties.

**Ethical considerations**

- Informed consent will be obtained from all participants.
- Participants' anonymity and confidentiality will be strictly maintained throughout the study.
- Ethical guidelines will be followed to ensure the welfare and rights of participating farmers.

### Expected outcomes

- The study aims to provide insights into the prevailing turmeric cultivation practices in Erode district.
- Findings will inform strategies to optimize cultivation techniques, enhance productivity and address challenges faced by turmeric farmers.

This methodology is designed to provide a detailed analysis of turmeric cultivation practices among farmers in Erode district, utilizing both percentage and Chi-square analysis to explore relationships and patterns in the data effectively.

## RESULTS AND DISCUSSION

### Percentage analysis

The percentage analysis highlights the key factors influencing farmers' preference for turmeric cultivation, showing that economic benefits, suitable agro-climatic conditions and traditional knowledge are the strongest motivators, while value addition and cultural significance have a lesser impact (Table 1).

**Table 1.** Factors motivating farmers to prefer turmeric cultivation.

| S.no | Motivation factors | High motivation | Medium motivation | Low motivation | Percentage |
|---|---|---|---|---|---|
| 1 | Market demand and price stability | 69 | 50 | 31 | 150 |
| 2 | Profitability | 91 | 40 | 19 | 150 |
| 3 | Suitable agro-climatic conditions | 99 | 35 | 17 | 150 |
| 4 | Traditional knowledge and expertise | 90 | 25 | 35 | 150 |
| 5 | Government support and subsidies | 75 | 48 | 27 | 150 |
| 6 | Crop rotation benefits | 83 | 40 | 27 | 150 |
| 7 | Minimal input requirements | 61 | 51 | 38 | 150 |
| 8 | Value-added products | 55 | 51 | 44 | 150 |
| 9 | Cultural and traditional significance | 60 | 49 | 41 | 150 |
| 10 | Diversification of income sources | 52 | 58 | 40 | 150 |

### High motivation factors

**Suitable agro-climatic conditions (99%):** Farmers are highly motivated by the suitability of their land for turmeric cultivation.

**Profitability (91%):** High profits are a significant motivator for farmers to cultivate turmeric.

**Traditional knowledge and expertise (90%):** Farmers' existing knowledge and expertise in turmeric cultivation motivate them to continue growing the crop.

### Medium motivation factors

**Market demand and price stability (69%):** A stable market demand and price for turmeric motivate farmers to some extent.

**Government support and subsidies (75%):** Government support and subsidies provide a moderate level of motivation for farmers.

**Crop rotation benefits (83%):** The benefits of crop rotation, such as improved soil health, motivate farmers to some extent.

**Minimal input requirements (61%):** The relatively low inputs required for turmeric cultivation motivate farmers to some extent.

### Low motivation factors

**Value-added products (55%):** The potential for value-added products from turmeric motivates farmers to a lesser extent.

**Cultural and traditional significance (60%):** The cultural and traditional significance of turmeric motivates farmers to some extent, but not as much as other factors.

**Diversification of income sources (52%):** Diversifying income sources through turmeric cultivation motivates farmers to a lesser extent.

Overall, farmers are highly motivated by factors related to the suitability of their land, profitability and traditional knowledge. Medium motivation factors include market demand, government support and crop rotation benefits. Factors related to value-added products, cultural significance, and income diversification motivates farmers to a lesser extent.

### Chi-square analysis

The chi-square analysis indicates a statistically significant association between the variables, as evidenced by the p-values (<0.001) in all tests (Table 2).

**Table 2.** Chi-square tests.

| | Value | Degrees of freedom (df) | Asymptotic significance (2-sided) |
|---|---|---|---|
| Pearson Chi-square | 128.393[a] | 4 | <.001 |
| Likelihood ratio | 145.016 | 4 | <.001 |
| Linear-by-linear association | 97.62 | 1 | <.001 |
| McNemar-Bowker test | 43 | 2 | <.001 |
| N of valid cases | 150 | - | - |
| **Significance:** [a]1 cells (11.1%) have expected count less than 5. The minimum expected count is 3.09. | | | |

The small expected count warning (1 cell with expected count less than 5) may affect test accuracy. The results suggest strong associations and significant differences between variables, but further analysis is needed to understand the nature of these relationships. In practical terms, this means that the variables are not independent, and there are significant relationships between them (Table 3).

**Table 3.** One-sample statistics.

| | N | Mean | Std. deviation | Std. error mean |
|---|---|---|---|---|
| Market demand and price stability | 150 | 1.73 | 0.766 | 0.063 |
| Profitability | 150 | 1.4733 | 0.6419 | 0.05241 |
| Suitable agro climate conditions | 150 | 1.4467 | 0.68087 | 0.05559 |

| | | | | |
|---|---|---|---|---|
| Traditional knowledge and expertise | 150 | 1.6333 | 0.8388 | 0.06849 |
| Government support and subsides | 150 | 1.68 | 0.76255 | 0.06226 |
| Crop rotation benefits | 150 | 1.6267 | 0.77327 | 0.06314 |
| Minimal input requirements | 150 | 1.8467 | 0.80048 | 0.06536 |
| Value added products | 150 | 1.9267 | 0.8118 | 0.06628 |
| Cultural and traditional significance | 150 | 1.8733 | 0.81345 | 0.06642 |
| Diversification of income source | 150 | 1.92 | 0.78167 | 0.06382 |

Market demand and price stability, profitability, suitable agro-climatic conditions, traditional knowledge and expertise, government support and subsidies, crop rotation benefits, minimal input requirements, value-added products, cultural and traditional significance and diversification of income source are all significant factors.

## CONCLUSION

The analysis of turmeric cultivation practices among farmers in Erode district reveals several challenges and opportunities for enhancing agricultural productivity, sustainability and socio-economic development. Based on the findings and the literature review.

In conclusion, addressing the challenges faced by turmeric farmers in Erode district requires a multi-faceted approach that integrates technological advancements, sustainable practices, market access improvements and policy support. By implementing these suggestions, stakeholders can foster a conducive environment for sustainable agricultural development, enhance farmers' resilience to external shocks and improve their socio-economic well-being in the long term.

## LIMITATIONS

The study's findings will be specific to Erode district and may not be fully generalizable to other regions without considering local agricultural contexts. Variability in farmers' responses due to differences in socio-economic status and access to resources may influence the study outcomes. The findings may be specific to Erode district and may not be generalizable to other regions without considering local agricultural contexts. Variability in farmers' responses due to differences in socio-economic status and farm management practices may influence the study outcomes.

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