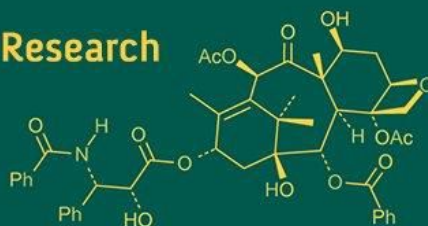
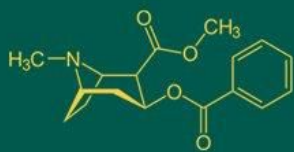


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Challenges faced by turmeric growers in the Kandhamal region of Odisha

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Abstract

This study explores the challenges faced by turmeric farmers in the Kandhamal region of India, focusing on the Daringibadi block. Data collected from 80 farmers reveal critical insights into their demographic and operational realities. A significant 71.3% of farmers cultivate turmeric on plots smaller than one hectare, while 28.7% operate on landholdings between one and two hectares. Financial instability emerged as the most critical issue, directly affecting production capabilities. Additional challenges include low productivity, limited technical knowledge, and inadequate marketing awareness, compounded by frequent price fluctuations. Social and technological barriers, such as insufficient knowledge of high-yielding turmeric varieties and poor economic conditions, exacerbate these struggles. These findings highlight the urgent need for targeted government interventions to address financial, technological, and knowledge gaps. Recommendations include improving market access, providing technical training, and promoting sustainable practices. Implementing these strategies could enhance farmers' livelihoods and ensure the long-term sustainability of turmeric cultivation in the region. This study underscores the importance of holistic support to address the multifaceted challenges faced by turmeric farmers in Kandhamal, ensuring both economic resilience and agricultural sustainability.

Keywords: Challenges, garrett ranking, turmeric

Introduction

Turmeric (*Curcuma longa* L.) is a perennial, herbaceous plant belonging to the Zingiberaceae family, primarily cultivated for its rhizomes. It is known for its vibrant yellow colour and bioactive compound, curcumin. Turmeric has been extensively used in culinary, medicinal, and industrial applications worldwide (Bhardwaj *et al.*, 2011) ^[2]. Historically, it has played a crucial role in traditional medicine, particularly in Ayurveda and Chinese medicine, due to its anti-inflammatory, antioxidant, and antimicrobial properties (Prasad & Aggarwal, 2011) ^[13]. The increasing global demand for natural health products, functional foods, and organic spices has further amplified its economic significance.

India dominates the global turmeric market, accounting for nearly 80% of total production, followed by China, Myanmar, Nigeria, and Bangladesh (Ndondo, 2023) ^[12]. The global turmeric market was valued at USD 4.3 billion in 2022 and is projected to grow at a CAGR of 5.5% from 2023 to 2030, driven by rising consumer awareness of its health benefits. At the national level, India produces approximately 1.1 million metric tonnes of turmeric annually from a cultivated area of about 250,000 hectares (NHB, 2023) ^[11]. The major turmeric-producing states include Telangana, Tamil Nadu, Karnataka, Maharashtra, Andhra Pradesh, and Odisha, with Telangana contributing nearly 30% of the total national production. The crop is mainly grown under rainfed conditions in warm, humid climates, thriving in well-drained loamy or alluvial soils. India is also the largest exporter of turmeric, supplying it to over 150 countries, with major importers including the USA, UAE, Bangladesh, and Malaysia. In 2022-23, India exported 169,000 metric tonnes of turmeric, generating USD 207 million in export earnings (Spices Board of India, 2023). Kandhamal, a tribal-dominated district in Odisha, is known for its high-quality organic turmeric, often cultivated without chemical fertilizers or pesticides. The region's hilly terrain, forest cover, and favourable agro-climatic conditions make it an ideal location for turmeric cultivation. Nearly 50,000 smallholder farmers depend on turmeric as their primary source of income, cultivating the crop across 25,000 hectares and producing over 26,000 metric tonnes of dry turmeric annually (Babu *et al.*, 2015) ^[1]. Despite its economic significance, turmeric growers

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in Kandhamal face multiple challenges, including limited access to quality seeds, inadequate processing facilities, price fluctuations, lack of direct market linkages, and dependence on intermediaries. Additionally, climate variability, poor irrigation infrastructure, and restricted financial support further constrain productivity and profitability (NABARD, 2022). The present study aims to identify and analyze the key challenges faced by turmeric growers in Kandhamal and explore possible interventions to enhance their livelihood sustainability.

The agriculture sector plays a pivotal role in ensuring food security, reducing poverty, and fostering economic growth. It serves as the primary source of income for over 60% of rural households (Surapaka *et al.*, 2022) ^[18] and demonstrates its critical contribution to rural livelihoods. This substantial rise in agricultural output has positioned Indian agriculture prominently on the global stage. It shows its ability to meet local needs and support the global food supply.

Kandhamal turmeric, known as *Kandhamal Haldi*, is of very high quality, containing 2-3% curcumin, 12.15% oleoresin, and 5.3% volatile oil (KASAM Project Report, 2018) ^[10]. These qualities give it a strong aroma and high medicinal value, making it popular in both domestic and international markets. In recognition of its unique properties, *Kandhamal Haldi* was awarded a Geographical Indication (GI) tag in 2019 ((Sahoo *et al.*, 2022) ^[15]. Odisha contributes about 21% of India's turmeric cultivation, and Kandhamal accounts for more than half of this, making it an important turmeric-producing region. India itself is the world's largest producer and exporter of turmeric (Pushp, 2019) ^[14]. However, farmers in Kandhamal face many challenges. Most of them are tribal farmers who are socio-economically and educationally disadvantaged (Das *et al.*, 2024) ^[4]. Farmers in Kandhamal rely on traditional practices like shifting cultivation (PODU) and upland farming, which support organic methods but result in low yields (Sahoo *et al.*, 2018) ^[16]. Limited access to modern technology further hampers productivity. Market challenges also persist, with many farmers forced to sell turmeric at ₹30-35 per kg, far below market rates. This study examines these production and marketing challenges and explores strategies to promote sustainable turmeric farming and improve farmer livelihoods.

Methodology:

The study focuses on the challenges and prospects of turmeric growers in the Kandhamal region, with the Daringibadi block as the primary study area due to its prominence in turmeric cultivation. A multistage purposive sampling method was employed to select the district, block, and villages for the study. Eight villages were chosen from four-gram panchayats within the block, and a sample of 80 turmeric growers was selected through a simple random sampling technique. Data collection was conducted between June and August 2023 using structured interviews to gather primary data. Analytical tools such as percentage analysis, Garrett ranking were utilized to interpret the data. This comprehensive methodology aimed to provide insights into the socio-economic conditions, challenges for turmeric cultivation in the Kandhamal region.

The Garrett's ranking method was used to prioritize the challenges faced by the farmers both in the production and marketing of Turmeric in Kandhamal region. The turmeric

farmers in the selected villages were asked to rank the challenges they encountered in production and marketing challenges. These ranks were converted into percent position by using the formula

$$\text{Percentage position} = \frac{100(R_{ij}-0.5)}{N_j}$$

Where,

R_{ij} = Rank given for the i^{th} item by the j^{th} individual

N_j = Number of items ranked by the j^{th} individual

The percent position of each rank was converted to a score by referring to tables given by Garrette and Woodsworth (1969). Referring to Garrett's table, the estimated percent positions were converted into a score. Thus, for each problem, the mean score was estimated. The problem with the highest mean value was considered as the most important one and the others followed in that order. The challenges were initially included in the pre-structured schedule. The challenges faced by the turmeric farmers in production and marketing were as follows: Financial weakness, Lack of storage facilities, Low productivity, Lack of technical Knowledge High cost of labour, non-availability of quality seed, Lack of Know how about price variation, Fluctuation in price, Improper marketing channel, Lack of grading facilities, Lack of transportation Poor economic condition, Lack of finance, small size of land holding, Lack of awareness of HYV varieties, Lack of adoption of appropriate technology, Lack of training programmes related with production technology, Less information about seed treatment, Very less adoption of innovation suggested by KVK, Cost of post-harvest technology is high, high charges by commission agents, Fluctuation in market price, Lack of timely credit facility, High cost of rhizome

Results and Discussion

To rank the problems identified in the production factors, marketing factors, social factors, technological factors, financial factors of turmeric grower, Garrett's ranking technique was used. By using the Garrett's formula, the percent position was obtained. These were converted into score by relating to Garrett's table. The mean score value was obtained and constraints having the highest score value was identified as the most important.

Production factors			
S.No	Constraints	Mean Score	Rank
1	Financial weakness	76.3	1
2	Lack of storage facilities	57	2
3	Low productivity	52.91	3
4	Lack of technical Knowledge	49.36	4
5	High cost of labour	32.51	5
6	Non availability of quality seed	31.91	6

Table 1 illustrated that farmers were asked to rank the intensity of various problems they encountered. It was observed that respondents rated "financial weakness" as the most critical issue, with a mean score of 76.3. This was followed by "lack of storage facilities," which had a mean score of 57 and was identified as the second most significant problem. The absence of adequate storage led to higher post-harvest losses, reduced market access, and other challenges. "Low productivity," with a mean score of 52.91,

was ranked third, contributing to lower incomes, increased production costs, food security risks, and fewer market opportunities. "Lack of technical knowledge" was ranked fourth, with a mean score of 49.36, leading to reduced yields, inefficient resource use, missed value-added opportunities, and limited innovation. "High cost of labor," ranked fifth with a mean score of 32.51, directly increased production costs and reduced profit margins. Lastly, "non-availability of quality seeds" was ranked sixth, with a mean score of 31.91, further complicating the challenges faced by turmeric farmers.

Marketing Factors			
S.No	Constraints	Mean Score	Rank
1	Lack of Know how about price variation	65	1
2	Fluctuation in price	58.7	2
3	Improper marketing channel	56.25	3
4	Lack of grading facilities	34.56	4
5	Lack of transportation	34.25	5

According to the data in Table 2, respondents ranked "lack of knowledge about price variation" as the most significant issue faced by turmeric growers, with a mean score of 65. "Fluctuation in price" was ranked second by the majority of farmers, earning a mean score of 58.7. This issue not only increased input costs but also created income uncertainty due to price volatility. "Improper marketing channels" was ranked third, with a mean score of 52.91, highlighting challenges in reaching profitable markets. "Lack of grading facilities" was placed fourth, with a mean score of 34.56, resulting in inconsistent quality and unpredictable pricing. Lastly, "lack of transportation" was ranked fifth, with a mean score of 34.25. However, only a small number of respondents identified transportation issues as a major challenge.

Social Factors			
S.No	Constraints	Mean Score	Rank
1	Poor economic condition	69	1
2	Lack of finance	42.16	2
3	Small size of land holding	38.83	3

Social constraints, which arise from societal and economic factors, were analyzed using the Garrett ranking method. Among these, "poor economic condition" was identified as the most significant constraint, with a mean score of 69. This was followed by "lack of finance," which had a mean score of 42.16, and "small size of landholding," ranked third with a mean score of 38.83. These findings highlight the significant impact of socio-economic limitations on turmeric farming practices.

Technological Factors			
S.No	Constraints	Mean Score	Rank
1	Lack of awareness of HYV varieties	66.3	1
2	Lack of adoption of appropriate technology	60.02	2
3	Lack of training programmes related with production technology	57.96	3
4	Less information about seed treatment	50.83	4
5	Very less adoption of innovation suggested by KVK	34.48	5
6	Cost of post harvest technology is high	30.38	6

In table 4 it shown that the respondents were asked to rank the challenges faced regarding technological aspects.

According to the data in Table 1, the respondents ranked "Lack of awareness of HYV varieties," with a mean score of 66.3, as the most significant issue facing turmeric growers. "Lack of adoption of appropriate technology" was placed second by the majority of farmers, earning it a mean score of 60.02. In addition to raising input costs, this component makes income uncertain owing to price volatility. Third-place finisher "Lack of training programmes related with production technology" had a mean score of 57.96. With a mean score of 50.83, "Less information about seed treatment" finished in fourth place, leading to variable quality and unpredictability in cost. Very less adoption of innovation" was ranked fifth with a mean score value of 34.48. "Cost of post-harvest technology is high" was ranked sixth, with a mean score value of 30.38.

Financial Factors			
S.No	Constraints	Mean Score	Rank
1	Highest charges by commission agents	70.15	1
2	Fluctuation in market price	57.95	2
3	Lack of timely credit facility	44.9	3
4	High cost of rhizome	27	4

The farmers were asked to rank four major constraints in financial parameter. It is observed that the farmers have ranked charges by commission agents with highest mean score of (70.95) followed by fluctuation in market price (57.95), lack of timely credit (44.9) and high cost of rhizome (27).

Conclusion

The turmeric growers in Kandhamal face a multitude of challenges spanning production, marketing, technological, social, and financial domains. Among production-related constraints, financial weakness, lack of storage facilities, and low productivity emerged as the most pressing issues. Marketing constraints such as lack of knowledge about price variation, price fluctuations, and improper marketing channels significantly hinder farmers' profitability. Technological limitations, including a lack of awareness about high-yielding varieties and insufficient adoption of advanced technologies, further exacerbate the situation. Social and financial barriers, such as poor economic conditions, small landholdings, high charges by commission agents, and inadequate access to timely credit, add to the difficulties faced by the farmers. The high cost of production, driven by factors like the use of traditional methods, lack of mechanization, and inefficient primary processing techniques, results in negative profit margins for many farmers. Additionally, the absence of supportive pricing mechanisms leads to distress sales, where farmers are often exploited by middlemen. Limited adoption of improved seed varieties and post-harvest technologies also restricts the potential for enhanced yields and profitability. While some NGOs have initiated efforts to procure turmeric at fairer prices, the rates remain below the prevailing market value, indicating a critical need for government intervention. Supporting these organizations, introducing innovative technologies, and establishing better marketing channels could significantly improve the livelihoods of turmeric farmers. Addressing these systemic challenges through targeted policies and support mechanisms is essential for ensuring the sustainable growth of turmeric cultivation and

improving the socio-economic conditions of farmers in Kandhamal.

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