

An Exploratory Research on the Novel Strategies and the Challenges Faced by Turmeric Farmers in Erode District, Tamil Nadu

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Abstract

Turmeric is a perennial, rhizomatous and herbaceous plant, native to the Indian subcontinent and Southeast Asia. It comprises of powerful anti – inflammatory and anti-oxidant properties. India has much pride in cultivating Turmeric in India. The literature reviews showed there has been a research gap on various strategies that can be used to boost turmeric yield and thereby encouraging Turmeric Farming. Hence, the present study aimed to explore the novel strategies and challenges faced by the turmeric farmers. The data collected were analyzed using SPSS 22.0. It was found from the research that majority of the respondents used drip irrigation, crop rotation and mulching for boosting turmeric yield. Turmeric farmers faced the challenges which includes financial stability, inadequate marketing facilities and lack of skilled labours. The study concluded that in order to uplift turmeric farming, the government and private organization should initiate research centres for quality turmeric cultivation.

Keywords: *Anti-Inflammatory, Antioxidant properties, Turmeric, Turmeric cultivation, Turmeric Farmers.*

Introduction

In recent years, the commercial value of spices has grown substantially all over the world. Turmeric popularly known as ‘Indian Saffron’ is an important ancient and sacred spice grown commercially in India. It is also known as the ‘Golden Spice of life’ and is one of the most essential spices used as an important ingredient all over the world. Turmeric is grown only in 6 per cent of the total area under spices and condiments in India. Over the years it has been widely used in traditional medicine as a household remedy for various diseases such as for cough, diabetic wounds and sinusitis.

India is the largest producer, consumer and exporter of turmeric in the world. Because of high curcumin content, Indian turmeric is considered as the best in the world market and accounts for about 80 per cent of world turmeric production and 60 per cent of world exports. Andhra Pradesh, Tamil Nadu, Odisha, Karnataka, West Bengal, Gujarat, Meghalaya, Maharashtra, Assam are some of the important states that cultivate turmeric in India. Tamil Nadu is the second largest producer of turmeric contributing for about 17 per cent of output in the country. Being one of the largest producers of turmeric, Erode is also the largest market for turmeric. Originally, the area of turmeric cultivation was around one lakh acres when the entire Tamil Nadu was cultivating in 2.5 lakh acres. But now the area of turmeric cultivation has shrunk to 50,000 acres in the state while it is 15,000 acres in Erode alone. Erode turmeric has about 90 percentage of curcumin content which is a natural food coloring agent as approved by WHO and is also known for its rich medicinal value. There is a huge demand for Erode turmeric in countries like Bangladesh, Malaysia, Singapore, UK, USA and the Gulf Countries.

Review of Literature

The study on turmeric farming is gaining importance in the present scenario as the farmer faces numerous challenges and they seek strategies to overcome their issues. Hence the researcher focused attention on the above aspect based on which previous literature has been reviewed to probe the challenges faced by turmeric farmers. The study in question has been undertaken on both humans and robots. The researcher Kiruthika N (2013) explored the economics of production of turmeric of Erode district in India. The objective was to study the economics of production and to understand the efficiency of input use in production of turmeric in Erode district of Tamil Nadu. Among the taluks in Erode district, Erode taluk was selected purposively for the study. There are three blocks in Erode taluk. Among the three blocks, based on the maximum area under turmeric two blocks viz., Kodumudi and Modakurichi were selected. Thirty farmers were selected from each of the three selected villages and thus the total sample size is 90. Both primary and secondary data were collected for the study. The questionnaires were pre-tested and finalized. The study found that the cost of production was higher in the case of marginal farmers followed by small and large farmers respectively which reflected the economies of scale.

The adoption, marketing and problems of turmeric growers in Mizoram were investigated by Sharma L.S. & Vanlalhumi (2013). The study was conducted through a sample of 74 turmeric farmers in Reiek area through a structured questionnaire. The study found that the short life of the turmeric produce makes the Mizoram farmer vulnerable in absence of proper post-harvest processing facilities and marketing infrastructure and it was suggested that skill development was necessary for increasing the productivity and success of this product.

As previously proposed by Jayasubramanian P. & Sasikumar (2015) the purpose of the present study was to investigate the problems and prospects for turmeric products perceived by small farmers in Erode district. The objective of the study was to find out the problems and prospects perceived by the small farmers in turmeric market. Sample size was confined to 228 small farmers and was found that maintaining labour by small farmers are having level of impact in their business. Hence it was suggested to encourage the small farmers and help them to achieve greater heights in future.

The researcher Jayanthi M. & Vaideke A. (2015) examined the cultivation practices of turmeric farmers in erode district of Tamil Nadu. The sampling technique in this project was convenient sampling. A sample of 100 respondents was taken into account for this study. Thus, the study concluded that to enhance the productivity, popularization of cost- effective, ecofriendly production technologies among the farming community and the indigenous technical knowledge acquired by the farmers need to be tested and refined with the modern techniques.

The study was undertaken by Prasad Yadav and Gaur Tarun (2017) about the versatility of turmeric. The medicinal properties of Turmeric include anti-inflammatory, anti-oxidant, anti-coagulant, anti-diabetic, anti-microbial, anti-ulcer, wound healing and anti-fertility activities. It is effectively used in diabetes, various malignant disease, Alzheimer's disease and other chronic disease. This study was conducted to review the Introduction, Geographical distribution, History, Cultivation, Uses, Strange facts, Side effects, Synonyms, Botanical description, Taxonomical classification, Nutritional value, hytochemical constituents, and Pharmacological activities along with the current trends in research on Turmeric. The study found that a precise understanding of effective dose, safety, and mechanism of action was required for the rational use of turmeric in the treatment of human diseases.

The researcher Viraja C.V., Thumar V.M., & Tandel V.B., (2018) assessed the cost and returns of turmeric in Navsari District of South Gujarat. The selection of turmeric growers was made by adopting a multistage simple random sampling design with tehsils (Taluka) in the selected district as the first stage unit, villages within each taluk as the second stage unit and turmeric growers within selected villages as the third stage unit of sampling. Total 12 villages from each of selected taluka were selected at random and 120 turmeric growers were selected. Thus, the study revealed that the expenditure share of operating cost in the total cost was 82.83 percent.

According to Manivannan B & Mahesh V (2019) assessed the cultivation practices of turmeric farmers in Erode district. The researcher selected 150 turmeric growers. This selection was made on a convenient sampling method. Thus, it was found that the turmeric growers were suffering with various problems like non- availability of labors, less technical knowledge about diseases management, non- availability of agricultural research station for turmeric crop.

Researchers Vijay G. Rokade & Mr. Lahu D. Hingane (2020) reviewed on Turmeric: The Indian Golden Spicy Root *Curcuma longa* (Turmeric), belonging to Zingiberaceae family was one of the most useful herbal medicinal plants. Extensive research proved that most of the turmeric activities of the turmeric were due to curcumin. It also has antifungal, antimicrobial, renal and hepato protective activities. Development of modern drugs from turmeric should be emphasized for the control of various diseases. This study suggested that evaluation to be carried out on turmeric in order to explore the concealed areas and their practical clinical applications, which can be used for the welfare of mankind.

The study proposed by Smriti Baral & Gaurab Luitel (2021) assessed the Production and marketing of turmeric (*Curcuma longa*) in Sunsari District, Nepal. Turmeric is a popular spice in Nepalese households and a potential cash crop in the country's tropical areas. 100 turmeric producers were selected by using simple random sampling technique from total turmeric growing population registered in PMAMP at Barahakshetra Municipality of the district. The average productivity of dry turmeric in the study area was 1800 kg per hectare. It was found that insufficient technical services and low market price of the turmeric were main production and marketing problem faced by turmeric producing community. This study suggested to adopt the innovative technology for farming, government intervention in price fixing and replacement of local seed by improved seed.

The scope of the existing studies has limited to certain dimensions such as turmeric cultivation, processing, marketing, clinical applications and health benefits to the people. Understanding the techniques becomes the need of the hour to uplift the turmeric farming. This study also gives insight on various strategies that can be used to boost turmeric yield and thereby encouraging Turmeric Farming.

Statement of the Problem

In this technological era, industrial growth is at faster pace and agriculture is fading its ground due to various reasons. So, the present study focuses on the novel strategies and challenges faced by the Turmeric farmers in Erode district, Tamilnadu, India.

Objectives of the Study

- To identify the reasons for preferring turmeric cultivation.
- To analyze the importance of the strategies used in increasing the turmeric yield.
- To rank the challenges faced by the turmeric farmers.
- To give suggestions to uplift turmeric farming.

Research Methodology

The present research is descriptive research design as it describes the novel strategies and challenges faced by Turmeric farmers in Erode district. The study was undertaken in May - July 2023. 100 Turmeric farmers in Erode District were taken on the basis of stratified random sampling. Taluks considered in Erode district include Erode, Modakurichi, Kodumudi, Perundurai, Bhavani, Anthiyur, Gobichettipalayam, Sathyamangalam, Thalavadi and Nambiyur. Statistical tools such as Chi-square Test, ANOVA and Weighted Average Score Ranking method were used in this study. The present study used both primary and secondary data. Primary data was collected through a well-structured questionnaire from turmeric farmers in Erode District, Tamilnadu.

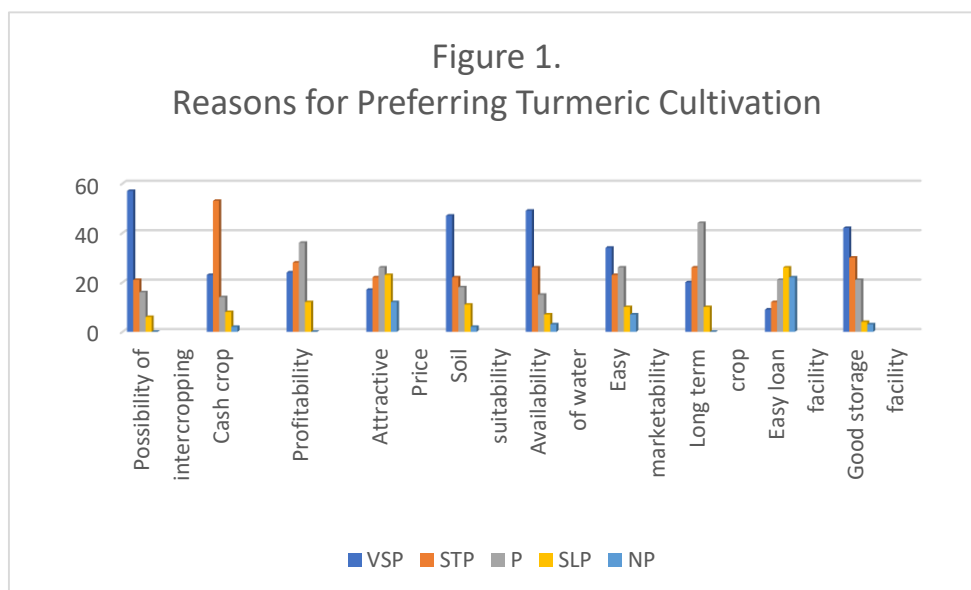
Hypothesis Tested

- There is no significant relationship between area for turmeric cultivation and crop rotation strategy for more plant growth.
- There is no significant relationship between educational qualification and selecting popular turmeric varieties.
- There is no significant relationship between age and harvesting methods.
- There is no significant relationship between experience in turmeric cultivation and availability of water as reasons for preferring turmeric cultivation.
- There is no significant relationship between annual income and easy marketability as reasons for preferring turmeric cultivation.

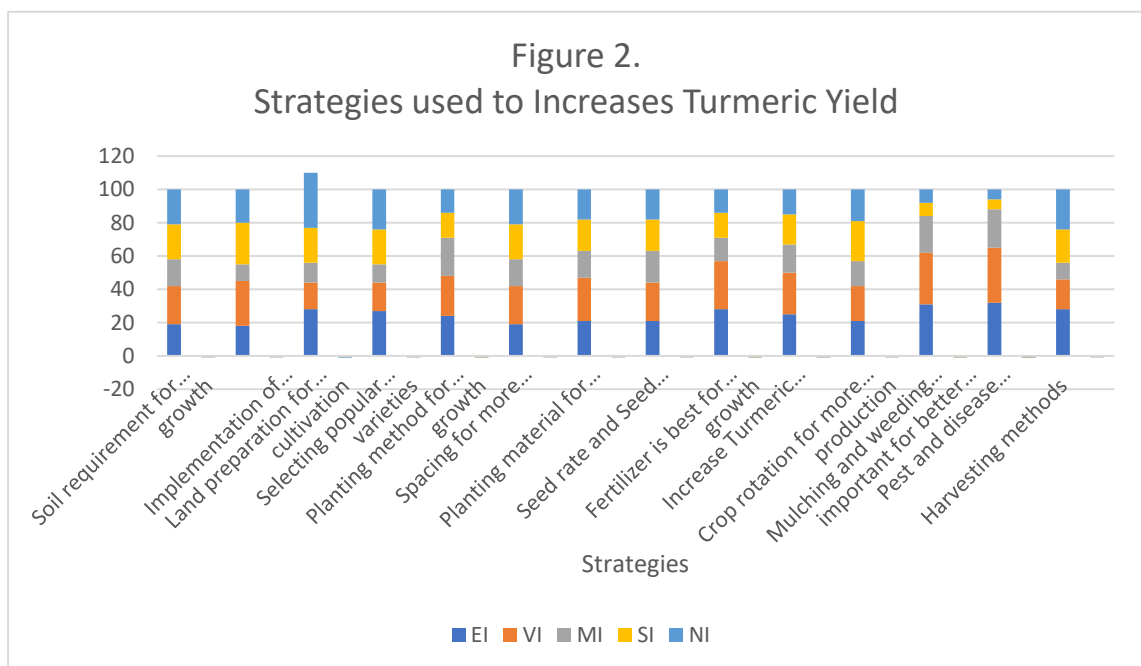
Limitations of the Study

- The area of the study is restricted to Erode district only.
- Respondents' bias in understanding the questionnaire is also considered. Thus, the generalization of the findings of the study is subject to limitations.

Data Analysis and Interpretation



It is observed from the above figure no.1 that the majority (57%) of the respondents very strongly prefer possibility of intercropping for turmeric cultivation, the majority(53%) of the respondents strongly prefer cash crop for turmeric cultivation, the majority (36%) of the respondents prefer profitability for turmeric cultivation, the majority (26%) of the respondents prefer attractive price for turmeric cultivation, the majority (47%) of the respondents very strongly prefer soil suitability for turmeric cultivation, the majority (49%) of the respondents very strongly prefer availability of water for turmeric cultivation, the majority, the majority (34%) of the respondents very strongly prefer easy marketability for turmeric cultivation, the majority (44%) of the respondents prefer long term crop for turmeric cultivation, the majority (26%) of the respondents slightly prefer easy loan facility for turmeric cultivation and the majority (42%) of the respondents very strongly prefer good storage facility for turmeric cultivation.



The above figure no.2 shows that the majority (23%) of the respondents opined that soil requirement for more crop growth is very important to boost turmeric yield, (27%) of the respondents opined that implementation of drip irrigation is very important to boost turmeric yield, (33%) of the respondents opined that land preparation for turmeric cultivation is not important to boost turmeric yield, (27%) of the respondents opined that selecting popular turmeric varieties is extremely important to boost turmeric yield, (24%) of the respondents opined that using planting method for turmeric growth is extremely and very important to boost turmeric yield, (23%) of the respondents opined that spacing for more production is very important to boost turmeric yield, (26%) of the respondents opined that planting material for turmeric plant growth is very important to boost turmeric yield, (23%) of the respondents opined that seed rate and seed treatment is very important to boost turmeric yield, (29%) of the respondents opined that fertilizer is very important to boost turmeric yield, (25%) of the respondents opined that increase turmeric production with precision irrigation is extremely and very important to boost turmeric yield,

(24%) of the respondents opined that crop rotation for more plant production is slightly important to boost turmeric yield, (31%) of the respondents opined that mulching and weeding extremely and very important to boost turmeric yield, (33%) of the respondents opined that pest and disease management is very important to boost turmeric yield and (28%) of the respondents opined that harvesting methods is extremely important to boost turmeric yield.

Area for Turmeric Cultivation and Crop Rotation Strategy followed by Turmeric Farmers

Ho: There is no significant relationship between area for turmeric cultivation and crop rotation strategy followed by turmeric farmers.

H1: There is a significant relationship between area for turmeric cultivation and crop rotation strategy followed by turmeric farmers.

Table 1. Area for Turmeric Cultivation and Crop Rotation Strategy followed by Turmeric Farmers

	Value	df	Asymp.Sig.(2-sided)
Pearson Chi-Square	10.108	16	.861

The above table no.1 shows that 'p' value lies between 0.051 to 1.000. Hence the null hypothesis is accepted at 5% level of significance which indicates that there is no significant relationship between area for turmeric cultivation and crop rotation strategy followed by turmeric farmers.

Educational Qualification and Selecting Popular Turmeric Varieties of the Turmeric Farmers

Ho: There is no significant relationship between educational qualification and selecting popular turmeric varieties of the turmeric farmers.

H1: There is a significant relationship between educational qualification and selecting popular turmeric varieties of the turmeric farmers.

Table 2. Educational Qualification and Selecting Popular Turmeric Varieties of the Turmeric Farmers

	Value	df	Asymp.Sig. (2-sided)
Pearson Chi-Square	33.706	16	.006

The above table no. 2 shows that 'p' value lies between 0.000 to 0.010. Hence the null hypothesis is accepted at 1% level of significance which indicates that there is a significant relationship between educational qualification and selecting popular turmeric varieties of the turmeric farmers.

Educational Qualification and Selecting Popular Turmeric Varieties of the Turmeric Farmers

Ho: There is no significant relationship between age and harvesting methods of the turmeric farmers

H1: There is a significant relationship between age and harvesting methods of the turmeric farmers.

Table 3. Educational Qualification and Selecting Popular Turmeric Varieties of the Turmeric Farmers

	Value	df	Asymp.Sig. (2-sided)
Pearson Chi-Square	15.805	12	.200

The above table no.3 shows that ‘p’ value lies between 0.051 to 1.000. Hence the null hypothesis is accepted at 5% level of significance which indicates that there is no significant relationship between age and harvesting methods of the turmeric farmers.

Experience in Turmeric Cultivation and Availability of Water as a Reason for Preferring Turmeric Cultivation

Ho: There is no significant difference between experience in turmeric cultivation and availability of water as a reason for preferring turmeric cultivation.

H1: There is a significant difference between experience in turmeric cultivation and availability of water as a reason for preferring turmeric cultivation.

Table 4. Experience in Turmeric Cultivation and Availability of Water as a Reason for Preferring Turmeric Cultivation

Sources of Variations	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	15.860	4	3.965	4.963	0.001**
Within Groups	75.900	95	.799		
TOTAL	91.760	99			

** -Significant at 1% level

The above table no.4 shows that the ‘p’ value lies between 0.000 to 0.010. Hence the null hypothesis is rejected at 1% level of significance which indicates that there is a significant difference between experience in turmeric cultivation and availability of water as a reason for preferring turmeric cultivation.

Annual Income of the Turmeric Farmers and Easy Marketability as a Reason for Preferring Turmeric Cultivation

Ho: There is no significant relationship between annual income and easy marketability as a reason for preferring turmeric cultivation.

H1: There is a significant relationship between annual income and easy marketability as a reason for preferring turmeric cultivation.

Table 5. Annual Income of the Turmeric Farmers and Easy Marketability as a Reason for Preferring Turmeric Cultivation

Sources of Variations	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	21.288	4	5.322	5.636	.000**
Within Groups	89.712	95	.944		
TOTAL	111.000	99			

** -Significant at 1% level

The above table no.5 shows that the 'p' value lies between 0.000 to 0.010. Hence the null hypothesis is rejected at 1% level of significance which indicates that there is a significant difference between annual income and easy marketability as a reason for preferring turmeric cultivation.

Challenges Faced in Turmeric Farming

Table 6. Challenges Faced in Turmeric Farming

S.No.	Challenges	Score	Rank
1	High cost	32	VI
2	Financial weakness	38	II
3	Lack of storage facilities	23	IX
4	Low Productivity	35	IV
5	Non-availability of quality seed	39	I
6	Lack of skilled labors	34	V
7	Lack of technical knowledge	36	III
8	Lack of Government support	30	VIII
9	Inadequate market information	31	VII

The above table no.6 shows non-availability of quality seed was ranked first with the highest score of 39 points, financial weakness was ranked second with the total score of 38 points, lack of technical knowledge ranked third with the total score of 36 points, low productivity ranked third with the total score of 35 points, lack of skilled labors was ranked fourth with the total score of 34 points, high cost was ranked sixth with the total score of 32 points, inadequate market information was ranked seventh with the total score of 31 points, lack of government support was ranked eighth with the total score of 30 points, and lack of storage facilities was ranked ninth with the total score of 23 points.

Results and Discussions

1. Launching of Special Campaigns

From the study it was found that the farmers lack technical knowledge and in need of assistance in selecting the popular turmeric varieties. Hence Ministry of Agriculture can organize a special campaign to illiterate farmers on popular turmeric varieties which could give higher yield.

2. Usage of Organic Manure

The challenge of low productivity can be overcome by organic manures which can be used to increase the yield and quality of the turmeric rhizome as it contains all the essential plant nutrients such as Nitrogen and Phosphorous.

3. Leasing of Machinery

To solve the problem of lack of skilled labor, mechanization can be implemented to a great extent. Government, private organization and new start-ups can support farmers by leasing machinery at reasonable cost.

4. Marketing Facilities

The government can provide a learning platform through mass media to ensure that the farmers are getting updated market information. Government and NGO'S could assist under privileged farmers in marketing and selling the produce.

Conclusion

The present study on the novel strategies and challenges faced by the Turmeric farmers in Erode district is gaining its importance in the present scenario as it caters to the local need of turmeric farmers in Erode district. Though the turmeric possesses the basic significance of medicinal and domestic value for the produce, farmers producing them do face the challenges like financial instability, inadequate marketing facilities and lack of skilled labors. To overcome the above issues and to uplift turmeric cultivation, the Government and private organization should come forward to establish Research centers for quality turmeric cultivation and thereby encouraging Turmeric farming.

References

- [1] Abhimanyu Chaturvedi, Amit Kumar Singh, Simanta Kumar Kalita, Pura Hano, Narendra Kumar 2021 Popularization of Turmeric Production Technologies through Demonstrations in Tirap District of Arunachal Pradesh, India. *International Journal of Current Microbiology and Applied Sciences*. 10(2): 1470 – 1475.
- [2] Able Shrestha., Smriti Baral., Sushma Sharma 2021 Factors Affecting Turmeric Production in Sunsari District, Nepal. *International Journal of Environment, Agriculture and Biotechnology*. 6(6): 53-57.
- [3] Akram M., Shahab – Uddin., Afzal Ahmed., Khan Usmanghani., Abdul Hannan., Mohmuddin E. Asif M. 2010 Curcuma Longa and Curcumin: A Review Article. *Plant Biology*. 55(2): 65-70.

- [4] Alexandra R.Vanghn, Amy Branum, Raja K. Sivamani 2016 Effects of Turmeric (*Curcuma longa*) on Skin Health: A Systematic Review of the Clinical Evidence. *Phytotherapy Research*. 30(8): 1243-1264.
- [5] Choudhury D. 2019 Study on the nutrient composition of local variety of turmeric (*Curcuma longa*). *The Pharma Innovation*. 8(2): 205-207.
- [6] Debjit Bhowmik, Chiranjib K.P. & Sampath Kumar, Margret Chandira, Jayakar B (2009) Turmeric: A Herbal and Traditional Medicine. *Applied Science Research*. 1(2): 86-108.
- [7] Ekissi Alice Christine., Kouname Kan Benjamin., Beugre Grah Avit Maxwell., Seraphin Kati-Coulibaly 2021 Study of the knowledge of Turmeric (*Curcuma longa*) and Ginger (*Zingiber Officinale*) in the region of Daloa (cote D'Tvoire). *Scientific Research Publishing*. 12(1): 1328-1337.
- [8] Gamit N.S., Litoriya N.S., Thounoajam A.S., & Patel P.K. 2022 Biochemical Composition, Oil profiling and Elementary analysis of different Cumin (*Cuminum Cyminum* L.) genotypes. *Journal of Spices and Aromatic Crops* .32(1): 34-48.
- [9] Hamid Nasri, Sahinfard N., Mahmood Rafieian-Kopaei., Rafieian S. 2014 Turmeric: A Spice with Multifunctional Medicinal Properties. *Journal of Herbmed Pharmacology*, 3(1), 5-8.
- [10] Jayanthi M. & Vaideke A. 2015 A Study on Cultivation Practices of Turmeric Farmers in Erode District. *Indian Journal of Applied Research* .5(4): 100-102.
- [11] Jaggi Lal 2012. Turmeric Curcumin and our life: A review. *Bulletin of environment, Pharmacology and life sciences*. 1(7): 11-17.
- [12] Jayasubramanian P., Sasikumar 2015 Problems and prospects for turmeric products perceived by small farmers in Erode district. *International Journal of Applied Research*. 1(13): 306 – 311.
- [13] Johnrell S. Zuniega & Elda B, Esguerra 2019 Extending the storage life of fresh turmeric (*Curcuma longa* L) Rhizomes through light and temperature manipulation. *Philippine Journal of Crop Science*. 44(1): 18-24.
- [14] Kiruthika Natarajan 2013 The Economics of Production of Turmeric in India: A Case Study of Erode District of Tamil Nadu. *Journal of Innovative Research and Solutions (JIRAS)*. 1(1): 23 –30.
- [15] Krishna Raj & Namrata Arya 2022 Review on Pharmacological Activities of Turmeric. *International Journal of Innovative Research in Engineering and Management*. 9(1): 282-286.
- [16] Mahesh, V., & Manivannan, B. 2019. A Study on Cultivation Practices of Turmeric Farmers in Erode. *Journal of Emerging Technologies and Innovative Research*. 6(5): 176-180.
- [17] Prangya Paramita Sahoo & Sarangi K.K 2018 Value chain analysis of organic turmeric in Kandhamal district of Odisha. *Journal of Pharmacognosy and Phytochemistry*. 7(4): 1130 – 1137.
- [18] Ram Singh., Feroze S.M., Shiv Kumar 2020 Production of Turmeric in North East Hill Region of India: A Value Chain Analysis. *Indian Journal of Agricultural Economics*. 75(4): 359-374.
- [19] Rathai Rajagopalan & Yashasvi Suvarna 2015 Turmeric: The spice king of health. *World Journal of Pharmaceutical Research*. 4(10): 579-585.

- [20] Roshan Prasad Yadav & Gaur Tarun 2017 Versatility of turmeric: A review the golden spice of life, *Journal of Pharmacognosy and Phytochemistry*. 6(1): 41 – 46.
- [21] Sapariya P.S., Joshi N.U. & Dabhi M.N. 2023 Physical and Functional Properties of Low Temperature ground Turmeric (*Curcuma Longa*) Powder. *Journal of Spices and Aromatic Crops*, 32(1): 24-33.
- [22] Smriti Barel., Gaurab Luitel., Able Shrestha., Bibhusha Basnet 2021 Production and marketing of turmeric (*Curcuma longa*) in Sunsari District, Nepal. *Archives of Agriculture and Environmental Science*. 6(4): 556-562.
- [23] Sharma L. 2013 An Analysis on the Adoption, Marketing and Problems of Turmeric Growers in Mizoram: A Case Study of Reiek Turmeric Farmers. *Uttaranchal Business Review*. 3(2): 1-11.
- [24] Sunidhi Mishra & Bharti Goel 2020. Pharmaceutical and Nutritional properties of Turmeric (*Curcuma longa*): A mini review. *Advances in Zoology and Botany*. 8(3): 83-86.
- [25] Shiyou Li., Wei Yuan., Guangrui Deng., Ping Wang., Peiyang Yang & Bharat B. Aggarwal 2011 Chemical Composition and Product Quality Control of Turmeric (*Curcuma longa* L.). *Pharmaceutical Crops*. 2(1): 28-54.
- [26] Susan J.Hewlings & Douglas S.Kalman 2017 Curcumin: A Review of its Effects on Human Health. *Foods*. 6(10): 92-100.
- [27] Swapneel Suryawanshi., Aniket Todkar., Pratik Sanns., Divya Thite., Pravin Badhe 2023 *Curcuma longa* (Turmeric): Ethnomedicinal uses, chemistry, morphology and pharmacological activities- a review. *International Journal of Creative Research Thoughts*. 11(5): 34-43.
- [28] Suraj Archarya., Pankay Raj Dhital., Bimarsh Bista., Aashish Rashik Ghimira 2021 Resource Productivity Analysis of Organic Turmeric Production in Surkhet District, Nepal *Economic Affairs*. 66(2): 189-194.
- [29] Tsegaye Melesa., Mebratre Alemu, Asmsalu Mitiku., Nesra Kedir 2022 Economic Efficiency of Turmeric Production: South- Western Ethiopia. *Research Square*. 8(2): 1-13.
- [30] Vaishnavi S., Pakhare., Vijay G.Rokade., Lahu D. Hingane 2020 A Review on Turmeric: The Indian Golden Spicy Root. *Journal of Emerging Technologies and Innovative Research*. 7(1): 61-71.
- [31] Venkatesh R. & Madheswaran S 2017 Innovative Solutions for Snags of Turmeric Farmers in India, *International Journal of Applied and Advanced Scientific Research*. 2(1): 57 – 64.
- [32] Viraja Chandrakant 2018 Cost structure and profitability of turmeric cultivation in Navsari district of South Gujarat. *International Journal of Chemical Studies*. 6(5): 1486 – 1488.