**Revitalising the turmeric sector in Bihar: A Value Chain Perspective**

**Abstract**

Turmeric (Curcuma longa L.) is a high-value crop with significant health, culinary, and industrial importance, making it an integral part of India’s agricultural exports. While India dominates global turmeric production, Bihar despite its favorable agro-climatic conditions has witnessed stagnation in productivity, acreage, and value addition. This study analyzes the turmeric sector in Bihar through a comprehensive value chain perspective, integrating secondary data analysis (2011–2025) with primary field insights from Samastipur and East Champaran districts. Findings reveal that Bihar lags behind national averages in yield and output value due to low adoption of improved varieties, inadequate processing infrastructure, and fragmented marketing systems. Farmers receive only 23.4% of the final consumer price, with the largest value addition occurring at the processing and retail levels.

The study benchmarks successful value chain models from Telangana, Odisha, and Meghalaya to identify replicable strategies for Bihar. Policy recommendations emphasize promoting Farmer Producer Organizations (FPOs), investing in post-harvest infrastructure, facilitating organic and GI certification, and enhancing direct market access. The paper concludes that a multi-pronged interventionanchored in institutional support, branding, and export facilitationcan revitalize Bihar’s turmeric economy. Future research should focus on FPOled innovation models, digital market integration, and sustainable production systems to ensure equitable and scalable growth across the turmeric value chain.

**Keywords:** Turmeric Value Chain, Turmeric Cultivation in Bihar, Turmeric Retail Price Trends, Value Addition, Processing & Marketing Inefficiencies, Best Practices, Challenges in Value Chain

**Introduction**

Turmeric(*Curcuma longa L.*), popularly known as “golden spice of life,” has gained global recognition due to its health benefits, primarily attributed to its high curcumin content, which possesses antioxidant, anti-inflammatory, and antimicrobial properties (Hewlings et al., 2017; Teow et al., 2016 & Sravani et al., 2023). Turmeric is an essential agricultural commodity in India, contributing significantly to the country’s economy. India is the largest producer, consumer, and exporter of turmeric, accounting for approximately 80% of global production (Bishnoi et al., 2020). The country contributes approximately 78% to the world's turmeric production, followed by China (8%) and Myanmar (4%) (cgg.gov.in). The demand for Indian turmeric is high in international markets, with major export destinations including the United States, the Middle East, the European Union, and Southeast Asia (Bishnoi et al., 2020). India dominates the global turmeric trade, accounting for 60% of the world’s turmeric exports due to its superior varieties with high curcumin content (PMFME DPR, 2017).Major importers include the United States, the Middle East, the European Union, and Southeast Asia.

The crop plays a crucial role in the livelihoods of millions of smallholder farmers, particularly in states like Telangana, Andhra Pradesh, Tamil Nadu, Maharashtra, Odisha (Sahoo and Sarangi, 2018) and Bihar. In Telangana, turmeric cultivation spans about 42,535 hectares, yielding 184,285 metric tons during the 2015-16 period (cgg.gov.in). Similarly, in Bihar, turmeric contributed over 244 million Indian rupees to the state's economy in the fiscal year 2021 (statista.com).

Bihar, with its fertile alluvial plains and favourable agro-climatic conditions, holds substantial potential for turmeric cultivation as part of its broader agricultural portfolio (Sahoo, 2020). Despite these favourable conditions, turmeric production in Bihar has shown limited growth. In Samastipur district, which is one of the Bihar’s core turmeric growing regions, the average cost of cultivation reached Rs. 53,700 per acre in 2019, yielding a decent net return of Rs. 56,300 per acre (Bishnoi et al., 2020). As reported by farmers, marketing inefficiencies, unpredictable pricing, and inadequate infrastructure hinder profitability and crop adoption (Bishnoi et al., 2020; Sravani et al., 2023). These dynamics reflect broader structural issues in Bihar’s agricultural markets, such as weak market linkages, low value addition, and limited producer organization (Kannan &Pohit, 2021).

Given the rising global demand for natural food additives, colorants, and curcumin-rich extracts from turmeric, improving production efficiency and market functioning in Bihar is critical (PMFME DPR, 2017; Mukherjee et al., 2024). Understanding the experiences of turmeric farmers with respect to cost structures, yield performance, and marketing strategies is therefore essential to inform value chain interventions and policy decisions.

This paper investigates the current state of turmeric cultivation in Bihar with the objective to analyze production economics and farmer-level returns, drawing on primary data from Samastipur; examine marketing and value chain constraints such as price volatility, middlemen influence, and storage deficiencies; and propose evidence-based strategies to enhance incomes and integrate Bihar more fully into high-value turmeric markets.

By combining empirical field insights with secondary data, we aim to highlight critical leverage points in Bihar’s turmeric value chain and inform policy and organizational initiatives that can close productivity gaps, minimize market inefficiencies and strengthen farmer livelihoods.

**Methodology**

This study employs a mixed-methods approach combining both quantitative secondary data analysis and qualitative field-based value chain mapping to examine the constraints and opportunities within the turmeric sector in Bihar, particularly in the districts of Samastipur and East Champaran.

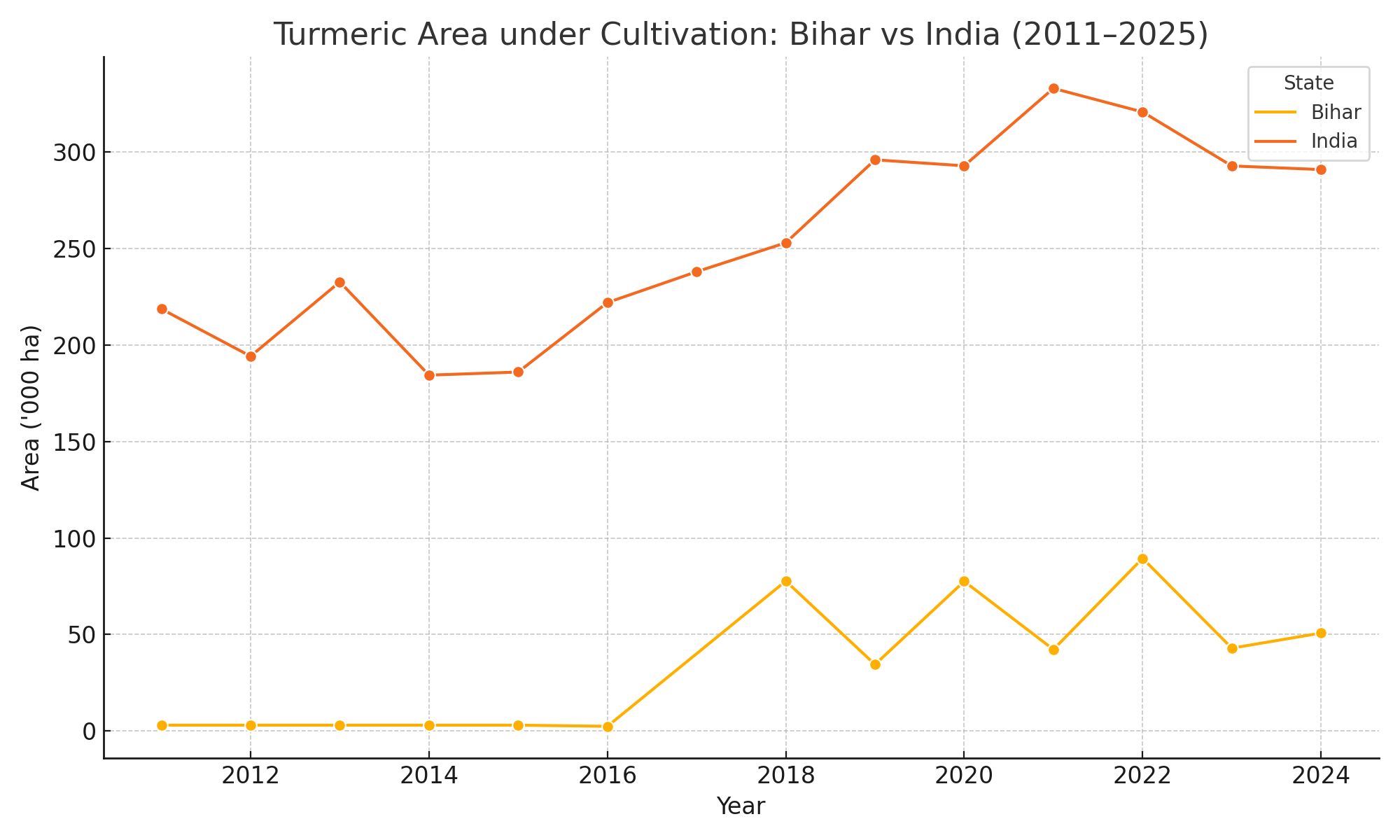
***Secondary Data Analysis:*** Quantitative data on area, production, productivity, value of output, and retail price trends (2011–2025) were sourced from authoritative national databases, including IndiaStat, Statista, and published government reports (e.g., PMFME DPR 2017). These datasets provided temporal insights into Bihar’s relative performance in turmeric cultivation and economic contribution compared to the national context.Key indicators analyzed includearea under cultivation;production volume and productivity (MT/ha); value of output at constant and current prices;monthly and annual retail price trends; Comparative analysis across states; Field Survey and Value Chain Mapping

***Primary data*** were collected through field visits and semi-structured interviews with turmeric farmers, traders, and processors in Samastipur and East Champaran during early 2025. Observations and discussions focused onvalue chain stages and marketing channels; processing practices and infrastructure availability; transportation and storage costs; local price realization and intermediary margins; farmer perspectives on institutional and policy support; based on these field insights, value chain diagrams were developed to visualize flow channels and stakeholder interactions. A cost-price spread table was constructed to analyze value addition and the share of the consumer rupee across different actors (farmers, traders, processors, wholesalers, and retailers).

***Case Study Benchmarking:*** To contextualize Bihar’s turmeric sector challenges, the study also undertook a comparative review of successful value chain models from Meghalaya (Lakadong turmeric), Odisha (Kandhamal turmeric), and Telangana. These cases were selected for their emphasis on GI-tagging, organic certification, and FPO-led marketing, offering policy and institutional lessons for Bihar.

**Turmeric Cultivation in Bihar and India: Trends from 2011 to 2025**

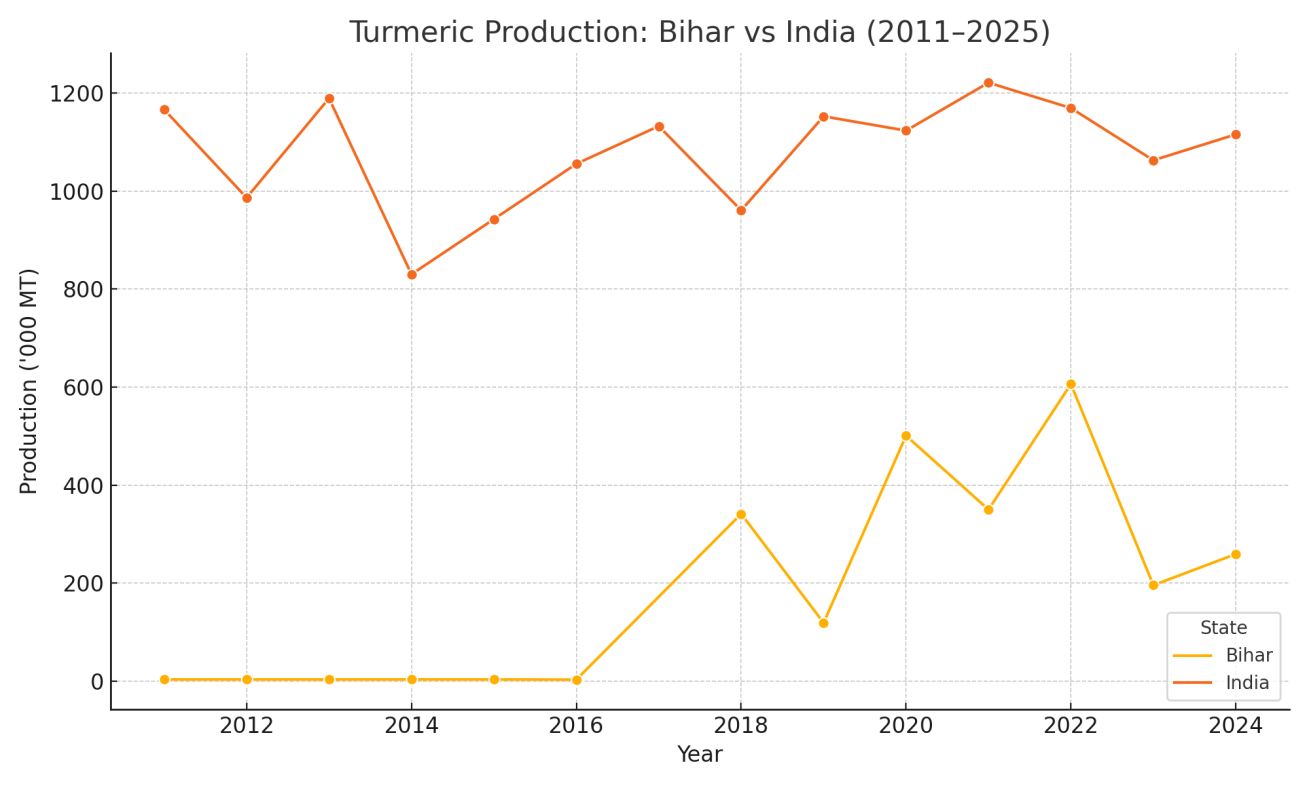
Turmeric cultivation in India has witnessed substantial growth over the past decade, whereas Bihar’s performance has remained relatively stagnant. A comparative review of area under cultivation, production, and productivity reveals significant gaps between Bihar and the national average.



**Figure 1. Area under turmeric cultivation in Bihar compared to all India (2011-2025)**

*Source:* Data for Bihar sourced from IndiaStat’s *Area, Production and Productivity of Turmeric in Bihar dataset;* Comparative data for India sourced from IndiaStat’s *Area, Production and Productivity of Turmeric in India dataset*

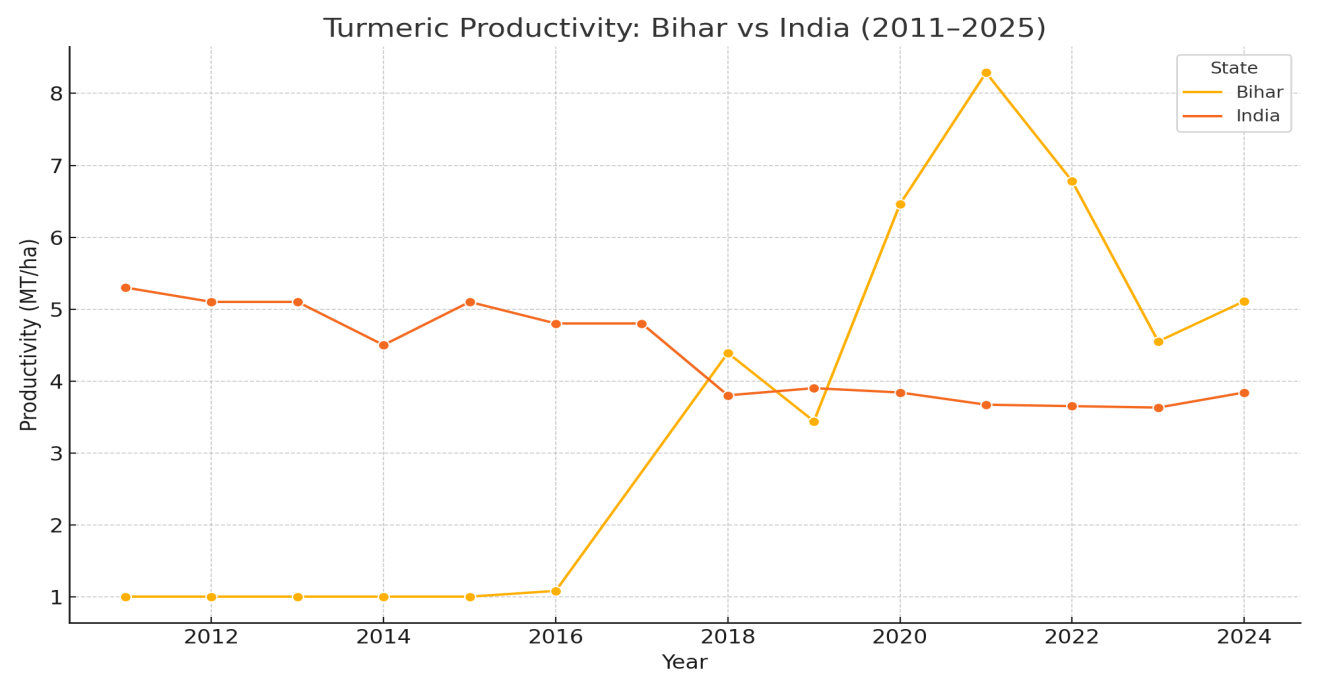
Figure 1 shows that Bihar’s area under turmeric cultivation has hovered around 3,000 hectares with minor fluctuations, while India overall shows a steady upward trend in cultivated area. The stagnation in Bihar’s turmeric acreage may be attributed to limited crop diversification incentives, weak market linkages and farmer preference for more remunerative crops.



**Figure 2. Turmeric Production volumes in Bihar compared to all India (2011-2025)**

*Source:* Bihar production figures sourced from IndiaStat’s *Area, Production and Productivity of Turmeric in Bihar;* National production figures sourced from IndiaStats’s *Area, Production and Productivity of Turmeric in India.*

Production volumes in Bihar have shown minimal change over the period, remaining around 3,000 metric tonnes. In contrast, India’s national turmeric production displays robust expansion, particularly driven by states like Telangana, Andhra Pradesh, and Maharashtra. This divergence suggests that Bihar has not benefited from the technological and infrastructural advancements visible in leading turmeric producing states.



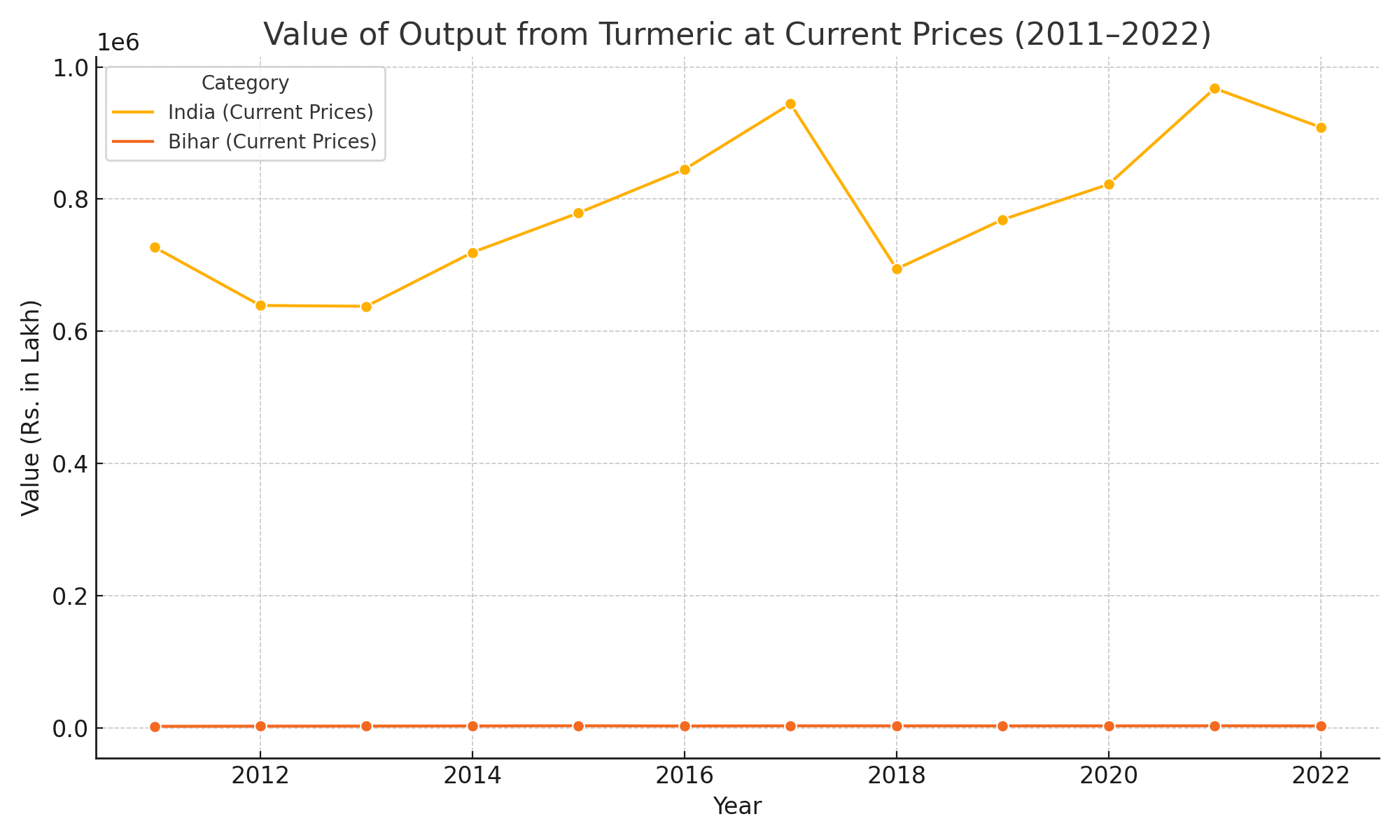
**Figure 3. Productivity of turmeric in Bihar versus all India averages (2011-2025)**

*Source: Bihar yield* data sourced from IndiaStats’s Bihar dataset on turmeric; *India wide productivity data* sourced from IndiaStat’s India dataset

Bihar consistently records around 1.0 metric tonne per hectare, significantly below the national average of 3.5-5.5. MT/ha. This wide gap underscores systematic challenges in Bihar’s turmeric sector such as poor adoption of high-yielding varieties, lack of irrigation infrastructure, and minimal use of scientific agronomic practices.

**Value of Output and Regional Contribution (2011-2022)**

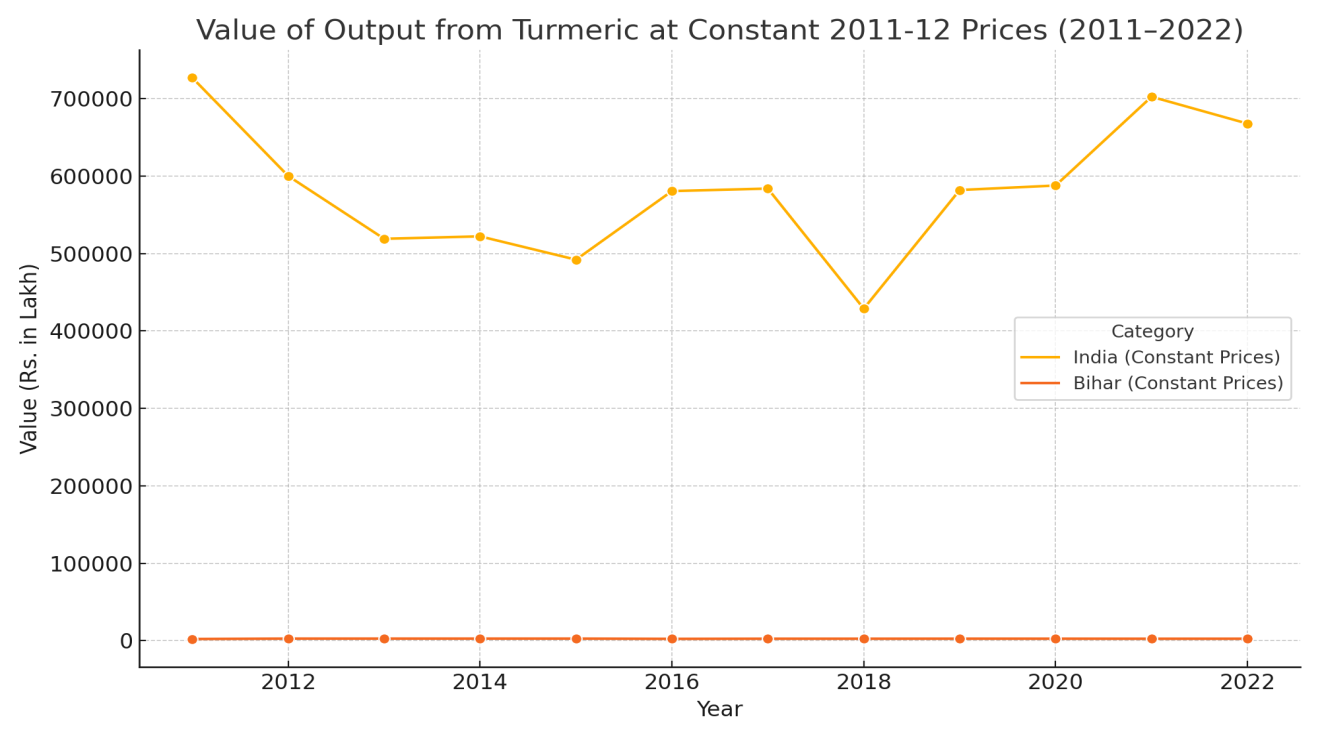
The value of output from turmeric cultivation is a critical indicator of its economic contribution at both state and national levels. Between 2011 and 2022, India witnessed a steady rise in the gross value of turmeric output, particularly at current prices, reflecting the effects of inflation, rising market demand, and expansion in cultivated areas across major producing states. However, Bihar’s contribution to this national growth has remained stagnant, particularly when examined at constant 2011-12 prices, which offer a clearer picture or real growth excluding inflationary effects.



**Figure 4. Value of Output from turmeric at Current Prices in Bihar and India (2011-2022)**

*Source:* IndiaStat (2024).*Value of output from turmeric in India and Bihar (2011-2022).*

This figure illustrates that while India’s value of turmeric output has steadily increased over the years, peaking in 2021-22, Bihar shows only marginal improvement. The apparent increase at current prices in Bihar is largely a reflection of inflation rather than expansion in production or productivity.



**Figure 5. Value of Output from Turmeric at Constant Prices in India & Bihar (2011-2022)**

*Source:* IndiaStat (2024).*Value of output from turmeric in India and Bihar (2011-2022).*

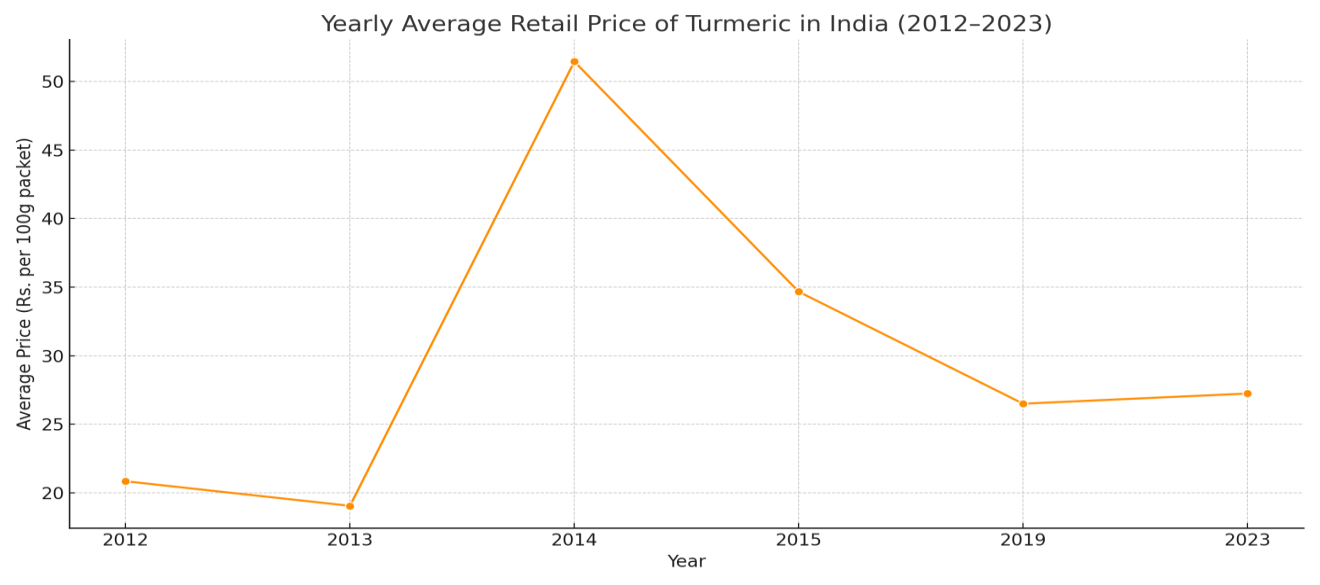
When adjusted for inflation, Bihar’s turmeric output value shows virtually no real growth. The output remained stagnant in the range of Rs. 2,400-Rs. 2,550 lakh over the entire period. This indicates that economic returns from turmeric cultivation in Bihar have not improved in real terms over the last decade.

The stagnant real output further reflects missed opportunities to align with national and global turmeric demand trends, which have surged due to the crop’s medicinal and culinary value. Bihar’s inability to capitalize in this growing market potential has resulted in its limited regional contribution to India’s turmeric economy.

The gap between nominal (current price) growth and real (constant price) stagnation highlights the need for strategic interventions in Bihar. Without structural changes, such as farmer training, investment in value chains and GI-based branding, the state will continue to contribute minimally to India’s expanding turmeric economy.

**Retail Price trends (2011-2023)**

An in-depth analysis of turmeric prices across Bihar and major Indian centers between 2011 and 2023 reveals significant fluctuations in both retail and wholesale markets. These price movements reflect a combination of supply chain bottlenecks, seasonal variations and demand-side shifts, especially during the post-COVID period.

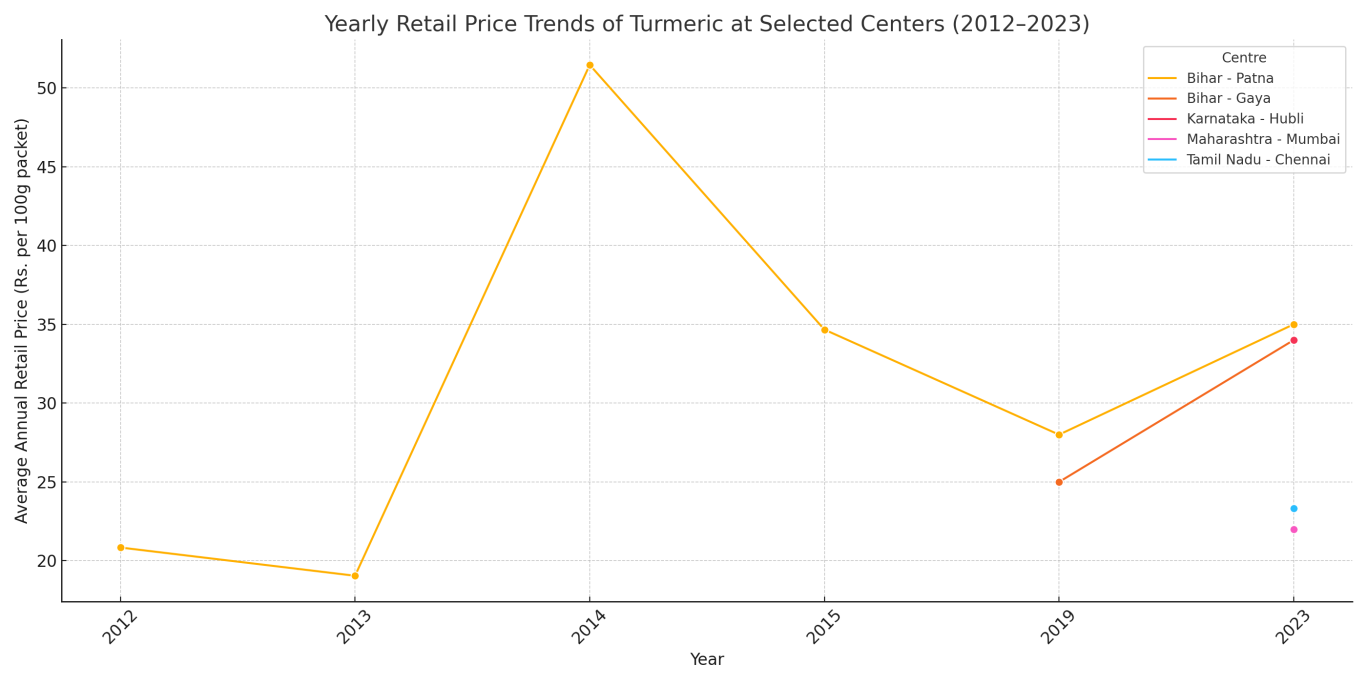


**Figure 6. Yearly Average Retail Price Trend of Turmeric in India (2012-13)**

*Source:* IndiaStat (2024).*State-wise monthly average retail prices of turmeric (powder) in India.*

Retail turmeric prices showed moderate and stable trends from 2012 to 2013, averaging Rs. 20-22 per 100g in many centers. However, sharp prices spikes occurred in 2014 and 2015, especially in Patna, where retail prices escalated to Rs. 78 and Rs. 86 respectively. These increases were likely driven by localized supply disruptions, speculative market behaviour, and transportation inefficiencies.

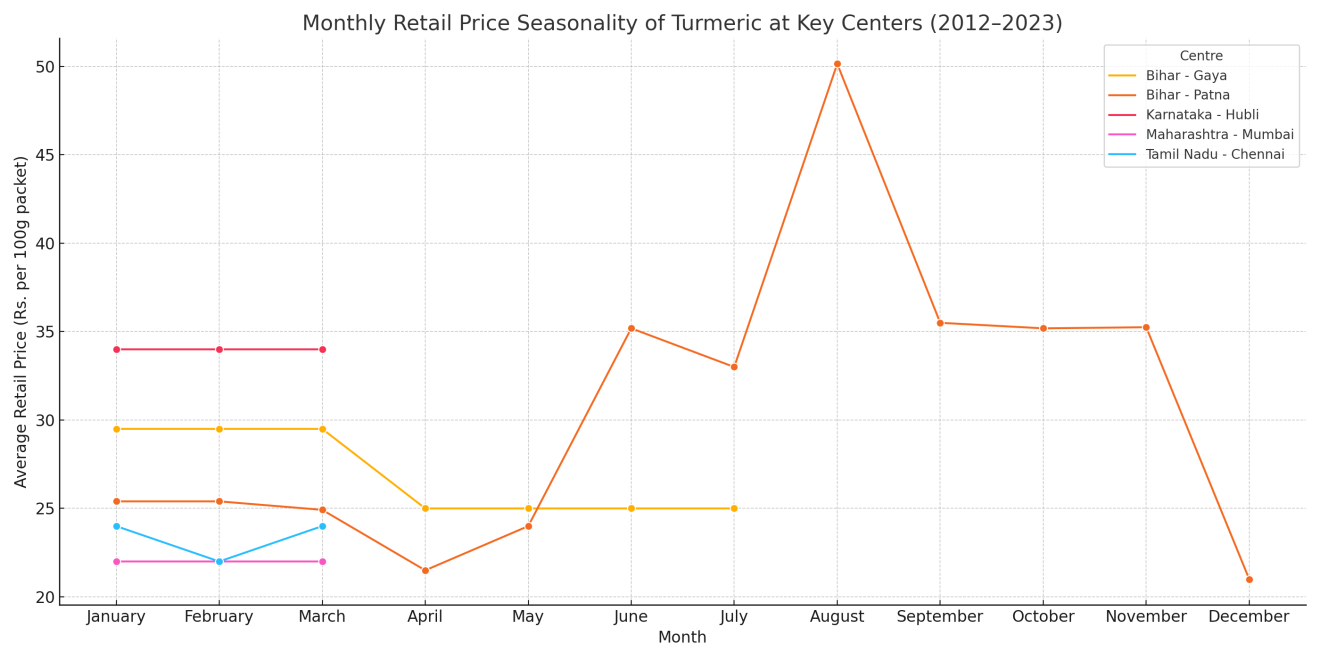
A second major uptrend was observed post 2020, coinciding with the COVID-19 pandemic, when global and domestic demand for turmeric rose sharply due to its perceived immunity boosting and health enhancing properties. This period saw persistent retail price increases across Bihar, Maharashtra, and Delhi, sustaining well into 2023.



**Figure 7. Retail Price Trends at Selected Centers in Bihar (2012-2023)**

*Source:* IndiaStat (2024).*State-wise monthly average retail prices of turmeric (powder) in India.*

Patna exhibited the highest price volatility, with multiple peaks indicating unstable supply chain or market inefficiencies. In contrast, Gaya’s pricing was more stable and predictable, reflecting better procurement or buffer stock management. Urban centers like Mumbai and Delhi maintained consistently higher prices due to better branding, urban packing, and higher consumer willingness to pay.



**Figure 8. Monthly Retail Price Seasonality of Turmeric (2012-2023)**

*Source:* IndiaStat (2024).*State-wise monthly average retail prices of turmeric (powder) in India.*

A clear seasonal pattern in visible, with peak prices between March and June, likely tied to lean supply phases and immediate post-harvest procurement. Prices soften during monsoon months (July to October), possibly due to lower market activity and improved supply. A second price increase is often noted in November to February, aligning with festive demand and winter stockpiling.

**Value Chain Analysis**

The turmeric value chain in Bihar, particularly in districts like Samastipur and East Champaran, is characterized by multiple marketing channels, varying degrees of processing, and a fragmented structure that often limits the income of primary producers. An indepth analysis reveals the stages through which turmeric moves from farm to market and highlights inefficiencies and value addition disparities.

In Samastipur, four primary channels are observed:

* **Channel 1:** Raw turmeric sold at the farm gate to local traders (baniya), who process and sell dried or powdered turmeric in local markets.
* **Channel 2:** Farmers transport turmeric directly to the Samastipur Bazaar Samiti, incurring transport costs but accessing better prices.
* **Channel 3:** On-farm processing by farmers (boiling and drying), with sales of dried turmeric at significantly higher prices.
* **Channel 4:** Interstate movement by traders to markets in Uttar Pradesh after purchasing processed turmeric.

In East Champaran, similar channels exist, but with more focus on home-based processing and milling. Farmers process turmeric and sell the powdered form in local markets (e.g., Madhuban Mela) or even export to nearby districts or Nepal. However, despite the value addition, dependency on local traders and seasonal fairs limits market scale.

|  |  |
| --- | --- |
| **Channel 1** |  |
| **Channel 2** |  |
| **Channel 3** |  |
| **Channel 4** |  |

**Figure 9: Turmeric Value Chain Channels in Samastipur district, Bihar**

*Source:*Field Survey, 2025

|  |  |
| --- | --- |
| **Channel 1** |  |
| **Channel 2** |  |
| **Channel 3** |  |
| **Channel 4** |  |

**Figure 10: Turmeric Value Chain Channels in East Champaran district, Bihar**

*Source:*Field Survey, 2025

**Cost-Price Breakdown and Value Addition**

A stage-wise analysis of costs and value addition highlights critical insights:

**Table 1. Cost-price spread and share in consumer rupee across turmeric value chain actors**

(Rs/Kg)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Stage** | **Cost Price** | **Selling Price** | **Value Addition** | **%Share in Consumer Rupee =(SP at stage/Consumer Price)\*100** |
| Farmer | 45.00 | 55.76 | 10.76 | 23.4% |
| Trader | 55.76 | 64.00 | 8.24 | 13.8% |
| Processor | 64.00 | 129.00 | 65.00 | 34.2% |
| Wholesaler | 129.00 | 155.00 | 26.00 | 13.7% |
| Retailer | 155.00 | 190.00 | 35.00 | 14.9% |
| Consumer |  | 190.00 |  | 100% |

*The consumer price of Rs. 190/kg is an average based on recent market data (Commodity Online, 2025)*

*Source:*Commodity Online (2025, May 26) and Field Survey, 2025

It could be observed from Table 1 that, the processor stage contributes the most to value addition (44.8%), while farmers despite initiating the value chain receive only 23.4% of the consumer rupee. This points to an imbalance in value distribution.

**Processing and Marketing Inefficiencies**

Despite its potential, Bihar’s turmeric value chain suffers from several inefficiencies:

* *Lack of modern processing facilities:* Most farmers rely on traditional boiling and drying methods, leading to quality inconsistency.
* *High transport costs:* Farmers often incur Rs. 500-1000 per 10 bags just to reach the markets.
* *Risk of adulteration:* In the absence of regulatory oversight, turmeric powder sold in haats is sometimes mixed with rice flour, compromising quality.
* *Limited access to packaging and branding:* The absence of organized retail channels or cooperatives limits the ability to market turmeric under a unified identity.
* *Poor storage infrastructure:* Farmers and small traders lack cold or dry storage facilities, leading to losses or distress selling.

The value chain analysis demonstrates that while local processing adds significant value to turmeric, the lack of institutional support, aggregation models and organized marketing restricts farmers from maximizing returns. Strengthening processing infrastructure, farmer-producer collectives, and direct to market linkages are key to improving equity and efficiency in Bihar’s turmeric sector.

**Case studies and Best Practices**

An examination of successful turmeric producing regions across India provides valuable insights into how robust value chain development, institutional support, and quality branding can transform regional turmeric sectors. The experiences of Lakadong in Meghalaya, Kandhamal in Odisha, and selected districts in Telangana serve as instructive models for policy and practice that could be adapted to the context of Bihar

**Lakadong Turmeric in Meghalaya**

Lakadong turmeric, cultivated in the Jaintia Hills of Meghalaya, is distinguished bu its exceptionally high curcumin content (7-12%), making it highly sought after in both domestic and international markets (Lakadong Turmeric Action Plan, 2021). The Government of Meghalaya, through the Lakadong Turmeric Action Plan, has facilitated the development of an integrated value chain by supporting post-harvest processing infrastructure, GI certification, and market branding. These efforts have not only enhanced farmers income but also reduced dependence on intermediaries by enabling direct market access. This case demonstrates the role of product differentiation through GI-tagging and integrated value chain support in creating premium market positioning (Mukherjee et al., 2021).

**Kandhamal Turmeric in Odisha**

The Kandhmal region of Odisha offers another successful example of value chain enhancement through community-led approaches. Farmers here produce organic turmeric that has secured both organic and GI certifications, enabling access to niche global markets. The formation of the Kandhamal Apex Spices Association for Marketing (KASAM) has played a crucial role in collective marketing, capacity building, and direct export facilitation. Furthermore, partnerships with certification bodies such as Control Union Certification (CUC)have enabled compliance with stringent European and North American organic standards (Sahoo & Sarangi, 2018). This case underscores the importance of collective institutions, certification mechanisms, and public-private partnerships in improving value realization for smallholders.

**FPO-Led Model in Telangana**

In Telangana,turmeric cultivation is concentrated in districts like Nizamabad and Warangal, where Farmer Producer Organizations (FPOs) have empowered farmers through collective marketing, processing, and branding (Singh et al., 2020). State support for drying, polishing and curcumin extraction facilities has further enhanced value addition (Ram Singh et al., 2020). Telangana’s model illustrates how collectivization and investment in value chain infrastructure can increase farmer share in the consumer rupee and reduce dependence on informal markets.

**Implications for Bihar**

The successful practices in Meghalaya, Odisha, and Telangana offer replicable insights for Bihar, which currently faces issues of low value addition, weak farmer organization, and market fragmentation. Key learnings include:

* Promoting GI-tagging and branding for Bihar-grown turmeric varieties (e.g., Rajendra Sonia) to capture premium markets;
* Establishing FPOsand cooperative marketing platforms to inform collective bargaining and reduce dependence on intermediaries;
* Investing in post harvest processing units and storage infrastructure (e.g.; solar dryers, polishing machines) to reduce losses and improve product quality;
* Facilitating organic and curcumin certification to enhance market access and export potential.

Adapting these proven models with localized policy support could significantly improve Bihar’s turmeric value chain, enhance farmer incomes, and elevate the state’s profile in national and global turmeric markets.

**Challenges in the Value Chain**

Despite its agro-climatic suitability and expanding national demand Bihar’s turmeric sector remains constrained by systemic inefficiencies across the value chain. A critical analysis of the economic, infrastructural, policy, technological and sustainability-related dimensions reveals several interlinked barriers that limit value realization for turmeric growers in the state.

***Economic Challenges***

Farmers in Bihar often realize a low share of the consumer rupee, with limited control over pricing due to the dominance of intermediaries. As the value chain analysis shows, farmers receive only 23.4% of the final consumer price, while the processor and retailer capture nearly 60% combined. Price volatility driven by seasonal gluts, weak procurement systems and limited access to storage, further exacerbates income instability. Farmers often resort to distress selling especially during the post harvest period when prices are typically at their lowest (Singh et al., 2020)

***Infrastructure Gaps***

The lack of modern post-harvest processing units, drying yards, and storage facilities severely impact product quality and shelf life. Traditional drying and polishing methods lead to inconsistencies, which reduce competitiveness in premium markets. Moreover, the absence of cold storage or warehouse receipt systems forces farmers to sell immediately after harvest, eliminating the possibility of timing the market for better returns (Sahoo &Srangi, 2018; Ram Singh et al., 2020).

***Policy and Institutional Barriers***

The absence of a Minimum Support Price (MSP) for turmeric leaves farmers vulnerable to market crashes, Especially during surplus production years. Additionally, the low penetration of Farmer Producer organizations (FPOs) in turmeric growing regions of Bihar weekens farmers bargaining power and hinders collective marketing efforts. In contrast to states like Telangana, where FPOs play a central role in aggregation and value addition, Bihar’s institutional ecosystem remains underdeveloped (Mukherjee et al., 2021).

***Technological and R&D Constraints***

Limited access to high-yielding, high-curcumin turmeric varieties and poor extension support contribute to Bihar’s low productivity, which averages around 1.0 MT/ha, well below the national average of 3.5 to 5.5 MT/ha (as per the data retrieved from IndiaStat, 2024). Mechanization of planting, harvesting and drying is also minimal. Moreover, public and private investment in turmeric-focused research and technology dissemination remains inadequate, particularly in developing region-specific economic packages (Timsia et al., 2012).

***Sustainability and Certification Issues***

Sustainability concerns are emerging due to the excessive use of chemical inputs, which affects soil health and export eligibility. The adoption of organic farming practices is limited by high certification costs, lack of training and minimal institutional support. While states like Odisha have advanced in organic certification through cooperative models (e.g.,Kandhamal turmeric), Bihar lacks the organized infrastructure and incentives necessary to promote eco-certified or GI tagged turmeric production (Sahoo & Sarangi, 2018).

Addressing these multi-faceted challenges will require an integrated strategy involving policy reforms, infrastructure investment, institutional strengthening, and farmer-centric technology dissemination. Without such interventions, Bihar’s turmeric sector will continue to lag behind other leading states, both in terms of productivity and market competitiveness.

**Policy Recommendations**

To address the systemic inefficiencies in Bihar’s turmeric sector and enhance its competitiveness at both national and international levels, a multi-pronged policy strategy is essential. The following recommendations are grounded in best practices from other turmeric producing regions and tailored to Bihar’s specific constraints identified through the value chain analysis.

**i. Strengthen Farmer Producer Organizations (FPOs), Warehousing and Price Monitoring**

One of the most effective ways to empower smallholder turmeric farmers is through the formation and support of Farmer Producer Organizations (FPOs). These collectives can play a vital role in aggregating produce, negotiating prices, reducing intermediary margins, and facilitating direct market access (Mukherjee et al., 2021). Policymaker should provide targeted capacity building support, working capital access, and digital training to FPOs in key producing districts.

Additionally, the establishment of modern warehousing infrastructure including dry storage units and solar-powered dryers can reduce post-harvest losses and allow farmers to time their sales to take advantage of favourable market prices. To further stabilize incomes, the government should implement real time price monitoring systems and explore the introduction of Minimum Support Price (MSP)mechanisms or price assurance schemes specific to turmeric, particularly in price volatile centers like Patna (Ram Singh et al., 2020; Singh et al., 2020).

**ii. Promote Organic Farming and Geographical Indications (GI) Branding**

To position Bihar’s turmeric competitively in high value domestic and export markets, the state should promote organic farming practices and GI certification for locally dominant varieties such as Rajendra Sonia. This includes financial support for organic certification costs, farming training unsustainable practices, and technical extension services for disease and pest management.

Drawing on successful models like Lakadong in Meghalaya and Kandhamal in Odisha, Bihar can improve its market identity through GI-tagging initiatives that highlight curcumin content, traditional cultivation methods, and ecological advantages (Lakadong Turmeric Action Plan, 2021; Sahoo &Srangi, 2018). A dedicated branding strategy and public awareness campaign can help establish Bihar turmeric as a distinct, premium product in national and international markets.

**iii. Facilitate Export Promotion and Value Addition Infrastructure**

India’s dominance in global turmeric exports provides an opportunity for Bihar to enter high-margin export markets. However, this will require investment in value addition infrastructure, such as turmeric processing units, curcumin extraction plants, and packaging facilities complaint with international quality standards (Mukherjee et al., 2021). These facilities can be developed through public-private partnerships (PPPs) or under centrally sponsored schemes like the Pradhan Mantri Formalization of Micro Food Processing Enterprises (PMFME).

Export promotion should also involve:

* Quality certification and residue monitoring systems to meet stringent EU and US standards
* Trade facilitation support for local exporters, including market intelligence and logistics linkages
* The formation of a dedicated turmeric export cell or board to support product positioning and compliance management (Singh et al., 2020)

Such efforts will not only improve Bihar’s turmeric export readiness but also enhance farm-level incomes by integrating the state into the higher ends of the value chain.

**Conclusion and Future Directions**

This study provides a comprehensive examination of Bihar’s turmeric sector through a value chain lens, highlighting persistent challenges in productivity, processing, marketing, and institutional support. Despite its agro-climatic potential, Bihar has yet to realize the full economic benefits of turmeric cultivation due to systemic inefficiencies and underdeveloped value chain infrastructure. Comparative insights from states like Meghalaya, Odisha, and Telangana underscore the transformative potential of collective marketing, GI-tagging, and value addition investments.

To fully integrate Bihar into national and global turmeric markets, coordinated policy action, farmer-centric institutional development, and strategic investments in post-harvest processing and certification systems are imperative. Empowering Farmer Producer Organizations, promoting organic practices, and enhancing export readiness can significantly improve farm-level returns and market competitiveness.

Future research should explore impact assessment of FPO-led interventions in turmeric-producing regions of Bihar; feasibility studies for curcumin extraction and organic certification in eastern India; value chain finance models tailored to smallholders and role of digital platforms in improving market linkages and traceability in turmeric trade.Addressing these gaps through empirical and participatory research can guide evidence-based policymaking and foster inclusive growth in Bihar’s spice economy.

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