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REVIEW ARTICLE

Institutional scaffolding and market dynamics in the value chains of NTFPs in emerging economies: A systematic literature review

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Abstract

Non-timber forest products (NTFPs) are central to rural livelihoods in emerging economies, yet their value chains remain fragmented, dominated by intermediaries, and analytically underexplored. This systematic review examines institutional frameworks and market dynamics of NTFP value chains, with particular focus on North East India. Following a PRISMA 2020-compliant protocol, 52 sources were synthesised from 788 identified records (2000–2025) using Global Value Chain governance theory and Price Transmission Theory. Three findings emerge: (1) state regulatory frameworks, including MSP-for-MFP, exhibit weak first-mile enforcement; (2) collective institutions like FPOs and VDVKs hold structural promise; and (3) formal econometric price transmission evidence is near-absent across NTFP chain nodes. A policy-research agenda centred on multi-node price data construction, threshold price transmission modelling, and quasi-experimental evaluation of collective enterprises is proposed.

Keywords: Non-timber forest products, Value chain analysis, Price transmission, North East India

JEL Classification: Q23, Q13, L14, O13

Introduction

Non-timber forest products (NTFPs), broadly defined as all biological materials excluding industrial roundwood and sawn timber that are extracted from forests, woodlands, and agroforestry systems for subsistence or trade, represent a globally significant but analytically understudied dimension of rural livelihoods, forest conservation, and emerging bioeconomies. Such as wild fruits, vegetables, mushrooms, bamboo, canes, resins, medicinal and aromatic plants, ferns, honey, and faunal products, NTFPs provide both use values (food, fuel, medicine) and exchange values that generate cash income for forest-dependent households across Sub-Saharan Africa, South Asia, Southeast Asia, and Latin America. NTFPs contribute 20 to 40% of total household income among communities dependent on forest produce in developing regions, and their importance is amplified during agricultural lean seasons, market shocks, and climate-related livelihood disruptions. (Derebe *et al*. 2023)

Within this global landscape, North East (NE) India is especially noteworthy. Occupying parts of the Indo–Burma and Eastern Himalayan biodiversity hotspots, the region's eight states Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, and Tripura support a concentration of endemic NTFP species including bamboo, broom grass (*Thysanolaena maxima*), wild ferns, jackfruit, diverse mushrooms, wild honey, and numerous medicinal plants, many of which are commercially significant in local, regional, and niche national markets. Tribal and forest fringe communities in these states depend on NTFPs for nutrition, energy, income diversification, and the maintenance of customary cultural practices, embedding NTFP production within complex socio-ecological systems that regulate both access and extraction.

Central to this paper is the concept of institutional scaffolding: the layered ensemble of formal regulations, collective organizations (SHGs, FPOs, cooperatives), and informal customary norms that together determine how

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NTFP value chains are governed, how surplus is distributed, and whether upgrading opportunities reach primary collectors. In NE India, this scaffolding is structurally incomplete: regulations exist but go unenforced, collectives are nascent but undercapitalized. Customary norms protect ecological access while providing little market-facing leverage. Understanding how this layered incompleteness shapes chain governance and price dynamics is the central analytical problem this review addresses.

Despite this significance, the value chains through which endemic NTFPs move from forest to final consumer remain structurally weak, institutionally fragmented, and analytically underexplored. Early diagnostic work in Eastern India, notably captured in the thematic synthesis of Tiwari (2000), identified persistent market inefficiencies, including collector-level monopsony, absence of local processing, information asymmetries, and chronically low and volatile prices as structural features of NTFP commercialization. These patterns have proven remarkably persistent across subsequent decades and geographies: later bibliometric and conceptual reviews, including Sharma and Bharti's (2020) analysis of NTFP value chain research clusters, confirm that while the scholarly community has generated growing interest in livelihood outcomes and commercialization strategies, rigorous quantitative analysis of price formation and transmission dynamics remains critically absent.

This dual absence of rigorous price transmission evidence and of evaluated institutional interventions is analytically consequential. Without econometric evidence on how prices move through NTFP chains, it is impossible to determine whether policy price floors (MSPs) are being transmitted to collectors, whether collective enterprises (FPOs, VDVKs) are narrowing margin gaps, or whether institutional expansion is generating real welfare gains or merely institutional activity. A systematic review that simultaneously synthesizes governance evidence and price dynamics evidence is therefore not a literature exercise; it is the necessary precondition for policy-actionable diagnosis.

The policy and institutional landscape has been simultaneously evolving. The expansion of decentralized governance, the National Bamboo Mission, state-level NTFP policies, the formation of bamboo-sector FPOs, Van Dhan Vikas Kendras, state rural livelihood missions, and bilateral technical cooperation programs such as the JICA Bamboo Value Chain Promotion Project in North East India signal intensifying institutional engagement with NTFP commercialization. Yet translating institutional ambition into tangible improvements in collector-level prices and chain efficiency requires a systematic understanding of how institutional scaffolding, the layered ensemble of formal rules, collective organizations, and informal norms, shapes value chain governance and price dynamics.

A shift in India's NTFP policy has been the operationalization of the Ministry of Tribal Affairs' (MoTA) "Mechanism for marketing of Minor Forest Produce (MFP) through Minimum Support Price (MSP) and development of value chain for MFP," implemented through TRIFED and State-level agencies to reduce distress sales and improve price realization for primary gatherers. The MSP for the MFP basket has expanded over time to cover 87 MFP items notified by MoTA, indicating an attempt to institutionalize floor prices across a broad NTFP portfolio. Complementing price support, the Van Dhan Vikas Karyakram (PMVDY/"Van Dhan Yojana") institutionalizes a collective-enterprise model (Van Dhan Vikas Kendras, VDVKs) intended to enable aggregation, primary processing, and market linkage in tribal areas, thereby targeting functional upgrading within the NTFP value chain.

The present paper addresses the gap through a systematic literature review that synthesizes evidence from various peer-reviewed articles, book chapters, policy documents, and technical reports published between 2000 and 2025. It is guided by two research questions:

- How does the institutional scaffolding governing NTFP value chains in emerging economies shape market linkages, governance structures, and upgrading opportunities?
- What does existing evidence reveal about price transmission dynamics and margin distribution across NTFP value chains, and what gaps exist in the empirical literature?

To address these questions, this paper synthesizes 52 peer-reviewed and grey literature sources drawn from 788 identified records through a PRISMA 2020-compliant screening protocol. The review integrates two theoretical traditions, Global Value Chain governance (Gereffi *et al*., 2005) and Price Transmission Theory (Meyer & von Cramon-Taubadel, 2004), that have developed in parallel without cross-fertilization in the NTFP context. The primary contribution is demonstrating that institutional scaffolding functions simultaneously as a governance moderator and a price transmission mechanism, a dual role not captured by existing frameworks and one that has direct implications for how policy interventions in NTFP markets should be designed and evaluated.

Theoretical Framework

Value chain analysis and global value chain governance

Value chain analysis (VCA), proposed by Porter (1985), extended by Kaplinsky and Morris (2001), and by Gereffi, Humphrey, and Sturgeon (2005), examines how activities, actors, and governance modes are configured from resource extraction to final consumption. The Gereffi *et al*. (2005) typology identifies three governance determinants: transaction complexity, codifiability, and supply base

capability, generating five governance types ranging from market to hierarchy along a continuum of increasing power asymmetry.

NTFP chains in emerging economies typically exhibit captive or relational governance upstream, where atomistic collectors face powerful traders under conditions of information asymmetry and asset specificity, while downstream nodes trend toward market-type governance.

Upgrading process, product, functional, and intersectoral dimensions is systematically constrained for NTFP collectors by weak organizational capacity, inadequate processing infrastructure, poor market information, and regulatory barriers. These collectively define the institutional scaffolding deficit that determines prevailing governance modes, shapes upgrading pathways, and drives inequitable margin distribution.

A critical extension in NTFP contexts is treating ecological sustainability as an integral VCA dimension: economic upgrading must be evaluated alongside environmental stewardship and social inclusion, given that over-extraction of ecologically vulnerable species documented for Asian honeybee and wild black pepper in the Eastern Himalayan and Indo-Burma hotspots can erode the resource base underpinning collector livelihoods.

Price transmission theory: Spatial and vertical dimensions

Price transmission theory examines how price signals propagate across spatially separated markets (spatial transmission) or vertically linked marketing stages (vertical transmission). The Law of One Price (LOP) posits that in competitive arbitrage-connected markets, equivalent goods should sell at uniform prices net of transfer costs (McNew, 1996). Empirical cointegration methods test whether price series across locations or chain nodes maintain long-run equilibrium. The foundational bivariate long-run price relationship between a farm-gate price P_f and a wholesale price P_w is expressed as:

$$P_w = \alpha + \beta P_f + \varepsilon$$

where β is the long-run transmission elasticity and ε captures deviations from equilibrium. The associated Error Correction Model (ECM) governs short-run dynamics:

$$\Delta P\omega t = \mu + \hat{\varepsilon}_{t-1} + \sum_{i=1}^{P} \gamma_i \Delta P_{f,} t - i + u_t$$

where λ captures the speed of adjustment following a shock (von Cramon-Taubadel, 1998), full, symmetric, and efficient transmission requires $\beta = 1$ combined with a rapid, significant λ. Departures signal incomplete or delayed transmission, reflecting market frictions, power asymmetries, or regulatory distortions (Fackler & Goodwin, 2001).

Asymmetric price transmission

Where price increases and decreases transmit with different speed, magnitude, or completeness is a critical further dimension. In forest product markets, APT is empirically documented: rising upstream prices pass through rapidly while falling prices do so more slowly, indicating processor market power over suppliers. For NTFP chains, analogous dynamics are structurally expected given oligopolistic trader segments facing atomistic collector markets, yet direct econometric evidence remains sparse, constituting one of the most significant gaps identified in this review.

Methodology

PRISMA 2020 compliance

This systematic literature review follows the PRISMA 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines, which provide a 27-item checklist for transparent and comprehensive reporting across identification, screening, eligibility, and inclusion stages. The PRISMA 2020 framework was selected over the PRISMA 2009 due to its enhanced provisions for non-randomized evidence synthesis, its updated guidance on reporting search strategies, and its allowance for mixed quantitative and qualitative evidence, all features that align with the heterogeneous study designs common in NTFP and rural livelihood research.

A formal review protocol was not published *a priori*, and this systematic review was not registered in a prospective registry such as PROSPERO prior to commencement.

Research questions and search strategy

The review was guided by two research questions stated in the introduction

- On institutional scaffolding and governance
- On price transmission and margin distribution.

Boolean search strings were constructed by combining controlled vocabulary and free-text terms in two clusters: *Cluster 1 (Subject terms):* non-timber forest products OR NTFPs OR forest produce OR forest-based livelihoods OR bamboo OR wild honey OR broom grass OR ferns OR jackfruit»

Cluster 2 (Analytical/contextual terms): value chain OR supply chain OR price transmission OR market integration OR institutional framework OR governance OR farmer producer organization OR collective action OR market inefficiency OR margin distribution.

Geographic and contextual filters were applied: "India" OR "South Asia" OR "Southeast Asia" OR "Sub-Saharan Africa" OR "developing economies" OR "emerging economies."

These strings were run across Scopus, Web of Science, Google Scholar, FAO documentation centre, World Bank Open Knowledge Repository, CGIAR institutional repositories, and selected grey-literature sources including

government planning documents, JICA and World Bank project evaluations, and state forest department policy archives. In addition to peer-reviewed studies, national policy and implementation documents on NTFP marketing institutions, particularly MoTA/TRIFED MSP-for-MFP scheme materials and PMVDY/VDVK guidelines, were included as grey literature because they directly define the institutional scaffolding shaping NTFP value-chain governance and market linkage in India.

Inclusion and exclusion criteria

Inclusion criteria

- Peer-reviewed journal articles, book chapters, technical/policy reports, and government documents published between 2000 and 2025
- Studies focusing on NTFPs in developing, emerging, or transitional economies
- Studies addressing at least one of: value chain structure/mapping, institutional governance, price dynamics or transmission, collector livelihoods, or collective organization
- Studies in English and available in full text

Exclusion criteria

- Studies exclusively focusing on timber/roundwood without NTFP content
- Studies in fully industrialized economies without comparative emerging-economy evidence

Screening, selection, and quality appraisal

The initial structured database search yielded 747 records across Scopus, Web of Science, Google Scholar, the FAO Documentation Centre, and the World Bank Open Knowledge Repository. A parallel targeted search of grey-literature repositories including government planning documents, JICA project evaluations, TRIFED/MoTA policy archives, State Rural Livelihood Mission (SRLM) programme documents, and the SFURTI portal identified an additional 41 sources, bringing the total identified corpus to 788 records. Following manual cross-check, 589 unique records were carried forward to title-and-abstract screening.

Title and abstract screening were conducted independently by the author against the inclusion criteria in Section 3.3. A total of 412 records were excluded at this stage (primary reasons: off-topic, geographic scope restricted to fully industrialized economies, or no substantive NTFP content). The remaining 177 records were retrieved in full text for eligibility assessment. Of the 177 full-text records assessed, 145 were excluded for failure to meet inclusion criteria. A total of 52 sources were retained for final qualitative and thematic synthesis: 37 peer-reviewed journal articles and book chapters, and 15 grey or policy

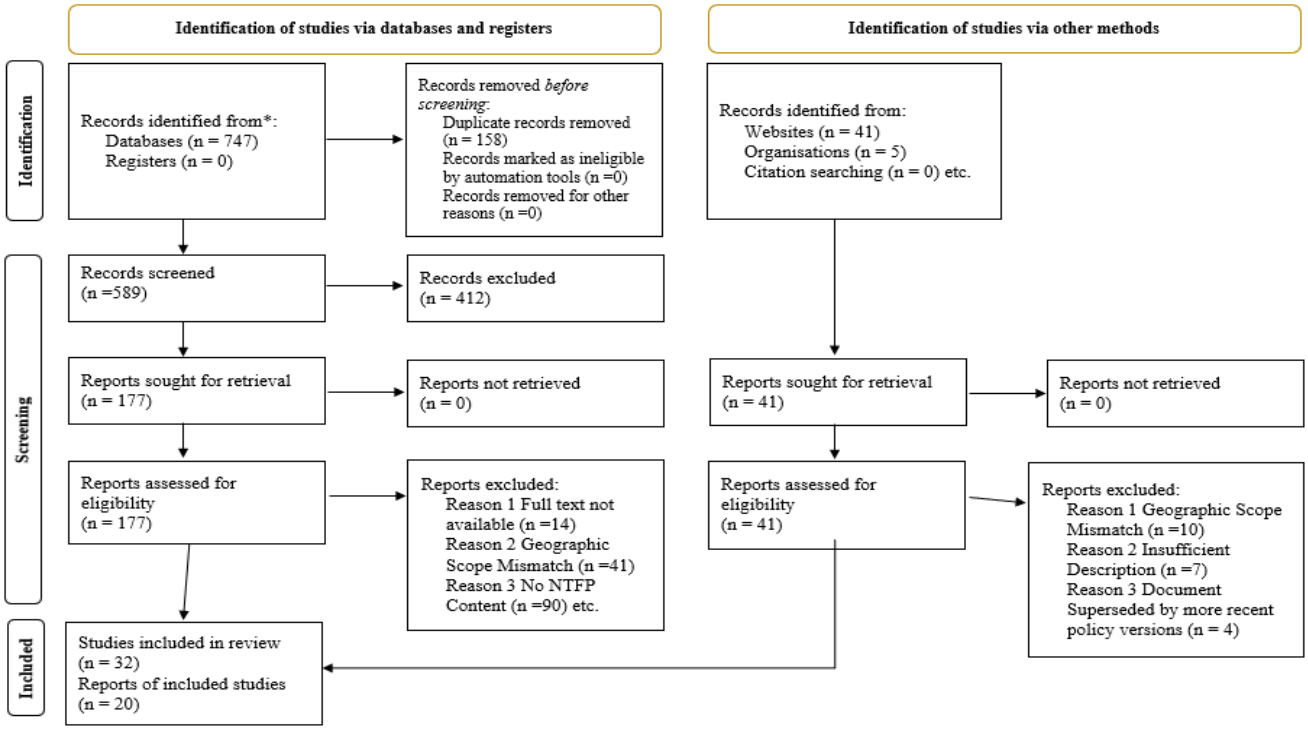

Figure 1: PRISMA 2020 flow diagram illustrating the study selection process

literature documents (see Figure 1 for the PRISMA 2020 flow diagram). No formal meta-analysis was conducted given the heterogeneity of outcome measures; instead, a narrative and thematic synthesis was employed following the convergent integrated synthesis model (Page *et al*., 2021).

Results

NTFP Diversity and Value Chain Mapping

Across the 52 retained studies, a consistent finding is that NTFP portfolios in emerging economies are biologically diverse and economically heterogeneous, with a small number of high-value, high-demand commodities driving the bulk of commercial transactions. In NE India specifically, the most commercially active NTFPs include bamboo (shoots, poles, craft material), broom grass, wild vegetables and ferns, mushrooms, wild honey, jackfruit, snails and freshwater fauna, and a range of medicinal and aromatic plants. Mokokchung district in Nagaland documents 103 harvestable NTFP species, with bamboo, honey, eels, crabs, and wild black pepper generating the highest per-unit economic value for collectors; NTFPs contribute approximately 30% of annual household cash income and represent a second income stream after wage labour, with non-cash NTFPs (fuel, fodder, wild vegetables) providing additional subsistence value equivalent to several thousand rupees annually per household (Jamir *et al*., 2021; Longkumer *et al*., 2020).

A recurring structural observation across the literature is the stark discontinuity between ecological richness and market articulation. VCA studies from Central India, Nepal, Madhya Pradesh, and Assam find that NTFP chains typically involve three to six intermediary stages between forest collector and end consumer, each adding margins while the collector receives only 15-30% of the final consumer price (Lele *et al*., 2010; Kar & Jacobson, 2012; Modi & Trivedi, 2013). Case studies from Nepal's Rapti Hills document price spreads with collectors receiving a fraction of terminal market prices, mediated through "long and secretive marketing chains" that systematically extract surplus from the most resource-poor chain participants (Kar & Jacobson, 2012). In Karnataka and Tamil Nadu, ecosystem landscape studies confirm that weak infrastructure, inadequate storage, and absent processing facilities compound information asymmetries to render NTFP value chains commercially inefficient from the collector's perspective (Donovan *et al*., 2015).

Empirical micro-studies from North East India provide concrete evidence of large within-basket price dispersion in NTFP markets, consistent with heterogeneous product attributes, seasonality, and market segmentation. Longkumer *et al.* (2020) assessed the contribution of NTFPs to rural income and employment in Mokokchung district, Nagaland, using a survey of 100 respondents drawn from 10 villages across Changtongya and Ongpangkong N blocks. The study finds that NTFPs constitute a major component of household livelihoods, contributing 30% of total annual household income (second only to wage employment) and generating 29.1% of annual employment (117 man-days), underscoring the centrality of forest-based value chains to rural welfare in this context (Jamir *et al*., 2021).

Corroborating evidence from the adjacent state of Arunachal Pradesh reinforces this pattern at a larger ecological scale. Sharma *et al*. (2015), surveying 350 households across eight districts, documented 135 plant-based and 36 animal-based NTFPs contributing over 50% of annual household income in four of the eight districts, with Adi tribe households earning up to Rs. 38,750 annually from NTFP sales. Critically, the study reports only income ranges: honey at Rs. 200–300/litre, wild fruits at Rs. 500 to1,000/household rather than a systematic per-unit price series, reflecting the near-total absence of formal market records across forest-edge procurement points. This data architecture directly mirrors the price transmission bottleneck identified in this review: without systematic multi-node price monitoring spanning collection points through urban wholesale centres, neither market integration nor asymmetric transmission can be empirically modelled.

NTFPs were classified into wild fruits, wild vegetables, medicinal plants, fuelwood, and an "Others" category (including broom grass, wild meat, fish, etc.), with the "Others" category generating the highest average annual income among NTFP types (Rs. 26,756; 44.4%), followed by wild vegetables (Rs. 16,890.5; 27.9%). Fuelwood dominates non-cash income (Rs. 6,826 per household; 49.9%), implying that price-based assessments of NTFP value chains risk underestimating welfare effects unless subsistence consumption is explicitly valued.

Spatial price mapping, where conducted, reveals substantial geographic price variation for identical NTFP products, consistent with high spatial transfer costs and thin arbitrage between forest-edge markets and urban wholesale centres (Talukdar *et al*., 2021; Sharma & Bharti, 2020). Detailed quantity and price data for informal NTFP markets are difficult to collect, as most transactions occur in periodic markets without formal records, and market players often withhold price information (Tiwari, 2000; Sharma & Bharti, 2020). This data scarcity directly impedes the application of formal price transmission models and constitutes a methodological bottleneck for the research agenda.

Institutional Scaffolding: Governance and Regulatory Frameworks

Institutional scaffolding in NTFP value chains comprises formal regulations, customary institutions, collective organizations, and development interventions. Across reviewed studies, these layers are heterogeneous and frequently misaligned.

Regulatory Frameworks and State Policies

National and state forest regulations in India have historically prioritized extraction control over market facilitation. Reforms devolving NTFP marketing rights to gram panchayats and establishing minimum support prices (MSP) aimed to improve collector incomes, but field evidence from Eastern and Central India consistently shows weak MSP implementation: informal traders dominate procurement, price information remains asymmetric, and collectors sell below MSP floors due to remoteness, lack of storage, and immediate liquidity needs (Magry *et al*., 2022; Tiwari, 2000; Ministry of Tribal Affairs, GoI, n.d.).

Several central schemes can materially improve NTFP value-chain outcomes when implemented in convergence with collector institutions (SHGs, FPOs, VDVKs):

PM-KISAN (Pradhan Mantri Kisan Samman Nidhi)

Provides Rs. 6,000/year in three direct cash transfers to eligible farm households. In the NTFP context, its relevance is indirect: by reducing income seasonality, it may lower distress-sale pressure during peak harvest seasons when collectors are forced to sell immediately below MSP. However, PM-KISAN is designed for cultivated-land holders and excludes a significant portion of forest-dependent tribal households who lack land title, precisely the most vulnerable NTFP collectors. Its impact on NTFP price realization remains unevaluated and is, at present, a testable hypothesis rather than an established finding (PIB, 2019).

PM Kisan SAMPADA (Pradhan Mantri Kisan Sampada Yojana)

Supports cold-chain infrastructure, primary processing units, and food-park development. For perishable NTFPs, mushrooms, bamboo shoots, and wild fruits SAMPADA funded cold chains could extend shelf life, enabling better-timed and better-graded product lots that command premium prices downstream. In practice, SAMPADA clusters have been largely concentrated in horticultural and marine value chains; documented NTFP-specific cold-chain investments under SAMPADA are minimal, and no outcome evaluations linking SAMPADA infrastructure to NTFP collector price improvements have been published (PIB, 2021).

PMFME (Pradhan Mantri Formalisation of Micro Food Processing Enterprises Scheme)

Operates under the One District One Product (ODOP) framework and provides credit-linked subsidies and technical support to individual micro-enterprises and FPOs/SHGs for food processing. It explicitly includes NTFP-based enterprises, honey processing, jackfruit products, and bamboo shoot pickling as eligible units. PMFME is the most directly relevant central scheme for functional upgrading within NTFP chains, as it targets the processing node where the largest value addition occurs. However, tribal NTFP collectors face barriers in accessing PMFME credit collateral requirements, lack of business registration, and low financial literacy, limiting their first-mile reach without targeted handholding by SRLMs or NGOs (PIB, 2023).

SFURTI (Scheme of Fund for Regeneration of Traditional Industries)

Finances cluster-based common facility centres (CFCs) providing shared processing machinery, training, design support, and market linkage for traditional artisanal industries. Functional bamboo and honey clusters under SFURTI are documented in official reporting. SFURTI is significant because it directly addresses the infrastructure deficit at the processing node the single largest gap preventing NTFP collectors from capturing value-addition margins. Its limitation is scale: cluster development is slow, governance of CFCs is uneven, and financial sustainability beyond initial grant support is inconsistently achieved. No rigorous impact evaluations exist linking SFURTI bamboo clusters to measurable improvements in collector income or price realization.

MSP-for-MFP (Mechanism for Marketing of Minor Forest Produce through Minimum Support Price)

The most direct price-support instrument for NTFP collectors is currently covering 87 notified Minor Forest Produce items with an All-India MSP floor guaranteed by the Ministry of Tribal Affairs through TRIFED and State-level procurement agencies (TRIFED, 2026). The scheme was expanded and revised in 2020 to improve coverage and procurement credibility. In principle, MSP-for-MFP should function as a price transmission backstop, preventing collector prices from falling below a socially determined floor even when trader monopsony is present. In practice, field evidence from Jharkhand (Magry *et al*., 2022), Odisha, and Central India consistently documents that collectors receive prices below MSP: procurement points are spatially inaccessible, state agency procurement is seasonal and underfunded, and traders exploit information asymmetry and advance-loan dependency to purchase below the floor. The governance awareness of MSP entitlements among collectors is as low as 2.58 to 3.10% (Magry *et al*., 2022), making the scheme operationally inert at the first mile. MSP-for-MFP represents the right policy logic but requires complementary investment in rural procurement infrastructure, digital price dissemination, and enforcement mechanisms to deliver its stated objective.

Van Dhan Vikas Kendras (under Pradhan Mantri Van Dhan Yojana/PMVDY — TRIFED, 2018–present)

Clusters approximately 15 SHGs (~300 tribal members) per Kendra to support aggregation, primary value addition (drying, grading, basic processing), and MSP-linked procurement at local haats. Infrastructure ownership vested in Gram Panchayats is intended to embed enterprise assets

within local self-governance, integrating price support with upgrading within the same market geography. VDVKs are the most structurally coherent institutional response to captive governance in NTFP chains; they simultaneously address aggregation failure, processing absence, and MSP non-compliance. Over 2,800 VDVKs have been sanctioned nationally (TRIFED, 2022). However, operational performance is highly variable: working capital constraints, lack of assured market linkage beyond the haat level, and limited managerial capacity within Gram Panchayats mean that many VDVKs operate below design capacity. Rigorous outcome evaluations of VDVK's impact on collector prices remain absent from the peer-reviewed literature.

National Bamboo Mission and International Cooperation

The National Bamboo Mission (NBM), substantially reconfigured in 2018, represents the most sector-specific institutional response in NE India. Its Action Plan for the Northeast region operationalizes a "One Cluster, One Product" approach, covering species assessment, FSC certification pilots, entrepreneurship funds, machinery banks, and inter-state supply agreements spanning nursery through end-market within an explicit VCA framework.

JICA's Technical Cooperation Project (since January 2023), implemented with NBM and NECBDC, adds technology transfer (bamboo-based animal feed, pavement), financial management training, and Indo-Japanese joint research under a bilateral Bamboo Initiative agreed in 2022. The World Bank's ELEMENT similarly supported bamboo clusters in Tripura through the Tripura Bamboo Mission, though partnership development underperformed against targets due to coordination gaps (World Bank, 2024).

SRLMs and Collective Enterprise Development

State Rural Livelihood Missions (SRLMs) are the primary vehicles mobilizing women into SHGs and promoting enterprise development. The World Bank GoI NRETP explicitly frames SHG federations as scalable platforms for aggregation and downstream market engagement functions central to upgrading in high-transaction-cost NTFP markets (World Bank, 2020).

ASRLM (Assam) illustrates three SRLM-enabled mechanisms: organizational scaffolding through SHG mobilization; brand and market access scaffolding via the ASOMI® product identity; and aggregation of dispersed household production into standardized portfolios. Over 500 SHG members are engaged in bamboo craft, demonstrating non-trivial producer-base scale.

MSRLM's MKSP NTFP programme (Manipur) explicitly covers the full NTFP value chain regeneration, collection, processing, and marketing framing, upgrading as a collective institutional project aimed at shifting governance control toward SHGs and federations. In VCA terms, this strengthens upstream capabilities while reducing trader-controlled procurement, with the potential to improve price transmission by reducing information asymmetries.

Customary Institutions and FPOs

Customary institutions like the village councils and tribal apex bodies in Meghalaya and Nagaland regulate harvesting seasons, exclude destructive techniques, and negotiate collectively with traders, providing ecological safeguards that formal enforcement often fails to deliver. However, social hierarchies, gendered forest-access norms, and elite capture can reproduce power asymmetries analogous to those at the trader-collector interface.

The FPO model is expanding into NTFP and bamboo sectors: 40 bamboo FPOs have been approved under the GoI's 10,000 FPOs programme, with 18 in Assam alone through NAFED and NERAMAC. Agricultural evidence confirms FPOs reduce transaction costs and improve price realization. Intermediaries in FPO-absent settings can capture up to 40% of producer margins, but rigorous counterfactual evaluations for NTFP-specific FPOs remain absent.

Van Dhan Vikas Kendras (VDVKs under PMVDY/TRIFED) cluster 15 SHGs (~300 members) to support aggregation, primary value addition, and MSP-linked procurement at local haats. Infrastructure ownership by Gram Panchayats embeds enterprise assets within local self-governance, conceptually integrating price support and upgrading within the same market geography.

Market Dynamics, Inefficiencies, and Price Transmission

NTFP markets in South Asia are characterized by three structurally interconnected features: intermediary dominance, weak price information, and incomplete vertical and spatial price transmission.

Intermediary Power and Collector Marginalization

The majority of NTFP chain surplus is captured by traders rather than collectors. Field surveys document weighing discrepancies, opaque pricing, and credit-tied advance sales to itinerant traders that foreclose access to better-priced channels. Over 95% of collectors in some studies cite price volatility and low prices as their primary constraint, and most sell immediately after collection due to liquidity pressure and storage absence, consistent with the "captive" governance mode of Gereffi *et al*. (2005).

The most granular chain-level evidence of surplus extraction in this review comes from Magry *et al*. (2022), who conducted an integrated VCA of Lac (*Kerria lacca*), Mahua (*Madhuca longifolia*), and Tamarind (*Tamarindus indica*) across 387 collectors and 33 traders in Khunti District, Jharkhand. Gross margin analysis revealed a stark distributional asymmetry: collectors netted INR 135.52/kg on Lac while wholesalers earned INR 315/kg, a margin ratio exceeding 2:1 at the chain terminus despite collectors bearing the full ecological risk, labor cost, and

harvest uncertainty. MSP was formally notified for all three products yet systematically bypassed: 15% of collectors were locked into barter arrangements and 8.5% operated under advance loan dependency to itinerant traders, structurally foreclosing access to better-priced channels. Governance awareness among collectors was near-negligible at 2.58 to 3.10%, directly quantifying the information asymmetry that renders policy price floors operationally inert at the first-mile node. These findings constitute the strongest available empirical confirmation of captive governance dynamics in the Indian NTFP context and provide a methodological template integrated gross margin analysis combined with governance awareness assessment that future NE India-specific research should replicate.

One of the few NE India-based studies providing commodity-level unit prices is Talukdar *et al.* (2021), who surveyed local markets adjacent to Patharia Hills Reserve Forest, Karimganj, Assam, documenting 14 economically important NTFPs at collector-facing market prices. Price variation across the basket is stark: *Parkia roxburghii* (tree bean) commands Rs. 300 to 400/kg while broom grass (*Thysanolaena maxima*), with the second-highest use frequency at 48%, fetches only Rs. 30–50/bundle, illustrating the high-volume, low-margin collector trap that pervades NTFP chains. These prices reflect only the nearest local market node; the absence of corresponding district, regional (Guwahati), or national (Delhi) price observations renders margin distribution analysis across chain nodes impossible. The study thus simultaneously provides the most granular price evidence available for Assam NTFPs and exemplifies the data gap in single-node, single-period pricing that prevents rigorous spatial and vertical price transmission modelling.

Asymmetric Price Transmission

Minimum Support Price for MFP functions as a policy price floor at primary procurement nodes, but its transmission to collector-level prices depends on procurement credibility, spatial accessibility, and enforcement against parallel informal buying. Where procurement is thin or irregular, a persistent wedge between notified MSP and realized forest-gate prices is the typical outcome. VDVKs and FPOs can, in principle, narrow this wedge through aggregation, grading, and direct market linkage, but performance depends on local institutional capacity and operational funding. Critically, price support alone is insufficient: transmission barriers require direct investment in rural roads, storage, market information systems, and digital price reporting.

Information Asymmetries and Ecological Price Drivers

Collectors rely on informal, trader-influenced price signals; formal market records, standardized grading, and institutional storage are near-absent in NTFP chains. Digital price reporting and e-NAM equivalents for NTFPs are discussed in policy documents but remain unevaluated in the reviewed literature.

A distinctive NTFP-specific price driver largely absent from mainstream agricultural economics is ecological scarcity generated by seasonal variation, habitat degradation, and overharvesting. Vulnerability assessments in NE India identify Asian honeybee, wild black pepper, and betel leaf vine as ecologically "very vulnerable" due to overexploitation, meaning rising market demand can produce simultaneous price increases and chain-collapse risk. Integrating ecological indicators into VCA and price-monitoring frameworks is therefore analytically essential but remains rare in the reviewed literature.

Discussion

The reviewed literature converges on a structural diagnosis: NTFP value chains in NE India and comparable emerging economies are locked in captive governance, incomplete price transmission, and institutional fragmentation that systematically disadvantages primary collectors while retarding commercialization, sustainability, and equitable benefit-sharing. VCA-based studies effectively map actors, activities, and governance modes but rarely extend to quantitative price dynamics. Price transmission studies document asymmetry and incompleteness but seldom engage NTFP-specific chain structures. This review argues that merging these traditions, VCA to structure institutional and governance analysis, and Threshold Vector Error Correction Models (TVECMs) to quantify how institutional configurations shape price pass-through, would generate substantially more powerful and policy-actionable evidence.

The reviewed evidence indicates that institutional scaffolding operates as a layered and frequently misaligned ensemble rather than a coherent governance system. Formal regulatory instruments MSP-for-MFP, Forest Rights Act provisions, and Gram Panchayat devolution establish enabling conditions on paper but consistently fail at the first mile due to remoteness, procurement thinness, and collector-level information deficits. Magry *et al.* (2022) document governance awareness as low as 2.58 to 3.10% among collectors, directly quantifying how institutional intent collapses at the collector–trader interface. Collective enterprise models, such as SHGs, FPOs, and VDVKs, carry the strongest theoretical potential to shift governance modes from captive toward relational or market-type, but rigorous counterfactual evidence of their impact on price realization remains absent across the NE India corpus. Customary institutions in Meghalaya and Nagaland provide the most robust ecological governance observed in the literature, yet their market-facing capacity is constrained by elite capture and gendered access barriers that reproduce upstream power asymmetries. The net finding is that upgrading, whether process, product, or functional, remains

systematically blocked not by any single institutional failure but by the compounding interaction of weak infrastructure, absent market information, liquidity-driven distress sales, and misaligned regulatory enforcement. Effective institutional scaffolding must therefore operate simultaneously across all four dimensions rather than sequentially.

The reviewed evidence reveals a near-total absence of formal econometric analysis of price transmission in NTFP chains, despite strong structural conditions for asymmetry. What exists is largely diagnostic: gross margin analyses confirm collectors receive 15 to 30% of final consumer prices, with traders and wholesalers capturing the remainder through opaque procurement, credit tying, and standard-setting power. The Magry *et al*. (2022) data on Lac, where collectors net INR 135.52/kg against a wholesaler margin of INR 315/kg and the Talukdar *et al*. (2021) single-node Assam price observations both confirm the distributional pattern but provide no chain-spanning, multi-period price series from which transmission elasticity (β) or adjustment speed (λ) can be estimated. MSP-for-MFP introduces a formal price floor, but field evidence consistently shows a persistent wedge between notified and realized prices, analogous to the asymmetric transmission documented in timber and agricultural markets where price increases pass through rapidly while decreases do not. The central empirical gap is the absence of monthly, multi-node price data spanning village haats, district markets, Guwahati, and Delhi, the minimum architecture required to apply cointegration-based spatial models or TVECMs to NE India's endemic NTFP portfolio.

Research Gaps and Future Directions

Econometric price transmission for endemic NTFPs in NE India

No published TVECM analyses exist for spatial or vertical price transmission across NE India's endemic NTFP portfolio. Systematic collection of monthly price data spanning collection points, primary markets, and urban wholesale centres would enable rigorous testing of market integration, transmission elasticity, adjustment speed, and asymmetry.

Rigorous impact evaluation of FPOs and collective enterprises

Existing evidence remains largely assertive. Robust evaluations should quantify FPO effects on price realization and incomes; identify effect heterogeneity by perishability, remoteness, infrastructure availability, and governance quality; and assess whether gains persist beyond project support. FPO promotion must be paired with targeted scaffolding, working capital, common facility centres, quality protocols, digital price information, and assured market linkage, not registration and aggregation alone.

Ecological sustainability in price transmission analysis

Integrating ecological monitoring data (species abundance, harvest rates, regeneration indicators) with market price series to model how ecological scarcity feedbacks affect price dynamics and chain sustainability remains theoretically important yet largely unexplored.

Gender-disaggregated VCA and price analysis

Women are central to NTFP collection, processing, and local marketing across NE India, yet gender-disaggregated analyses of node participation, bargaining power, and price realization are rare. Magry *et al*. (2022) document over 70% female participation at the upstream collection node with zero downstream presence, and Mipun *et al*. (2019) observe analogous patterns among the Karbi tribe in Assam, confirming that women's labour subsidizes the value chain while market benefits accrue almost exclusively to men. Future research must embed gender explicitly in both VCA frameworks and price/income analysis to reveal how institutional reforms shape intra-household and inter-actor benefit distribution.

Longitudinal and comparative cross-state research

Most studies are cross-sectional and geographically narrow. Longitudinal panel designs tracking collectors, intermediaries, and marketing nodes across multiple NE Indian states and product categories would support stronger causal inference. Multi-market price series spanning village haats, district markets, Guwahati, and Delhi would simultaneously provide the empirical foundation for threshold and asymmetric transmission models.

Limitations of the Review Process

While this review followed the PRISMA 2020 framework, three limitations warrant disclosure. First, screening and eligibility assessment were conducted by a single author with a self-consistency check on a random sub-sample, deviating from the recommended dual-reviewer protocol and potentially introducing selection bias. Second, restricting the search to English-language publications may have excluded relevant regional grey literature and local-language empirical studies. Third, 14 studies were excluded due to inaccessible full texts, representing a marginal but potentially relevant gap in the evidence base.

Conclusion

Despite NE India's extraordinary bioresource endowment, NTFP commercialization remains structurally constrained by fragmented value chains, trader intermediation, and market environments in which price signals do not reliably reach primary collectors. This review demonstrates that institutional scaffolding has expanded significantly through customary governance, MSP-for-MFP, PMVDY/VDVKs, SRLM-linked collectives, commodity missions, and donor-supported programmes, yet these layers operate without durable integration and are rarely evaluated in outcome terms. The consequence is a persistent institutional

scaffolding deficit: a gap between policy intent and collector-level outcomes that neither regulatory reform nor collective organization alone can close.

The most urgent research priority is constructing NTFP-specific, multi-node price datasets spanning village haats through regional and national wholesale centres, enabling the first rigorous tests of spatial and vertical price transmission, asymmetry, and market integration for NE India's endemic portfolio. Equally critical is impact evaluation of FPOs and VDVKs using quasi-experimental designs to identify what scaffolding conditions infrastructure, procurement credibility, governance quality, and buyer contracts are necessary for collective enterprises to deliver sustained price gains rather than registration-level outcomes.

For policy, the central implication is that collective organization is not sufficient in itself. FPOs and SHG federations require customized operational scaffolding, working capital, common facilities for grading, storage, and primary processing, quality protocols, and assured market linkage to convert institutional intent into durable welfare gains for collectors. Without these complementary investments, institutional expansion reproduces the same fragmentation it is designed to overcome.

Theoretically, this review contributes to the GVC governance literature by demonstrating that in non-standardized, ecologically constrained commodity chains, institutional scaffolding functions simultaneously as a governance moderator shaping the transition from captive to relational chain configurations and as a price transmission mechanism determining the speed and completeness with which upstream price signals pass through to collectors. This dual role is not captured by existing Gereffi *et al*. (2005) typologies and represents a theoretically significant extension that future work on forest-based and other informally governed value chains should formalize and empirically test.

Ethical Approval and Informed Consent

This paper is a systematic literature review based entirely on previously published peer-reviewed articles, book chapters, policy documents, technical reports, and publicly available government sources. No primary data were collected from human participants, animals, or any living subjects. Accordingly, no institutional ethics board approval, informed consent, or participant recruitment was required or sought for the conduct of this research.

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