



# Breaking the Silos: A Cross-Sectoral Analysis of Disconnected Practices in Indonesia's Agri-Food-Tourism Value

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## Data of the Article

First Received: 19 January 2025 | Last Revision Received: 14 March 2025

Accepted: 16 March 2025 | Published Online: 17 March 2025

DOI: <https://doi.org/10.5281/zenodo.17109461>

## Keywords

Agri-food Value Chain,  
Cross-sectoral  
Collaboration,  
Tourism,  
Smallholder Farmers,  
Supply Chain  
Integration,  
Indonesia,  
Horeca,  
Inclusive Development.

Indonesia's agri-food value chain, particularly in tourism-focused regions, suffers from systemic fragmentation across its actors. This study focuses on three regions representing distinct stages of tourism development: Bali (mature), West Nusa Tenggara (emerging), and North Sulawesi (nascent). These varying contexts offer insight into how tourism maturity shapes value chain coordination among farmers, in-chain intermediaries, and HORECA (hotel, restaurant, catering) sectors. Disconnected practices across these actors hinder efficiency, innovation, and equitable participation—especially for smallholder producers. A mixed-methods design was employed to analyze cross-sector dynamics in the selected regions. Data were collected through structured surveys, semi-structured interviews, and participatory workshops involving stakeholders from the farmer, in-chain, and HORECA segments. The study examined patterns of communication, collaboration, risk distribution, and institutional support along the value chain. Across all regions, informal and short-term arrangements dominate, limiting trust, transparency, and strategic coordination. Smallholder farmers face limited access to market feedback and bear disproportionate risk. In-chain and HORECA actors often operate independently of upstream realities, and innovations remain isolated. Institutional mechanisms to foster systemic learning or traceability are largely absent. The research underscores how tourism development stage influences the depth and quality of agri-food value chain integration. While Bali exhibits slightly more developed linkages, fragmentation remains prevalent in all contexts. Addressing these silos requires regionally sensitive reforms that foster long-term partnerships, formal agreements, and structured feedback systems. Building cross-sector collaboration is essential to advancing a more resilient, inclusive, and sustainable agri-food-tourism system in Indonesia.



## 1. Introduction

In recent decades, the agri-food sector has undergone dramatic shifts, shaped by global market integration, technological advances, and changing dietary preferences. These transformations have reconfigured how food is produced, processed, and distributed. Yet, in many contexts, particularly in the Global South, agri-food value chains remain characterized by loose coordination and asymmetrical relationships between actors. Instead of functioning as cohesive systems, these chains often resemble disconnected clusters of activity, lacking the feedback mechanisms, formal agreements, and collaborative norms necessary for inclusive and sustainable development (Grohmann et al., 2023; McKeon, 2021).

Indonesia is no exception. While its food system supports millions of livelihoods, it is also fragmented, with limited cross-sector collaboration and uneven power dynamics. Smallholder farmers, who constitute the majority of producers, frequently operate with minimal and perhaps inaccurate market information and are largely excluded from value-added segments. Midstream players, including processors and distributors, are inconsistently linked to upstream and downstream partners, often operating through informal arrangements. Meanwhile, buyers in sectors like hospitality and tourism, particularly the HORECA (hotel, restaurant, and catering) segment, tend to engage in short-term transactions with limited regard for long-term partnerships or traceability (Deloitte & AWS, 2024; USDA, 2022).

What complicates this further is the layered role of tourism in Indonesia's regional economies. Bali, a global tourism hub, has fostered complex food supply relationships over time. West Nusa Tenggara (NTB), by contrast, is in a phase of active tourism development, while North Sulawesi represents a newer frontier, where tourism is only beginning to influence local economies. These regional contrasts offer a rare opportunity to explore how tourism maturity affects agri-food chain organization. Studies have shown that tourism can drive demand for higher-quality, locally sourced food, potentially improving farmer incomes and stimulating local economies (Királová & Malec, 2021). However, this potential is often not fully harnessed when there is a lack of institutional support, effective coordination mechanism, and inclusive governance – or when these elements are directed solely toward tourism.

It is not merely the absence of infrastructure or finance that hinders integration—it is the structural design of

the value chain itself. Farmers often have no formal channels through which to negotiate, receive feedback, or co-develop solutions. Intermediaries operate under tight margins and are rarely incentivized to invest in long-term relationships. HORECA businesses, driven by cost and reliability, tend to default to a handful of known suppliers, bypassing small producers who lack certification or scale (Stanco et al., 2020). These dynamics create what researchers increasingly describe as “silos”—not just operational separation, but systemic disconnection (Prišenk et al., 2024; Remans et al., 2024).

Much of the academic discourse on value chains emphasizes governance structures—how rules, norms, and institutions mediate relationships between actors (Gereffi, Humphrey, & Sturgeon, 2005). When these structures are weak or absent, the result is a system where trust is limited, risk is externalized onto the most vulnerable actors, and innovation fails to scale. Moreover, the social and institutional environments that surround these systems—local norms, government regulation, and market access—play a powerful role in shaping how value chains evolve (Granovetter, 1985; Reardon et al., 2014).

This paper seeks to understand where and why these disconnections persist across Indonesia's tourism-linked agri-food systems. By focusing on three provinces that vary in their tourism development histories—Bali, West Nusa Tenggara, and North Sulawesi—we analyze how communication breakdowns, weak feedback systems, innovation stagnation, short-termism, and unequal risk distribution manifest across farmers, in-chain actors, and HORECA businesses. Using a mixed-methods approach that includes structured surveys, semi-structured interviews, and participatory workshops, the research contributes evidence on what inhibits value chain integration and what opportunities exist for systemic reform.

This is not simply an exploration of inefficiencies. At its core, this research examines how structural fragmentation perpetuates inequality and erodes resilience. In doing so, it responds to a growing call within food systems research: to move beyond technical fixes and examine the social architecture of value chains—how relationships are built, maintained, or broken—and what that means for the future of inclusive rural development.

## 2. Materials and Methods

### 2.1. Study Design

This study employed a mixed-methods cross-sectional

design to examine fragmentation and siloed practices in Indonesia's agri-food value chains. The research was conducted in three provinces—Bali, West Nusa Tenggara (NTB), and North Sulawesi—each representing a distinct stage of tourism development: established, developing, and emerging, respectively. These regional contrasts provided a basis for understanding how tourism maturity affects integration across farmers, midstream actors, and HORECA (hotel, restaurant, and catering) sectors.

The study combined structured surveys with qualitative interviews and participatory workshops to assess patterns in communication, collaboration, innovation, and risk-sharing across the value chain.

## 2.2. Sampling and Participants

A stratified purposive sampling approach was adopted to ensure diverse representation across geographic location, actor type, gender, and generational category. The study reached a total of 372 respondents, comprising:

- 180 smallholder farmers, engaged in food crop and horticultural production;
- 59 in-chain actors, including aggregators, processors, and logistics providers;
- 133 HORECA stakeholders, ranging from independent restaurants to medium-sized hotels.

Additional qualitative data were collected through:

- 24 semi-structured interviews, and
- Three multi-stakeholder workshops, each held in one of the research provinces.

## 2.3. Data Collection

### 2.3.1. Digital Surveys via KoboToolbox (KOBO)

Structured questionnaires were designed for each actor group and deployed using KoboToolbox (KOBO)—a reliable open-source platform widely used for collecting, analyzing, and managing data in survey-based research, monitoring, and evaluation. KOBO was selected for its practical suitability in diverse field conditions. Its features, including real-time monitoring, GPS-tagging, and built-in logic checks, helped ensure consistency, accuracy, and completeness across data collection sites.

The survey instruments were informed by relevant literature and prior diagnostic studies. Questionnaire modules covered five thematic domains:

1. Communication flows and record-keeping;
2. Feedback mechanisms and information exchange;
3. Innovation practices and knowledge diffusion;
4. Transaction types and relationship formalization;
5. Risk distribution and institutional support.

Enumerators were trained in the use of KOBO and ethical field procedures. Surveys were administered face-to-face between December 2023 and July 2024 using mobile devices in rural, peri-urban, and urban areas.

### 2.3.2. Interviews and Workshops

Semi-structured interviews were conducted with selected stakeholders to gather deeper insight into relational dynamics, sourcing behaviours, and perceived constraints. Participants were purposively selected from each actor group and region.

Participatory workshops were conducted in each of the three provinces with 10–12 multi-sector stakeholders. Sessions used participatory tools such as value chain mapping and constraint ranking to validate survey findings and co-develop perspectives on integration barriers and opportunities.

## 2.4. Data Analysis

### 2.4.1. Quantitative Analysis

Survey data collected via KOBO were exported to Excel for cleaning and analysis. Analytical procedures focused on:

- Descriptive statistics, including frequencies and percentages for key indicators (e.g., use of contracts, feedback systems, certification);
- Cross-tabulations to identify patterns by region and actor type;
- Group comparisons aligned with the study's five analytical themes.

No inferential tests were applied in the reported results, although the structure of the data supports such extensions in future work.

### 2.4.2. Qualitative Analysis

Interview transcripts and workshop notes were analyzed using thematic framework analysis, guided by five core dimensions:

- Communication and information silos,
- Weak or missing feedback systems,

- Innovation isolation,
- Transactional relationships,
- Disproportionate risk exposure.

A deductive coding strategy was used initially, with inductive refinements emerging from cross-case comparisons and validation with field teams.

Thematic analysis was conducted using NVivo 14 software to manage and code qualitative data. A combination of deductive and inductive coding strategies was employed. Initial themes were based on the study’s conceptual framework, followed by inductive refinements after reviewing all transcripts and workshop notes. Coding consistency was ensured through intercoder reliability checks within the research team. To mitigate potential researcher bias during participatory workshops, standardized facilitation protocols were employed, and all outputs were validated in real time with participants to ensure accuracy and mutual agreement.

## 2.5. Ethical Considerations

All participants were informed about the voluntary nature of participation, the use of digital tools, and their right to withdraw without consequence. Informed consent was obtained in written or verbal form. All data were anonymized and securely stored. Ethical approval was granted by the National Research and Innovation Agency of Indonesia (BRIN). To support equitable participation, respondents—especially those attending in-person interviews and workshops—received modest compensation in the form of transport reimbursement and meal allowances. This support was disclosed prior to participation and included in the informed consent process.

## 2.6. Limitations

The study’s cross-sectional design and reliance on self-reporting introduce potential for recall and social desirability bias. Limited access to remote areas may have led to underrepresentation of more marginalized groups. Despite these limitations, the integration of quantitative and qualitative methods across diverse actors and regions strengthens the depth and credibility of the findings.

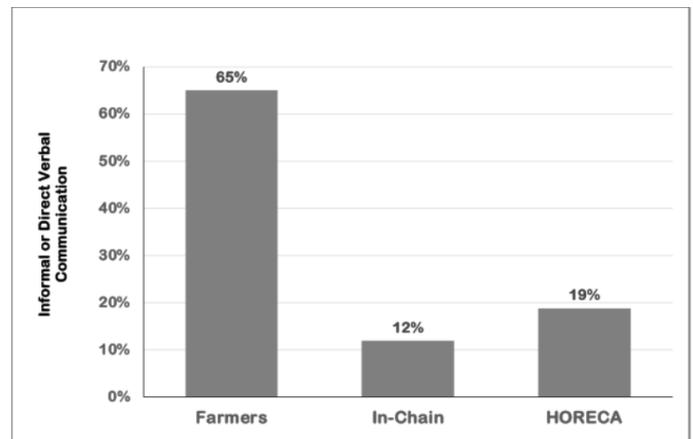
## 3. Results

### 3.1. Communication Silos across the Value Chain

Communication across the agri-food value chain

was found to be fragmented, informal, and largely unstructured. Among farmers, 65% reported relying exclusively on verbal negotiations, with no structured mechanism for information flow or document (Figure 1). In-chain actors similarly operated with informal protocols; only 11.9% (7 out of 59) indicated that they maintained written records or feedback systems with suppliers or buyers.

HORECA stakeholders were the least connected to upstream actors. Only 18.8% of HORECA respondents sourced products directly from smallholder farmers. The remainder relied on intermediaries, which diluted feedback loops and accountability. As one hotel manager in North Sulawesi noted: “We usually just call our usual supplier. We don’t know where they get the products.”



**Figure 1:** Visualization of Informal or Direct Verbal Communication Patterns Across the Agri-food-tourism Value Chain.

### 3.2 Limited Feedback and Learning Mechanisms

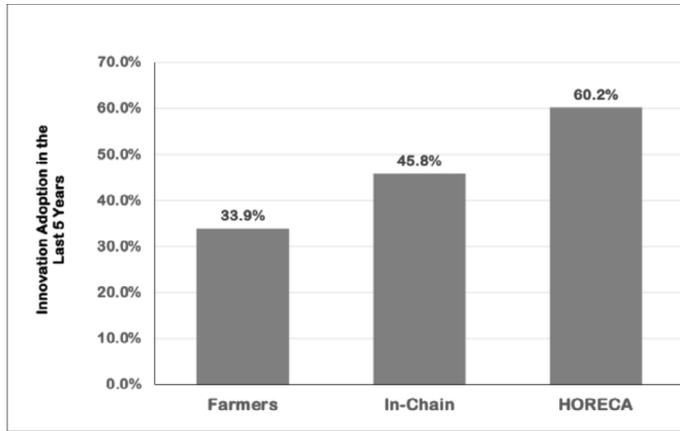
Formalized feedback mechanisms were largely absent. Less than 10% of farmers reported receiving technical or market-related feedback from buyers. In-chain actors cited lack of time or incentives to engage in mutual learning, while HORECA businesses maintained largely transactional procurement models.

Only a small fraction of in-chain respondents (8.5%) shared post-sale assessments with suppliers. Similarly, 6.8% of HORECA actors participated in any training or feedback forums related to sustainable sourcing or procurement.

### 3.3 Isolated Innovations and Low Collaboration

Innovation adoption was sporadic. Figure 2 shows the

proportion of actors who reported implementing new technologies or practices in the past five years. Farmers had the lowest adoption rate (33.9%), followed by in-chain actors (45.8%), and HORECA with the highest (60.2%). Despite these efforts, innovations remained isolated, and there was no evidence of systematic knowledge-sharing across actor groups.

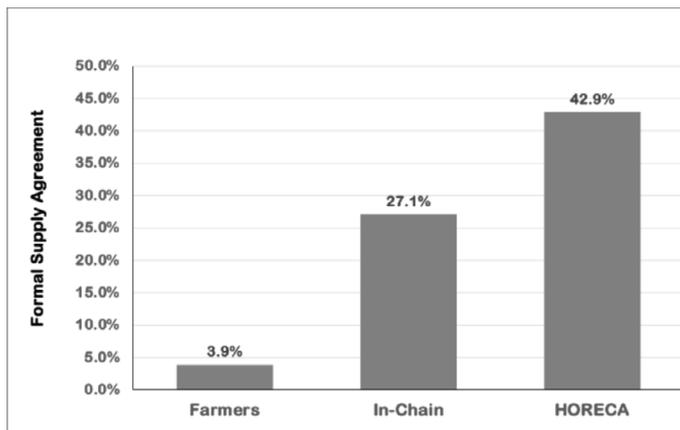


**Figure 2:** Adoption of Innovations or Technologies in the Past Five Years, Disaggregated by Actor Group.

Qualitative data revealed that actors implementing innovations often did so independently. For example, one in-chain distributor in West Nusa Tenggara shared: *“We use cold storage now, but we never discuss it with our suppliers—it’s just for our benefit.”*

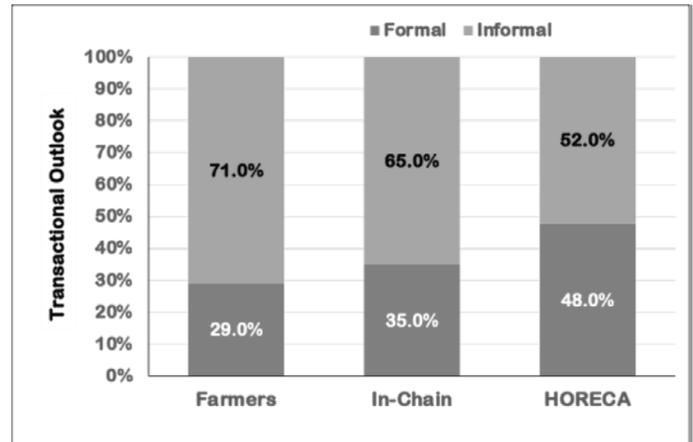
### 3.4. Transactional and Short-Term Relationships

Short-termism characterized most interactions across the value chain. More than 70% of farmers reported selling to whichever buyer offered the best price on the day, without repeat transactions or contracts. Similarly, only 3.9% of farmers, 27.1% of in-chain actors, and 42.9% of HORECA stakeholders reported having formal supply agreements (Figure 3).



**Figure 3:** Proportion of Respondents Engaged in Formal Supply Contracts, Categorized by Actor Group.

This trend is reinforced by respondents’ transactional outlooks. Figure 4 presents the breakdown of actors with either formal (partnership-based) or informal (price-driven) mindsets. Farmers and in-chain actors overwhelmingly held informal outlooks, while HORECA stakeholders showed a slightly higher inclination toward formality.



**Figure 4:** Transactional Orientation among Value Chain Actors, Categorized by Preference for Formal or Informal Relationships.

### 3.5. Unequal Risk Distribution

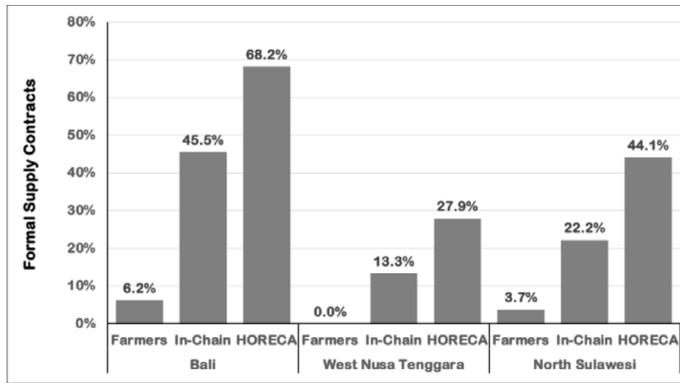
Risk exposure was highly uneven. Most farmers bore the brunt of price volatility, rejected products, and spoilage. In contrast, in-chain actors and HORECA businesses passed this risk upstream via volume shifts or payment delays.

Among farmers with contracts, the perceived benefits were noteworthy. 23% believed contracts reduced supply risk, 20% cited price risk mitigation, and others mentioned improved cash flow and consistent buyers. This highlights the potential of formal agreements in balancing power and risk. As a farmer in Bali stated: *“If the crop fails or the buyer cancels, we are left with nothing. A contract would give us at least some guarantee.”*

### 3.6. Regional Differentiation in Contracting and Innovation

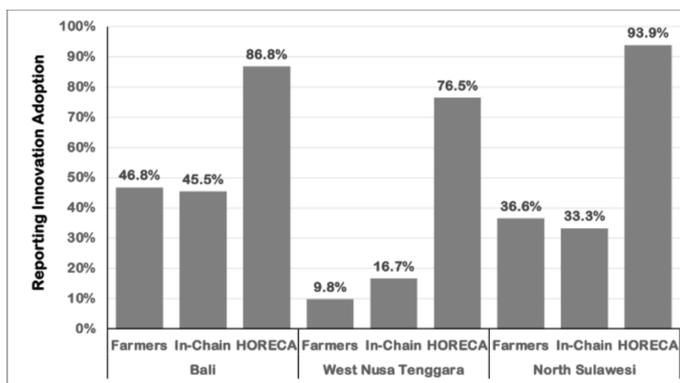
A regional breakdown of contract adoption reveals substantial variation across the tourism development spectrum. As illustrated in Figure 5, Bali—Indonesia’s most mature tourism region—exhibits the highest level of formalization across all three actor groups. Among HORECA stakeholders in Bali, 68.2% reported holding formal supply contracts, compared to 27.9% in NTB and 44.1% in North Sulawesi. In-chain actors in Bali

also reported relatively strong contract use (45.5%), whereas formal engagement was markedly lower in NTB (13.3%) and North Sulawesi (22.2%). Further investigation is needed to better understand why formal engagement in North Sulawesi appears stronger than we theorized. Farmers consistently reported the lowest levels of formal contracting across all regions, ranging from 6.2% in Bali to 0% in NTB.



**Figure 5:** Adoption of Formal Supply Contracts by Region and Actor Group. The Figure Presents the Percentage of Respondents—across Farmers, Intermediaries, and HORECA Stakeholders—who Reported Participating in Formal Contractual Arrangements, Disaggregated by Geographic Region.

Innovation adoption followed a similar regional pattern. As shown in Figure 6, HORECA actors again lead, with 93.9% of North Sulawesi and 86.8% of Bali respondents reporting adoption of new practices or technologies in the past five years. Farmers in NTB displayed the lowest innovation uptake (9.8%), compared to 46.8% in Bali and 36.6% in North Sulawesi. In-chain actors displayed moderate and regionally varied adoption rates—45.5% in Bali, 33.3% in North Sulawesi, and only 16.7% in NTB.



**Figure 6:** Innovation Adoption by Region and Actor Group. This Figure shows the Percentage of Respondents—across Farmers, Intermediaries, and HORECA Stakeholders—who Reported Adopting Innovations or New Technologies within the Past Five Years, Disaggregated by Region.

## 4. Discussion

### 4.1. Fragmented Communication Undermines Coordination

The study highlights persistent communication gaps across the agri-food value chain, particularly in regions such as West Nusa Tenggara and North Sulawesi. Among farmers, reliance on informal verbal agreements was pervasive, while less than 12% of in-chain actors maintained any form of written documentation or structured feedback mechanisms. These silos undermine coordination and trust among actors, mirroring prior findings that weak communication structures are a major barrier to inclusive and adaptive value chains (Astill et al., 2019; Rueda, Garrett, & Lambin, 2017; Trienekens, 2011). In the absence of structured channels, misunderstandings proliferate, and opportunities for collaboration and efficiency are lost (Knight et al., 2022).

In tourism-dependent food chains, where quality, traceability, and responsiveness are key to meeting hospitality standards, fragmented communication is particularly detrimental. Research suggests that transparent, real-time information flow is vital for traceability and risk management in high-value and perishable supply chains (Kilelu, Klerkx, & Leeuwis, 2017). Yet, intermediaries dominate HORECA sourcing strategies, adding opacity and reducing the incentive to build long-term supplier engagement. Such patterns are consistent with findings across the Global South, where downstream buyers often prioritize convenience over relationship-building (El Bilali & Allahyari, 2018; Reardon et al., 2019).

The lack of digital adoption compounds the problem. While ICT tools have demonstrated success in bridging market information gaps and improving price transparency in African and Asian agricultural markets (Fabregas, Kremer, & Schilbach, 2019; Wyche & Steinfeld, 2016), their uptake in Indonesia remains limited. This reflects structural barriers including digital illiteracy, poor rural connectivity, and the absence of inclusive digital platforms tailored to multi-actor systems (El Bilali & Allahyari, 2018; Kilelu et al., 2017).

To address these gaps, communication innovations must be both technological and relational. Programs that embed feedback loops into sourcing platforms, coupled with cooperative-led communication protocols, can help transition from fragmented, ad hoc transactions to more transparent and predictable relationships (FAO,

2020; Pyburn et al., 2015). Creating incentives for in-chain actors to share quality feedback with producers, and building platforms for horizontal learning, would further enhance value chain efficiency and inclusivity.

#### 4.2. Low Formalization Perpetuates Risk and Exclusion

The results indicate that formal supply agreements are uncommon, particularly among farmers (3.9%), while moderately higher among in-chain actors (27.1%) and HORECA stakeholders (42.9%). This lack of formalization has significant implications for risk distribution and value chain inclusiveness. Prior research has consistently shown that contracts reduce uncertainty and increase farmers' willingness to invest in productivity-enhancing inputs (Barrett et al., 2017; Marc, 2015; Ton et al., 2018). Without formal arrangements, smallholders are more vulnerable to price volatility, quality rejections, and opportunistic behaviors from buyers (Markelova & Mwangi, 2010; Poulton, Dorward, & Kydd, 2010).

Moreover, in settings where legal systems are weak or inaccessible to rural producers, the costs of enforcing informal agreements are high, making relational trust the primary—yet fragile—basis for trade (Barrett et al., 2017). While contracts could offer a pathway to de-risking transactions and creating structured commitments, they often reflect power asymmetries. Studies have noted that contracts frequently prioritize buyer flexibility and impose strict quality and delivery standards on producers without reciprocal guarantees (FAO, 2020; Kilelu et al., 2017; Ton et al., 2018). Such arrangements can exclude the most vulnerable producers, reinforcing systemic inequity.

Another contributing factor is the lack of negotiation capacity and legal literacy among farmers. Without support from producer organizations, many smallholders perceive contracts as tools for exploitation rather than empowerment (Pyburn et al., 2015; Ton et al., 2018). This perception is exacerbated by past experiences with breached agreements or unfair pricing. In other contexts, intermediated contract models—facilitated by trusted third parties such as NGOs or cooperatives—have been more successful in aligning incentives and balancing risk (Devaux et al., 2016).

To build trust in formal agreements, interventions must combine contract facilitation with support services such as legal advisory, grievance redress mechanisms,

and collective negotiation platforms. Governments and buyers can co-develop inclusive contract templates and model agreements that simplify terms and include shared benefit clauses (FAO, 2020; UNCTAD, 2020). These steps are essential to transitioning the agri-food system from opportunism to predictability and resilience.

#### 4.3. Innovation is Isolated and Unevenly Distributed

Innovation in the Indonesian agri-food value chain appears unevenly distributed, with the highest adoption among HORECA actors (60.2%) and the lowest among farmers (33.9%). These findings echo broader literature pointing to innovation gaps between upstream and downstream actors, particularly in value chains characterized by fragmentation and informality (Pyburn et al., 2015; Reardon et al., 2019). In many cases, downstream actors invest in traceability systems, packaging, or quality upgrades without engaging producers in the innovation process, resulting in misalignment and limited benefits for the base of the chain (Barrett et al., 2017; Devaux et al., 2016).

The lack of coordination in innovation is compounded by insufficient extension support, inadequate incentives, and fragmented value chain governance. Smallholders are often excluded from innovation ecosystems due to their limited access to credit, training, and stable markets (Kilelu et al., 2017; Ton et al., 2018). Moreover, informal market structures and price-driven relationships reduce the predictability needed for farmers to risk adopting new technologies or practices. Research in similar Southeast Asian contexts finds that innovation adoption improves when embedded in long-term relationships and supported by trusted intermediaries (Marc, 2015; Markelova & Mwangi, 2010).

Isolated innovation is not just an efficiency concern; it also affects resilience. Actors operating independently are less able to collectively respond to shocks such as pandemics, climate variability, or tourism disruptions. Joint innovation platforms, such as collaborative R&D projects, certification schemes, and digital supply chain mapping, have been shown to improve systemic learning and adaptive capacity (El Bilali & Allahyari, 2018; HLPE, 2020; Trienekens, 2011). However, these require institutional support, capacity building, and trust—three elements that remain underdeveloped in the regions studied.

Addressing these gaps will require innovation to be reconceptualized not as individual decisions, but as collective processes. Incentivizing collaborative innovation

through co-investment programs, peer learning networks, and participatory pilot projects can stimulate adoption across actor groups (Devaux et al., 2016; FAO, 2020). Aligning these innovations with tourism market trends, such as demand for local, organic, or traceable food, could create new entry points for inclusive upgrading.

#### 4.4. Informal Transactional Mindsets Prevail

The dominance of informal transactional mindsets—particularly among farmers (71%) and in-chain actors (65%)—signals a deeper issue of short-termism and mistrust in the agri-food value chain. This pattern is consistent with evidence from sub-Saharan Africa and South Asia, where informal transactions dominate due to weak institutions and high monitoring costs (Barrett et al., 2017; Poulton et al., 2010). Informality may offer flexibility but typically comes at the cost of investment, consistency, and system resilience (Kilelu et al., 2017; Ton et al., 2018).

From a systems perspective, informalism reflects and reinforces power asymmetries. Buyers can shift sourcing patterns without notice, leaving farmers exposed to sudden income losses. Conversely, farmers may engage in side-selling when market prices rise, breaking informal agreements and eroding trust. These behaviors are rational in uncertain environments but ultimately prevent the formation of long-term, value-driven relationships (Reardon et al., 2019; Trienekens, 2011). As the results show, even actors with formal leanings, such as HORECA, fail to extend those norms upstream—indicating a systemic barrier rather than individual disinterest.

Beyond trust, the absence of incentives for repeated interaction plays a critical role. Spot-market behavior thrives when there is no mechanism to reward loyalty or penalize defection. Introducing relational contracting mechanisms—such as tiered pricing, preferential access, or supplier development programs—can reframe these relationships from transactional to strategic (FAO, 2020; Ton et al., 2018). These tools not only improve coordination but also help build a foundation for traceability and certification systems essential in tourism-driven markets.

To overcome informalism, reform must target institutional architecture, not just actor behavior. Strengthening cooperatives, formalizing aggregation hubs, and building inclusive procurement standards can provide structural support for long-term engagement. Equally, embedding fairness and flexibility in formal

agreements is crucial to making them attractive and durable for all chain participants (Pyburn et al., 2015).

These results also align with theoretical perspectives from institutional economics and relational governance. Granovetter's (1985) theory of embeddedness posits that economic action is deeply rooted in social networks and interpersonal relationships, rather than occurring in isolation. In Indonesia's agri-food-tourism value chains, the absence of trust-based networks and formalized interdependencies limits the ability of actors to collaborate, share information, and build long-term partnerships. Furthermore, the observed short-term, opportunistic transactions suggest a weak presence of relational governance, which is typically characterized by mutual trust, joint problem-solving, and norms of reciprocity to reduce uncertainty and coordinate exchange (Gereffi et al., 2005; Hobbs & Young, 2000). Strengthening these relational mechanisms could enhance coordination, reduce risk asymmetries, and foster more inclusive value chain development in tourism-linked regions.

#### 4.5. Tourism Trajectories as a Determinant of Value Chain Integration

These regional disparities reflect the developmental stage of tourism and supporting infrastructure. Bali's more developed integration likely stems from its long-established tourism industry, which has cultivated demand for quality, traceability, and consistent supply—factors that incentivize both formal contracts and innovation (Pyburn et al., 2015; Reardon et al., 2019). HORECA actors in Bali, accustomed to serving international clientele, are more likely to demand reliable sourcing and adopt technologies to meet food safety and service expectations (Trienekens, 2011).

In contrast, NTB's weak performance on both indicators signals structural limitations in tourism value chain readiness. Limited investment in producer linkages, fewer established HORECA players, and fragmented intermediaries contribute to low formalization and innovation diffusion. These findings align with studies showing that early-stage tourism destinations often lack aggregation mechanisms, farmer organization, and governance institutions needed to facilitate inclusive upgrading (Devaux et al., 2016).

North Sulawesi, despite being an emerging destination, outperformed NTB in innovation adoption—especially among HORECA. This may be linked to donor-driven development initiatives and regional branding efforts.

However, formalization remains weak, suggesting that innovation can occur without strong relational contracting, though its sustainability may be limited without long-term partnerships (Barrett et al., 2017; Ton et al., 2018).

Overall, the findings emphasize that tourism maturity correlates with stronger value chain coordination. Yet, formalization and innovation are not automatic outcomes of tourism development; they depend on intentional interventions—such as certification programs, supplier development initiatives, and investment in digital systems—that foster trust, capability, and interdependence across actors (FAO, 2020; Kilelu et al., 2017; UNCTAD, 2020).

## 5. Conclusion

This study has provided a cross-sectoral and regionally comparative analysis of fragmentation in Indonesia's agri-food value chain, particularly within tourism-dependent contexts. Drawing on extensive mixed-methods data from Bali, West Nusa Tenggara, and North Sulawesi, the research highlights how systemic disconnections—rooted in communication silos, weak institutional support, and short-termism—undermine coordination, innovation, and equity across farmers, in-chain actors, and HORECA businesses.

The analysis identified five persistent challenges:

1. Fragmented communication, with limited formal documentation or feedback infrastructure.
2. Absent or weak feedback systems, impeding adaptive learning and improvement.
3. Innovation isolation, with low uptake and poor diffusion across the value chain.
4. Transactional relationships, dominated by opportunistic and short-term engagement.
5. Inequitable risk burden, disproportionately affecting smallholder producers.

These issues are not merely operational but structural, revealing how institutional gaps and weak governance limit the capacity of the value chain to function as an integrated system. Moreover, the study shows that the stage of tourism development significantly influences the maturity of value chain coordination. Bali, with its established tourism infrastructure, exhibits relatively higher levels of formalization and innovation. In contrast, NTB and North Sulawesi lag behind with underdeveloped institutions, fragmented linkages, and limited market incentives for collaboration.

Addressing these entrenched silos requires multi-level reform. At the micro-level, enhancing communication mechanisms, feedback protocols, and inclusive contracting practices is essential. At the meso-level, strengthening cooperatives, embedding relational governance, and incentivizing innovation adoption through trusted intermediaries can facilitate more equitable integration. At the macro-level, supportive policy frameworks, investment in digital traceability infrastructure, and region-sensitive tourism-agriculture linkages are crucial for systemic transformation.

Ultimately, this research calls for a paradigm shift—from fragmented, transactional models toward collaborative, inclusive, and future-oriented agri-food systems. Only by bridging the structural silos that define current practices can Indonesia's agri-food value chain evolve to meet the twin goals of sustainability and social equity, particularly in regions where tourism holds transformative potential.

## 5.1. Acknowledgment

The authors extend their sincere appreciation to the Australian Centre for International Agricultural Research (ACIAR) for its financial support of this research through the project “Creating Resilient Communities through Smallholder-Inclusive Tourism Markets in Indonesia.” We are equally grateful to all the research team and stakeholders who generously contributed their time and insights during the surveys and interviews. Their perspectives were invaluable in shaping this study and informing strategies for strengthening Indonesia's agri-food value chains.

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