SCIENTIFIC CULTURE
www.sci-cult.com

SCIENTIFIC CULTURE, Vol. 12, No. 4, (2026), pp. 1717-1732
Open Access. Online & Print

DOI: 10.5281/zenodo.12426252

RECONSTRUCTING FOOD CENTER MANAGEMENT THROUGH SUSTAINABLE AGRICULTURAL CULTURE: A SYSTEMIC MODEL FROM ENDE, INDONESIA

Imaculata Fatima[1]*, Sri Wahyuni[2], Willybrordus Lanamana[3], Laurentius Dominicus Gadi Djou[4]

[1,4] Master of Management Program, Universitas Flores, Ende, Indonesia·
[2,3] Agrotechnology Study Program, Universitas Flores, Ende, Indonesia.

Received: 15/10/2025
Accepted: 26/02/2026

Corresponding Author: Imaculata Fatima (imapampe@gmail.com)

ABSTRACT

Regional food centers are increasingly promoted as strategic mechanisms to enhance food security and farmer welfare in agrarian regions. However, existing food center management frameworks remain predominantly production-oriented and administratively driven, often overlooking the culturally embedded institutional dynamics that shape compliance, coordination, and long-term sustainability. This study reconstructs food center management through the integration of sustainable agricultural culture within a systemic governance framework. Drawing on Social–Ecological Systems theory and institutional embeddedness, and operationalized through Soft Systems Methodology (SSM), the research examines governance–ecology interactions in Ende Regency, Indonesia. Empirical findings reveal that persistent production deficits are rooted not solely in ecological constraints but in structural misalignment between irrigation systems, institutional coordination, and culturally embedded agrarian norms. Governance fragmentation and legitimacy gaps limit adaptive capacity and innovation adoption. The reconstructed model introduces four interdependent pillars—cultural legitimacy, adaptive resource coordination, institutional alignment, and transparent agribusiness integration—forming a culture-embedded governance architecture that enhances resilience. The study advances food governance scholarship by repositioning agrarian culture as structural governance infrastructure rather than contextual background. By bridging ecological adaptation and institutional legitimacy within a systemic reconstruction framework, the model offers transferable insights for agrarian regions characterized by dual formal–informal governance systems and ecological vulnerability. These findings suggest that sustainable food center management requires governance integration rather than incremental production expansion.

KEYWORDS: Adaptive Governance; Cultural Legitimacy; Food Center Management; Social–Ecological Systems; Sustainable Agriculture.

1. INTRODUCTION

Ensuring sustainable food security remains a central challenge in many agrarian regions of the Global South. In response, governments have increasingly promoted the establishment of regional food centers or food hubs as strategic governance mechanisms to stabilize supply chains, enhance farmer incomes, and strengthen local food resilience (Pennings et al., 2023). These initiatives typically emphasize productivity enhancement, land optimization, technological intensification, and value chain coordination (Casey et al., 2021). While such technocratic models often improve short-term output, their long-term sustainability and institutional durability frequently remain fragile, particularly in regions where agriculture is deeply embedded in cultural norms, customary authority systems, and socio-ecological relationships.

The dominant paradigm of food center management is largely grounded in administrative coordination and production efficiency (Rozanski & Gavin, 2023). However, agriculture functions not merely as an economic sector but as a socio-ecological system shaped by cultural practices, local knowledge, and institutional embeddedness. Socio-ecological systems theory highlights the interdependence between ecological processes and social governance structures, emphasizing that resilience emerges from adaptive interactions rather than isolated productivity gains (Mukhlis et al. 2023). Similarly, institutional embeddedness theory underscores that economic activities are deeply rooted in social relations and normative frameworks. When food center governance frameworks overlook these embedded cultural dimensions, implementation gaps frequently arise—manifested in limited adoption of agricultural innovations, persistent informal trading systems, irrigation misalignment, weak institutional coordination, and resistance to externally promoted seed varieties.

Despite increasing scholarly attention to sustainable agriculture and community-based governance, the integration of agrarian culture into formal food center management models remains under-theorized (Nasution et al., 2025). Existing literature often acknowledges local knowledge as a complementary asset but rarely conceptualizes culture as a structural governance mechanism capable of shaping legitimacy, compliance, and long-term sustainability (Laginová et al., 2024). Moreover, systemic methodologies such as food hub governance frameworks seldom incorporate customary authority, ethical norms, or culturally embedded resource management into their institutional design. This gap creates a theoretical disconnect between sustainability discourse—which emphasizes resilience, equity, and ecological balance—and food center management practice, which frequently remains technocratic and administratively centralized.

Indonesia provides a compelling context in which this governance–culture tension is particularly visible. Although national policies aim to strengthen regional food resilience, disparities persist in institutional coordination, land management, irrigation systems, and agribusiness integration (Mukhlis & Saidah, 2025). In several districts, rice-centered food systems operate alongside enduring customary institutions, collective labor arrangements, and culturally embedded farming practices (Geest et al., 2025). These parallel systems—formal administrative governance and informal agrarian cultural authority—often coexist without structural integration, resulting in fragmented management outcomes.

Ende Regency in eastern Indonesia illustrates this complexity. The region possesses substantial agricultural potential, particularly in its rice-producing subdistricts, yet faces persistent challenges related to irrigation efficiency, market transparency, technological adoption, and strategic coordination among stakeholders (Herdiansyah & Majesty, 2024). At the same time, customary leaders, farmer collectives, and culturally rooted agricultural norms continue to shape land use decisions, water management, and seed preferences. These dynamics suggest that improving food center management in such contexts requires not merely production scaling but a reconstruction of governance that embeds sustainable agricultural culture within systemic institutional design (Mudiyanselage et al., 2024).

This study addresses the following research questions:

1. How does agrarian culture shape institutional legitimacy and governance effectiveness in regional food center management?
2. What systemic tensions exist between technocratic food center policies and culturally embedded agricultural practices?
3. How can Soft Systems Methodology (SSM) be employed to reconstruct food center management by integrating sustainable agricultural culture into a coherent systemic model?

By answering these questions, this research seeks to move beyond incremental policy adjustment and toward conceptual reconstruction (Mukhlis, 2025). Rather than treating culture as a peripheral

constraint or background variable, this study positions sustainable agricultural culture as a foundational governance mechanism within food center management (Seah et al., 2022). Using Soft Systems Methodology, the research develops a culturally embedded systemic model that aligns ecological sustainability, institutional coordination, and socio-cultural legitimacy.

The contribution of this study is threefold. Theoretically, it bridges socio-ecological systems theory and institutional embeddedness with food center governance literature, offering a framework that reconceptualizes culture as structural infrastructure rather than contextual ornamentation. Methodologically, it demonstrates how SSM can facilitate institutional–cultural integration in complex agrarian systems. Practically, it provides a policy-relevant model for regions seeking to strengthen food center management while preserving cultural legitimacy and ecological resilience.

By reconstructing food center management through sustainable agricultural culture, this study contributes to broader debates on sustainable governance transitions in agrarian economies and offers a transferable systemic approach for culturally embedded food systems in developing contexts.

2. LITERATURE REVIEW

2.1 Food Centers and the Governance Challenge in Regional Food Systems

Regional food centers (often discussed in the broader literature as regional food hubs or place-based food system organizations) are commonly defined as centrally located entities with a business and management structure that facilitates aggregation, storage, processing, distribution, and marketing of locally or regionally produced food (Sukayat et al., 2023). In governance terms, food centers are not merely physical infrastructures; they represent coordination regimes that bring together heterogeneous actors across production and distribution networks (Wiratno et al., 2025). Their performance depends on the alignment of rules, incentives, infrastructures, and stakeholder cooperation, rather than on productivity improvements alone.

Recent research on food hubs highlights that governance design matters for sustainability outcomes, particularly in contexts characterized by institutional fragmentation and uneven capacity among stakeholders (Junaidi et al., 2024). For example, empirical studies emphasize that food hubs can contribute to sustainable and adaptive food systems when governance is deliberately designed for local context and stakeholder coordination (Mukhlis & Abdullah, 2025). This resonates with the Ende case as documented in your file, where the ecosystem of actors is extensive (farmers, farmer groups, government agencies, market actors, customary leaders, and others), but strategic coordination and formalized management remain limited in key areas.

However, a recurring limitation in food center management literature is an implicit assumption that governance challenges can be solved primarily through administrative optimization (planning, strategy, and infrasption becomes problematic in agrarian societies where agricultural practices, compliance, and collective action are shaped by cultural norms and customary institutions that cannot be reduced to "implementation barriers" (Zainuddin Rela et al., 2021).

2.2 Social–Ecological Systems (SES): Resilience as a Governance Outcome

SES theory conceptualizes agriculture as an integrated system of humans-in-nature, where ecological processes and social institutions co-produce outcomes such as food availability, risk management, and resilience (Miswar et al., 2023). A core claim of resilience-oriented SES scholarship is that governance should move beyond "controlling" system variables toward enhancing the capacity of a system to cope with, adapt to, and shape change—especially under uncertainty and disturbance (e.g., climate variability, water scarcity, land pressure, and market shocks) (Mukhlis et al. 2025).

In the context of food center management, SES theory implies that success cannot be evaluated solely in terms of output growth; it must also be assessed through system-level properties such as:

1. adaptive capacity of farmers and institutions,
2. robustness of resource management (land–water), and
3. cross-scale coordination between local practices and formal governance.

Your Ende manuscript contains multiple signals consistent with SES problem framing: irrigation shortfalls during dry seasons, uneven water infrastructure, land-use constraints, and the need for integrated approaches (including integrated farming) to improve sustainability (Prihadyanti & Aziz, 2023). From an SES perspective, these are not isolated technical issues but interdependent social–ecological dynamics that require governance arrangements capable of learning, coordination, and adaptation (Mukhlis, Janwari, et al., 2023).

2.3 Embeddedness and Agrarian Culture: Legitimacy, Compliance, and Collective Action

Embeddedness theory, classically associas formulation, argues that economic action is embedded in social relations and cannot be fully understood—or effectively governed—without attention to the social structures within which it occurs (Denashurya et al., 2023). In agrarian contexts, embeddedness is particularly salient because production, exchange, and resource management are often mediated by social norms, trust networks, customary authority, and moral economies (Dewi et al., 2025). This means that "management" interventions—pricing transparency, seed certification, input adoption, cooperative formation, irrigation coordination—are not neutral technical instruments; they interact with legitimacy systems and cultural expectations.

This point is directly relevant to the Ende case described in your file, where "culture and attitudes" influence farmer willingness to adopt improved varieties and organic fertilization, and where customary institutions (mosalaki) are explicitly recognized among key actors (Umar & Arif, 2023).

In embeddedness terms, such institutions should not be treated merely as contextual variables; they are governance resources that shape enforcement, coordination, and compliance (Mukhlis, 2025a). Failure to embed formal food center management within these cultural–institutional structures can produce predictable gaps: weak adoption, low coordination, persistent informal practices (e.g., *ijon in market governance).

Accordingly, embedding sustainable agricultural culture into food center management can be theorized as a legitimacy strategy: cultural alignment increases the perceived appropriateness of rules and thereby strengthens compliance and collective action (Roza et al., 2025). This is also consistent with the fact that your file identifies broad stakeholder agreement on the importance of the food center, yet reveals weaknesses in formal strategy readiness and implementation coherence—an indicator of governance legitimacy/coordination problems rather than purely technical constraints (Prayitno et al., 2022).

2.4 Bridging SES and Embeddedness: Why "Culture-Based" Management is Systemically Necessary

SES theory explains why sustainability problems emerge from coupled human–nature dynamics; embeddedness explains how governance interventions succeed or fail depending on social relations and normative structures (Mukhlis, Arifin, Ridwan, Zulbaidah, et al., 2025). When combined, these theories provide a strong conceptuanstructing food center management:

- SES lens: food center outcomes depend on adaptive governance across land–water–production–distribution linkages.
- Embeddedness lens: governance works when it is culturally legitimate and institutionally aligned with local networks and customary authority.

This combined framing is particularly suitable for Ende, where the agricultural system simultaneously faces ecological constraints (water, land suitability, infrastructure) and socio-institutional tensions (technology adoption, informal markets, fragmented strategy, customary leadership dynamics) (Prajanti et al., 2025).

2.5 Soft Systems Methodology (SSM) as a Systemic Bridge for Culture-Embedded Governance Design

Given the complexity of food center management in culturally embedded SES contexts, Soft Systems Methodology (SSM) is widely recognized as a suitable approach for "messy" problem situations involving multiple stakeholders, competing worldviews, and contested definitions of improvement (Hasan et al., 2025). Checkland's SSM emphasizes inquiry into human activity systems, meaning-making, and the development of conceptually defensible models for change rather than purely technical op (Mukhlis, Maryam, et al., 2023).

Recent systemic development scholarship also highlights the substantial role of soft systems thinking and practices in agricultural and development contexts (Mukaddas et al., 2025). Importantly, your uploaded manuscript already demonstrates the operational compatibility of SSM with the Ende case—through rich picture construction, CATWOE, root definitions, and conceptual modeling, as well as performance validation principles (e.g., "5E").

The present study extends that base by repositioning "sustainable agricultural culture" from an environmental constraint into a core governance component within the reconstructed management model (Hidayati et al., 2023). This move provides a theoretically anchored rationale for the reconstruction: the systemic model must integrate cultural legitimacy (embeddedness) while strengthening adaptive capacity and resilience (SES).

2.6 Synthesis and Research Gap

The literature establishes that:

1. food centers require governance designs that support sustainability outcomes,
2. SES resilience depends on adaptive governance across social–ecological linkages, and
3. embeddedness impliforms must be grounded in social relations and normative legitimacy.

Yet, an explicit integration of sustainable agricultural culture as a structural management mechanism within food center governance models remains limited—particularly in studies that operationalize this integration using systemic methodologies for design and reconstruction. This gap motivates the present study's focus on reconstructing food center management through a culture-embedded systemic model in Ende, Indonesia, using SSM as the bridging methodology.

3. CONCEPTUAL FRAMEWORK

3.1 Integrating Social–Ecological Systems and Institutional Embeddedness in Food Center Management

Food center management in agrarian regions operates within complex social–ecological systems (SES), where ecological conditions (land, water, climate variability) interact dynamically with institutional arrangements, economic incentives, and social norms (Apriyana et al., 2021). Within this coupled system, agricultural production cannot be treated as an isolated technical process; rather, it emerges from continuous interactions between environmental constraints and socially embedded governance structures.

From an SES perspective, sustainability depends on adaptive capacity, cross-scale coordination, and resilience-building mechanisms (Mukhlis et al., 2024). Ecological pressures—such as irrigation variability, land suitability constraints, and seasonal fluctuations—require governance systems capable of learning and adaptation (E. Handayani, 2023). However, adaptation is not purely administrative; it is mediated by the degree to which institutional arrangements are culturally legitimate and socially embedded.

Institutional embeddedness theory complements SES by explaining how governance effectiveness is shaped by social relations, trust networks, customary authority, and normative expectations. In agrarian societies, production decisions, technology adoption, irrigation coordination, and market participation are embedded within social structures that define legitimacy and compliance. When formal food center policies operate independently of these embedded systems, governance fragmentation and implementation gaps emerge.

Thus, food center management must be conceptualized as a dual-layer governance system:

1. Ecological Layer (SES domain)
   - Land and water resource management
   - Agricultural productivity and diversification
   - Infrastructure and environmental sustainability
2. Institutional–Cultural Layer (Embeddedness domain)
   - Customary authority structures
   - Farmer collectives and social networks
   - Norms shaping compliance and innovation adoption
   - Trust-based market relations

The failure to integrate these two layers results in technocratic governance—administratively structured but socially fragile (Auliah et al., 2022). Conversely, embedding sustainable agricultural culture into governance design can enhance legitimacy, strengthen collective action, and improve adaptive resilience.

3.2 From Fragmented Governance to Culture-Embedded Systemic Reconstruction

Building on this theoretical integration, this study proposes that food center management reconstruction requires three interrelated transformations:

1) Governance Realignment

Aligning formal regulatory frameworks with customary institutions and local agrarian norms.

2) Adaptive Resource Coordination

Integrating irrigation management, land-use planning, and production systems within a resilience-oriented SES framework.

3) Legitimacy-Based Institutionalization

Ensuring that market mechanisms (pricing transparency, seed systems, cooperatives) are culturally endorsed and socially embedded.

Rather than treating culture as a background variable, the framework conceptualizes sustainable agricultural culture as governance infrastructure—a mechanism that shapes compliance, cooperation, and long-term sustainability.

3.3 Role of Soft Systems Methodology (SSM)

Soft Systems Methodology functions as the operational bridge between theory and reconstruction. In complex, multi-actor agricultural systems, SSM enables:

- Mapping of problem situations (Rich Picture)

- Identification of stakeholder worldviews (CATWOE)
- Development of root definitions
- Construction of culturally legitimate conceptual models
- Validation through multi-dimensional criteria (e.g., efficacy, efficiency, effectiveness, ethicality, elegance)

Through SSM, the reconstruction process becomes participatory, context-sensitive, and capable of integrating both SES dynamics and embedded institutional structures into a coherent management model.

Based on the integration of Social–Ecological Systems theory and institutional embeddedness, and operationalized through Soft Systems Methodology, the proposed conceptual framework illustrates how cultural legitimacy and adaptive governance mechanisms interact to reconstruct food center management. The structural relationships among ecological pressures, embedded institutions, systemic integration processes, and reconstructed governance outcomes are presented in Figure 1.

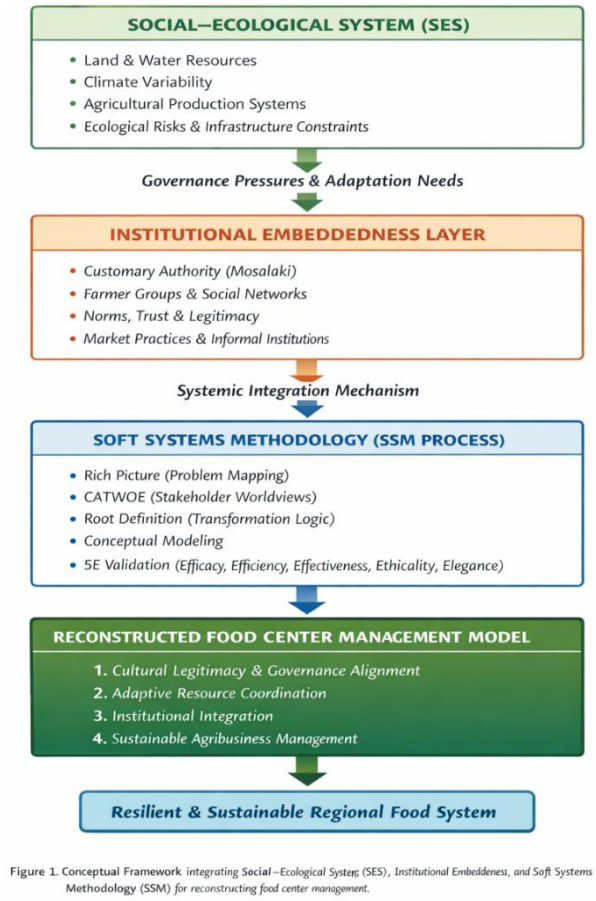

Figure 1. Conceptual Framework integrating Social–Ecological System (SES), Institutional Embeddedness, and Soft Systems Methodology (SSM) for reconstructing food center management.

Figure 1: Conceptual framework integrating Social–Ecological Systems (SES), Institutional Embeddedness, and Soft Systems Methodology (SSM) for reconstructing food center management.

As illustrated in Figure 1, ecological pressures originating from land, water, and climatic dynamics generate governance adaptation needs within the food system. These pressures interact with culturally embedded institutional structures, including customary authority, social networks, and trust-based market relations. Soft Systems Methodology functions as the systemic integration mechanism that translates these interacting layers into a reconstructed food center management model. The resulting framework emphasizes cultural legitimacy, adaptive resource coordination, institutional alignment, and sustainable agribusiness management as core pillars of a resilient regional food system.

4. METHODOLOGY

4.1 Research Design and Study Context

This study adopts a qualitative-dominant mixed-methods design grounded in Soft Systems Methodology (SSM). The selection of SSM is theoretically aligned with the study's objective to reconstruct food center management within a complex social–ecological system characterized by ecological variability, institutional fragmentation, and culturally embedded agrarian practices.

Unlike linear policy evaluation approaches, SSM is particularly suited for complex governance environments involving multiple stakeholders with distinct worldviews. In this research, SSM serves as the operational bridge integrating Social–Ecological Systems (SES) theory and institutional embeddedness into a coherent reconstruction process (see Figure 1).

The study was conducted in rice-producing areas of Ende Regency, eastern Indonesia. The region presents a dual governance landscape: formal administrative institutions (agricultural agencies, planning authorities, irrigation offices) coexist with customary agrarian leadership structures that influence farming decisions and resource management. This configuration provides an analytically relevant setting for examining the interaction between ecological pressures and embedded institutional dynamics.

4.2 Data Collection and Sampling

Data collection combined primary and secondary sources to capture both ecological and institutional dimensions of food center management.

Primary data were obtained through semi-structured interviews, focus group discussions (FGDs), and field observations. Participants included farmers, farmer group leaders, agricultural officers, irrigation managers, market actors, and customary

leaders. Purposive sampling was employed to ensure representation of actors central to both formal governance and culturally embedded decision-making processes.

Secondary data included agricultural production statistics, land-use records, irrigation infrastructure data, regional planning documents, and food security reports. These sources enabled triangulation and contextual validation of qualitative findings.

4.3 Analytical Framework and SSM Procedure

To ensure analytical clarity, the study operationalizes SES and institutional embeddedness through explicit constructs summarized in Table 1.

Table 1: Operationalization of Analytical Constructs.

Theoretical Lens	Analytical Construct	Operational Indicators
Social–Ecological Systems	Resource Stress	Irrigation variability, land suitability constraints, seasonal fluctuations
Social–Ecological Systems	Adaptive Capacity	Institutional coordination, farmer responses to ecological variability
Social–Ecological Systems	Governance Fragmentation	Overlapping mandates, strategy incoherence, weak inter-agency alignment
Institutional Embeddedness	Cultural Legitimacy	Alignment between formal regulations and customary authority
Institutional Embeddedness	Normative Compliance	Innovation adoption, adherence to collective agreements
Institutional Embeddedness	Trust-Based Exchange	Pricing transparency, informal market practices, collective resource management

These constructs guided thematic coding and interpretation throughout the SSM process.

The SSM procedure followed five structured stages:

1. exploration of the problem situation through rich picture mapping;
2. stakeholder worldview analysis using CATWOE;
3. formulation of root definitions redefining food center management transformation;
4. development of conceptual activity models integrating cultural legitimacy and adaptive governance; and
5. validation using the 5E framework (efficacy, efficiency, effectiveness, ethicality, and elegance).

Through this process, SSM functioned not merely as a diagnostic tool but as a systemic design mechanism for reconstructing culture-embedded food center governance.

4.4 Validity, Reflexivity, and Methodological Limitations

Analytical rigor was ensured through triangulation across interviews, FGDs, field observations, and documentary data. Data saturation was considered achieved when recurring themes related to ecological constraints, governance fragmentation, and cultural legitimacy consistently emerged across stakeholder groups.

Divergent stakeholder perspectives were analyzed comparatively to preserve institutional plurality rather than being aggregated into uniform conclusions.

Given the culturally embedded nature of the governance system studied, reflexivity was maintained throughout data collection and analysis. Care was taken to avoid privileging formal institutional narratives over customary perspectives. Reflexive memos documented interpretive decisions and potential positional bias.

This study has several limitations. First, SSM is interpretive and context-specific; findings emphasize analytical depth rather than statistical generalizability. Second, cultural legitimacy assessment relies on qualitative interpretation of stakeholder narratives. Third, ecological variables were analyzed within governance framing rather than through quantitative environmental modeling.

Despite these limitations, the integration of SES constructs, embeddedness theory, and systemic reconstruction provides strong internal validity and conceptual coherence.

5. FINDINGS

5.1 Structural Production Deficit and Ecological Constraints (SES Dimension)

Empirical evidence indicates a persistent structural gap between rice production capacity and regional food demand in Ende Regency. Despite moderate increases in productivity between 2021 and 2023, total rice output remains significantly below estimated consumption needs.

Table 2: Rice Production and Food Demand Gap in Ende Regency.

Year	Harvest Area (ha)	Rice Production (ton)	Estimated Regional Demand (ton)	Structural Balance
2021	4,479	9,184.67	30,549.74	Deficit
2022	4,604	11,398.26	>30,000	Deficit
2023	4,558	11,154.96	>30,000	Deficit

(Data derived from regional agricultural statistics)

Although productivity improved in 2022, the increase did not structurally alter the production–demand imbalance. From a Social–Ecological Systems (SES) perspective, this deficit reflects constrained adaptive capacity under existing land-use patterns, irrigation limitations, and seasonal variability.

Importantly, field observations reveal that irrigation infrastructure design does not consistently align with water source elevation and seasonal flows. This indicates not only technical inefficiency but also governance failure in resource coordination.

The production deficit is not merely a function of limited land area; it represents a systemic misalignment between ecological capacity and governance responsiveness. The SES layer demonstrates that resource constraints are structurally embedded within institutional fragmentation.

5.2 Governance Fragmentation and Strategic Incoherence

Stakeholder responses reveal a paradox: while development activities are widely acknowledged, formal strategic coordination remains weak.

Table 3: Stakeholder Perceptions of Food Center Governance Readiness.

Governance Dimension	Affirmative Response (%)	Negative Response (%)
Ongoing Development Activities	69.45	30.55
Existence of Formal Strategy	14.44	85.56
Alignment with National Policy	10	90
Adequacy of Infrastructure	<50	>50

(Data interpreted from stakeholder responses)

While nearly 70% of respondents acknowledge active development efforts, over 85% report the absence of a formal integrated strategy. Furthermore, 90% indicate weak alignment with national agricultural policy frameworks.

This divergence suggests governance fragmentation rather than policy absence. Administrative initiatives exist, but they lack systemic integration.

Governance in Ende operates as a set of parallel interventions rather than a coherent food center management system. The absence of strategic integration reduces the adaptive capacity of the SES and prevents coordinated ecological response.

5.3 Cultural Embeddedness and Legitimacy Mechanisms

Beyond ecological constraints, findings reveal that institutional embeddedness plays a decisive role in shaping governance outcomes.

Table 4: Embedded Governance Mechanisms Identified.

Embedded Mechanism	Empirical Observation	Governance Implication
Customary Authority	Local leaders (mosalaki) involved in decision-making	Cultural gatekeeping function
Seed Preference	Reluctance toward certified superior varieties	Legitimacy misalignment
Informal Pre-Harvest Sales (Ijon)	Trust-based transactions persist	Income instability & market opacity
Collective Water Norms	Informal water-sharing practices	Latent coordination capacity

The involvement of customary leaders indicates that governance legitimacy is mediated through cultural structures. Meanwhile, reluctance to adopt certified seed varieties reflects normative resistance rather than purely economic calculation.

The persistence of informal pre-harvest sales ("ijon") demonstrates that trust-based exchange systems coexist with formal market mechanisms. While these practices reduce transaction uncertainty, they undermine income stability and weaken agribusiness integration.

Embedded institutions function as parallel governance systems. Formal food center management cannot achieve compliance or innovation diffusion without cultural legitimation. Embeddedness operates as a structural determinant of governance effectiveness.

5.4 Systemic Misalignment Between SES and Embedded Institutions

The findings reveal a dual-layer governance gap:

SES Domain	Embedded Institutional Domain	Observed Misalignment
Irrigation planning	Customary land-water norms	Infrastructure not aligned with local ecological knowledge
Seed certification policy	Cultural seed preference	Low adoption of superior varieties
Agribusiness orientation	Subsistence logic & trust networks	Limited formal market integration

Ecological planning decisions appear disconnected from culturally embedded land-use logic. For example, irrigation systems were constructed without fully integrating local water-

sharing norms, resulting in inefficiencies during dry seasons.

Similarly, agribusiness modernization efforts encounter normative resistance when they conflict with established social exchange systems.

The central governance challenge is not technological insufficiency but institutional misalignment. SES pressures and embedded cultural systems operate in parallel rather than in coordination.

5.5 Toward Reconstruction: Identifying Leverage Points

Through the SSM process, reconstruction leverage points were identified in three areas:

1. Institutional realignment integrating customary authority into formal planning.
2. Transparent pricing mechanisms to reduce dependence on informal pre-harvest sales.
3. Ecological adaptation through improved irrigation alignment and integrated farming systems.

Stakeholder responses indicate high awareness of the benefits of designated food center areas (83.89%) but limited implementation coherence.

Reconstruction requires shifting from production expansion to governance integration. Sustainable agricultural culture must transition from contextual influence to structural governance component.

6. RECONSTRUCTED MODEL AND THEORETICAL IMPLICATIONS (FINAL VERSION)

6.1 From Production-Centered Management to Culture-Embedded Governance

The findings demonstrate that the primary limitation of food center management in Ende Regency does not lie solely in production capacity, but in systemic misalignment between ecological constraints and culturally embedded institutional structures (Yustikasari, 2025). While development initiatives are present, strategic integration and cultural legitimation remain insufficiently institutionalized.

Based on the Soft Systems Methodology (SSM) reconstruction process, this study proposes a shift from a production-expansion paradigm toward a culture-embedded systemic governance model (Yulista, 2025). In this model, sustainable agricultural culture is repositioned from a contextual factor to a structural governance component.

The reconstruction addresses three core gaps identified in the findings:

1. Ecological misalignment between irrigation systems and land–water realities
2. Institutional fragmentation across governance actors
3. Legitimacy deficits between formal policy and embedded agrarian norms

6.2 The Culture-Embedded Food Center Management Model

The reconstructed model consists of four interdependent governance pillars:

Pillar 1: Cultural Legitimacy

Customary authority and agrarian norms are formally integrated into decision-making processes to enhance compliance and collective coordination.

Pillar 2: Adaptive Resource Coordination

Irrigation, land-use planning, and agricultural diversification are aligned with ecological variability and local knowledge systems.

Pillar 3: Institutional Alignment

Strategic synchronization between agricultural agencies, planning institutions, and local governance bodies ensures coherence in implementation.

Pillar 4: Transparent and Sustainable Agribusiness Integration

Pricing transparency, cooperative mechanisms, and seed governance are redesigned to reduce informal dependency while preserving trust-based relationships (Sulastri, 2025).

To synthesize these interdependent pillars into a coherent governance architecture, the reconstructed model is visually represented in Figure 2.

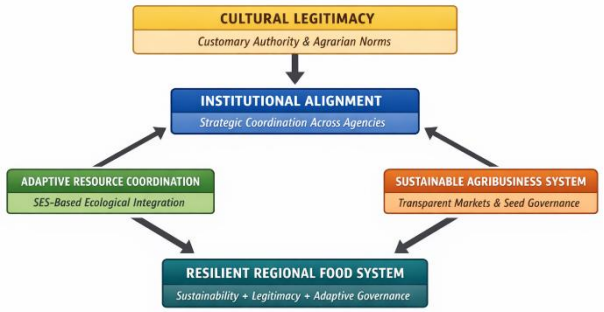

Figure 2: Culture-Embedded Food Center Management Model.

As illustrated in Figure 2, cultural legitimacy forms the foundational governance layer enabling institutional alignment and adaptive coordination. These interactions collectively strengthen sustainable agribusiness integration and enhance food system resilience (Sukmawati, 2025). The model therefore emphasizes structural integration rather than incremental administrative reform.

6.3 Mechanism of Systemic Transformation

The reconstruction process reveals a clear causal sequence underlying the governance challenges of the regional food system (Satory, 2025). Ecological pressures—manifested in irrigation variability, land constraints, and seasonal fluctuations—contribute to governance fragmentation across institutions (Nismawati, 2025). This fragmentation, in turn, generates legitimacy deficits, as formal policies fail to align with culturally embedded agrarian norms. The resulting institutional misalignment weakens coordination, reduces compliance, and limits adaptive capacity within the food center system.

The proposed reconstruction intervenes by integrating cultural legitimacy into governance structures, strengthening adaptive coordination mechanisms, and synchronizing institutional strategies across administrative levels (Indra Martadinata, 2025). Through cultural integration and strategic institutional alignment, governance coherence can be restored. This coherence enhances the resilience of the regional food system by aligning ecological adaptation with socially embedded legitimacy structures. Consequently, the reform emphasis shifts away from technological intensification alone and toward the redesign of governance architecture as the primary pathway to sustainable food system transformation.

6.4 Theoretical Contributions

This study advances three major theoretical contributions.

First, it reconceptualizes agrarian culture as governance infrastructure rather than contextual background. Cultural legitimacy is shown to influence compliance, coordination, and adaptive capacity.

Second, it bridges Social–Ecological Systems theory with institutional embeddedness by demonstrating how ecological resilience and social legitimacy interact within food center governance.

Third, it extends Soft Systems Methodology from diagnostic inquiry toward structured systemic reconstruction in agrarian governance contexts.

To clarify the theoretical advancement offered by this study, Table 5 contrasts conventional food center management approaches with the reconstructed culture-embedded model.

Table 5: Comparative Governance Logic: Conventional vs. Reconstructed Model.

Dimension	Conventional Food Center Model	Culture-Embedded Reconstructed Model
Governance Orientation	Production-centered	Culture-embedded systemic governance
Legitimacy Source	Administrative mandate	Cultural and institutional alignment
Ecological Response	Infrastructure expansion	Adaptive coordination within SES
Institutional Structure	Fragmented agency-based	Integrated multi-layer governance
Market Mechanism	Formal aggregation focus	Transparent integration of formal and trust-based systems
Sustainability Logic	Output growth	Resilience + legitimacy-based sustainability

The reconstructed model extends existing governance frameworks by integrating cultural legitimacy and adaptive ecological coordination into the structural core of food center management. Rather than optimizing production within fragmented institutions, it restructures governance relationships to enhance both sustainability and systemic coherence.

6.5 Transferability Beyond Ende

Although grounded in empirical evidence from Ende Regency, the model offers broader applicability for agrarian regions characterized by:

- Dual governance systems (formal and customary)
- Ecological vulnerability
- Informal market dominance
- Institutional fragmentation

The transferable principle lies not in cultural specificity but in governance integration logic: sustainable food systems require alignment between ecological adaptation and embedded institutional legitimacy.

7. DISCUSSION

7.1 Reframing Food Center Governance Beyond Production Intensification

This study demonstrates that food center management in agrarian regions cannot be sustainably strengthened through production intensification alone (Uyun et al., 2024). While conventional governance frameworks emphasize infrastructure expansion, input provision, and yield improvement, the findings from Ende Regency reveal that structural deficits emerge primarily from governance misalignment rather than absolute production scarcity.

The persistent production–demand gap identified in the findings is not simply a matter of land limitation but reflects insufficient adaptive coordination within the Social–Ecological System (SES). Irrigation variability, seasonal constraints, and infrastructure misalignment illustrate how ecological pressures require governance responses that are

dynamic rather than static (Lestari & Suyanto, 2024). This supports resilience-oriented SES scholarship, which argues that sustainability depends on adaptive governance rather than linear growth strategies.

The reconstructed model therefore shifts the analytical focus from output maximization to governance coherence, positioning resilience as the core performance indicator of food center systems.

7.2 Cultural Legitimacy as a Structural Governance Mechanism

A central contribution of this study is the reconceptualization of agrarian culture as governance infrastructure (Arimbawa et al., 2024). Existing food center literature frequently acknowledges local knowledge but rarely integrates cultural legitimacy into formal governance design.

The findings reveal that customary authority structures and embedded agrarian norms influence innovation adoption, irrigation practices, and market participation (Kurniawati et al., 2021). Resistance to certified seed varieties and the persistence of trust-based pre-harvest transactions demonstrate that institutional compliance is mediated through culturally embedded legitimacy mechanisms.

This aligns with institutional embeddedness theory, which emphasizes that economic behavior is rooted in social relations and normative structures (L. Handayani, 2025). However, this study extends embeddedness theory by operationalizing it within a systemic governance reconstruction framework. Rather than treating embeddedness as a descriptive sociological condition, the model leverages it as an institutional design principle.

Thus, cultural legitimacy becomes a mechanism for reducing transaction uncertainty, strengthening collective action, and enhancing long-term policy compliance.

7.3 Bridging SES and Embeddedness: Toward Integrated Governance Logic

The integration of SES and embeddedness provides a novel analytical lens for food center governance (Haryati et al., 2024). SES explains ecological resilience and adaptive capacity, while embeddedness explains legitimacy and compliance (Ade Sitorus, 2025). The reconstructed model demonstrates that sustainability emerges from the interaction of these domains.

In many agrarian governance systems, ecological planning and institutional legitimacy operate in parallel rather than in coordination (Eddy et al., 2025). The findings show that irrigation infrastructure planning, seed policy implementation, and agribusiness modernization efforts lack systematic alignment with culturally embedded authority structures.

The culture-embedded model proposed here integrates:

- Adaptive ecological coordination (SES dimension)
- Institutional alignment (administrative dimension)
- Cultural legitimacy (embeddedness dimension)

This multi-layered integration strengthens governance coherence and reduces systemic fragmentation.

7.4 Extending Soft Systems Methodology in Agrarian Governance Research

Soft Systems Methodology (SSM) is often used as a participatory diagnostic tool (Kuntyastuti et al., 2020). This study extends its application by employing SSM as a structured reconstruction mechanism for governance architecture.

By integrating SES constructs and embeddedness mechanisms within the SSM process, the study demonstrates how systemic modeling can bridge ecological variability and institutional plurality (Darma et al., 2025). The 5E validation framework further strengthens analytical rigor by ensuring that reconstruction addresses efficacy, efficiency, effectiveness, ethicality, and systemic coherence.

This methodological integration contributes to governance research by offering a replicable approach for analyzing culturally embedded food systems in other developing contexts.

The reconstructed model has several implications for regional food governance:

1. **Formal Recognition of Customary Authority**

   Integrating culturally embedded leadership into formal planning enhances legitimacy and compliance.

2. **Adaptive Irrigation Governance**

   Infrastructure planning must align with ecological variability and local water-sharing norms.

3. **Transparent Market Integration**

   Reforming pricing mechanisms while preserving trust networks can reduce informal dependency without disrupting social cohesion.

4. **Strategic Institutional Synchronization**

   Agricultural agencies, planning institutions, and irrigation bodies must operate within a unified governance framework rather than parallel mandates.

Policy reform should therefore prioritize governance integration rather than isolated program expansion.

The governance–culture tension observed in Ende is not unique. Many agrarian regions in the Global South exhibit dual governance systems in which formal administrative institutions coexist with customary or informal structures.

The transferable insight of this study lies in governance integration logic rather than cultural specificity (Syahidah et al., 2025). Sustainable food systems require alignment between ecological adaptation and embedded institutional legitimacy (Junaidi et al., 2024). Without such alignment, technocratic reforms risk generating implementation gaps and low compliance.

While the study offers a robust systemic reconstruction model, several limitations remain. The interpretive nature of SSM limits statistical generalization. Future research may combine systemic reconstruction with quantitative modeling of ecological variables or comparative multi-region analysis to test transferability.

Additionally, longitudinal research could assess how culture-embedded governance reforms influence long-term resilience outcomes.

8. CONCLUSION

This study demonstrates that the sustainability of regional food center management depends not merely on production expansion or infrastructural investment, but on the structural integration of ecological adaptation and cultural legitimacy within governance design. Drawing on Social–Ecological Systems theory, institutional embeddedness, and Soft Systems Methodology, the findings reveal that governance fragmentation and legitimacy misalignment—rather than absolute resource scarcity—constitute the primary constraints to food system resilience in Ende Regency. By repositioning sustainable agricultural culture as governance infrastructure rather than contextual background, the reconstructed model offers a systemic pathway toward institutional coherence, adaptive coordination, and market transparency.

The proposed culture-embedded food center management model contributes to both theory and practice by bridging ecological resilience and embedded institutional legitimacy within a structured reconstruction framework. Although empirically grounded in Ende, the model's governance integration logic is transferable to agrarian regions characterized by dual formal–informal institutional systems and ecological vulnerability. Future research should examine the long-term performance of culture-integrated governance reforms and test the model's applicability across comparative regional contexts.

9. ACKNOWLEDGMENT

The authors gratefully acknowledge the Government of Ende Regency for providing financial support for this research. The authors also extend sincere appreciation to the Heads of Wewaria and Maurole Subdistricts, the Heads of the Agricultural Extension Centers (BPP) of Wewaria and Maurole, and all village heads and respondents in Wewaria and Maurole for their valuable cooperation and participation throughout the study. The authors further express their gratitude to the Rector of Universitas Flores, the Chair of the Flores Higher Education Foundation, the Head of the Research and Community Service Institute (LPPM) of Universitas Flores, and colleagues from the Agrotechnology Study Program for their institutional support and academic collaboration.

Conflicts of Interest: The author declares that there is no conflict of interest regarding the publication of this article.

REFERENCES

Ade Sitorus, S. (2025). Phenomenological Study of Senior Executive Experiences in Navigating Strategic Ambiguity in VUCA Environments. *Journal of Business, Management, and Accounting*, *1*(5), 194–202.

Apriyana, Y., Surmaini, E., Estiningtyas, W., Pramudia, A., Ramadhani, F., Suciantini, S., Susanti, E., Purnamayani, R., & Syahbuddin, H. (2021). The integrated cropping calendar information system: A coping mechanism to climate variability for sustainable agriculture in Indonesia. *Sustainability (Switzerland)*, *13*(11). Scopus. https://doi.org/10.3390/su13116495

Arimbawa, P., Arsana, I. M. W., Bande, L. O. S., Batoa, H., Taufik, Y., & Kasim, S. (2024). Adoption of Organic Rice Farming in East Kolaka Regency, Indonesia: Factors and Stakeholder Collaboration. *International Journal of Sustainable Development and Planning*, *19*(4), 1499–1504. Scopus. https://doi.org/10.18280/ijsdp.190426

Auliah, A., Prayitno, G., Ari, I. R. D., Rahmawati, R., Wardani, L. E., & Meidiana, C. (2022). The Role of Social Capital Facing Pandemic COVID-19 in Tourism Village to Support Sustainable Agriculture (Empirical Evidence from Two Tourism Villages in Indonesia). *Economies*, *10*(12). Scopus. https://doi.org/10.3390/economies10120320

Casey, H., DeAtley, J., Eckle, C. R., Burger, M., Maxwell, J., & de Valpine, E. (2021). Case study of a food relief grocery model: The Neighborhood Pop-Up Grocery Project. *Journal of Agriculture, Food Systems, and Community Development*, *10*(2), 273–278. Scopus. https://doi.org/10.5304/jafscd.2021.102.012

Darma, R., O'Connor, P., Akzar, R., Tenriawaru, A. N., & Amandaria, R. (2025). Enhancing Sustainability in Rice Farming: Institutional Responses to Floods and Droughts in Pump-Based Irrigation Systems in Wajo District, Indonesia. *Sustainability (Switzerland)*, *17*(8). Scopus. https://doi.org/10.3390/su17083501

Denashurya, N. I., Nurliza, u., Dolorosa, E., Kurniati, D., & Suswati, D. (2023). Overcoming Barriers to ISPO Certification: Analyzing the Drivers of Sustainable Agricultural Adoption among Farmers. *Sustainability (Switzerland)*, *15*(23). Scopus. https://doi.org/10.3390/su152316507

Dewi, T., Risma, P., Oktarina, Y., Dwijayanti, S., Mardiyati, E. N., Sianipar, A. B., Hibrizi, D. R., Azhar, M. S., & Linarti, D. (2025). Smart integrated aquaponics system: Hybrid solar-hydro energy with deep learning forecasting for optimized energy management in aquaculture and hydroponics. *Energy for Sustainable Development*, *85*. Scopus. https://doi.org/10.1016/j.esd.2025.101683

Eddy, T., Agustina, n., & Purnomo, S. (2025). Ecological Crisis and Human Security: A Legal Analysis of the Exploitation of the Sei Ular River. *Khazanah Hukum*, *7*(2), 140–155. Scopus. https://doi.org/10.15575/kh.v7i2.44891

Geest, F. D., Dyson, J., Guest, S., Jeffrey, C., & Scrinis, G. (2025). 'It has a life': Youth revaluing food 'waste' at an Australian university. *Geoforum*, *166*. Scopus. https://doi.org/10.1016/j.geoforum.2025.104409

Handayani, E. (2023). THE ROLE OF CUSTOMARY LAW IN THE GOVERNANCE OF SUSTAINABLE AGRARIAN CULTURE IN LOCAL COMMUNITIES. *Corporate Law and Governance Review*, *5*(1), 29–37. Scopus. https://doi.org/10.22495/clgrv5i1p3

Handayani, L. (2025). Interpretative Phenomenological Analysis of University Students' Experiences of National Identity among Indonesian University Students in the Digital Age: An IPA Approach. *Journal of Educational Innovation and Research*, *1*(5), 173–179.

Haryati, N., Lasitya, D. S., Nurirrozak, M. Z., Herdianti, D. F., Fibrianingtyas, A., & Hidayat, A. R. R. T. (2024). Demographics and course choices: Impact on youth farming intention in Indonesia. *International Journal of Adolescence and Youth*, *29*(1). Scopus. https://doi.org/10.1080/02673843.2024.2358088

Hasan, M., Supatminingsih, T., Tahir, T., Guampe, F. A., Dolfriandra Huruta, A. D., & Lu, C. Y. (2025). Sustainable agricultural knowledge-based entrepreneurship literacy in agricultural SMEs: Triple bottom line investigation. *Journal of Open Innovation: Technology, Market, and Complexity*, *11*(1). Scopus. https://doi.org/10.1016/j.joitmc.2025.100466

Herdiansyah, H., & Majesty, K. I. (2024). Conflict Mitigation Strategies for Sustainable Agriculture in Palm Oil Expansion. *International Journal of Sustainable Development and Planning*, *19*(5), 1893–1902. Scopus. https://doi.org/10.18280/ijsdp.190527

Hidayati, B., Yusida, E., Qurrata, V. A., & Huang, W. (2023). THE DIGITAL AGRICULTURE MODEL FOR SUSTAINABLE FOOD SYSTEM: AN ANALYSIS OF AGRICULTURAL TECHNOLOGY ADOPTION IN EAST JAVA, INDONESIA. *Journal of Sustainability Science and Management*, *18*(4), 173–191. Scopus. https://doi.org/10.46754/jssm.2023.04.013

Indra Martadinata, M. (2025). Phenomenological Study of Airport Staff's Experiences in Managing Increased Air Traffic during Peak Periods. *Journal Homepage: Https://Journals.Ai-Mrc.Com/jmriJournal of Multidisciplinary Research and Innovation*, *1*(5), 194–202.

Junaidi, A., Mashar, A. Z., Basrowi, n., Muharomah, D. R., Situmorang, J. W., Lukas, A., Asgar, A., Herlina, L., Manalu, L. P., & Layuk, L. (2024). Enhancing sustainable soybean production in Indonesia: Evaluating the environmental and economic benefits of MIGO technology for integrated supply chain sustainability. *Uncertain Supply Chain Management*, *12*(1), 221–234. Scopus. https://doi.org/10.5267/j.uscm.2023.10.003

Kuntyastuti, H., Sutrisno, n., & Lestari, S. A. D. (2020). Effect of application of organic and inorganic fertilizer on soybean yield in lowland Vertisols. *Journal of Degraded and Mining Lands Management*, *8*(1), 2439–2450. Scopus. https://doi.org/10.15243/JDMLM.2020.081.2439

Kurniawati, A., Windriyati, R. D. H., Wulansari, N. K., Tóth, G., & Tóth, Z. (2021). Alternatives for circular bioeconomy in organic farming under excessive nutrients (Goat manure and arbuscular mycorrhizal fungi): A case study in Indonesia. *Sustainability (Switzerland)*, *13*(22). Scopus. https://doi.org/10.3390/su132212333

Laginová, L., Jarábková, J., & Varecha, L. (2024). INVOLVEMENT OF FOODSERVICE ESTABLISHMENTS IN SHORT FOOD SUPPLY CHAINS: ORGANISATIONAL MODELS IN SLOVAKIA. *Folia Geographica*, *66*(2), 58–82. Scopus.

Lestari, N., & Suyanto, S. (2024). A systematic literature review about local wisdom and sustainability: Contribution and recommendation to science education. *Eurasia Journal of Mathematics, Science and Technology Education*, *20*(2), 1–19. Scopus. https://doi.org/10.29333/ejmste/14152

Miswar, D., Suyatna, A., Zakaria, W. A., Wahono, E. P., Saleh, Y., & Suhendro, S. (2023). Geospatial Modeling of Environmental Carrying Capacity for Sustainable Agriculture Using GIS. *International Journal of Sustainable Development and Planning*, *18*(1), 99–111. Scopus. https://doi.org/10.18280/ijsdp.180110

Mudiyanselage, M. W., Aghdam, F. H., Kazemi-Razi, S., Chaudhari, K., Marzband, M., Ikpehai, A., Abusorrah, A., & Harris, G. (2024). A Multiagent Framework for Electric Vehicles Charging Power Forecast and Smart Planning of Urban Parking Lots. *IEEE Transactions on Transportation Electrification*, *10*(2), 2844–2857. Scopus. https://doi.org/10.1109/TTE.2023.3289196

Mukaddas, J., Kan, M., Ega, A. A., & Afa, M. (2025). Sustainable Agriculture: The Role of Biostimulants in Enhancing Crop Growth and Resilience. *Journal of Global Innovations in Agricultural Sciences*, *13*(2), 561–573. Scopus. https://doi.org/10.22194/JGIAS/25.1688

Mukhlis, L. (2025a). A Phenomenological Study of Personal Spiritual Experiences in Navigating Religious Pluralism within Interfaith Communities. *Irfana: Journal of Religious Studies*, *1*(6), 212–220.

Mukhlis, L. (2025b). Spiritual Grounds for Economic Growth: A Qualitative Exploration of Rural Indonesian Women's Transformative Journeys Through Mosque-Led Empowerment Programs. *Servina: Jurnal Pengabdian Kepada Masyarakat*, *1*(8), 289–298.

Mukhlis, L., & Abdullah, M. N. (2025). *Hukum Keluarga Islam di Indonesia* (1st ed.). Mukhlisina Revolution Center.

Mukhlis, L., Arifin, T., Ridwan, A. H., & Zulbaidah. (2024). Integrating Artificial Intelligenceand Maqāṣid al-Syarīʻah: Revolutionizing Indonesia's Sharia Online Trading System. *Computer Fraud and Security*, *2024*(11), 301–309. https://doi.org/10.52710/cfs.238

Mukhlis, L., Arifin, T., Ridwan, A. H., & Zulbaidah. (2025). Reorientation of Sharia Stock Regulations: Integrating Taṣarrufāt al-Rasūl and Maqāṣid al-Sharīʻah for Justice and Sustainability. *Journal of Information Systems Engineering and Management*, *10*(10s), 58–66. https://doi.org/10.52783/jisem.v10i10s.1341

Mukhlis, L., Arifin, T., Ridwan, A. H., Zulbaidah, Rosadi, A., & Solehudin, E. (2025). Reformulation of Islamic Stock Law: The Application of Taṣarrufāt al-Rasūl and Maqāṣid al-Syarīʻahto Develop a Dynamic and Sustainable Islamic Capital Market in Indonesia. *Journal of Posthumanism*, *5*(3), 1–13. https://doi.org/10.63332/joph.v5i3.913

Mukhlis, L., Janwari, Y., & Syafe`i, R. (2023). INDONESIA STOCK EXCHANGE: THEORETICAL AND PHILOSOPHICAL ANALYSIS OF MUDHARABAH AND MUSYARAKAH CONTRACTS. *Yurisprudentia: Jurnal Hukum Ekonomi*, *9*(2), 243–264. https://doi.org/10.24952/yurisprudentia.v9i2.8466

Mukhlis, L., Maryam, S., & Sormin, S. A. (2023). Model Pembelajaran Living History Berbasis PjBL Untuk Meningkatkan Keterampilan Histografi Mahasiswa. *Jurnal Educatio FKIP UNMA*, *9*(4), 1800–1809. https://doi.org/10.31949/educatio.v9i4.5595

Mukhlis, L., & Saidah, Y. (2025). Dynamics of Nature-Based learning in Developing Children's Motoricic Skills: Teacher and Parent Perspectives. *HUMANISMA: Journal of Gender Studies*, *9*(1), 64–79. http://dx.doi.org/10.30983/humanisme.v4i2.9366

Mukhlis, L., Suradi, Janwari, Y., & Syafe`i, R. (2023). Sosialisasi Saham Syariah sebagai Instrumen Pengembangan Ekonomi Masyarakat di Badan Kontak Majelis Taklim (BKMT) Kabupaten Mandailing Natal. *Jurnal Pengabdian Multidisiplin*, *3*(2), 2–9. https://doi.org/10.51214/japamul.v3i2.604

Nasution, M. S., Rusli, Z., Heriyanto, M., Syahza, A., Zulkarnaini, Z., Mayarni, M., Mashur, D., Ananda, F., & Ikhsan, M. (2025). Bibliometric Analysis of Rural Economic Development: Convergence Between Sustainable Agriculture, Digital Technology, and Community Engagement for Village Self-Reliance. *International Journal of Sustainable Development and Planning*, *20*(1), 245–262. Scopus. https://doi.org/10.18280/ijsdp.200123

Nismawati. (2025). Exploring Lived Experiences of Post-Therapy Recovery after Spinal Cord Injury. *Journal of Regenerative Medicine and Molecular Innovation*, *1*(5), 174–181.

Pennings, R., Wiegmans, B., & Spit, T. (2023). Can We Do More with Less? Analyzing the Organization of Flexibility of Space and Infrastructure at UDCs: A Case Study for Food Center Amsterdam. *Logistics*, *7*(4). Scopus. https://doi.org/10.3390/logistics7040090

Prajanti, S. D. W., Soesilowati, E., & Lestari, E. P. (2025). SUSTAINABILITY STRATEGY OF INTEGRATED ORGANIC FARMING BASED ON CIRCULAR ECONOMY IN REALIZING SUSTAINABLE AGRICULTURE AND FOOD SYSTEM. *Jurnal Ilmiah Ilmu Terapan Universitas Jambi*, *9*(2), 527–545. Scopus. https://doi.org/10.22437/jiituj.v9i2.39889

Prayitno, G., Hayat, A., Efendi, A., Tarno, H., & Fauziah, S. H. (2022). Structural Model of Social Capital and Quality of Life of Farmers in Supporting Sustainable Agriculture (Evidence: Sedayulawas Village, Lamongan Regency-Indonesia). *Sustainability (Switzerland)*, *14*(19). Scopus. https://doi.org/10.3390/su141912487

Prihadyanti, D., & Aziz, S. A. (2023). Indonesia toward sustainable agriculture – Do technology-based start-ups play a crucial role? *Business Strategy and Development*, *6*(2), 140–157. Scopus. https://doi.org/10.1002/bsd2.229

Roza, D. F., Lubis, S. N., Sihombing, L., Kesuma, S. I., & Lubis, A. A. R. D. (2025). Strengthening Rural Economies Through Integrated Agriculture: Evidence from Southeast Aceh Using Input–Output Modeling. *International Journal of Sustainable Development and Planning*, *20*(4), 1595–1601. Scopus. https://doi.org/10.18280/ijsdp.200421

Rozanski, C., & Gavin, M. (2023). Growing in relation with the land: Experiential learning of Root and Regenerate Urban Farms. *Journal of Agriculture, Food Systems, and Community Development*, *13*(1). Scopus. https://doi.org/10.5304/jafscd.2023.131.002

Satory, A. (2025). Emotional Meaning-Making in Legal Consultants Managing Digital Contract Disputes: An Interpretative Phenomenological Study. *Hukmuna: Journal of Law and Policy*, *1*(5), 195–202.

Seah, S. S. Y., van Dam, R. M., Tai, B. C., Tay, Z., Wang, M. C., & Rebello, S. A. (2022). An evaluation of the healthier dining programme effects on university student and staff choices in Singapore: A cluster-randomized trial. *Food Policy*, *107*. Scopus. https://doi.org/10.1016/j.foodpol.2021.102211

Sukayat, Y., Setiawan, I., Suharfaputra, U., & Kurnia, G. (2023). Determining Factors for Farmers to Engage in Sustainable Agricultural Practices: A Case from Indonesia. *Sustainability (Switzerland)*, *15*(13). Scopus. https://doi.org/10.3390/su151310548

Sukmawati. (2025). Understanding the Emotional, Social, and Existential Dimensions of Living with Continuous Glucose Monitoring: An Interpretative Phenomenological Analysis of Adults with Type 2 Diabetes. *Journal of Digital Health Innovation and Medical Technology*, *1*(7), 289–298.

Sulastri, A. (2025). Exploring the Experiences of Pharmaceutical Practitioners in the Development and Evaluation of Herbal Products as Alternative Therapy in Indonesia: Challenges and Strategies in Quality Control and Regulation. *PhytoCare: Journal of Pharmacology and Natural Remedies*, *1*(3), 96–104.

Syahidah, F., Rabbani, Q. S., Sopandi, T. P., & Putri, Z. N. (2025). Financial Literacy Intervention for Rural Farmers: A Qualitative Study on Collective Wealth Building through Simulation-Based Learning in Mekarmanik Village, Indonesia. *Journal Homepage: Https://Journals.Ai-Mrc.Com/finanomicsJournal of Economic and Financial Studies*, *1*(7), 323–329.

Umar, I., & Arif, D. A. (2023). Spatial models of rice fields change and sustainable agriculture in Solok District, West Sumatra Province. *Journal of Degraded and Mining Lands Management*, *11*(1), 4875–4885. Scopus. https://doi.org/10.15243/jdmlm.2023.111.4875

Uyun, Q., Respatie, D. W., & Indradewa, D. (2024). Unveiling the Allelopathic Potential of Wedelia Leaf Extract as a Bioherbicide against Purple Nutsedge: A Promising Strategy for Sustainable Weed Management. *Sustainability (Switzerland)*, *16*(2). Scopus. https://doi.org/10.3390/su16020479

Wiratno, n., Trisawa, I. M., Taufik, I., Ardi, I., Thesiana, L., Kusrini, E., Susanti, D., Minarni, E. W., Nurawan, A., Jufri, A., Sukamto, n., Apriyana, Y., Sutrisna, N., Surdianto, Y., Susanto, B., & Susanto, U. (2025). Eco-friendly pest management in integrated rice-fish farming systems using plant-derived biopesticides to promote sustainable agriculture. *Global Journal of Environmental Science and Management*, *11*(3), 983–1000. Scopus. https://doi.org/10.22034/gjesm.2025.03.07

Yulista, Y. (2025). Meaning-Making among Islamic Philosophy Students through Engagement with Sufi Literature. *Humanexus: Journal of Humanistic and Social Connection Studies*, *1*(7), 253–260.

Yustikasari. (2025). Digital Self-Reconstruction: Postgraduate Reflections on YouTube's Role in Identity Formation. *CommVersa: Journal of Communication Studies*, *1*(5), 175–181.

Zainuddin Rela, I., Firihu, M. Z., Awang, A. H., Iswandi, M., Malek, J. A., Nikoyan, A., Nalepo, L., Batoa, H., & Salahuddin, S. (2021). Formation of farming community resilience models for sustainable agricultural development at the mining neighborhood in Southeast Sulawesi Indonesia. *Sustainability (Switzerland)*, *13*(2), 1–17. Scopus. https://doi.org/10.3390/su13020878