

Communal Solidarity and Cultural Infrastructure as Pillars of Indigenous Food Security: A Systematic Literature Review

Nora Fiza^{1*}, Erwin², Novizar Nazir³, Faidil Tanjung⁴

¹Doctoral Programme in Development Studies, Graduate School, Andalas University, Padang, Indonesia

²Department of Anthropology, Faculty of Social and Political Science, Andalas University, Padang, Indonesia

³Department of Food Technology and Agricultural Products, Faculty of Agricultural Technology, Andalas University, Padang, Indonesia

⁴Agribusiness Study Program, Faculty of Agriculture, Andalas University, Padang, Indonesia

Corresponding Author's e-mail : norafiza.sumbar@gmail.com

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Abstract : Food security among Indigenous communities is shaped by complex interactions between social relationships and cultural-physical structures, yet these two dimensions are often examined separately. This systematic review aimed to analyse the contributions and interactions of communal solidarity and cultural infrastructure in maintaining Indigenous food security. The study applied the PRISMA framework through searches across four databases: Scopus, Google Scholar, ScienceDirect, and DOAJ. From 187 identified records, 10 primary studies were analysed. The findings indicate that communal solidarity contributes to food security through mechanisms of knowledge and food exchange, although its effects depend on the forms of social capital involved and may reinforce the dominance of certain groups. Cultural infrastructure supports food security through effective and low-cost approaches but remains vulnerable to climate change and long-term storage limitations. The interaction between these two dimensions plays an important role in intergenerational knowledge transmission. These findings emphasise the importance of Indigenous food governance approaches that integrate social and cultural-physical dimensions simultaneously.

Keywords : Communal Solidarity, Cultural Infrastructure, Food Security, Indigenous Communities, Social Capital.

Abstrak : Ketahanan pangan masyarakat adat dipengaruhi oleh interaksi kompleks antara hubungan sosial dan struktur budaya-fisik, namun kedua dimensi tersebut sering dikaji secara terpisah. Tinjauan sistematis ini bertujuan menganalisis kontribusi serta interaksi solidaritas komunal dan infrastruktur budaya dalam menjaga ketahanan pangan masyarakat adat. Penelitian ini menggunakan kerangka PRISMA dengan penelusuran pada empat basis data, yaitu Scopus, Google Scholar, ScienceDirect, dan DOAJ. Dari 187 artikel yang diidentifikasi, sebanyak 10 studi utama dianalisis. Hasil menunjukkan bahwa solidaritas komunal berkontribusi terhadap ketahanan pangan melalui mekanisme pertukaran pengetahuan dan pangan, meskipun dampaknya dipengaruhi oleh bentuk modal sosial yang diterapkan dan berpotensi memperkuat dominasi kelompok tertentu. Infrastruktur budaya terbukti mendukung ketahanan pangan melalui pendekatan yang efektif dan berbiaya rendah, tetapi tetap rentan terhadap

perubahan iklim dan keterbatasan penyimpanan jangka panjang. Interaksi kedua dimensi tersebut berperan dalam pewarisan pengetahuan antargenerasi. Temuan ini menegaskan pentingnya pendekatan tata kelola pangan masyarakat adat yang mengintegrasikan aspek sosial dan budaya-fisik secara bersamaan.

Kata Kunci : Solidaritas Komunal, Infrastruktur Budaya, Ketahanan Pangan, Masyarakat Adat, Modal Sosial.

INTRODUCTION

Historical relationships with land, resources, and local governance structurally determine indigenous food security. Indigenous food systems rely on reciprocity, collective resource management, cultural continuity, and adaptive practices to sustain cross-generational resilience (Jayasekara et al., 2026). However, indigenous populations globally experience consistently higher rates of food insecurity than non-indigenous groups. Climate change, socioeconomic transformations, and restricted access to traditional lands drive this disparity (Jayasekara et al., 2026). Furthermore, resource extraction activities near indigenous territories directly degrade the ecological foundations of local food systems (Owen et al., 2023). Consequently, indigenous food security depends fundamentally on the social and spatial dimensions that govern collective food access, management, and distribution.

Recent empirical data illustrate the severity of this crisis. A population survey of indigenous families in Alagoas, Brazil, recorded a 69.1 percent prevalence of food insecurity, with nearly a third facing moderate to severe conditions (Almeida et al., 2025). This vulnerability also affects long-term health outcomes. Indigenous Australians face at least three times the risk of diabetes compared to the general population, while indigenous youth face a sixfold risk increase (Jayasekara et al., 2026). These findings prove that the transition from traditional to processed diets deteriorates nutritional quality across various regions (da Rosa et al., 2026). Consequently, indigenous food insecurity represents a collapse of the social and structural mechanisms that traditionally maintained community resilience, rather than a mere caloric deficit.

Two theoretical frameworks help explain this phenomenon. Social capital theory posits that reciprocal networks and food sharing strengthen resilience through knowledge and product exchange. These exchanges directly influence the four pillars of food security: availability, access, utilization, and stability (Nosratabadi et al., 2020). The indigenous food system governance framework complements this perspective. It identifies eight interconnected governance characteristics, including collective action, social networks, and religious cultural dimensions, as intrinsic drivers of sustainability (Jayasekara et al., 2026). Together, these frameworks establish indigenous food security as a multidimensional construct encompassing interpersonal social relations and the institutional and physical structures facilitating them.

Empirical studies validate the distinct contributions of communal solidarity and cultural infrastructure to food security. Food and knowledge sharing practices within urban indigenous food systems strengthen food sovereignty and support community self-determination through relationality, responsibility, and reciprocity (Miltenburg et al., 2022). Regarding physical infrastructure, traditional food storage structures like granaries promote agricultural sustainability because they are cost-effective, environmentally friendly, and embedded with intergenerational knowledge (Bisheko et al., 2023). Strong community infrastructure, including local human capacity, also correlates significantly with better access to health and psychosocial services during environmental shocks like floods (Dewa et al., 2023). These findings consistently highlight the importance of social and physical cultural dimensions. However, researchers typically examine them separately.

This analytical separation creates a significant conceptual gap. Global literature reviews on indigenous food governance identify governance characteristics but ignore how physical cultural infrastructure interacts with social capacity (Jayasekara et al., 2026). Conversely, studies on traditional storage structures focus heavily on technical aspects and post-harvest efficiency while neglecting the underlying social solidarity mechanisms (Bisheko et al., 2023). Dietary transition

studies display a similar disconnect, highlighting consumption shifts without adequately explaining the simultaneous degradation of social and physical cultural structures (da Rosa *et al.*, 2026). The absence of a synthesis integrating these literary streams into a unified food security determinant framework forms the primary gap justifying this systematic review.

Field realities amplify the urgency of this research. Systemic and climatic changes increasingly constrain the intergenerational transmission of harvesting skills and sharing values within indigenous families (Prieto *et al.*, 2026). Similar trends occur in archipelagic and rural communities, where market consumption rapidly replaces essential local foods like traditional fruits and vegetables (Sithole *et al.*, 2023). The indigenous communities of the Mentawai Islands, West Sumatra, provide a concrete empirical illustration. The simultaneous erosion of mutual cooperation (*gotong royong*) and the shift toward processed foods demonstrate how communal solidarity and cultural infrastructure degrade together, yet remain absent from integrated academic analyses. Ignoring this interaction risks producing fragmented and unsustainable food security interventions

Current literature proposes several sectoral solutions, including strengthened self-governance, integrated crop-livestock systems, and reciprocity-based food initiatives (Jayasekara *et al.*, 2026; Miltenburg *et al.*, 2022; Sekaran *et al.*, 2021). However, existing studies fail to integrate communal solidarity with physical cultural infrastructure into a cohesive intervention strategy. Addressing this limitation, this study investigates how communal solidarity and cultural infrastructure interact to sustain indigenous food security. Specifically, this research synthesizes these mechanisms from global literature, identifies their interaction patterns across the four pillars of food security, and formulates conceptual and practical implications for developing a culturally sensitive measurement framework.

RESEARCH METHOD

This study applies a Systematic Literature Review (SLR) method using the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta Analyses) framework (Page *et al.*, 2021). The PRISMA framework transparently guides the identification, screening, eligibility assessment, and study inclusion stages. This transparency guarantees synthesis validity while integrating two previously separate literature streams: communal solidarity and cultural infrastructure. We searched for primary studies across four databases: Scopus, Google Scholar, ScienceDirect, and DOAJ. We formulated Boolean keyword combinations to capture two main concept clusters. The first cluster covers communal solidarity, including social capital, collective action, and reciprocity. The second cluster focuses on cultural infrastructure, including traditional storage and granaries. We paired both clusters with food security and population context terms, such as indigenous and rural. We restricted the publication range to between 2021 and 2026 to capture the most recent empirical dynamics.

We applied inclusion and exclusion criteria consistently throughout the selection process (see Table 1). We only included English peer-reviewed journal articles, conference proceedings, and systematic reviews. The selected articles must explicitly discuss the relationship between communal solidarity, cultural infrastructure, and food security among indigenous or rural populations. We excluded non peer-reviewed documents, such as editorials, opinion pieces, book chapters, and news reports. We also excluded studies focusing on urban areas in developed countries without indigenous contexts.

Table 1. Inclusion and Exclusion Criteria

Criteria	Inclusion	Exclusion
Publication Year	Articles published between 2021-2026.	Articles published outside 2021-2026.
Document Type	Peer-reviewed journal articles, proceedings, or systematic/scoping reviews	Editorials, opinions, book chapters, news, or non-peer-reviewed documents

Criteria	Inclusion	Exclusion
Language	English	Non-English
Text Availability	Full text available	Full text unavailable
Topic Relevance	Discusses communal solidarity and/or cultural infrastructure related to food security	Does not discuss food security, communal solidarity, or cultural infrastructure
Population Focus	Indigenous or rural communities	Urban areas or developed countries without an indigenous context

The selection process followed four main PRISMA stages: identification, screening, eligibility assessment, and final inclusion. Figure 1 visually demonstrates this process, illustrating the reduction of 187 initial records down to the final 10 primary studies.

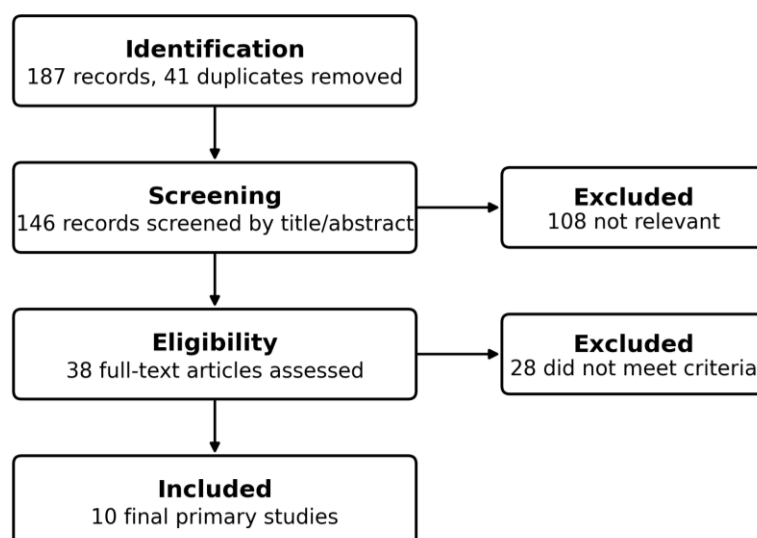


Figure 1. PRISMA flow diagram of the study selection process

RESULT AND DISCUSSION

Result

The literature search and selection process followed the PRISMA guidelines. The initial search across four databases (Scopus, Google Scholar, ScienceDirect, and DOAJ) using Boolean operators generated 187 records. We removed 41 duplicates and screened the remaining 146 articles by title and abstract. This screening step eliminated 108 irrelevant records. We then evaluated 38 full-text articles for eligibility. The full-text assessment excluded 28 studies that failed to meet the inclusion criteria. Finally, we included 10 primary studies in the main analysis. Table 2 presents the characteristics of these ten studies.

Table 2. Characteristics of Included Studies

No	Author (Year)	Country/Context	Study Design	Focus	Key Findings
1	Rusmawati et al. (2023)	Indonesia	Quantitative	Communal Solidarity	Bonding and bridging social capital correlate

					positively with food security.
2	Craig et al. (2023)	Malawi	Quantitative	Communal Solidarity	Social capital typology determines food access and varies by gender.
3	Duguma et al. (2023)	Ethiopia	Quantitative	Communal Solidarity	Social organization participation increases livelihood diversification by 40%.
4	Sibane (2023)	Burkina Faso	Quantitative	Communal Solidarity	Structural social capital significantly strengthens food security (OR=1.959).
5	Cheraghi (2024)	Iran	Quantitative	Communal Solidarity	Social capital shows a significant relationship with rural food security.
6	Miltenburg et al. (2022)	Canada	Qualitative	Communal Solidarity	Reciprocity-based food sharing practices strengthen community food sovereignty.
7	Jayasekara et al. (2026)	Global	Literature Review	Solidarity & Governance	The study identifies eight primary characteristics of indigenous food system governance.
8	Bisheko et al. (2023)	India	Narrative Review	Cultural Infrastructure	Traditional grain storage facilities cost less but offer limited capacity.
9	Mkhize & Cele (2025)	South Africa	Quantitative	Cultural Infrastructure	The absence of cold storage predicts trader income loss.
10	Prieto et al. (2026)	Canada	Qualitative	Both	Land-based intergenerational learning fosters harvesting skills

and sharing
values.

Communal Solidarity

Seven of the ten included studies analyzed the contribution of communal solidarity to food security. Five quantitative studies from Indonesia, Malawi, Ethiopia, Burkina Faso, and Iran demonstrated a positive correlation between social capital and household food security status. These studies identified knowledge sharing, food distribution, kinship support, and local social organization participation as the primary mechanisms driving food security (Cheraghi, 2024; Craig et al., 2023; Duguma et al., 2023; Rusmawati et al., 2023; Sibane, 2023). A qualitative study on urban indigenous communities in Canada showed that reciprocity-based food sharing practices strengthen food sovereignty (Miltenburg et al., 2022). Furthermore, a global literature review established collective action and social networks as two of the eight primary characteristics of indigenous food governance (Jayasekara et al., 2026).

Cultural Infrastructure

Two studies specifically explored the physical and cultural infrastructure dimensions. The first study on smallholder farmers in India highlighted traditional grain storage structures. This infrastructure utilizes local materials and requires low costs, although it suffers from limited capacity and high pest vulnerability (Bisheko et al., 2023). A subsequent study on indigenous food traders in South African informal markets revealed that the lack of cold storage facilities significantly predicts trader income loss ($\beta = 1.53$, $p < 0.01$) during climate shocks and pandemics (Mkhize & Cele, 2025).

Interaction of Communal Solidarity and Cultural Infrastructure

One qualitative study on indigenous Inuvialuit families in Canada demonstrated a direct interaction between both dimensions. Land-based learning facilitates the simultaneous transmission of harvesting skills as a physical dimension and sharing values as a social dimension. However, current climatic and systemic changes severely restrict community opportunities to pass down these dual dimensions to future generations concurrently (Prieto et al., 2026).

Discussion

Communal Solidarity and Food Security

Seven of the ten included studies demonstrate a positive relationship between communal solidarity and household food security in rural and indigenous areas. Knowledge sharing, food distribution, and local organization participation serve as the primary mechanisms (Cheraghi, 2024; Craig et al., 2023; Duguma et al., 2023; Rusmawati et al., 2023; Sibane, 2023). These findings align with social capital theory. This theory posits that reciprocal interactions strengthen the four pillars of food security (Nosratabadi et al., 2020). Rural households in China exhibit a similar pattern. Trust among neighbors significantly reduces the risk of multidimensional poverty (Wang et al., 2023). The consistency of these findings across continents indicates that communal solidarity acts as a universal pillar of food security.

However, this relationship carries specific nuances. Craig et al. (2023) found that bonding and bridging social capital improve food access, while linking social capital decreases it. Exclusive social networks can strengthen elite domination and marginalize vulnerable groups (Yusriadi, 2025). Therefore, the impact of communal solidarity depends heavily on the type of social capital and local power structures. Food sharing practices among urban indigenous communities in Canada validate this complexity. These practices manifest community self-determination rather than mere economic distribution (Miltenburg et al., 2022). Global indigenous food system governance also institutionalizes collective action and social networks (Jayasekara et al., 2026). Since the majority of these studies are correlational, we cannot draw definitive causal conclusions. We can only confirm a consistent positive association between communal solidarity and food security.

Cultural Infrastructure and Food Security

Two studies examining cultural infrastructure present a more complex reality. Traditional grain storage structures in India are cost-effective and environmentally friendly, but they lack

adequate capacity and pest protection (Bisheko et al., 2023). Local knowledge systems in South Africa reflect a similar pattern. While these systems support subsistence farmers, they fail to mitigate long-term climate change impacts independently (Kom et al., 2024). Consequently, cultural infrastructure holds significant value but faces distinct technical limitations. A study on informal market traders in South Africa reinforces this argument. The absence of cold storage facilities drastically reduced trader income during climate and pandemic crises (Mkhize & Cele, 2025). These findings form a coherent pattern. Traditional infrastructure functions effectively under normal conditions but remains highly vulnerable to large-scale shocks. These capacity limitations are structural and apply across different regions.

Interaction of Communal Solidarity and Cultural Infrastructure

Research on Inuvialuit indigenous families in Canada details the explicit interaction of both dimensions. Land-based learning simultaneously develops physical harvesting skills and social sharing values (Prieto et al., 2026). Communal solidarity and cultural infrastructure intertwine closely. Land and physical facilities provide spaces to practice and pass down social values. This finding supports the indigenous food governance framework that integrates cultural dimensions with collective action (Prieto et al., 2026). Synthesizing these global findings with the archipelagic context of the Mentawai Islands reveals critical parallels. The traditional Mentawai architectural structure, the Uma (longhouse), historically serves as a physical center for collective food processing and storage. Similar to the Indian mud silos and South African traditional structures, the Uma faces immense pressure from modern systemic changes. The empirical degradation of *gotong royong* (communal solidarity) in Mentawai directly correlates with the physical abandonment or deterioration of these traditional spaces. Social capital cannot thrive without the physical cultural infrastructure that facilitates it, and the infrastructure loses its function without the communal solidarity to maintain it. Because current literature only offers limited qualitative data on this specific interaction, universal generalization requires further empirical verification through longitudinal studies in archipelagic indigenous communities.

CONCLUSIONS AND RECOMMENDATIONS

This systematic review evaluates how communal solidarity and cultural infrastructure interact to sustain indigenous food security, alongside the hurdles of integrating both into a holistic framework. Analyzing ten primary studies demonstrates that knowledge sharing, food distribution, and local organization participation actively improve household food security. Yet, this positive impact is heavily conditional. Exclusive management of social capital risks reinforcing local elite domination rather than alleviating poverty. On the physical side, traditional facilities operate affordably under baseline conditions but consistently fail to meet capacity demands during climate shocks, pandemics, or long-term storage requirements. Crucially, one study validates that communal solidarity and physical infrastructure merge during intergenerational cultural transmission. They mutually reinforce each other while remaining equally fragile against external systemic disruptions. Consequently, evaluating indigenous resilience through a single dimension inevitably produces incomplete conclusions.

To address this gap, scholars must expand indigenous food governance frameworks by treating physical cultural infrastructure as a strict complement to collective action. For policymakers, effective interventions demand a dual approach. Food security initiatives in regions like the Mentawai Islands must simultaneously modernize traditional storage while strengthening communal solidarity, taking specific care to prevent vulnerable group exclusion. We acknowledge certain limitations, notably the reliance on English databases which potentially overlooks regional grey literature, and a prevalence of correlational designs that limit cross-cultural causal claims. Future research should prioritize developing simultaneous measurement instruments for both dimensions, ideally applied through longitudinal studies within archipelagic indigenous communities to verify these interaction patterns empirically.

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