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From Local Resources to Rural Livelihoods: The Social and Economic Dynamics of Traditional Brick-Making Communities in Eastern Indonesia

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Abstract

This study examines how locally available resources are transformed into livelihood opportunities through traditional brick-making and how this process shapes the social and economic dynamics of rural communities in Eastern Indonesia. Drawing on a qualitative case study of brick-making communities in Negeri Hatu, Central Maluku, the study investigates the roles of local resources, traditional knowledge, informal labour arrangements, social relations, and market access in sustaining rural livelihoods. Data were generated through participant observation, semi-structured in-depth interviews, and documentation involving producers, workers, transport and distribution actors, buyers, community authorities, local leaders, and surrounding residents, and were analysed thematically. The findings show that traditional brick-making operates simultaneously as a livelihood strategy, a community-based production system, and a source of local economic circulation. Locally available clay functions as a productive asset, while experiential knowledge, task specialization, trust, and informal labour networks enable production with limited formal capital. The activity generates employment and household income but remains vulnerable to resource depletion, weather variability, labour constraints, production technology, fuel availability, and market access. The study advances the Local Resource–Livelihood Nexus, demonstrating that local resources do not inherently produce sustainable livelihoods; livelihood security emerges from their interaction with knowledge, labour organization, social relations, and market connectivity. The findings highlight the need for integrated interventions combining appropriate technology, skills development, market strengthening, participatory resource management, and environmental safeguards to enhance the resilience of traditional resource-based rural economies.

Keywords: *Community-Based Production, Eastern Indonesia, Informal Labour, Local Economic Development, Local Resources*

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INTRODUCTION

Rural communities in developing and transitional societies rarely depend on a single economic activity to sustain household well-being. Where formal employment is limited, access to productive capital is uneven, and agricultural livelihoods are exposed to climatic and market uncertainties, households tend to combine different forms of work, assets, skills, and social relationships to secure their livelihoods. Rural livelihood, therefore, cannot be reduced

to income or employment alone. It encompasses the resources, capabilities, social relations, and activities through which households construct a means of living and respond to economic and environmental uncertainty (G et al., 2024; Mugambiwa, 2024; Sakthivel & Kannan, 2023). This perspective is particularly important in geographically dispersed and resource-dependent regions, where locally available natural resources may constitute one of the few productive assets that communities can access with relatively limited financial capital. The challenge, however, lies in understanding how such resources are transformed into sustainable livelihood opportunities and what social and environmental consequences emerge from that transformation.

This issue is especially relevant in Eastern Indonesia, where rural and island communities often operate within distinctive geographical, infrastructural, and economic conditions. In such settings, the distance from major markets, limited access to formal employment, uneven infrastructure, and dependence on locally available resources can encourage the persistence of small-scale and traditional economic activities. The research context examined in this study, Negeri Hatu in Central Maluku, illustrates this condition through the persistence of traditional brick-making. The availability of clay, locally acquired production skills, local labour, and demand for construction materials provides the basic conditions under which brick-making can continue as a source of economic activity. Yet the significance of this activity extends beyond the production and sale of bricks. Production involves owners, workers, transporters, buyers, households, and community members whose interactions are structured through division of labour, informal agreements, trust, experience, and repeated social exchange. The activity can therefore be understood not simply as a small manufacturing enterprise, but as a socio-economic institution embedded in the everyday life of the community. This understanding is consistent with (Behera et al., 2024) argument that economic action is embedded in social relations rather than occurring independently of them. In rural settings, social networks can facilitate access to information, labour, opportunities, and economic resources, while relationships of trust and reciprocity can reduce the uncertainty associated with market exchange (Kien et al., 2024; Wang et al., 2022).

The importance of examining this phenomenon becomes clearer when the livelihood benefits of resource-based production are considered alongside its vulnerabilities. Natural resources can provide an important foundation for poverty reduction and livelihood diversification, particularly when households have limited access to alternative forms of productive capital (Ligombi et al., 2025). Livelihood diversification may enable rural households to reduce their exposure to seasonal fluctuations, economic shocks, and declining returns from agriculture (Susanti et al., 2026). At the same time, however, dependence on a particular resource can create a new form of vulnerability when the resource becomes degraded, difficult to access, or increasingly costly to exploit. Sustainable livelihood thinking has long emphasized that livelihood strategies must be assessed not only in terms of immediate income but also according to their capacity to maintain the resource base upon

which future livelihoods depend (Kanneboyena et al., 2023; Sun et al., 2024). This creates a fundamental tension for traditional resource-based industries: the same natural resource that provides employment and income may also become a source of long-term vulnerability if extraction and production are not accompanied by appropriate forms of resource management.

The informal character of many traditional rural industries further complicates this relationship. Informality is often interpreted primarily through the absence of formal contracts, limited regulatory oversight, low technological intensity, and weak social protection. (Kanneboyena et al., 2023) emphasizes that informal economic activity encompasses substantial employment and enterprise opportunities while simultaneously presenting persistent deficits in protection, rights, productivity, and representation. (Mubangizi & Nzabona, 2025) similarly argues that informality should not simply be understood as an economic residue waiting to disappear through modernization. Rather, it is a heterogeneous economic space in which individuals and enterprises develop strategies for generating income under conditions of constrained access to formal institutions and resources. For rural communities, informal organization can provide flexibility and reduce barriers to participation, particularly when entry into formal employment or capital-intensive production is difficult. However, the same informality may also expose workers and producers to unstable incomes, occupational risks, limited technological upgrading, and weak environmental regulation. Understanding traditional brick-making therefore requires attention to both sides of informality: its capacity to function as an adaptive mechanism and its potential to reproduce livelihood vulnerability.

Previous scholarship on sustainable livelihoods provides a strong conceptual foundation for understanding these dynamics. (Hahury et al., 2022) established the importance of capability, equity, and sustainability in defining rural livelihoods, shifting analytical attention away from narrow measures of income toward the broader means through which people construct their lives. (Ahmad et al., 2023) subsequently conceptualized sustainable livelihoods through the interaction of livelihood resources, institutional processes, and livelihood strategies, emphasizing that natural, human, social, and economic resources are combined differently across contexts. (Ahmad et al., 2023) further demonstrated that rural households frequently construct diversified portfolios of activities rather than relying exclusively on agriculture, with non-farm employment, trade, migration, and small-scale enterprise becoming important components of livelihood security. More recent applications of the livelihoods perspective continue to emphasize diversification as a means of strengthening community resilience and responding to environmental, economic, and seasonal uncertainty (Etsay et al., 2022; Yusriadi & Cahaya, 2022). Evidence from Indonesia also demonstrates that livelihood diversification must be understood in relation to natural-resource dependence and the distinctive conditions of archipelagic communities. (Ramaano, 2026), for example, showed that changes associated with resource-intensive economic activity can generate new livelihood opportunities while simultaneously placing

pressure on the natural-resource base upon which local communities depend. This body of research establishes that rural livelihoods are dynamic and multidimensional, but it leaves open an important question concerning the role of small-scale traditional manufacturing as a livelihood strategy.

A second strand of literature focuses on social relations and the organization of economic activity. The concept of social capital suggests that economic opportunities are shaped by relationships, norms, information channels, and obligations embedded within social structures (Andriyanto et al., 2026). (Cheruiyot et al., 2026) demonstrated that social networks can facilitate the circulation of information and connect individuals to opportunities beyond their immediate social groups, while his later theory of embeddedness emphasized that economic behaviour cannot be adequately understood without considering the social relationships in which it is situated (Hegde et al., 2026). These arguments are particularly relevant to traditional production systems in which recruitment, knowledge transmission, work coordination, transactions, and market access may occur through personal relationships rather than formal organizational mechanisms. Local production can consequently depend on a form of social infrastructure that is difficult to observe when the industry is assessed only through conventional economic indicators. In this sense, social relations are not merely an external background to production; they can constitute part of the mechanism that enables production to persist.

A third body of literature examines the informal economy and small-scale production as an important component of development in low- and middle-income settings. The informal economy provides employment and income for large numbers of workers, particularly where formal labour markets cannot absorb the available workforce (Ulimboka et al., 2025). (Pelane et al., 2023) argues that informal enterprises should be understood through their relationships with regulation, markets, labour, and state institutions rather than simply categorized as unregulated activities. This perspective is relevant to traditional brick-making because the sector can operate through relatively simple technologies, experiential knowledge, flexible labour arrangements, and locally embedded market relationships. Nevertheless, informal production can also generate occupational and environmental risks. Studies of brick production in South Asia have documented the use of agricultural topsoil, environmental degradation, air pollution, and negative consequences for surrounding agricultural livelihoods (Agina et al., 2026; Groth et al., 2023). Research on brick-making communities in Zimbabwe similarly shows how clay extraction, vegetation removal, and fuel use can affect local ecosystems and the sustainability of community livelihoods. Research on brick kiln labour in India further illustrates how informal employment may be intertwined with seasonal livelihood strategies, migration, debt, climatic exposure, and labour insecurity (Dinh, 2025). More recent research has extended this concern by demonstrating that climatic heat stress can directly affect labour capacity and brick production, revealing how environmental change can become an economic and livelihood issue for workers in the sector (Ramaano, 2025b).

A fourth strand of scholarship has increasingly emphasized the relationship between resource dependence, environmental change, and livelihood resilience. Sustainable livelihood research suggests that natural capital cannot be separated from the social and institutional conditions through which people gain access to it (Monalisa et al., 2025). (Hiwale, 2025) work on common-pool resources further demonstrates that the sustainability of resource use depends not simply on the resource itself but on institutions, rules, collective action, and local capacities for managing shared resources. Recent studies reinforce the need to examine livelihood diversification and environmental sustainability together rather than treating them as separate policy domains. Research on community-based livelihood diversification, for example, emphasizes the interaction among resource access, social organization, economic activities, and environmental sustainability in building local resilience (Kumar et al., 2023; Lamidi et al., 2025). In resource-dependent industries, however, economic gains and environmental pressures may emerge from the same production process. Evidence from brick-producing regions shows that the extraction of fertile soil and emissions from combustion can undermine agricultural productivity and thereby affect the livelihoods that surround the industry (Haulle et al., 2024; Karki et al., 2022). Recent scholarship on the international brick trade similarly highlights the interconnected vulnerabilities produced by climate change, environmental degradation, and precarious labour within brick-producing communities (Razak et al., 2025).

Taken together, these studies provide a substantial understanding of rural livelihood diversification, informal economic activity, social capital, and resource sustainability, yet they tend to examine these dimensions separately. Livelihood studies commonly focus on agriculture, migration, fisheries, mining, or household diversification; studies of informal economies tend to emphasize employment conditions and institutional exclusion; while research on brick-making has predominantly concentrated on environmental pollution, occupational health, technological efficiency, or labour exploitation. Consequently, less attention has been given to how a small-scale, traditional, resource-based manufacturing activity becomes embedded in community social relations and simultaneously operates as a livelihood institution and a source of resource-dependent vulnerability. This is particularly evident in Eastern Indonesia, where rural economic life is shaped by archipelagic conditions and where empirical evidence concerning traditional manufacturing as a livelihood strategy remains comparatively limited. The issue is therefore not simply whether brick-making generates income, but how local resources are socially and economically transformed into livelihood opportunities, how informal labour relations and social networks sustain that transformation, and how dependence on the same resources may expose communities to future risks.

Against this background, the present study develops an integrated reading of traditional brick-making by bringing together sustainable livelihoods, informal economy, social embeddedness, and local resource perspectives. The central proposition is that the livelihood value of local resources is neither automatic nor purely economic. Rather,

resources become livelihood assets through a process involving local knowledge, skills, community-based production, informal labour organization, social relations, and access to markets. At the same time, the very production system that generates employment and income can create pressures that affect the long-term sustainability of the resource base. This perspective is captured in what this study terms the Local Resource-Livelihood Nexus: a relational process through which local natural resources are converted into productive activities, social organization, employment, income, and livelihood security, while resource dependence can simultaneously generate environmental pressure and livelihood vulnerability. The analytical value of this perspective lies in connecting two processes that are frequently examined separately: the social mechanisms that make traditional production economically viable and the resource constraints that determine whether such production can remain viable over time. Rather than treating traditional brick-making merely as a low-technology economic activity, the study consequently views it as a community-based socio-economic institution whose sustainability depends on the interaction between economic security, social organization, and resource conservation.

The study therefore aims to examine how local resource availability, traditional knowledge, labour organization, social relations, and market demand shape the persistence of traditional brick-making in Negeri Hatu, Central Maluku, and to analyze how this activity contributes to rural livelihoods through employment, household income, livelihood diversification, and local economic circulation. It further seeks to understand how producers and community members negotiate the benefits of brick-making with the vulnerabilities associated with resource dependence, technological limitations, environmental pressures, and changing production conditions. By doing so, the study moves beyond an economic assessment of traditional brick production and offers an empirically grounded explanation of how local resources become livelihood assets through socially embedded forms of production. The analysis is intended to contribute to a more context-sensitive understanding of rural development in Eastern Indonesia and to inform community-based development strategies that combine technological upgrading, skills development, market access, participatory resource management, and environmental safeguards rather than pursuing economic modernization at the expense of the social and ecological foundations of local livelihoods.

RESEARCH METHOD

This study employed a qualitative descriptive approach to develop an in-depth understanding of the traditional red-brick industry and its social and economic dynamics in Negeri Hatu, Leihitu Barat District, Central Maluku Regency, Eastern Indonesia. A qualitative approach was selected because the phenomenon under investigation is closely embedded in everyday experiences, social relationships, informal work arrangements, local knowledge, and community practices that cannot be adequately captured through numerical measurement alone. The study sought to understand how people involved in brick production

interpret their work, organize production, negotiate relationships between owners and workers, and sustain their livelihoods through locally available resources. This approach is consistent with (Muhammad Kurnia Ramadhan, Harapan Tua Ricky Fredy Simanjuntak, 2023; Zhao et al., 2023) view that qualitative inquiry is appropriate when researchers seek to understand meanings and experiences within their natural social context. Negeri Hatu was purposively selected because traditional brick-making remains closely connected with local resources, community labor, inherited production knowledge, and local economic activities. The location therefore provides a meaningful social setting for examining how a resource-based rural industry operates not merely as an economic activity but also as a space in which cooperation, division of labor, social relations, and livelihood strategies are continuously reproduced.

The participants were selected through purposive sampling and subsequently expanded through snowball sampling to identify individuals with direct and relevant experience of the brick-making process. The study involved 20 informants consisting of five brick-making business owners, eight brick workers or craftsmen, two distributors or transporters, two buyers or customers, one village government representative, and two community leaders or residents living around the production area. Business owners were included because they possess knowledge concerning capital, production decisions, labor arrangements, marketing, and resource use, while workers were selected because they directly experience the production process, division of labor, working conditions, and everyday relationships within the industry. Distributors and buyers were included to understand the movement of products and market relations, whereas village representatives and community leaders provided contextual information concerning the position of the industry within the wider community. The number of informants was not determined merely by statistical considerations but by the relevance and depth of information obtained; interviews continued until recurring patterns became sufficiently clear and additional interviews no longer generated substantial new insights.

Data were collected through participant observation, semi-structured in-depth interviews, and documentation. Observation was conducted directly at brick-making locations to examine the sequence of production activities, division of tasks, interactions between owners and workers, cooperation among workers, use of local materials, and everyday working practices. In-depth interviews were conducted flexibly so that informants could explain their experiences in their own words while allowing the researcher to pursue emerging issues. Interviews explored ownership and labor relations, access to capital and resources, division of work, income and livelihood contributions, cooperation, conflict, market relationships, and perceptions of environmental pressures. Documentation included field notes, photographs, production records when available, and relevant village or institutional documents. These techniques were combined because interviews reveal participants' meanings and experiences, while observation allows the researcher to compare those accounts with practices occurring in everyday settings. Data analysis followed a

thematic process involving familiarization with the data, coding, development of themes, interpretation of relationships among themes, and theoretical integration, following (Xu et al., 2023). The interpretation was informed by Marx's perspective on relations between ownership of productive resources and labor, particularly the distinction between owners and workers, and Durkheim's perspective on division of labor and solidarity to examine how specialization and interdependence shape social relations within the production process.

To strengthen the trustworthiness of the findings, the study applied methodological and source triangulation. Methodological triangulation was conducted by comparing information obtained through interviews, observations, and documentation, while source triangulation involved comparing accounts from owners, workers, market actors, and community representatives. When differences emerged, the researcher returned to the field and conducted follow-up conversations to clarify the reasons behind divergent accounts rather than immediately treating one account as more valid than another. Selected interpretations were also discussed with relevant informants to ensure that the researcher's interpretation remained consistent with their experiences. These procedures strengthen credibility and confirmability, which are central dimensions of trustworthiness in qualitative research (Tofu et al., 2023). The study was geographically bounded to Negeri Hatu, meaning that its findings are context-specific and are intended to provide analytical understanding of traditional brick-making communities rather than statistical generalization to all brick-making industries in Indonesia.

RESULTS AND DISCUSSION

Local Resources as the Foundation of Rural Economic Activity

The findings indicate that the traditional brick-making industry in Negeri Hatu is closely connected to the availability of local natural resources, particularly clay that can be accessed and processed by community members. From the perspective of the local producers, clay is not understood merely as a component of the physical landscape, but as a productive resource whose economic value emerges through everyday knowledge, labour, and social organization. Field observations showed that brick production begins with the identification and extraction of suitable soil, followed by a series of processes through which locally available material is transformed into a standardized construction product. This finding is important because it demonstrates that the economic significance of natural resources is socially mediated. In livelihood studies, natural capital refers to the natural resource base upon which people construct their livelihood strategies, but access to such resources does not automatically translate into economic security (Do et al., 2022). The experience of brick-making households in Negeri Hatu illustrates this distinction particularly clearly: clay becomes economically meaningful because community members possess the knowledge, physical capacity, production experience, and social arrangements required to transform it into a marketable commodity.

The use of clay also reflects a form of locally situated environmental knowledge. Producers do not simply collect soil indiscriminately; rather, their production practices depend on practical understandings of which soil can be used, how it should be prepared, and how it responds during moulding, drying, and firing. Such knowledge is largely acquired through experience and observation rather than through formal technical training. In this sense, the production process represents an accumulation of knowledge embedded within everyday livelihood practices. The importance of this process becomes more apparent when the brick industry is viewed through the sustainable livelihood framework, which conceptualizes livelihoods as combinations of assets, capabilities, and activities rather than as income-generating activities alone (Derbile et al., 2022). The clay resource provides the initial material base, but its conversion into livelihood opportunities requires human capital in the form of skills and labour, physical capital in the form of production tools and facilities, and social capital in the form of relationships that enable production to continue.

The emergence and persistence of brick-making in Negeri Hatu can therefore be interpreted as a locally grounded economic response to the demand for construction materials. Rather than depending exclusively on formal employment or external investment, community members have developed an economic activity around resources that are relatively accessible within their surrounding environment. This condition is particularly significant in a rural setting where access to formal capital, advanced technology, and diversified employment opportunities may be more limited. The availability of locally accessible raw materials can reduce the initial resource requirements for entering production, allowing households to participate in economic activity without having to establish highly capital-intensive enterprises. This does not mean that brick-making requires no capital. Producers still require tools, moulds, firing facilities, labour, fuel, and transportation. However, the existence of a locally available raw-material base reduces one of the important barriers associated with production. This finding is consistent with the broader literature on rural livelihood diversification, which shows that households often construct livelihood strategies by combining resources available within their immediate social and ecological environments.

The transformation of clay into bricks also creates a direct connection between natural capital and employment. The production process requires several forms of labour, including material preparation, moulding, drying, arranging bricks, firing, handling, and distribution. Consequently, the value generated from clay does not remain attached to the resource itself but is distributed through a chain of productive activities involving different actors. This observation helps explain why the brick industry should not be understood simply as a relationship between raw material and final product. It is better understood as a local production system in which natural resources activate human labour and generate opportunities for economic participation. Similar dynamics have been observed in studies of resource-dependent rural livelihoods, where locally available resources can become important livelihood assets when households possess the capabilities and institutional

arrangements necessary to access and utilize them.

The findings further suggest that the economic importance of local clay is relational rather than intrinsic. Two communities may possess similar natural resources but derive different economic benefits from them because their knowledge, labour organization, access arrangements, and market connections differ. In Negeri Hatu, the continued use of clay for brick production is made possible by the interaction between the physical availability of the resource and the community's accumulated production experience. This provides an important analytical distinction from approaches that treat natural resources as automatically convertible into economic value. The resource becomes an asset only when people have the capacity to mobilize it within a particular social and economic context.

At the same time, the findings reveal an important vulnerability embedded within this resource-based livelihood arrangement. Because production depends substantially on local clay, the continuity of economic activity is inherently connected to the continued accessibility and suitability of the resource. Thus, the same natural resource that lowers barriers to economic participation can also create dependence. This dual character becomes particularly important when considering environmental change and resource pressure. Research on brick production in other developing-country contexts has demonstrated that resource extraction and brick production can generate pressures on land and surrounding environmental conditions, while climatic factors can also affect production and workers' livelihoods (Tofu et al., 2023). The Negeri Hatu case therefore illustrates an important dimension of the Local Resource–Livelihood Nexus: local resources generate livelihood opportunities only when they are mediated by human capabilities and social arrangements, but dependence on those resources can simultaneously expose households to livelihood risks when ecological or production conditions change

Traditional Knowledge and Informal Labour as Enabling Production Capacity

The second major finding concerns the role of traditional knowledge and informal labour in sustaining brick production under conditions of relatively simple technology and limited formal capital. Observations of production activities indicate that the continuity of brick-making does not depend exclusively on machinery or formal technical systems. Instead, much of the production process is sustained through practical knowledge acquired over time. Workers develop an understanding of how to prepare clay, determine its consistency, operate moulds, arrange bricks for drying, and manage the firing process through repeated participation in production. These practices demonstrate that traditional production should not automatically be equated with low capability. On the contrary, workers possess forms of situated knowledge that are highly relevant to the specific ecological and production context in which they work.

This finding requires a careful interpretation of the term "informal labour." Informality in Negeri Hatu does not simply indicate an absence of organization, regulation, or skills. Rather, it represents a flexible mode of organizing production around available labour, accumulated experience, and interpersonal relationships. This interpretation is consistent

with (Zhao et al., 2023) argument that the informal economy should not be understood merely as a residual sector that exists because formal economic institutions have failed. Informal economic activities can provide adaptive mechanisms through which individuals and households secure work and income under conditions where formal employment and institutional resources are constrained. (Xu et al., 2023) similarly recognizes the importance of the informal economy as a significant source of employment and livelihood, particularly in developing-country contexts.

The production process further reveals that skills are differentiated according to experience and practical competence. Although workers may learn through direct participation rather than formal certification, this does not mean that all workers perform identical tasks with identical capabilities. Some workers may be more experienced in preparing clay, others in moulding, drying, firing, or handling finished bricks. Such specialization represents an important form of labour organization within a traditional industry. It also provides a basis for interpreting the production system through Durkheim's perspective on the division of labour. The division of tasks creates interdependence because no individual worker can independently complete the entire production process at the same scale. Production therefore depends on the coordination of complementary activities.

From a Marxian perspective, the organization of labour also reveals the structural distinction between those who control productive resources and those who provide labour. The owner possesses or controls productive assets and determines important aspects of production, while workers contribute their labour and practical capabilities to transform raw materials into commodities. However, the empirical context of Negeri Hatu should not be reduced to a simple owner-versus-worker opposition. The production system is simultaneously shaped by cooperation, familiarity, and mutual dependence. The owner requires workers' skills and labour to maintain production, while workers depend on the existence of the enterprise for access to employment and income. This creates a relationship in which economic asymmetry coexists with practical interdependence.

The accumulated knowledge observed in the production process also demonstrates how livelihood capabilities are reproduced across time. Skills are learned through participation, observation, imitation, and repeated practice. Such transmission allows knowledge to remain within the community even when formal training or technological upgrading is limited. Rural entrepreneurship literature emphasizes that economic activity in resource-constrained environments can be sustained through the mobilization of locally embedded resources and capabilities. In the case of Negeri Hatu, these capabilities are embodied in people rather than machines. The worker becomes part of the productive infrastructure because production quality and continuity depend substantially on practical competence.

This finding also provides an important qualification to the assumption that technological modernization is the only pathway toward improving traditional rural industries. Technology can certainly improve productivity, occupational safety, and

production efficiency, but technological intervention that ignores existing knowledge may overlook the capabilities already embedded in the community. A more sustainable development approach would therefore recognize traditional knowledge as a resource that can be combined with appropriate technological improvement. The objective should not be to replace community knowledge but to strengthen it where technological intervention can reduce physical burdens, production losses, environmental pressure, or vulnerability to weather conditions.

Social Relations and Informal Organization as the Infrastructure of Production

The findings demonstrate that production continuity is supported not only by physical resources and labour but also by social relationships among actors. Relationships between business owners and workers, relationships among workers, and connections between producers, distributors, and buyers create an informal organizational structure through which production is coordinated. Communication frequently occurs through direct interaction, allowing production decisions and practical problems to be addressed without highly formalized administrative procedures. This arrangement is particularly important in a small community because social proximity creates familiarity and repeated interaction.

The absence of dominant or persistent labour conflict should therefore not be interpreted simply as evidence that power differences do not exist. From a Marxian perspective, the distinction between ownership and labour remains analytically relevant because owners and workers occupy different positions in relation to productive resources. However, the empirical findings suggest that these structural differences are mediated by close social relationships and mutual dependence. Workers depend on owners for employment opportunities, while owners depend on workers' knowledge and labour to sustain production. Such interdependence can reduce the need for formal coordination mechanisms and create practical forms of negotiation in everyday production.

This finding can also be interpreted through the concept of social capital. (Tofu et al., 2023) emphasizes that social relationships can facilitate coordinated action by creating obligations, expectations, information channels, and trust. (Haulle et al., 2024) concept of embeddedness further suggests that economic action is inseparable from the social relationships within which transactions occur. The Negeri Hatu case provides an empirical illustration of this principle. The production and circulation of bricks do not occur in an anonymous market environment. They take place among people who interact repeatedly and whose economic relationships are embedded within broader community relationships.

Trust is particularly important because it lowers the social and transactional difficulties associated with informal production. Workers need to trust that their labour relationship will continue, owners need to rely on workers' commitment and capabilities, and producers need reliable relationships with buyers and distributors. When problems arise, direct communication and social proximity can function as mechanisms for resolving them. This does not mean that conflict is impossible, but rather that social relationships provide an institutional environment within which disagreement can be negotiated without necessarily

disrupting the entire production system.

The division of labour also contributes to this relational infrastructure. From Durkheim's perspective, increasing differentiation of tasks can generate organic solidarity because individuals become mutually dependent on one another's specialized contributions. The production process in Negeri Hatu reflects this principle at a localized level. The person preparing the material, the person moulding bricks, the worker managing drying and firing, and those involved in transportation perform different but interconnected functions. The completion of one activity creates the conditions necessary for the next. Consequently, production depends not only on individual competence but on the capacity of workers to coordinate their complementary roles.

The significance of social relations extends beyond the workplace itself. Relationships with distributors and buyers connect production to the wider local economy, while relationships with community members shape perceptions of the industry's social and economic value. This finding supports (Karki et al., 2022), who argue for greater attention to relational dimensions and power relations in livelihood analysis. Livelihoods are not produced by isolated households acting independently; they are constructed through relationships, institutions, and broader social structures. In Negeri Hatu, therefore, social relations function as an informal institutional infrastructure through which labour, knowledge, and economic transactions are coordinated.

Brick-Making as a Livelihood Strategy and Source of Local Economic Circulation

The findings further indicate that brick-making contributes to livelihoods through more than direct income generation. The industry creates opportunities for people to participate in production, transportation, distribution, and construction-related transactions. Its livelihood significance therefore emerges through a network of economic activities rather than through the earnings of business owners alone. This pattern corresponds with the livelihood diversification perspective, which views households as combining different assets and activities to construct strategies for maintaining income and reducing dependence on a single source of livelihood.

For households directly involved in production, brick-making provides access to employment and income that can be used to meet everyday needs. Income from such work may contribute to food consumption, education, household expenses, social obligations, and other necessities. The importance of these earnings should be understood within the lived realities of rural households. For many households, livelihood security does not necessarily mean achieving high or rapidly increasing income. It may instead mean maintaining a sufficiently reliable source of earnings that allows household needs to be met when alternative employment opportunities are limited.

The economic effects also extend to workers who are not directly involved in moulding or firing bricks. Transportation and distribution create additional forms of economic participation because finished products need to reach buyers and construction sites. Buyers, in turn, connect the brick industry with construction demand. The industry therefore creates

a localized chain in which money generated through the sale of bricks can circulate among multiple actors. This is why describing the industry merely as a source of "household income" would underestimate its broader economic role.

The findings support an interpretation of traditional brick-making as a livelihood institution. The concept is useful because it emphasizes that the industry organizes access to work, resources, social relationships, and economic transactions simultaneously. The industry converts natural capital into financial income through human and social capital, while physical capital supports production and transportation. This combination reflects the central logic of sustainable livelihood analysis, in which livelihood outcomes emerge from the interaction of multiple asset categories rather than from one resource in isolation.

The localized nature of these economic linkages is particularly significant. When production, labour, transportation, and consumption are connected within the same geographical area, economic value has greater potential to circulate locally. This does not imply that all income remains within the village or that the industry is economically self-sufficient. Rather, it indicates that the industry establishes economic connections among community members who occupy different positions within the production and distribution process. Such circulation can strengthen the practical relevance of the industry to the wider community.

This finding also supports the argument that rural economic development should not be assessed only through formal employment statistics or the scale of registered businesses. Informal and traditional industries may make substantial contributions to livelihood security even when their operations are small, technologically simple, and weakly institutionalized. (Hiwale, 2025) emphasizes the importance of informal economic activities as sources of employment, while (Monalisa et al., 2025) highlights their role in livelihood provision. The Negeri Hatu case demonstrates this dynamic at the community level: the brick industry provides a locally accessible mechanism through which households can mobilize labour and available resources into income-generating activities.

From Individual Livelihoods to Community Economic Resilience

When the findings are considered collectively, brick-making contributes to a form of community-level economic interdependence. The industry's significance does not originate from any single household but from the connections among owners, workers, transporters, buyers, and other community members. The production system creates a network in which different actors depend upon one another for the continuation of economic activity. This interdependence is important for understanding livelihood resilience because households' ability to cope with economic uncertainty may be strengthened when they have access to multiple social and economic connections.

However, resilience in this context should not be interpreted as a condition in which the community is immune to disruption. Rather, it is more appropriate to understand the findings in terms of resilience capacity: the ability of households and community actors to maintain or reorganize livelihood activities in response to changing circumstances. The

flexibility of informal production contributes to this capacity because production arrangements can be adjusted through direct communication and social coordination. Local knowledge also provides a form of adaptive capacity because workers can modify production practices according to material conditions and accumulated experience.

The community's resilience capacity therefore emerges from the combination of several resources. Natural capital provides the raw material; human capital provides knowledge and labour; social capital enables coordination and trust; physical capital supports production and distribution; and financial capital is generated through the sale of bricks. This configuration is consistent with the sustainable livelihood approach, which emphasizes that livelihood resilience depends on the interaction of multiple assets rather than on income alone.

At the same time, the findings caution against attributing resilience exclusively to the existence of the brick industry. The industry's capacity to support livelihoods depends on continued access to clay, availability of workers, functioning social networks, market demand, and manageable environmental and climatic conditions. Consequently, resilience is relational and collective rather than an inherent characteristic of the industry itself. The industry becomes a source of resilience when the wider social, ecological, and economic relationships supporting it remain functional.

When the findings are considered collectively, brick-making contributes to a form of community-level economic interdependence. The industry's significance does not originate from any single household but from the connections among owners, workers, transporters, buyers, and other community members. The production system creates a network in which different actors depend upon one another for the continuation of economic activity. This interdependence is important for understanding livelihood resilience because households' ability to cope with economic uncertainty may be strengthened when they have access to multiple social and economic connections.

However, resilience in this context should not be interpreted as a condition in which the community is immune to disruption. Rather, it is more appropriate to understand the findings in terms of resilience capacity: the ability of households and community actors to maintain or reorganize livelihood activities in response to changing circumstances. The flexibility of informal production contributes to this capacity because production arrangements can be adjusted through direct communication and social coordination. Local knowledge also provides a form of adaptive capacity because workers can modify production practices according to material conditions and accumulated experience.

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This perspective also highlights the importance of continuity within the local production system. Because brick-making involves several interconnected actors, changes affecting one part of the system may have consequences for others. A reduction in production, for example, can influence workers' income, transportation activities, purchasing arrangements, and the circulation of money within the community. Economic resilience therefore depends partly on the capacity of these relationships to remain functional when particular livelihood activities experience pressure. The strength of the system lies not simply in the number of people involved, but in the connections that allow production and exchange to continue.

The findings further suggest that livelihood diversification within the community should not be understood only in terms of households engaging in entirely different occupations. Diversification may also occur through participation in different roles within the same production network. Individuals can contribute labour, transportation, processing, marketing, or other supporting activities, creating different points of economic participation. Such role differentiation expands the ways in which households can connect themselves to local economic activity and may reduce dependence on a single form of participation.

Yet this capacity remains conditional. Reliance on locally available resources and informal social coordination can strengthen flexibility, but it can also expose households to changes that they have limited ability to control. Access to raw materials, fluctuations in demand, environmental conditions, and the availability of labour can influence whether existing livelihood arrangements remain viable. The resilience observed in the community should therefore be understood as an adaptive capacity that is continually reproduced rather than as a permanent state.

Taken together, the findings position brick-making as part of a wider livelihood ecology in which economic activity, social relationships, local knowledge, and material resources are mutually connected. Its contribution to community economic resilience lies in the relationships and capacities that emerge around production rather than in brick production as an isolated economic activity. This distinction is important because it shifts the analysis from asking whether the industry generates income to examining how an interconnected local livelihood system enables households and community actors to sustain economic participation under changing conditions.

Vulnerabilities Behind Livelihood Benefits: Resource, Climate, Labour, and Market Constraints

The livelihood benefits identified above coexist with significant vulnerabilities. The same characteristics that make brick-making accessible also expose producers to uncertainty. Dependence on clay means that changes in the availability or quality of raw materials can affect production. Dependence on manual labour makes the industry sensitive to worker availability and physical capacity. Dependence on weather creates uncertainty during drying, while dependence on market demand exposes producers to fluctuations in sales. These conditions demonstrate that livelihood benefits and livelihood vulnerabilities are not separate phenomena; they are produced through the same resource-based economic system.

Weather is particularly important because traditional brick production contains stages that depend on environmental conditions. Drying requires appropriate weather, while excessive rainfall can delay production and potentially increase losses. This makes the industry environmentally sensitive even when production itself is organized locally. Research on brick production elsewhere has similarly identified climate and environmental conditions as important dimensions of livelihood vulnerability among workers and producers. The implication is that improving production efficiency cannot be separated from strengthening adaptive capacity to climatic uncertainty.

Labour dependence creates another vulnerability. Because many activities rely on physical work, shortages of experienced workers can directly affect production continuity. At the same time, the practical knowledge accumulated by experienced workers may not be easily replaced by simple technological substitution. This reinforces the importance of knowledge transmission between generations and among workers. If the industry is to remain viable, its future depends not only on access to clay and markets but also on the continued reproduction of the skills required to transform clay into a usable product.

Market dependence creates a further tension. The brick industry is sustained by demand for construction materials, meaning that changes in construction activity, purchasing power, transportation costs, or distribution networks can influence producers' income. The local embeddedness of economic relationships may provide some protection by facilitating repeated transactions, but it cannot completely eliminate exposure to wider market conditions. Thus, livelihood resilience depends partly on the capacity of producers to maintain market connections while managing production risks.

These findings reveal a central paradox: the same local resource that enables livelihood generation can also create livelihood vulnerability when resource availability, environmental conditions, labour capacity, or market demand become uncertain. This paradox is central to understanding the Local Resource–Livelihood Nexus developed in this study. It prevents the analysis from portraying traditional industry as either inherently beneficial or inherently problematic. Instead, the industry should be understood as a livelihood arrangement that simultaneously creates opportunities and dependencies.

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The distribution of these vulnerabilities is also unlikely to be uniform across households. Producers with stronger social networks, greater access to labour, or more stable relationships with buyers may have greater room to absorb temporary disruptions than those

whose participation depends on fewer economic connections. Vulnerability is therefore shaped not only by exposure to external pressures but also by the resources available to respond to them. This suggests that resilience within the brick-making community is differentiated and relational: households occupy different positions within the production network and consequently possess different capacities to cope with disruption.

From this perspective, strengthening the livelihood system requires more than increasing production or market access. It requires attention to the conditions that allow producers to adapt when one component of the system becomes unstable. Maintaining local knowledge, strengthening cooperation among production actors, improving access to reliable market information, and developing practical responses to weather-related disruption can increase the system's adaptive capacity. The Local Resource–Livelihood Nexus therefore captures a dynamic relationship in which resources generate livelihood opportunities while simultaneously creating forms of dependency that must be continuously negotiated. The sustainability of brick-making ultimately depends on the community's capacity to manage these interdependencies rather than simply maximizing production.

The Sustainability Dilemma: Economic Dependence versus Environmental Pressure

The relationship between livelihood generation and environmental sustainability constitutes the most critical tension emerging from the findings. Brick-making depends on the extraction and transformation of natural resources, particularly clay, while the economic security of participating households depends on the continuation of production. Consequently, reducing or restricting resource use without considering household livelihood needs could create economic consequences, while increasing extraction without environmental safeguards could undermine the ecological foundation upon which the industry itself depends.

This creates a fundamental sustainability dilemma. Natural capital provides the basis for economic activity, but continued extraction may generate pressure on the resource base. The problem is therefore not simply whether clay extraction is economically beneficial or environmentally harmful. The more important question concerns the conditions under which resource-dependent production can continue without undermining the resource and ecological conditions required for future livelihoods. This perspective is consistent with the sustainable livelihood literature, which emphasizes the need to understand livelihood strategies within changing ecological and institutional contexts.

The issue is particularly important because environmental sustainability and livelihood sustainability are mutually dependent in this setting. If clay resources become less accessible or suitable, producers may face higher production costs or reduced output. If environmental conditions make drying or firing increasingly difficult, production becomes more uncertain. If fuel requirements become more costly or environmentally constrained, the economic viability of production may also be affected. Environmental pressure therefore does not represent an external issue detached from livelihood concerns; it becomes an economic risk when it affects the conditions of production.

Evidence from brick-producing regions elsewhere reinforces the importance of this relationship. Studies have associated brick-kiln activities with land degradation, environmental pollution, and consequences for local livelihoods, demonstrating that economic benefits and environmental costs can emerge simultaneously. The Negeri Hatu case should not be assumed to replicate those contexts directly, because production technologies, ecological conditions, scale, and institutional arrangements differ. Nevertheless, the broader evidence supports the analytical proposition that resource-dependent industries require an integrated assessment of economic and ecological sustainability.

The findings therefore suggest that the long-term sustainability of traditional brick-making cannot be assessed solely through the income it generates. Its sustainability depends on whether the natural-resource base, human capabilities, labour arrangements, and market relationships can continue to support production over time. This is where the livelihood perspective becomes particularly valuable: it shifts attention from short-term economic output toward the capacity of households and communities to reproduce their livelihood systems under changing conditions. As (Ramaano, 2025a) emphasize, livelihood analysis benefits from an approach that takes seriously the dynamic relationship among ecological processes, social relations, and wider structures.

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This dilemma also places local institutions and collective decision-making at the centre of sustainability. Resource-dependent production cannot be sustained through individual household decisions alone when the resource base is shared or when environmental consequences extend beyond individual producers. The sustainability of brick-making therefore depends partly on whether community actors can negotiate acceptable forms of resource use, recognize emerging environmental pressures, and balance immediate livelihood needs with longer-term interests. Such processes are particularly important where households have few alternative income sources, because environmental restrictions may be experienced not simply as ecological measures but as direct threats to economic security.

The intergenerational dimension further strengthens this argument. The value of clay as natural capital is not limited to its contribution to present production; it also represents a potential livelihood resource for future community members. If present extraction reduces the quality or availability of that resource, future households may inherit fewer opportunities to participate in the same livelihood system. Conversely, maintaining the resource base while preserving local production knowledge can support continuity across generations. Sustainability, therefore, involves not only maintaining environmental resources but also maintaining the human and social capacities necessary to use those resources responsibly.

The Local Resource–Livelihood Nexus consequently points toward a more relational understanding of sustainability. Economic activity, ecological resources, social organization, and local knowledge should not be treated as separate dimensions competing for attention. They form a connected system in which pressure in one domain can generate consequences in another. The central sustainability challenge for Negeri Hatu is therefore not to choose

between livelihood security and environmental protection, but to understand the conditions under which both can be reproduced over time.

The Local Resource Livelihood Nexus: An Integrated Interpretation

Taken together, the findings reveal that traditional brick-making in Negeri Hatu is best understood as a connected livelihood system rather than as an isolated small-scale industry. The process begins with access to local clay, but the economic value of this natural resource is activated through accumulated knowledge and practical skills. These capabilities are then mobilized through community-based production and informal labour arrangements, while trust and social relationships coordinate interactions among owners, workers, distributors, and buyers. Production generates employment and household income, and these economic benefits create localized circulation that connects individual livelihoods with broader community economic activity.

This integrated pattern can be conceptualized as a Local Resource–Livelihood Nexus, in which natural capital is transformed into livelihood opportunities through the interaction of human capital, social capital, labour, production practices, and market connectivity. The findings therefore move beyond the conventional proposition that "natural resources generate income." Instead, they show that resources become livelihood assets through social processes. At the same time, resource dependence generates a feedback mechanism through which environmental pressure, climatic uncertainty, labour constraints, technological limitations, or market instability can affect production and subsequently increase livelihood vulnerability.

This integrated interpretation provides the central analytical contribution of the findings. Traditional brick-making is neither simply a low-technology economic activity nor merely an informal livelihood strategy. It is a community-embedded system in which natural resources, knowledge, labour, social relationships, and markets continuously interact. The sustainability of the system consequently depends on maintaining the connections among these elements rather than optimizing only one of them. The empirical significance of the Negeri Hatu case lies precisely in this interdependence: local resources create livelihood opportunities when communities possess the knowledge, labour, social organization, and market connections required to transform them into economic value, but the same dependence on local resources can reproduce vulnerability when the ecological and economic conditions supporting production become uncertain. This proposition extends the sustainable livelihood perspective by bringing the ecological basis of production and the social organization of work into a single analytical relationship, while also providing a grounded explanation of why rural economic resilience should be understood as relational, locally embedded, and environmentally contingent.

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The nexus also demonstrates that the conversion of natural resources into livelihood benefits is neither automatic nor uniform. The availability of clay alone does not determine whether households can participate successfully in brick-making. Participation depends on whether individuals possess the skills, labour capacity, social connections, and access to production and market networks necessary to convert the resource into income. This means that the same natural resource may generate different livelihood outcomes for different actors depending on their position within the local production system. The nexus therefore provides a useful basis for understanding how access to resources intersects with social and economic capabilities.

More importantly, the framework highlights the adaptive dimension of rural livelihood systems. When one element becomes constrained, actors may need to reorganize relationships among other elements to sustain production. Social coordination may compensate temporarily for labour shortages; accumulated knowledge may help workers adjust production practices to changing material or climatic conditions; and established buyer relationships may help maintain market access during periods of uncertainty. These responses do not remove structural vulnerabilities, but they demonstrate how resilience is produced through the capacity to reorganize existing resources and relationships.

The Local Resource–Livelihood Nexus thus captures a continuous process rather than a fixed economic condition. Its sustainability depends on whether the community can reproduce the knowledge, labour, social relationships, resource access, and market connections that sustain production while managing the pressures generated by resource dependence. In this sense, the Negeri Hatu case shows that rural economic resilience is embedded in the capacity to maintain productive relationships between people, resources, and markets over time. The nexus offers an integrated analytical lens through which livelihood generation, vulnerability, resilience, and environmental sustainability can be examined as interconnected dimensions of the same local economic system.

CONCLUSION

This study concludes that traditional brick-making in Negeri Hatu represents more than a small-scale economic activity; it constitutes a locally embedded livelihood system through which communities transform accessible natural resources into employment, household income, and local economic opportunities. The findings demonstrate that the livelihood value of local clay is not generated by resource availability alone, but through its interaction with experiential knowledge, informal labour organization, social relations, and market connections. At the same time, the industry remains vulnerable to resource dependence, weather variability, labour constraints, limited production technology, fuel requirements, and market conditions, indicating that its contribution to rural livelihoods is accompanied by sustainability challenges. The study therefore advances the Local Resource–Livelihood Nexus as a conceptual interpretation of how resource-based rural activities generate livelihood opportunities while potentially reproducing vulnerability when the ecological and socioeconomic conditions supporting production become constrained. Rather than treating traditional industries simply as residual forms of rural production, the findings suggest that their development should be understood through the combined dimensions of resource use, community organization, livelihood security, and environmental sustainability. In this context, strengthening traditional brick-making requires context-sensitive interventions that improve production capacity and market access while maintaining the social relations and resource base on which community livelihoods depend.

ETHICAL STATEMENT AND DISCLOSURE

This study was conducted in accordance with established ethical principles, including informed consent, protection of informants' confidentiality, and respect for local cultural values. Special consideration was given to participants from vulnerable groups to ensure their safety, comfort, and equal rights to participate. No external funding was received, and the authors declare no conflict of interest. All data and information presented were collected through valid research methods and have been verified to ensure their accuracy and reliability. The use of artificial intelligence (AI) was limited to technical assistance for writing and language editing, without influencing the scientific substance of the work. The authors express their gratitude to the informants for their valuable insights, and to the anonymous reviewers for their constructive feedback on an earlier version of this manuscript. The authors take full responsibility for the content and conclusions of this article.

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