

## Nature, Land, and Sustainability: Exploring the Livelihood Strategies of Local Community and Development of “Billionaire Village” in Tuban Regency, Indonesia

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### Abstract

Rural communities depend on natural resources for their livelihoods. As such, managing nature, land, and the environment is crucial. This study examines the livelihood assets and lives of the community following land compensation from a company establishing its presence in the region. This study employs purposive sampling, a method commonly used in quantitative research, to represent communities affected by industrial activity in Wadung Village, Jenu District, Tuban Regency, Indonesia. The participants consist of 30 fishermen and farmers. They filled out the survey for the primary data in this study. The findings show that land loss has significantly transformed the environmental ecosystem and the sustainability of life. This study examines five sustainable livelihood capitals—natural, social, financial, physical, and human capital. Social capital scored highest (14.78), reflecting the community's strong interpersonal networks and active community organizations. Financial capital ranked second (14.70), largely due to substantial compensation payments following land acquisition. However, these funds have led to financial management challenges, as many recipients lack financial literacy and spend compensation money on consumer goods rather than long-term investments. This spending pattern, combined with significant livelihood disruptions (including career changes and relocations after land loss), has created a need for structured financial guidance to ensure sustainable use of compensation funds.

### Keywords:

rural livelihood; local community; nature; land; sustainability; billionaire village Tuban

### Introduction

Overuse of land and natural resources has caused significant environmental harm, negatively impacting the lifestyles and means of subsistence of village communities, especially in a rapidly developing region. In Indonesia, development has accelerated due to population expansion, industrial growth, shifting consumption patterns, evolving livelihoods, and increased knowledge. Such development often results in social inequality because economic expansion tends to be more prioritised than equality and justice. In each location across the country, development often brings new realities and challenges,

including in Tuban Regency, East Java. Due to the region's rapid industrial expansion, the livelihoods of Tuban Regency's community are greatly impacted. Likewise, their social lives are also significantly affected as community events, which are a fundamental part of daily social interactions, changed. New interaction patterns developed along with new land use patterns and social characteristics following the advent of industrialisation, which often leads to overuse and exploitation.

Capitals supporting community livelihoods must ensure future generations' means of subsistence. However, in some communities in Tuban Regency, livelihood

strategies have become more vulnerable since the rice fields—strategic assets in for livelihoods—have been converted into industrial land. This land conversion has altered the rural and industrial environments and reduced people's the productivity. For example, according to data from the Tuban Food Security, Agriculture, and Fisheries Agency (DKP2P), rice production measured by *Gabah Kering Giling* (GKG) or Dry Milled Grain declined by 20,745 tons, or 3.14 percent, from 661,292 tons of in 2022 to 640,547 tons in 2023. Moreover, industrialisation not only changes local economies and livelihoods, but also leads to other changes such as migration, welfare, and social structure (Choithani et al., 2021).

Aside from natural resources, other capitals that support livelihoods include human capital (knowledge and skills), financial resources, social networks, and physical infrastructure, as illustrated in Figure 1. These capitals greatly influence the opportunities available to rural households to accomplish their goals, such as earning income, guaranteeing safety, or enhancing general welfare (Astuti & Handayani, 2020; Meikle et al., 2001). Households with natural resources will have better opportunities to earn incomes from different sources, such as farming, fishing, or forestry. Comparably, households with greater human capital, such as higher levels of education and training, will be able to adopt more livelihood options and adjust to shifting market dynamics or advances in technology (Alston et al., 2000; Bryan et al., 2018). The availability of social networks and financial resources can also strengthen the resilience of rural households. For instance, those with financial capital are better equipped to deal with unforeseen circumstances or shocks, obtain credit, and invest in productive assets. Likewise, households with strong social capital, such as close community relationships, trust, and cooperation, will have the valuable support

for knowledge exchange and assistance for resources when needed (Serrat, 2017a). Considering the importance of these capitals and their roles in enhancing livelihoods in rural areas, policymakers and development practitioners can create more targeted interventions and policies.

Research on rural livelihoods has become increasingly more important in the context of environmental changes and globalisation. A study in China's hilly areas along the Minjiang River shows that livelihood choices need to be matched with available capitals (Fang et al., 2014). Another study in China suggests a positive correlation between agricultural livelihood strategies and capitals (i.e., natural and human), despite variations among different types of organisations. This indicates that the quantity and nature of these capital endowments influence the effectiveness of agricultural activities, depending on the community contexts. The study also highlights the importance of social and financial capital in driving non-agricultural enterprises in the region. Therefore, approach to rural economic development need to be diversified (He & Ahmed, 2022).

Past studies like described above highlight the importance of understanding the complexities of livelihood capital in sustaining rural livelihoods. To effectively support various livelihood strategies, interventions need to be tailored to account for local contexts and the availability of diverse financial resources. Prioritising programs that enhance capitals and improve access to urban areas should be a key focus of policies aimed at strengthening rural communities. Policymakers need to focus on creating inclusive and resilient rural economies that can withstand shocks and promote long-term welfare by encouraging capital accumulation and equal access to opportunities (Fang et al., 2014)

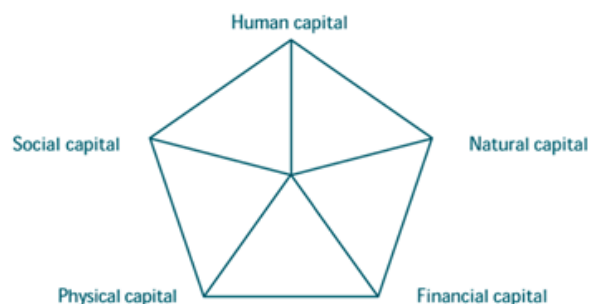
According to Boedjeck in Wijayanto et al. (2019), environmental changes have a

significant influence on capitals that support livelihoods and people's lives. This is critical because, as stated by Ellis in Wijayanto et al. (2019), a community's ability to implement livelihood strategies and meet its needs depends on the assets it possesses. Therefore, this study aims to conduct an in-depth analysis of the viability of living in the "billionaire village" in Tuban Regency. It also seeks to examine the characteristics of the community, livelihood patterns, vulnerabilities, and the shifts in livelihood and life assets caused by land and natural resource exploitation.

### Literature Review

The concept of sustainable livelihood is used by experts to assess and improve community living conditions, particularly in addressing poverty and village development. Several development organisations have integrated this approach into their initiatives for sustainable development, including the British Department for International Development (DFID, 1999a). The framework created by the British Department for International Development, as shown in Figure 2, has been widely adopted (DFID, 1999a). This framework provides a structured understanding of the various factors that constrain or enhance livelihood opportunities. It highlights key elements influencing household livelihoods and illustrates the interconnections between these factors. The British Department for International Development states that this framework serves as a valuable tool for planning new development initiatives and evaluating the extent to which existing activities align with livelihood goals.

The environment significantly shapes livelihood structures and daily life, making sustainable asset management essential for ensuring long-term sustainability (DFID, 1999b; Gai et al., 2020a). The framework provides a useful conceptual tool for understanding urban poverty and the conditions of those living in

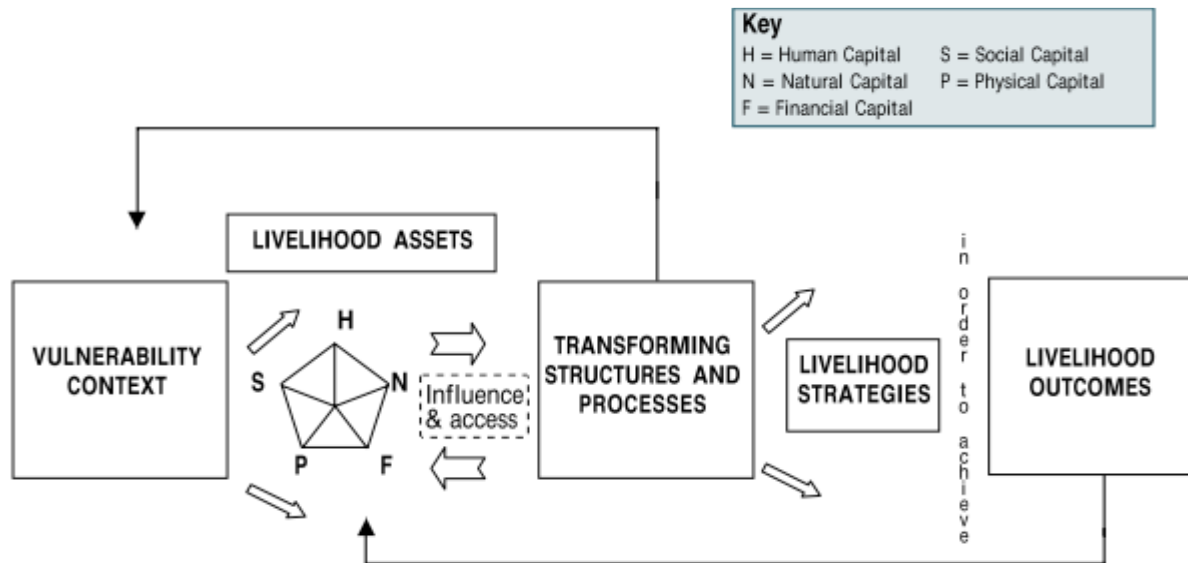


**Figure 1. Livelihood Capitals**

Source: *The British Department for International Development (DFID, 1999a)*

urban settlements. It also serves as a valuable resource for analysing the impact of policies on their livelihoods (SNV et al., 2006) (Waqid, 2014).

In socio-ecological dynamics, the rural livelihood system emerges from the integration of social and ecological systems, offering diverse options for farmers' subsistence strategies (Chambers & Conway, 1992). Five types of resources contribute to the development of farmer welfare: human capital, physical capital, natural capital, financial capital, and social capital (Krantz, 2001; Serrat, 2017b). Human capital includes people's health, knowledge, and abilities to work and obtain employment. Natural capital is the physical environment and essential natural resources for sustaining life. Financial capital comprises personal income, savings, and expenditures. Physical capital includes tangible resources such as vehicles, clean water, and sanitary facilities that contribute to a comfortable and efficient environment. Social capital refers to individuals' interactions within their social networks, including formal and informal connections with neighbours, relatives, and friends (Natarajan et al., 2022). Sustainable livelihoods involve social development processes that maintain a community's standard of living while considering environmental sustainability, natural resources, and the needs of future generations (Ayana et al., 2022).



**Figure 2. Sustainable Livelihoods Framework**

Source: *The British Department for International Development (DFID, 1999a)*

**Table 1.**  
**Research Method Matrix**

Description	Variable	Data measurement	Data source	Data analysis
Livelihood Assets	Human Capital	Education, Health, experience, knowledge, skills/expertise, workforce	Interview via questionnaire	Quantitative and qualitative
	Natural Capital	Land tenure and land productivity		
	Social Capital	Community organisations, mutual cooperation, social networks		
	Financial Capital	Income, expenses, savings, debts and receivables		
	Physical Capital	Facilities and infrastructure		

Source: *Author's Elaboration Adopted from (DFID, 1999a)*

## Methods

This study employs purposive sampling, a non-probability sampling method, to select representative communities in Jenu District, Tuban Regency, affected by industrial activities of PT Pertamina—a state-owned oil company. Participants comprised fishermen and farmers, with a sample size of 30 respondents for primary data collection. The data were analysed using binary logistic regression and sustainable livelihood analysis. A descriptive assessment of livelihood sustainability was conducted based on the sustainable livelihood framework as shown in Figure 1, which evaluates five key capital capitals: human, natural, social, financial, and physical. Each capital variable

was scored on a 0–5 scale for quantitative analysis.

The five livelihood capitals were calculated by averaging the values of their respective capital indicators. Primary data were collected through structured interviews, in-depth interviews, observations, and documentation. For the quantitative analysis, each indicator was initially scored on a 0–4 scale, where higher values indicated stronger support for a given indicator; these scores were then converted to a 0–10 scale to ensure consistent weighting and enhance interpretability. The qualitative analysis involved thematic interpretation of questionnaire responses, interview transcripts, and observational data, aligning with the

research objectives to provide a comprehensive understanding of the observed phenomena.

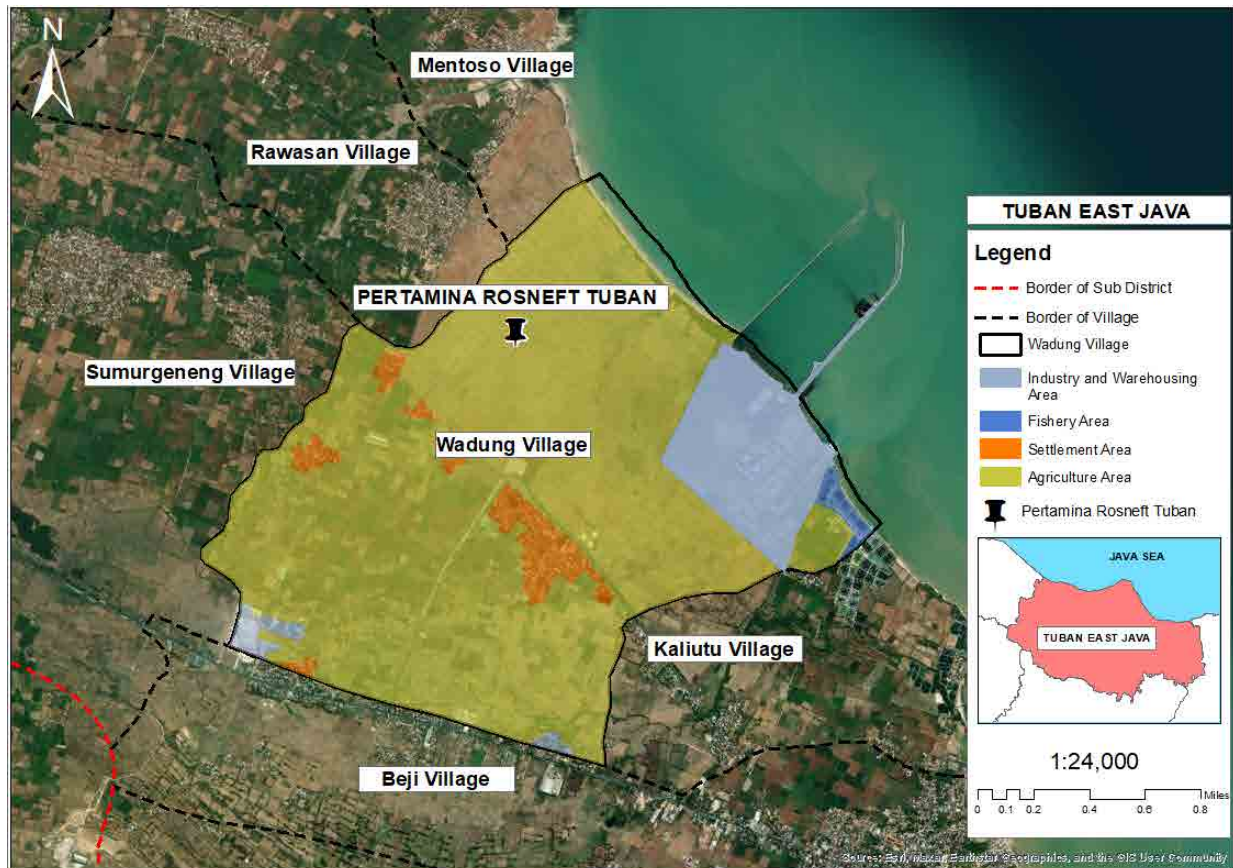
## **Results**

The establishment of large-scale industrial facilities serves as a key marker of industrialization and economic development. In several emerging economies, this process has precipitated rapid transformations in land use patterns. A study by Nurfitriani (2012) shows that the industrial sector grows more rapidly than the agricultural sector because investment in the industrial sector is considered more profitable. The findings also indicate that population growth pressures subject the agricultural sector to the law of diminishing returns. In addition, the sector is characterised by slower growth rate than other economic sectors (Nurfitriani, 2012). Agricultural land conversion has been extensive, which significantly increased farmer vulnerability. Research on livelihood strategies offers critical insights into how households adapt their livelihood patterns in response to external pressures and systemic shocks (Ifejika Speranza et al., 2014a; Wigati & Fitrianto, 2013a). The livelihood approach helps increase understanding of the community's adaptive capacity patterns and how to reduce poverty. This approach captures both the tangible resources available to communities and the diverse livelihood strategies they employ, extending beyond mere income generation to encompass critical social networks and support systems (Ifejika Speranza et al., 2014a; Rural and Urban Development, 2019). A study by Mardian Wiyata (2022) demonstrates that land use changes significantly increase vulnerability among farming households, leading to heightened socio-economic precarity. This impact follows a clear socioeconomic gradient—households in lower social strata experience disproportionately severe consequences from land conversion.

This study was carried out at Wadung Village in Jenu District, Tuban Regency, East Java Province, which is impacted by the development of PT Pertamina. The study area is primarily composed of industrial and agricultural areas. The livelihood strategies of the communities, are impacted by environmental changes. Wadung village is in the first ring, which is greatly impacted by the growth surrounding the business. The community received compensation, in exchange of the land, but this has led to the loss of natural resources and essential means of livelihood. Consequently, local residents lack the knowledge and skills required to maintain viable livelihoods amid changing land-use conditions. This study therefore aims to examine livelihood sustainability by systematically mapping and analysing existing livelihood assets within affected communities. The map of the research location is presented in Figure 3.

The use of adaptable indicators in livelihood assessments, tailored to urban or rural contexts, demonstrates an advanced understanding of the diverse environments in which livelihood strategies operate. By considering the unique socioeconomic and environmental dynamics of each location, these assessments provide more precise and practical insights into the opportunities and challenges communities face. In the study area, the development of 29 subcomponents enhances the primary livelihood assessment components, capturing the complexities of local livelihood systems. These subcomponents likely address key aspects such as business opportunities, social networks, infrastructure, healthcare, education, and natural resources. By refining broad components into specific subcategories allows for a more precise identification of the factors shaping livelihood outcomes, enabling the design of interventions that align with local needs. This detailed approach facilitates a deeper understanding of livelihood structures





**Figure 3. Map of the study location**

*Source: Author's construction 2023*

and enables the formulation of targeted, context-sensitive strategies for both urban and rural communities. The availability and accessibility of livelihood assets shape a household's ability to adapt to environmental changes and withstand challenges, with livelihood strategies reflecting how resources are organised and utilised. To analyse variations in sensitivity and key determinants, this study categorises livelihood strategies into agricultural and non-agricultural groups based on the ratio of non-agricultural income to total household income.

This classification makes it easier to comprehend how households respond to shifting economic conditions and environmental changes. Agricultural plans generally include a strong emphasis on human and natural capital, which reflects a tight relationship to the land and customary farming methods. On the other hand, non-agricultural approaches

could make more use of social and financial resources, enabling households to investigate non-agricultural options like side jobs, small enterprises, or community service. As such, this study captures various forms of capital interact and influence household resilience and adaptation strategies in the face of shifting environmental and economic conditions by breaking down livelihood strategies into these categories.

Understanding the relationships between various types of capital and how they affect livelihood strategies is essential to comprehending the resilience and adaptability of rural households. In the context of agricultural livelihood initiatives, natural and human capital are important (Gai et al., 2020b; Wigati & Fitrianto, 2013b). Natural capital, which includes resources like land, water, and biodiversity, serves as the basis for

agricultural activities and has a direct bearing on sustainability and production. Similarly, labour, knowledge, and skills make up human capital, which is essential to farm management, agricultural production, and animal husbandry (Ifejika Speranza et al., 2014b). Investments in education and training can increase agricultural resilience and productivity by empowering farmers to use contemporary methods, reduce risks, and adjust to shifting environmental circumstances (Zheng et al., 2013a).

Social and financial capital plays a crucial role in the success of non-farm livelihood strategies, enabling households to invest in diverse income-generating activities while enhancing resilience through access to credit, savings, and insurance. Strong social networks further support sustainable non-farm livelihoods by facilitating market access, resource sharing, and collective action, highlighting the need for policies that foster an environment conducive to capital accumulation and economic adaptability.

### ***Human Capital***

The community livelihood assets of Wadung Village depend largely on the collective capital of its residents. Recognising the central role of people in sustaining livelihoods highlights the significance of human capital. When analysing the constituents of human capital, experience, education, and aptitude stand out as critical factors. Specialised knowledge or competency obtained via school, training, or practical experience is referred to as expertise. It adds to the community's overall skill set and promotes flexibility. Meanwhile, background includes various cultural, social, and historical settings that influence people's viewpoints and actions, adding to the complexity of interpersonal relationships and approaches to problem-solving in communities. Wadung Village can strengthen its resistance to outside shocks and promote sustainable development paths that put the prosperity and well-being of

its residents first by valuing and utilising these aspects of human capital.

**Table 2.**  
**Human Capital in the Sustainable Livelihood Approach**

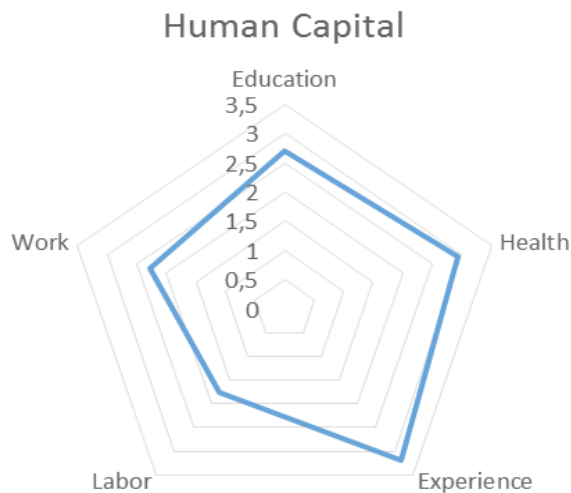
HUMAN CAPITAL	
Education	2.70
Health	2.93
Experience	3.20
Labour	1.77
Work	2.27
<b>Total</b>	<b>10.60</b>
Average	2.65

*Source: Author's Processed Data, 2023*

The experience variable stands out since it has the highest value of 3.20, which highlights Wadung Village's long history of agriculture. This score is a reflection of the generations-long cultivation of the villagers' vast knowledge and proficiency in farming techniques. Their livelihoods are based mostly on agriculture, which is deeply embedded in their daily routines and cultural identity. The community's deep connection to the land, fostered through their close engagement in agricultural activities, has strengthened their resilience in overcoming challenges and optimising farming productivity. The foundation of Wadung Village's economic and social structure is a strong agricultural ecosystem that has been developed via the generational transfer of farming knowledge.

On the other hand, the labour variable has the lowest score of 1.77, indicating that the community's human capital framework places comparatively less focus on it. Although labour is still a vital component, its decreased valuation points to a possible area where the local economy could be strengthened or diversified. This disparity may result from several factors, such as the scarcity of jobs outside of agriculture or the requirement for skill-development programs to maximise worker productivity in other industries. The pentagon of human capital, as shown

in Figure 4, provides a graphic depiction of these complex processes by emphasising both the socioeconomic landscape's strengths and prospective growth regions in Wadung Village.



**Figure 4. Pentagon human capital assets**

*Source: Author's Processed Data, 2023*

### Natural Capital

The abundance of resources offered by nature, from tangible assets like land and trees to intangible components like biodiversity and the climate, that directly support human livelihoods is known as natural capital. This wide range of resources highlights the complex interrelationship between humans and the environment, in which natural capital is essential to both supporting socioeconomic growth and preserving life. Natural capital is essential as it directly supports human needs and maintains ecosystem services, such as clean water and air, boosts agricultural production, and controls climatic patterns. The resilience and longevity of human societies depend on the recognition and stewardship of natural capital, which directly influences ecosystem stability and resource availability for livelihoods. Key indicators of natural capital include land area, water resource productivity, land productivity, and access to environmental services. A community's capacity to sustain its livelihoods through these natural resources is a crucial

determinant of its overall natural capital (Diniz et al., 2013; Zheng et al., 2013b).

**Table 3.**  
**Natural Capital in the Sustainable Livelihood Approach**

Natural Capital	
Land Tenure	2.25
Land Productivity	4.00
Water resources	2.33
Environmental Services	3.63
<b>Total</b>	<b>12.22</b>
<b>Average</b>	<b>3.05</b>

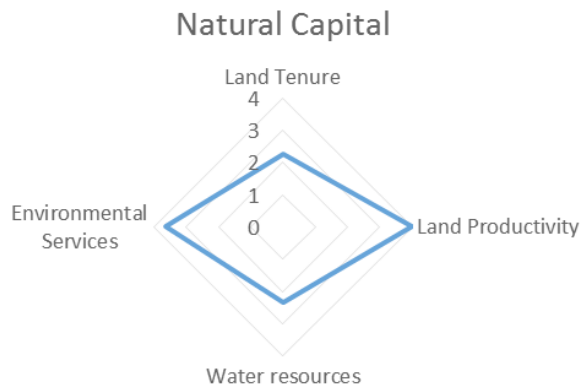
*Source: Author's Processed Data, 2023*

The table delineates the various components constituting natural capital, encompassing Land Tenure, Land Productivity, Water Resources, and Environmental Services. Notably, the aggregate natural capital assets at the research site average 3.05, with land productivity emerging as the most significant contributor, at 4.00. This indicates that land plays a crucial role in Wadung Village, where fertile soil supports agriculture and food security. The natural capital score of 12.22 reflects the village's abundant resources and potential for sustaining livelihoods and economic activities.

The asset pentagon for natural capital highlights land productivity as a dominant asset in Wadung Village's socio-economic landscape. The high rating reflects the village's dependence on agriculture and underscores the need to preserve soil fertility and optimize land use. Secure land tenure supports the community's agrarian lifestyle, where most residents rely on farming. This connection between land tenure and agricultural productivity reinforces the importance of sustainable land management for the village's long-term prosperity and resilience.

Natural capital plays a pivotal role in bolstering food security within the study area, notably Wadung Village, renowned as the rice granary of Tuban Regency. Spanning 348 hectares, the agricultural landscape of Wadung





**Figure 5. Pentagon of Natural Capital Assets**

Source: Researcher's Process, 2023

Village comprises predominantly paddy fields and arable land, representing a critical nexus between natural capital and sustenance. The fertile soil and ample water resources in the region support robust agricultural production, particularly rice cultivation, which serves as a staple food source for the local populace. The abundance of natural capital assets, including fertile land, reliable water sources, and favourable climatic conditions, underpins the village's capacity to meet its food requirements and contribute to regional food security. The agricultural sector serves as the backbone of Wadung Village's economy and livelihoods, with rice cultivation serving as a primary occupation for the majority of residents. The symbiotic relationship between natural capital and food security is evident in the village's reliance on land and water resources for sustenance and economic prosperity.

### Social Capital

Social capital is essential for optimising the use of social resources to achieve communal livelihood goals. While the benefits of social capital are directly felt by the community, social resources are often intangible and challenging to measure (DFID, 1999b). Changes in natural conditions in the research area significantly impact livelihood patterns in Wadung Village. As the ecological landscape evolves due to factors such as climate variability, land

degradation, or changes in water availability, communities must adapt their livelihood strategies to mitigate risks and capitalize on emerging opportunities.

Social capital plays a key role in shaping adaptive responses to changing natural conditions in Wadung Village. Community-based organisations and informal networks facilitate collective decision-making and resource management, strengthening adaptive strategies and promoting inclusive development. By integrating social, natural, and human capital, the village can adopt a holistic approach to sustainable development that supports both community well-being and environmental conservation.

**Table 4.**  
**Variables that make up social capital**

SOCIAL CAPITAL	
Community organisation	4.30
Participation in activities	3.47
Mutual cooperation	3.83
Social network	3.18
<b>Total</b>	<b>14.78</b>
Average	3.70

Source: Researcher's Process, 2023

Wadung Village's strong network of community groups demonstrates its social capital, as evidenced by its high score of 4.30. These groups enhance communication, strengthen community ties, and improve



**Figure 6. Community Social Capital Assets**

Source: Researcher's Process, 2023

access to government programs and resources, thereby enhancing social cohesion, resilience, and inclusive development. Wadung Village has a population density of 543 persons per km<sup>2</sup>, with 2541 residents. Out of all the sub-districts, Wadung Village has 4.59 inhabitants as its population proportion. The community actively participates in neighbourly activities, including marine almsgiving, rice field irrigation, and other cooperative efforts.

### Financial Capital

Financial resources are essential for sustaining livelihoods, allowing individuals and communities to meet their needs and achieve their goals. In Wadung Village, financial capital—including income, expenses, debts, savings, and assistance—directly impacts well-being and resilience. Effective financial management is crucial for navigating economic fluctuations and maintaining stability. Debt and savings play a key role in shaping households' financial resilience and long-term prospects. While judicious borrowing can facilitate investment in income-generating activities or essential assets, excessive debt burdens can undermine financial stability and exacerbate vulnerability to economic shocks. By effectively managing financial resources, Wadung Village can strengthen economic resilience, sustain livelihoods, and promote inclusive development that prioritises community well-being and prosperity.

**Table 5.**  
**Financial Capital**

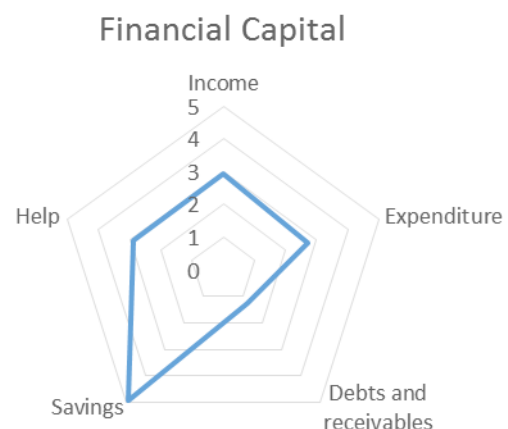
FINANCIAL CAPITAL	
Income	2.93
Expenditure	2.70
Debts and receivables	1.27
Savings	4.93
Help	2.87
<b>Total</b>	14.70
<b>Average</b>	2.94

Source: *Researcher's Process, 2023*

The findings of this research highlight the importance of savings within the financial

landscape of Wadung Village, as evidenced by its highest value of 4.93 among the analysed financial elements. The community's strong saving habits highlight its financial prudence, with villagers prioritising reserves as a safeguard against hardships and unforeseen events. In Wadung Village's agrarian setting, where livelihoods depend on unpredictable agricultural cycles, savings act as a crucial buffer during lean seasons or crop failures. This practice, especially during abundant harvests, reflects a deep awareness of agriculture's cyclical nature and the necessity of financial resilience.

Conversely, while income represents a fundamental component of financial capital, its comparatively lower value of 2.93 underscores the variability and unpredictability inherent in rural livelihoods. Despite efforts to diversify income through off-farm activities and small enterprises, fluctuating agricultural incomes remain a challenge for many households in Wadung Village. While financial assistance and expenditures help meet immediate needs and support economic activities, their modest levels highlight the need for better resource allocation and stronger external support to improve financial resilience. The high score on savings highlights the foresight and adaptability of Wadung Village residents in managing rural



**Figure 7. Community Financial Capital Assets**

Source: *Researcher's Process, 2023*

uncertainties, presenting opportunities for targeted interventions to further enhance financial stability and community well-being.

### Physical Capital

The sustainability of community life in Wadung Village is closely tied to the availability and functionality of existing infrastructure and facilities. As part of Tuban Regency's community development efforts, these essential facilities serve as the foundation for daily activities and socioeconomic initiatives. Although the region's predominant mobility patterns are reflected in the reliance on motorbikes and bicycles for transportation, the moderate value of 1.83 assigned to these modes of transportation highlights possible accessibility and adequacy concerns, especially in rural places like Wadung Village. The transportation infrastructure plays a crucial role in promoting mobility and connection, so improvement is needed to provide access to services, markets, and job opportunities. This would increase the community's resilience and economic inclusion.

On the other hand, the community's infrastructure (with value of 3.82) consists of a wide range of facilities that serve practical as well as cultural requirements. These include historical sites, prayer rooms, public baths, patrol posts, and village offices. These common areas serve as hubs for social interaction, cultural expression, and community cohesion in addition to meeting utilitarian needs.

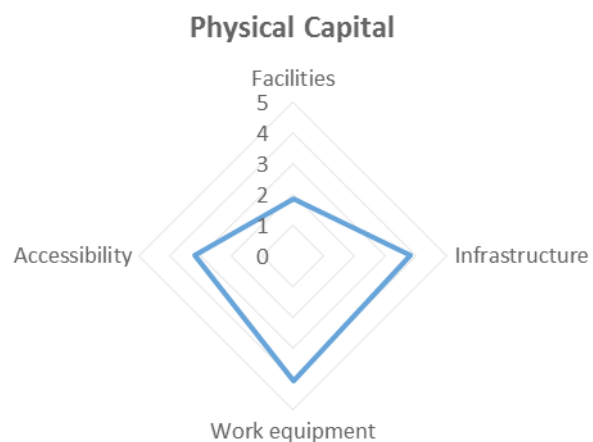
As a result, they help Wadung Village residents feel a sense of identity and belonging. Furthermore, the availability of labour equipment—such as tractors, farming implements, and pond machinery—highlights how important agricultural infrastructure is to maintaining livelihoods and boosting economic output. By investing in and preserving these key assets, Wadung Village can increase its resilience to shocks, foster socioeconomic development, and

guarantee the continuation of communal life for future generations.

**Table 6.**  
**Physical Capital**

PHYSICAL CAPITAL	
Facilities	1.83
Infrastructure	3.82
Work equipment	4.07
Accessibility	3.17
<b>Total</b>	<b>12.88</b>
<b>Average</b>	<b>3.22</b>

Source: Researcher Process, 2023



**Figure 8. Physical Capital Assets**

Source: Researcher's Process, 2023

The pentagon diagram visually highlights the importance of physical assets in sustaining livelihoods and supporting community well-being. Physical capital—including facilities, infrastructure, and accessibility—serves as the foundation of Wadung Village's socio-economic structure. As depicted in the diagram, these assets serve as enablers of livelihood activities, providing the necessary tools, resources, and connectivity for community members to thrive. The availability of these resources supports the sustainability and resilience of livelihoods in Wadung Village. These assets enhance productivity, reduce labour burdens, and expand economic opportunities. Investing in and maintaining physical assets strengthens the village's ability to withstand external shocks, adapt to change, and promote inclusive development for all residents.

## Discussion

### The need for sustainable livelihood strategies

The vulnerability of the Wadung Village community to agricultural land loss has a serious impact on the sustainability of their lives. Households with more assets are less vulnerable to economic and environmental shocks. Addressing this requires targeted initiatives and strategies. Knowledge of livelihood access has been preserved and passed down for generations, ensuring continuity in sustaining household resilience. Communities in Wadung Village often adopt livelihood strategies like intensification or extensification, particularly households with limited livelihood assets. Their direct reliance on agricultural land as a primary asset means any changes in land access could significantly threaten their livelihoods.

Strategies for intensification and extensification are important to improve agricultural activity while keeping the main livelihood focus intact. By using more labour and better techniques to increase agricultural output, intensification aims to maximise yields on a smaller amount of cultivated area. This strategy is pivotal for sustainable development, emphasising efficient resource utilisation and minimising environmental impact. By intensifying agricultural practices, communities can achieve higher productivity levels, optimise land use, and promote food security, to mitigate poverty and enhance economic stability.

The extensification strategy expands cultivated land to meet agricultural demands while maintaining environmental sustainability, complementing intensification, which focuses on maximising productivity within existing resources. Both approaches are essential for enhancing food security and rural livelihoods, but their implementation must be balanced with conservation efforts to ensure long-term sustainability. By integrating these strategies with modern agricultural

techniques, communities in Wadung Village can promote sustainable farming practices and build resilience for future generations.

## Conclusion

Wadung village's transformation from a rural to an industrial region has had a profound effect on people's lives, particularly those with limited sources of income. The findings contribute significantly to assessing vulnerability in Wadung Village and the importance of communal livelihood assets for future generations. Rural livelihoods in Wadung depend on the sustainable use of natural resources, which requires responsible practices to support community well-being. Land ownership and access to subsistence resources play a crucial role, especially for those near the Tuban industrial sector. With an average value of 3.70, social capital emerges as the most vital livelihood asset to foster community cohesion and resilience. Overall, the study highlights the importance of social and physical capital in sustaining livelihoods and promoting rural development.

The research highlights key factors essential for ensuring sustainable livelihoods in Wadung Village, including infrastructure, healthcare services, institutional support, education, transportation networks, and agricultural development. These interconnected elements function as catalysts for economic growth, social inclusion. The study highlights the importance of social and physical capital in sustaining livelihoods, promoting rural development, and ensuring environmental sustainability. Their synergistic interaction strengthens long-term resilience and enhances the village's capacity to navigate challenges.

Wadung Village's commitment to social cohesion and consensus values forms the foundation of its sustainable livelihoods. A collaborative mindset strengthens the community's ability to achieve shared goals and navigate challenges. By integrating these principles into daily life, villagers align



**Table 7.**  
**Conclusion**

CONCLUSION					
	Human Capital	Natural Capital	Social Capital	Financial Capital	Physical Capital
Total	10.60	12.22	14.78	14.70	12.88
Average	2.65	3.05	3.70	2.94	3.22

Source: Author's Processed Data, 2023

economic and environmental initiatives with local needs while reinforcing social ties. This integrated approach highlights the role of social dynamics and material resources in building resilience. By fostering teamwork and leveraging these strengths, Wadung Village can ensure the long-term well-being of its residents and sustain livelihoods for future generations.

According to the research findings, social capital has the highest value in the study area (score of 14.78). The community upholds social values like high levels of cooperation and vibrant community organisations, allowing them to sustain their livelihoods amid changes. Financial capital has the second-highest worth (14.70) due to the compensation money, which increases people's savings. Many decided to change occupations and even relocate to different towns and regions after losing their land. The lack of long-term natural resource management in Wadung Village stems from the shift of land and nature into monetary assets. As a result, livelihoods that have sustained families for generations are disappearing, leaving many without traditional employment. Due to people's limited financial literacy, strict help is needed once compensation money is delivered. For example, they should be informed that purchasing consumer goods weakens survival and may result in needing more aid.

Livelihoods in rural areas are often dependent on natural resources, while limited human capital constrains economic diversification. In regions such as Tuban, low educational attainment hinders the community's ability to access career opportunities and improve income sources, despite the availability of infrastructure and

amenities. This underscores the critical role of non-economic factors, such as education and skill development, in enhancing the overall quality of life in rural communities.

The assessment of livelihood vulnerability in the research area indicates a classification of "not sustainable," reflecting significant challenges faced by local inhabitants. Limited access to economic opportunities and resources heightens rural communities' susceptibility to external shocks, including natural disasters, market fluctuations, and climate change. Furthermore, the "billionaire villages" category highlights economic disparities, with the majority of residents experiencing relative poverty and limited control over their financial resources. Addressing these vulnerabilities requires targeted strategies that focus on human capital development, economic inclusion, and improved access to sustainable resources to enhance long-term resilience and stability.

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