



THE ECONOMICS Vs SUSTAINABILITY IN ECOTOURISM SITES PLANNING AND DEVELOPMENT: LESSONS LEARNED FROM THE IMPACT OF LANTEBUNG MANGROVE FOREST ECOTOURISM ON THE COMMUNITY'S SUSTAINABLE LIVELIHOOD

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Abstract

The study evaluates the Lantebung Mangrove Ecotourism Area (LMEA), managed by the Tourism Awareness Group (TAG), focusing on its economic contribution and potential to promote community awareness for ecosystem sustainability as part of the Sustainable Development Goals (SDGs). 187 respondents were interviewed and scored the human, social, natural, physical, and financial capital indicators of TAG individuals to create a pentagonal asset framework. The findings indicate that TAG LMEA has significant natural and social capital due to its ecological tourism potential and stakeholder support. The natural capital score was 2.52 (high), and the social capital score was 2.37 (high). In contrast, the measured values for human capital (1.63), physical capital (1.51), and financial capital (1.63) are insufficient. The study demonstrates a reciprocal relationship between financial and human capital, wherein community engagement fosters growth and participation in LMEA governance. Stakeholder trust is affected by human and social capital, necessitating government regulation of the "Build-Operate-Takeover" paradigm to protect vulnerable people from the adverse impacts of financial capital. Due to their limited knowledge, a "collaborator" component is essential to aid TAG in overseeing green tourism enterprises.

Keywords: Sustainable Livelihood, Ecotourism, Sustainable Tourism Policy

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INTRODUCTION

Sustainability is now an integral concept in the tourism industry, shaping development strategies worldwide. In Indonesia's 2030 Sustainable Development Goals strategy, tourism is highlighted as a key driver of welfare and environmental sustainability (UNDP, 2024). The sector significantly contributes to the national economy, employing 12.7 million people in 2020, which accounted for over 10% of the workforce (NDPA, 2021). By 2030, tourism is projected to contribute 5.13% to GDP and attract 23.18 million international tourists. Under the National Long-Term Development Plan (RPJPN), Indonesia aims to become a Golden Indonesia by 2045, targeting a per capita income above USD 23,000, requiring the achievement of the SDGs by 2030 (NDPA, 2023). This vision emphasises social reform, economic growth, good governance, rule of law, stability, and diplomacy (Akbar et al., 2024). Accelerating tourism initiatives is essential to support economic, environmental, social, and cultural development as part of these national goals.

Makassar, South Sulawesi's capital, is a popular Indonesian tourist destination for its history and culture. The Lantebung Mangrove Forest Ecotourism Area (LMEA) is a growing tourist attraction, an economic resource, and a natural defence against coastal erosion and climate change (Akram, 2024; Moussa et al., 2024). The Tourism Awareness Group-Pokdarwis (TAG), a varied economic, social, and cultural community organization, manages LMEA and represents a vulnerable group in need of help and progress. This method is essential to balancing the community's economic access to conservation programs with LMEA's green tourism impact on the local economy. In biodiversity-rich but economically poor locations, local communities depend heavily on natural resources for income (Dawson et al., 2021).

There has been substantial research into the development of mangrove forests as tourist attractions (Dalimunthe et al., 2023), as well as the measurement of community livelihoods (Mallick et al., 2021). Nevertheless, research examining the potential of mangrove forests as a community asset and economic resource, which could influence the sustainability of their livelihoods, remains very limited. This research posits that if the community identifies itself as integral to the preservation of the mangrove forest ecosystem, it will enhance their well-being, thereby fostering a mutually beneficial relationship between the community and environmental conservation (Petriello, 2024; Qin et al., 2024). This research seeks to evaluate the LMEA as a green tourism destination by examining its role as a contributor to the economy of the community, which can foster collective awareness for the sustainability of the regional ecosystem in a mutually beneficial manner. The analysis employed the Pentagonal Asset framework, a well-established tool for assessing the sustainability potential of a region. This research outcome will provide a significant reference for the

government, especially for the city of Makassar, in developing and executing enhanced policies, programs, and strategies to promote green and sustainable tourism destinations, thus aiding in the attainment of the SDGs.

LITERATURE REVIEW

Green Tourism and Sustainable Development Goals

Tourism is a fast-growing industry with major economic, social, and national impacts. Travel and tourism made up 9.1% of global GDP in 2023, up 23.2% from 2022 and down 4.1% from 2019. The sector added 27 million jobs, representing a 9.1% increase from 2022 and a 1.4% decrease from 2019. In 2023, domestic visitor expenditure rose 18.1%, exceeding 2019. Although foreign visitor expenditure rose 33.1% in 2023, it slipped 14.4% below 2019 levels (WTTC, 2023). Tourism is important for employment creation and foreign exchange gains (Zhao, 2023) as well as improving transportation infrastructure (Yanchao et al., 2023). It promotes social globalization, economic expansion, and prosperity (Alamineh, 2023). The tourism industry needs to rethink how to use innovation to create long-term recovery plans (Chiawo et al., 2023); improve educational programs to get people involved and help them work together to create the best ecotourism (Habibulloev et al., 2024); and use eco-friendly practices to help the world reach its sustainable development goals. People may confuse green tourism and ecotourism to mean rural tourism or ecotourism, both of which are environmentally conscious. Due to environmental concerns, tourism growth, and the necessity for careful management have evolved (Al-Sakkaf et al., 2024; Raza et al., 2024).

Environmental economics promotes green tourism and sustainable growth by viewing sustainable deterioration as a business failure. Environmental concerns and visitors' preferences for green tourism strongly influence ecologically responsible tourism behaviour (Tafsirun et al., 2024). The relationship between tourism and ecosystem conservation and restoration is also important. A viable environment for future tourists requires sustainable tourism activities. Cultural landscapes, resources, and customs can boost visitor satisfaction and stimulate repeat trips (Kızıldağ & Yıldız, 2024). Satisfied tourists may not behave properly, requiring a more deliberate approach (Borthakur & Kondasani, 2024). Travelers choose sustainable tourism destinations found that tourists prefer sustainable sites (Kyriakaki & Kleinaki, 2021). The largest tourism and hospitality corporations can help execute the SDGs. Tourism is a big polluter, say critics. Tourism authorities and the government could reduce this impact by passing eco-friendly laws (Wania et al., 2024).

Green Tourism Policy: A Global Perspective

While presenting obstacles to environmental preservation, green tourism is turning the green economy into a feasible area for economic expansion (Toubes & Araújo-Vila, 2022). Sustainable tourist management depends on effective regulation, yet many developing countries continue to have weaker legal systems than industrialized ones. In addition to taking proactive steps to mitigate negative environmental, social, and cultural impacts, sustainable tourism requires a nuanced understanding of social costs and benefits (Baena & Cerviño, 2024).

Globally, green tourism supports the human right to a sustainable, safe, and healthy environment that includes public health, decent housing, and spiritual prosperity. International cooperation, multi-level governance, resource allocation, and regulation should be the main focuses of green tourism policy. National frameworks, from economic facilitation policies to environmental protection acts and tourism laws, aim to promote cross-sector cooperation, safeguard ecosystems, and reward green projects; however, enforcement and policy clarity frequently continue to be major obstacles (Thang & Thanh, 2023). Numerous nations have implemented a range of tactics to encourage green tourism, such as eco-destination development, clean-green practices, blue-economy plans, sustainable sports, regenerative tourism, tourist decarbonization, and community-based tourism. Many strategies are used to improve quality and sustainability in tourism, including green certification, strategic marketing, innovation incentives, and educational initiatives (Tran & Xuan, 2021; UNWTO, 2023).

Azmadi et al. (2023), for instance, looked into digital smart-tourism applications, notably QR-code integration on the KL QR Trail. They discovered that visitors' established habits and sustainability attitudes greatly increase their happiness and behavioral intention toward smart-eco activities. Azinuddin et al. (2022) assessed overtourism, perceived man-made threats, and revisit intents in Malaysia's heritage environment, demonstrating how unchecked tourism pressures might undermine conservation objectives. For sustainability and social acceptance, Mohd Rasdi et al. (2022) discovered that local community involvement in responsible tourism is essential. Additionally, Shehab et al. (2023) investigated how socioeconomic disparities impact community support for tourism and how destination image branding influences resilience and retention in frameworks for sustainable tourism.

Green tourism significantly drives economic growth within the green economy but also creates challenges for environmental conservation, making effective regulation vital for sustainable tourism management (Toubes & Araújo-Vila, 2022). In Indonesia, although the government has prioritised green tourism governance through laws such as the Tourism Law 2009, Environmental Protection Law 2009, and Job Creation Law 2023, its regulatory frameworks

remain weaker compared to developed nations (Thang & Thanh, 2023). Achieving sustainable tourism requires balancing social costs and benefits while mitigating negative environmental, social, and cultural impacts (Baena & Cerviño, 2024). The 1945 Indonesian Constitution recognises green tourism as part of the right to a safe and healthy environment, including housing, healthcare, and prosperity rights. Therefore, policies should focus on regulation, governance, resource allocation, and international cooperation. Indonesia's Ministry of Tourism promotes initiatives such as regenerative tourism, decarbonisation, sustainable sports, blue ocean strategies, clean and green practices, tourist villages, and super priority destinations through green certification, strategic marketing, innovation, and education (Tran & Xuan, 2021; UNWTO, 2023).

For green tourism to succeed, human, ecological, cultural, financial, and technological resources must be managed efficiently based on sustainability and conservation principles (Ramírez et al., 2024). Governance should emphasise coordination, transparency, accountability, and collaboration within the tourism penta-helix—government, private sector, academia, communities, and media—to foster innovation, empower locals, protect intellectual property, and preserve cultural and environmental diversity (Andrades, 2024; Dushkova & Ivlieva, 2024). Effective governance also requires active stakeholder participation and green investments to optimise resource use and ensure equitable benefits. Collaborative governance is crucial for enhancing community ownership, encouraging responsibility for environmental preservation and cultural diversity, and supporting innovation and empowerment in environmental management, thereby making tourism economically viable, socially inclusive, and environmentally sustainable for long-term development (Dushkova & Ivlieva, 2024).

The Sustainable Livelihood (SL) Framework

Current discussions about poverty and sustainable development are increasingly emphasizing the interconnected themes of vulnerability, social protection, and livelihoods. This movement has been accompanied by a variety of techniques, all of which focus on studying conditions and evaluating the possible effects of project interventions. The livelihoods framework includes the skills, assets (both physical and social), and tactics that individuals and communities use to ensure their existence. Sustainability is the ability of individuals or groups to withstand and handle stress or crises while maintaining or developing their existing and future abilities and resources—all without depleting their natural resource base (Mondal & Palit, 2022; Yletyinen et al., 2024).

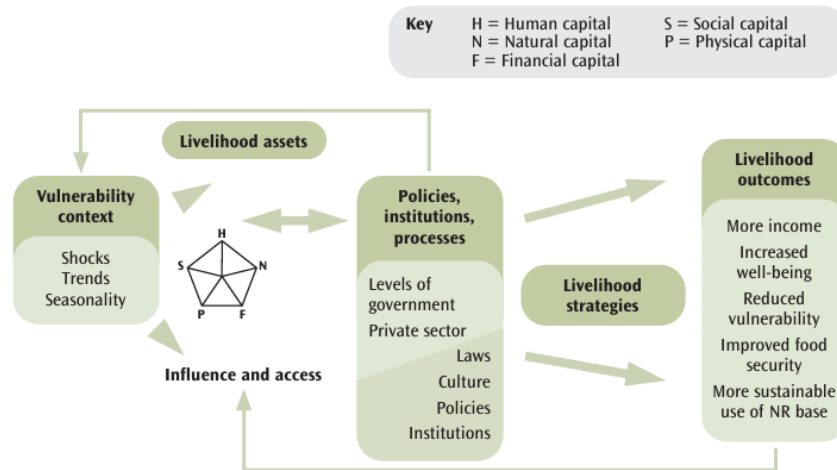


Figure 1: DFID's Sustainable Livelihoods Framework
Source: UNDP (2017).

Sustainable livelihoods (SL) strategies are used to organise information and analysis for assessing development projects, with flexibility being their main characteristic rather than a rigid methodology (Natarajan et al., 2022; Diehl & Bose, 2023). This study adopts an SL model framework encompassing three core components: (1) context, which includes external factors contributing to the hardships faced by poor communities; (2) assets and capabilities, referring to the resources available for their survival; and (3) policies, institutions, and processes that regulate access to these resources and shape livelihood choices. Natarajan et al. (2022) introduced a revised SL model that builds upon and addresses critiques of the DFID Sustainable Livelihoods Framework, aligning it with contemporary development perspectives. The updated framework emphasises understanding vulnerability in specific settings, creating livelihood protection plans, and assessing human, social, natural, physical, and financial capital to ensure comprehensive planning and implementation (UNDP, 2017).

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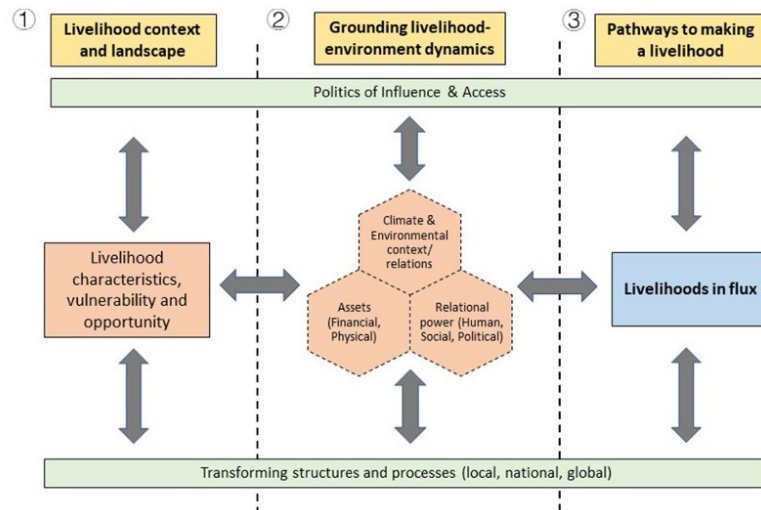


Figure 2: Sustainable Livelihoods Framework for the 21st Century
Source: Natarajan et al. (2022)

RESEARCH METHODOLOGY

The research was conducted at the LMEA, located in Bira Village, Tamalanrea district, Makassar City, South Sulawesi Province, Indonesia. This village is the largest in the Tamalanrea sub-district, including an area of 9.2 km², which constitutes 29.08% of the entire area of the sub-district.



Figure 3: Research Location
Source: Authors' research data (2024)

In 2023, Bira village had a population of 13,669, comprising 6,853 males and 6,816 females, yielding a ratio of 100.54% and a population density of 1,476.13 individuals per square kilometre. The primary vocations of the inhabitants in the Lantebung region include fishermen, aqua-culturists, labourers, artisans, and various other professions.

This research utilizes both primary and secondary data. Primary data was collected via comprehensive interviews with 187 participants, including 8 members of TAG LMEA, 36 individuals from the local community around LMEA, 6 local government leaders, 14 academics, 27 community members, 5 entrepreneurs, 6 media personnel, and 85 visitors. Secondary data was obtained from many sources, including journals, textbooks, statistical data, and findings from previous studies or papers relevant to the research objectives. Data was collected by observation, interviews, and document analysis.

A descriptive analysis was conducted to evaluate the livelihoods of the populations in the LMEA. The pentagonal asset model was employed to examine the livelihood assets of individuals. This model delineates five unique attributes of the assets that individuals possess or may acquire to fulfil their essential survival needs. The indicative evaluation results were classified into three categories: high, moderate, and low, to assess the state of each asset indicator. The asset indicators were evaluated using the interval scoring system, with intervals spanning from 1 to 3 (Low: 1.00 to 1.66, Moderate: 1.67 to 2.33, and High: 2.34 to 3.00).

Table 1: Indicators of Pentagonal Assets and Measurement Scales of the TAG- LMEA

Asset Type	NO	INDICATORS
Human Capital	1	Educational level
	2	Green business experience
	3	Green business Skills
	4	Family Health of
	5	Involvement on green activities
Physical Capital	1	Condition of accessibilities
	2	Diversity of green attractions
	3	Variety of green activities
	4	Availability of green accommodation
	5	Availability of green amenities
	6	Overall appearance as a green destination
Natural Capital	1	Land Availability
	2	Land ownership
	3	Biodiversity
	4	Preserving the ecosystem
	5	Planning and development policies
	6	Designation and function
	7	Availability of water and sanitation facilities
Social Capital	1	Harmonization of communities

	2	Trust among the stakeholders
	3	Participation/ involvement
	4	Collaboration among the stakeholders
	5	Cultural activities
	6	Recognition and awards
Financial Capital	1	Business development
	2	Sources of income
	3	Investment
	4	Availability of natural resources
	5	Business innovation and creativity

Source: Researchers' data analysis (2024)

ANALYSIS AND DISCUSSION

Livelihood Assets

Livelihood assets consist of various components, including human, physical, natural, social, and financial capital. An individual, community, or society owns or publicly manages assets or capital in the LMEA, which enables them to sustain their livelihood. Improving the resource potential allows evaluating its impact on the community's livelihoods and income, which subsequently provides benefits for meeting their needs and enhancing their well-being.

Human Capital

This study assesses five human capital factors: education, green business experience, skills, family health, and community green activity. These features show community members' strengths and traits (Tjahjadi et al., 2022; Ma et al., 2021). The analysis found a poor average human capital score of 1.63. This suggests the LMEA must prioritize human capital upgrades due to its limited capacity. The majority of TAG members in LMEA have only completed elementary to secondary education, resulting in their low educational attainment (1.52).

The community's green business experience indicator is low (1.47), mostly because green tourism is a new business model. Reduced community awareness leads to insufficient experience. The community can make mangrove coffee, batik with mangrove dye, and crab-nut crackers, according to the moderate (1.95) rating of green business competencies. Skills training programs are supported by local government and higher education. Their abilities and knowledge have improved after this course. TAG's moderate family health score of 2.21 indicates the LMEA is disease-free and safe. Most TAG family members have mild health difficulties. People also think this area is disaster-proof; however, the 2022 Makassar floods were a major tragedy. Each human capital aspect's scores are shown in Figure 4.

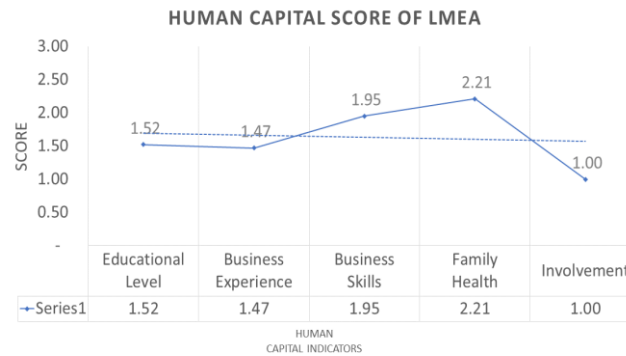


Figure 4: Human Capital of the TAG - LMEA Community
Source: Research data analysis (2024)

Physical Capital

Physical capital includes the infrastructure and structures that bolster the LMEA's status as a green tourism destination and affect local communities in achieving their livelihood objectives. This physical capital acts as a significant asset to enhance income and deliver services for creative communities to meet their needs. Figure 5 displays comprehensive metrics for each physical capital indicator.

The main road to the property and internal trails and boardwalks are moderately maintained by the LMEA (2.12). This signifies that concrete and asphalt principal roadways are in good condition. The narrow and degraded residential access roads to the LMEA site and the overly restricted neighbouring boardwalk access fail to meet visitor safety and comfort standards. The green attraction potential rating is 2.57 (high), indicating that the LMEA offers natural vistas, sunrises, sunsets, birdwatching, and cultural events. Green activities scored 1.53, indicating that tourist options are limited by a lack of facilities like fishing or boating equipment. A low green lodging score (0.51) is due to the absence of restaurants and cottages, or rooms for travellers seeking relaxation or overnight stays in the gorgeous mangrove forest area. Parking spots, identity gates and signage, information centres, restrooms, rubbish bins, and clean water were scarce and poor, resulting in a low availability rating of 0.57. The LMEA's modest aesthetic assessment of 1.75 suggests poor design and development, despite its green tourism potential. The boardwalk's bright colours hurt its green tourism image. Many indicators show that the LMEA's physical resources have a low grade of 1.51, suggesting that improving them is essential to attract tourists and enhance economic activity in the area.

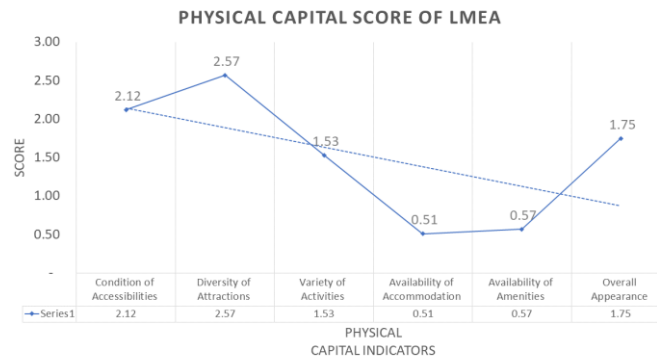


Figure 5: Physical Capital of the TAG - LMEA Community
Source: Research data analysis (2024)

Natural Capital

Local communities' survival depends on natural capital in agriculture, fishing, forestry, and tourism. Sustainable resource management can reduce poverty and boost wealth. Land availability, biodiversity, ecosystem conservation, planning, and water and sanitation service accessibility are utilized to assess natural capital potential. Local communities can fight poverty and achieve enduring prosperity by sustainably managing these resources (Damania et al., 2023). The LMEA scored natural capital 2.52. This means the area is vital to the ecology, the economy, disaster mitigation, and Makassar's carbon sink. Figure 6 summarizes all of the natural capital measure scores.

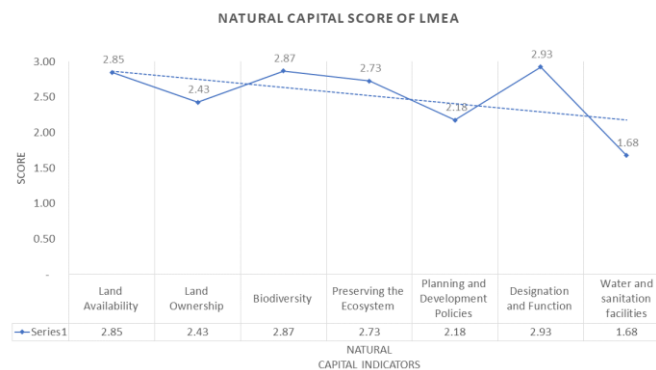


Figure 6: Natural Capital of the TAG - LMEA Community
Source: Research data analysis (2024)

Studies show the LMEA, which got 2.85, has 30 hectares. Community ownership exceeds 87% of LMEA-adjacent land. State sovereignty over the LMEA as a coastal border zone is allowed, but communities lack management capabilities. Despite a 2.43 score drop, this feature remains great. The LMEA has several mangrove species, maritime biota, and coastal and mangrove forest animals. The regional biodiversity index is 2.87. The LMEA ecological preservation target is met. All tourism partners plan and plant mangroves sustainably. Their 2.75 (high) score indicates tenacity despite substrate and waste management challenges. LMEA is a green tourism destination in Makassar city's regional regulation, but it lacks a master plan for regional development, earning a moderate score of 2.18 in the planning and development policies category. The LMEA has a categorization and functional indicator score of 2.93 (high) because it prevents floods and tidal disasters, mitigates coastal erosion, and provides green space for carbon absorption. The protracted dry season in Makassar makes it difficult for residents to get drinkable water. Poor environmental sanitation contributes to a concerning water and sanitation facilities indicator score of 1.68 (moderate), indicating restricted availability.

Social Capital

Social capital includes the norms, habits, networks, and cultures vital for improving connections within the community. It is essential for cultivating relationships among individuals, interest groups, society, and diverse stakeholders, creating a penta-helix of collaboration. Social capital, characterized by the structure and quality of social ties, arises as a significant result of social interactions, providing various advantages to individuals, social groups, and society at large (Sánchez-Arrieta et al., 2021; Tsounis & Xanthopoulou, 2024).

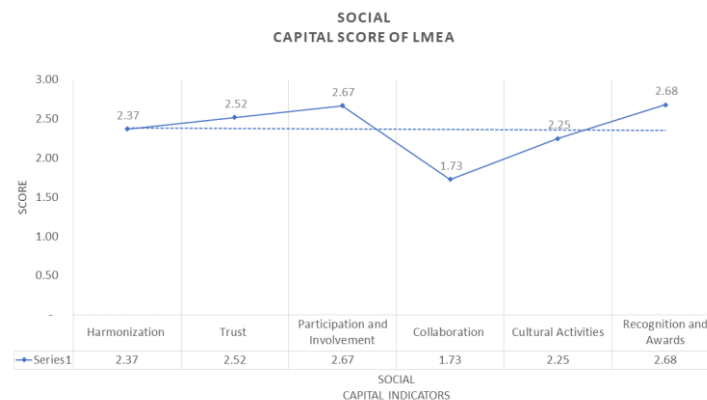


Figure 7: Social Capital of the TAG - LMEA Community

Source: Research data analysis (2024)

Indicators of collaboration among stakeholders reflect a modest level (1.73). Notwithstanding the robust elements of trust, relationships, and engagement, it appears that the majority of participation efforts function autonomously, devoid of coherence with one another or the LMEA development plan. This scenario pertains to the concept of collaborative governance, necessitating a "collaborator" to consolidate all stakeholders under a unified program and set of activities. Community involvement in cultural activities, essential for tourism, is restricted and frequently transient. Common cultural activities include religious events, Independence Day celebrations, batik-making with dyes derived from mangroves, and the manufacture of mangrove coffee (2.25). The LMEA's social capital is rated highly (2.37) across all criteria, indicating its favourable condition.

Financial Capital

Monetary resources, including financial capital, are crucial for local communities to achieve their livelihood goals. These resources, both flowing and existing, are essential for consumption and production, enabling individuals to implement various livelihood strategies (Lu et al., 2023; Azumah, 2023). The specific scores of every financial capital indicator measure are displayed in Figure 8.

TAG business development scores 1.35, which is low. Business creativity and innovation metrics score 1.56, also low. This is because TAG relies on entry fees as its main revenue source. Food and drink sales, fishing, and housing services are other tourism-related income sources that have not been studied. LMEA is moderate in income source measurement at 1.77. About 38% of the local people make a living fishing in the mangrove forest. Most LMEA residents work in manufacturing. LMEA facilities have only been developed with government backing and company social responsibility contributions. No external investment has accelerated LMEA's tourism destination transformation, resulting in a poor indicator score of 1.26. The remaining four indicators are disappointing because mangrove forest natural resources have great potential (2.37). This means the area is bountiful and can boost LMEA business growth, creativity, and innovation.

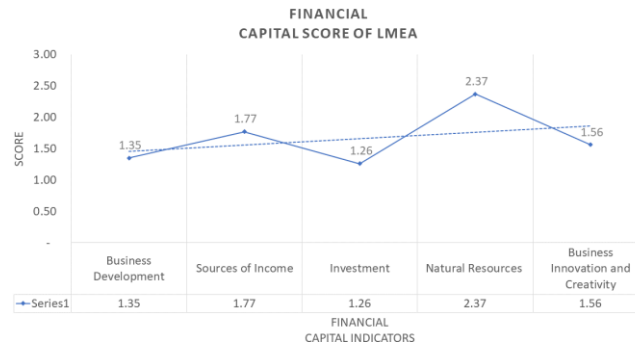


Figure 8: Financial Capital of the TAG - LMEA Community
Source: Research data analysis (2024)

Pentagonal Assets

The Sustainable Livelihoods Approach gives a structure and a list of important features that characterize people's livelihoods and explains how these aspects interconnect. The key components of this framework comprise the context of vulnerability, the assets of livelihood, the structures and processes, the strategies of livelihood, and the outcomes of livelihood. A livelihood is deemed sustainable if it can endure and recover from adversities while preserving or enhancing its capabilities and resources both presently and in the future, without depleting the underlying natural resources.

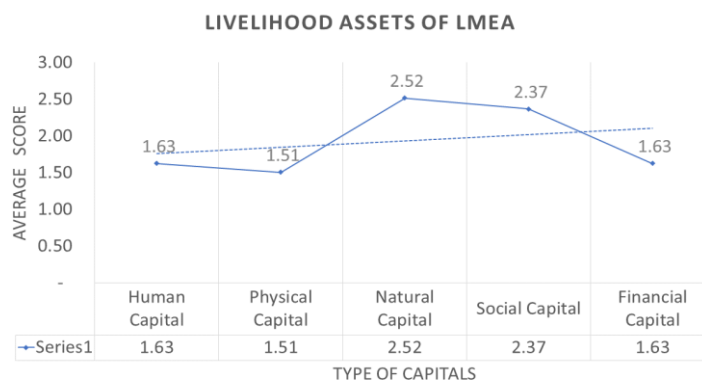


Figure 9: Livelihood Asset of the TAG - LMEA Community
Source: Research data analysis (2024)

For LMEA livelihoods to survive, community resources must be accessible. Each person has five asset categories. An individual's assets may

change. Variations may rise or decrease relative to previous possessions. Individual activities, societal changes, and environmental processes can cause these variances. Figure 9 shows TAG LMEA livelihood asset status. An asymmetrical pentagonal assets diagram in Figure 10 shows the TAG LMEA's livelihood assets and unequal access to the five asset types. The Pentagon's large divergence from the ideal illustrates this. Figure 10 shows two categories of communal livelihood assets. Human, physical, and financial capital are the least developed, whereas natural and social capital are abundant.

Human capital—skills, knowledge, and experience in green tourism—is essential to realizing LMEA as a green and sustainable livelihood source. Physical capital, such as infrastructure and sustainable tourism, enables varied LMEA livelihood strategies. Natural capital in LMEA includes household and family participation in mangrove ecotourism and resource collection for subsistence and income. TAG people and families' social capital—networks, group connections, and trust relationships—increases tourism and community revenue. Financial capital available to TAG individuals and households, including external investment sources from outside LMEA, supports business potential and innovation as livelihood or additional income routes. In alignment with the SDGs' goals of eradicating poverty, promoting decent work and economic growth, developing sustainable cities and communities, preserving life below water and on land, and fostering partnerships, this dynamic creates mutually beneficial interdependencies that create a sustainable environment and ecosystem in a thriving society.

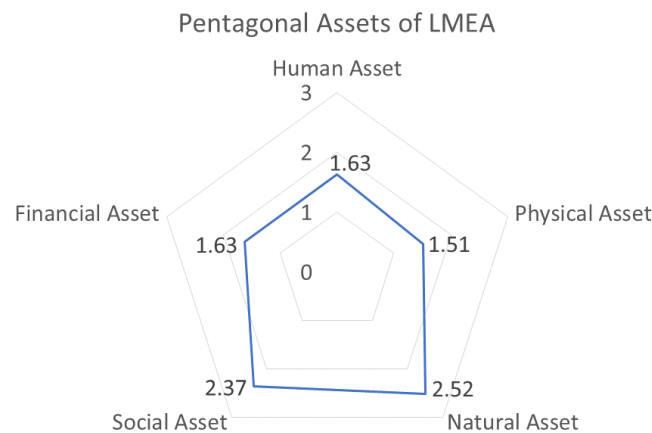


Figure 10: Pentagonal Assets of The TAG LMEA
Source: Research data (2024)

CONCLUSION

The TAG LMEA's asset situation is poor, with uneven access to various assets and significant disparity in community ownership. While natural and social capital have high levels due to ecological potential and tourism connections, human, physical, and financial capital levels are inadequate. Low educational attainment among TAG members negatively impacts skills, innovation, and creativity in establishing LMEA businesses. Local factories employ most individuals who do not rely on income. LMEA, with its natural capital and biodiversity, has potential for green tourism, but its governance is hindered by 87% of TAG members, who lack experience and high school education, and lack the necessary skills, training, and innovation to fully realize its potential.

Government support is crucial for building public infrastructure, especially in the LMEA region, including enhancing access roads and constructing boardwalks. Establishing tourism amenities like parking lots, signage, and facilities will enhance comfort, safety, visitor engagement, and revenue potential for the local community and TAG. A collective consciousness among all stakeholders is essential to establish LMEA as a "subject" rather than an "object" in the advancement of green tourism. To promote green tourism in LMEA, stakeholders must collaborate, focusing on economic, social, and cultural benefits. This will help local communities contribute to the area's sustainability, as neighbouring towns may use it negatively, potentially compromising its condition due to economic demands. External investors are crucial for regional development, but the government must oversee the "Build-Operate-Takeover" model to protect vulnerable communities from financial capital's adverse effects, as ownership may be usurped, leading to displacement and marginalization.

Theoretical Implication

To reduce tourism expansion and promote local livelihoods, development and conservation must be combined. This requires public-private collaboration, local conservation participation, proper funding, and education. Prioritizing human assets for households near natural areas is crucial for sustainable livelihoods. Local government policies should focus on mangrove conservation, governance enhancement, investment policy, and community empowerment. These policies should involve boundary zones, collaborative efforts, community empowerment, and economic capacity enhancement. The "build-operate-takeover" approach promotes mutually beneficial business management and development while ensuring intellectual property rights and geographical identity are protected.

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