

Analysis of Limits of Acceptable Change (LAC) In Sustainable Tourism Management in Gili Trawangan, Indonesia

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Abstract. Gili Trawangan, a premier destination in North Lombok, has experienced a surge in tourists, with significant impacts on the local environment, culture, and economy. This study aims to analyse stakeholder perceptions of the Limits of Acceptable Change (LAC) and identify critical indicators for sustainable tourism management. The researchers used a qualitative approach, including in-depth interviews, observations, and document analysis. This research is analysed qualitatively using thematic analysis. The research results indicate that, while the socio-cultural aspect of local income has increased, disparities in business access and dependence on tourism have created vulnerabilities.

Meanwhile, the environmental situation is critical, marked by declining water quality, ecosystem damage, and increased plastic waste. This study emphasises the need to implement indicator-based LAC, multi-stakeholder collaboration, and adaptive strategies to sustain small islands. Based on these findings, the application of the LAC concept is recommended through the establishment of priority indicators, change-tolerance standards, and periodic strengthening of multi-stakeholder collaborations. Strengthening research provides a theoretical contribution to refining the LAC concept in the context of small islands and offers practical implications for formulating sustainable tourism management policies in Indonesia.

Keywords: limits of acceptable change; Gili Trawangan; tourism management.

INTRODUCTION

Tourism is one of the strategic sectors that significantly contributes to the national and regional economic development. Indonesia, rich in diverse natural and cultural destinations, makes tourism a driver of the economy, a creator of jobs, and a means of promoting national identity. One of the destinations that has experienced rapid development is Gili Trawangan. This small island is a marine tourism icon, with its main attractions being the beauty of its beaches and coral reefs, as well as its motor vehicle-free atmosphere.

Based on data from the North Lombok Regency Tourism Office, the number of tourist visits to Gili Trawangan continued to increase significantly before the COVID-19 pandemic, making it one of the premier destinations in Southeast Asia. The surge in tourist visits has had a significant economic impact, particularly in increasing the in-

come of the local community. Many residents who previously worked as fishermen have switched to tourism entrepreneurship, offering sea transportation, accommodations, restaurants, and bicycle rentals. This transformation aligns with the concept of tourism-led development, which emphasises tourism as a catalyst for economic growth.

However, unmanaged tourism growth also creates serious problems, especially for small island destinations that are particularly vulnerable to tourism. Gili Trawangan faces complex challenges across environmental, socio-cultural, and economic domains. From an ecological perspective, the increase in tourism has led to increased consumption of clean water, accumulation of plastic waste, and damage to marine ecosystems from snorkelling and diving activities. Previous studies reported indications of declining water quality in

Gili Trawangan as well as coral reef damage of up to 35% over the past decade.

In the socio-cultural sphere, tourism influences the local community's lifestyle. Although the presence of tourists creates economic opportunities, it also triggers a shift in cultural values, such as the packaging of Peruvian performances as tourist entertainment, suggesting a shift from cultural values to commercial products. Nevertheless, some traditional practices, such as gotong-royong, still endure, indicating the local community's efforts to preserve its culture.

Meanwhile, from an economic perspective, although people's incomes have increased, there are indications of unequal distribution of benefits. Outsiders dominate the ownership of accommodation businesses and large-scale investments, while the local community is more involved in the informal sector. Full dependence on the tourism sector also creates vulnerability, as evidenced by the COVID-19 pandemic, which caused a drastic decline in income and the bankruptcy of small businesses.

Conventional approaches in tourism management, such as carrying capacity, often focus only on the maximum number of tourists a destination can accommodate. However, this concept inadequately accommodates dynamic socio-cultural and economic dimensions. Therefore, the Limits of Acceptable Change (LAC) concept is viewed as more relevant because it focuses on the extent of change acceptable to ecosystems and communities without sacrificing long-term sustainability [1].

LAC is an adaptive and participatory approach that aims to establish change tolerance limits based on mutually agreed indicators. The application of this concept is essential for small island destinations like Gili Trawangan, which have limited carrying capacity and are vulnerable to degradation under tourism pressure. However, studies on LAC in Indonesia, particularly in small-island contexts, remain limited, underscoring the importance of this research in filling that gap [2]. Based on this background, this research aims to: 1) Describe stakeholder perceptions of LAC concept application; 2) Identify priority LAC indicators in socio-cultural, economic, and environmental aspects that serve as references in sustainable tourism management.

The research results are expected to make theoretical contributions to the development of the

LAC concept for small island destinations, while providing practical insights for destination managers and policymakers in formulating adaptive and sustainable tourism management strategies [3].

METHOD

This research uses a qualitative approach with a descriptive case study design. The research location is Gili Trawangan, North Lombok Regency, chosen for its characteristics as a small island destination with high tourism intensity and complex sustainability issues. The researchers selected this method because it can comprehensively explore the views and experiences of the various parties involved in implementing the Limits of Acceptable Change (LAC) concept in sustainable tourism management [4].

The data sources in this study consist of primary and secondary data. Primary data were obtained through in-depth interviews with four groups of stakeholders, namely local communities, tourism business operators, tourists, and local government, selected using purposive sampling techniques with the criteria of direct involvement in tourism activities. In addition, the researchers conducted participatory observation at several strategic locations, including waste management sites (TPST), tourist routes, and cultural areas. Documentation included statistical reports on tourist visits, management policies, and secondary data from the scientific literature to support the analysis.

To enhance validity, this research employs method triangulation by comparing the results of interviews, observations, and documentation. This approach provides a deeper understanding of the socio-cultural, economic, and environmental dynamics in Gili Trawangan and their relation to the implementation of LAC.

RESULTS AND DISCUSSION

Gili Trawangan is one of the leading tourist destinations in North Lombok Regency that has experienced rapid development. With an area of 340 hectares, this island offers beaches, underwater life, and cultural attractions. Based on tourist visit data, the number of visitors exceeded 300,000 per year before the COVID-19 pandemic. This increase has a positive impact on the community's economy but also triggers serious environmental and social issues, so LAC-based man-

agement is needed to ensure the sustainability of tourism.

Socio-Cultural Dimension. The Gili Trawangan community still maintains local traditions such as traditional rituals, but adaptations tend toward cultural commodification to attract tourists. Social conflicts are relatively low and occur only during busy seasons, while community satisfaction with tourism impacts is relatively high. These findings indicate that the socio-cultural dimension remains within acceptable change limits, but control is needed to prevent loss of cultural authenticity [5].

Table 1 – LAC Indicators for Socio-Cultural Aspects

Indicator	Actual Condition	Status
Social Conflicts	Low during high seasons	Acceptable
Cultural Value Changes	Ritual adaptation for tourist attractions	Not Acceptable
Community Satisfaction	75% satisfied, 25% complain about lifestyle changes	Acceptable
Community Participation in Tourism	Good participation level	Acceptable
Sustainability of Tradition and Customs	Traditional ceremonies are still conducted, though with modifications	Need Controls

Economic Dimension. Tourism has a positive impact on the local economy, with income increases of around 40% after the pandemic. However, benefit distribution remains problematic because outside investors control large-scale businesses, while local communities manage only small enterprises. Job opportunities are sufficiently available, but workers from outside the region mostly fill strategic positions.

Table 2 – LAC Indicators for Economic Aspects

Indicator	Actual Condition	Status
Local Income	Increased but even	Needs Control
Job Creation	Available, but managerial positions are dominated by outsiders	Needs Control
Economic Inequality	High disparity level among business operators	Not Acceptable
Access to Capital	Outside investors	Concerning

Indicator	Actual Condition	Status
/ Investment	dominate large businesses	
Community Business Diversification	Local companies are still concentrated in the homestay sector	Needs Development

Environmental Dimension. The environmental issue is the most urgent. Field findings show declining freshwater quality, especially during holiday seasons, accompanied by odour and turbidity. Plastic waste experiences surges of $\pm 25\%$ during high-visitation periods, and in the last decade, coral reefs have been damaged by poorly regulated marine tourism [6].

Table 3 – LAC Indicators for Environmental Aspects

Indicator	Actual Condition	Status
Water Quality	Often turbulent during rainy season and busy periods	Not Acceptable
Plastic Waste	Increases $\pm 25\%$ during high season	Needs Control

Overall, socio-cultural and economic conditions remain within controllable categories, although there is potential for value shifts and economic inequality. Conversely, the environmental dimension is at a critical point requiring immediate action. These results align with the authors' [7] findings that LAC implementation must emphasise continuous monitoring, control of essential indicators, and active stakeholder participation. In the context of Gili Trawangan, recommended strategies include strengthening waste management and marine activity regulations, empowering communities to compete economically, and educating tourists to support environmentally friendly practices.

Critical LAC Indicators for Gili Trawangan. Analysis results show that not all indicators in the three LAC dimensions have the same urgency level. Several indicators are categorised as critical because their changes exceed acceptable limits and significantly impact destination sustainability. The Cultural Value Changes indicator is significant in the socio-cultural dimension because changing traditions for tourism attraction purposes can reduce local cultural values. If this situation is left unchecked, cultural identity,

which is the destination's main attraction, can be lost [7].

In the economic dimension, Economic Inequality and Access to Capital indicators are critical factors. Outside investor dominance in significant business ownership leads to uneven profit distribution and risks of local community marginalisation; this aligns with authors [8] findings that unequal economic access in tourism destinations often triggers social conflicts and reduces community resilience to tourism impacts.

Meanwhile, the environmental dimension has the most crucial indicators: freshwater quality and waste management. Research results show that freshwater quality significantly declines during high-visitation seasons, leading to increased turbidity and odour that affect tourist comfort and basic community needs. This condition has exceeded acceptable change limits because it directly impacts health, tourism service quality, and ecosystem sustainability.

This research confirms the importance of indicator prioritisation in LAC-based management planning. Interventions must focus on critical indicators to avoid long-term impacts on destination attractiveness and community quality of life. Recommended mitigation strategies include controlling marine tourism activities, implementing strict zoning, enhancing community capacity for economic management, and monitoring cultural adaptations to ensure they remain consistent with local values [9].

1) Socio-Cultural Dimension. The critical indicator in this dimension is cultural value changes, marked by the commodification of traditional rituals into tourist attractions. This condition potentially erodes local cultural identity, which is an attraction for tourism destinations. If left unchecked, this change can eliminate Gili Trawangan's authentic character and reduce the selling value of culture-based tourism.

2) Economic Dimension. Two economic indicators fall into the critical category: economic inequality and access to capital. Economic inequality arises from outside investor dominance in controlling large-scale tourism businesses, while local communities are concentrated in the informal sector and are less competitive. Difficult capital access worsens this condition, triggering economic vulnerability and risks of local community marginalisation.

3) Environmental Dimension. The environment is the most urgent aspect to address, with critical indicators including declining freshwater quality and plastic waste management. Freshwater quality on Gili Trawangan often declines sharply during high-visitation seasons, leading to increased turbidity and changes in odour that disturb tourist comfort. Plastic waste surges of $\pm 25\%$ during busy seasons worsen pressure on coastal ecosystems [10].

Table 4 – Critical LAC Indicators for Gili Trawangan

Dimension	Critical Indicator	Actual Condition	Status
Environmental	Water Quality	Turbid and amorous during the rainy season and high season	Not Acceptable
	Waste Management	25% surge during high season	Needs Control
Economic	Food Security Economics	Outside investors are dominant, with a high disparity	Not Acceptable
	Access to Capital	Difficult access for local communities	Concerning
Social	Changes in cultural values	Traditional rituals modified	Not Acceptable

Critical LAC indicators in Gili Trawangan must become the focus of sustainable tourism management. In the environmental dimension, declining freshwater quality and plastic waste surges have exceeded tolerance limits, directly impacting health and ecosystem quality. In the economic dimension, unequal benefit distribution and limited access to capital for local communities create social vulnerabilities. Meanwhile, in the socio-cultural dimension, traditional ritual modifications for commercial purposes threaten cultural identity, while uneven community participation persists. These three aspects are interconnected and require LAC-based interventions, with a priority on environmental control, economic equity, and preservation of artistic value to maintain destination sustainability.

Interpretation and Management Implications. The identified critical indicators confirm that Gili Trawangan is in an environmentally crucial condition, economically vulnerable, and facing threats to its cultural identity. Therefore, LAC implementation must prioritise interventions in:

Environment: Strengthening freshwater management regulations, implementing circular-based waste management systems.

Economy: Local economic empowerment through inclusive access and MSME development, plus investment regulations more favourable to local communities.

Socio-Culture: Monitoring cultural adaptations to remain consistent with local values, accompanied by tradition revitalisation programs.

CONCLUSIONS

The LAC approach can be a solution for sustainably maintaining Gili Trawangan's tourism. However, LAC implementation requires active involvement of all stakeholders, particularly in establishing acceptable change indicators. This research recommends establishing collaborative forums among stakeholders to set realistic limits on social, economic, and environmental change and to strengthen field-based, data-driven regulations.

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Based on the Limits of Acceptable Change (LAC) analysis results across three main dimensions, the researchers conclude that tourism management in Gili Trawangan is not entirely within acceptable change levels. The socio-cultural dimension is relatively stable because traditional values are still maintained, although there are indications of cultural commodification requiring control. The economic dimension, despite showing income increases, is overall not acceptable because inequality persists between local communities and outside investors, and business diversification remains limited. Meanwhile, the environmental dimension is in the most critical condition due to declining freshwater quality and increasing waste volumes from surges in tourism activity.

To maintain tourism sustainability in Gili Trawangan, local authorities and stakeholders must implement clear LAC indicators, strengthen environmental regulations, economically empower communities, and establish collaborative, stakeholder-based monitoring systems. LAC implementation is required with a focus on priority indicators, periodic monitoring, and multi-stakeholder collaboration to maintain small island sustainability.

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