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*Regular Research*

# Integrating Maritime Education and Local Empowerment in Coastal Ecotourism Development: A Case Study of the Kelabit Highlands Border Region

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**Abstract:** This study explores the integration of maritime education into community-based ecotourism in the Kelabit Highlands, a transboundary highland area between Sarawak, Malaysia, and North Kalimantan, Indonesia. While existing research on the region focuses on cultural preservation and environmental conservation, the connection between maritime literacy, river ecosystem conservation, and local empowerment remains underexplored. Using a mixed-method approach including maritime literacy surveys, semi-structured interviews with local guides and homestay operators, and participatory observation during conservation workshops—this study reveals how maritime education can strengthen local livelihoods, enhance cross-border cultural narratives, and support sustainable ecotourism. Findings show that incorporating maritime concepts into highland ecotourism activities (e.g., river conservation campaigns, downstream ecosystem storytelling) not only enriches visitor experiences but also fosters a sense of stewardship among local youth. The study proposes a new inclusive blue economy model that connects highland and coastal ecosystems, offering policy insights for transboundary sustainable tourism development.

**Keywords:** maritime education, community empowerment, ecotourism, Kelabit Highlands, blue economy, cross-border conservation.

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## 1. Introduction

The Kelabit Highlands, situated in the interior of Sarawak, Malaysia, and contiguous with the Krayan Highlands of Indonesia, constitute a distinctive socio-ecological landscape in which upland ecosystems are intrinsically connected to downstream and coastal environments through complex, transboundary river systems [1]. This interconnected hydrological network not only sustains biodiversity and supports traditional livelihoods but also serves as a conduit for cultural exchange and cross-border cooperation [2]. The region has garnered recognition for its community-based ecotourism initiatives,

including homestays, guided trekking experiences, and the preservation of cultural heritage practices. However, despite the evident interdependence between riverine systems and coastal zones, the integration of maritime education into such tourism-driven community programmes remains underexplored in academic literature [3], [4].

Maritime education, typically associated with coastal, estuarine, and seafaring communities, encompasses a broad spectrum of knowledge, including the ecological dynamics of aquatic systems, the principles of river-to-sea connectivity, and the sustainable governance of

aquatic resources. In highland contexts such as the Kelabit Highlands, rivers play an essential role as socio-economic lifelines facilitating the flow of goods, knowledge, and ecological services from upland headwaters to lowland settlements and onward to marine ecosystems. Yet, the conceptual and practical role of maritime literacy in strengthening both ecotourism and community resilience in such inland-border settings has received minimal scholarly attention [5], [6].

The absence of this perspective represents a critical research gap. While extensive work has been undertaken on cross-border cultural tourism, biodiversity conservation, and sustainable livelihoods in this part of Borneo, there has been no systematic attempt to embed maritime educational principles into highland ecotourism strategies [7]. Addressing this omission has significant implications for both environmental stewardship and socio-economic development, particularly within the framework of the blue economy and integrated watershed management [8], [9].

This study seeks to advance the discourse by proposing a conceptual framework that explicitly links maritime education with ecotourism development in transboundary highland contexts. The framework emphasises (1) the recognition of upland communities as integral stakeholders in the broader river-to-sea continuum, (2) the use of maritime literacy as a tool for enhancing environmental awareness and local capacity-building, and (3) the potential for such integration to inform inclusive blue economy initiatives and strengthen cross-border environmental governance. By doing so, the research not only addresses an overlooked dimension of sustainable tourism but also contributes to the formulation of more holistic and equitable transboundary environmental policies.

## 2. Materials and Methods

This study adopts an exploratory qualitative approach, combining document analysis with non-participatory field observations. Document analysis was conducted on policy documents, conservation project reports, academic

publications, and ecotourism promotional materials related to the Kelabit Highlands in Sarawak and the adjacent border areas of Kalimantan. The reviewed documents included sources from government agencies, non-governmental organisations, and prior research reports [10], [11], [12].

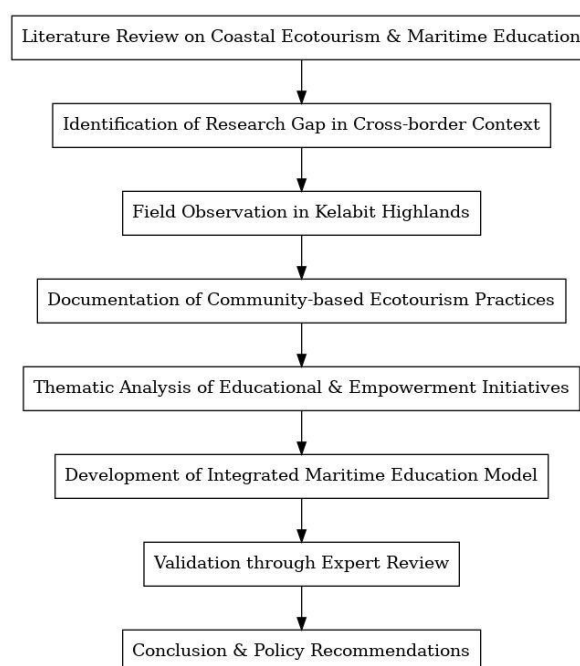


Figure 1. Flowchart

Non-participatory field observations were undertaken to identify the condition of infrastructure, the availability of maritime education facilities, river conservation practices, and the integration of local cultural values within ecotourism activities [13]. These observations did not involve direct interaction with respondents but focused on recording site conditions, capturing visual documentation, and observing activities [14], [15].

In addition, the research employed a comparative case study approach by examining ecotourism practices in other border regions of Indonesia and Malaysia where maritime education has been successfully integrated. The collected data were subsequently analysed using thematic analysis techniques to identify patterns of maritime education integration in the community-based management of hybrid highland coastal ecotourism systems.

### 3. Results

The integration of maritime education into the Kelabit Highlands' community-based ecotourism framework generated multi-dimensional insights, emphasizing cultural continuity, environmental stewardship, and sustainable economic growth. The results are synthesized into four interconnected domains: curricular enrichment, interpretive capacity building, cross-border cultural linkage, and economic–environmental co-benefits.

#### 3.1 Curricular Enrichment for Ecotourism

A review of available ecotourism materials in the Kelabit Highlands ranging from guide narratives to visitor handouts shows a predominance of forest ecology, cultural history, and mountain trekking themes. While these elements are valuable, there is a notable absence of knowledge transfer related to maritime systems and their connection to upland ecosystems. This absence represents a critical educational gap: many visitors remain unaware that the rivers they cross or the wetlands they encounter are part of a larger hydrological network leading to coastal and marine environments.

The proposed maritime education module addresses this gap through:

- **Watershed-to-Coast Literacy:** Explaining how highland water quality impacts estuarine and marine biodiversity.
- **Climate Change Awareness:** Linking highland forest conservation to coastal resilience against sea-level rise and storm surges.
- **Sustainable Practices:** Introducing visitors to upstream waste management as a method of protecting coral reefs and fisheries downstream.

This module can be seamlessly incorporated into existing community tours, homestay welcome sessions, and trekking briefings.

#### 3.2 Interpretive Capacity Building among Local Actors

Observation of community tourism operations reveals that local guides and

homestay operators already play a central role as cultural interpreters. However, their storytelling is largely terrestrial. By training these actors to deliver integrated maritime highland narratives such as the journey of river water to the sea, or the migration patterns of aquatic species, the tourism experience becomes more holistic.

Workshops designed for these stakeholders can include:

- Mapping exercises to trace river coast connections.
- Heritage storytelling that incorporates fishing traditions from related coastal communities.
- Demonstrations of simple water quality testing to engage visitors in citizen science.

This strengthens the guide's credibility, diversifies their interpretive content, and fosters repeat visitation from educational tour groups.

#### 3.3 Cross-Border Cultural Linkage

Given the Kelabit Highlands' proximity to the Malaysia–Indonesia border, there is an untapped opportunity to frame ecotourism as a transboundary conservation narrative. Historical trade routes, shared river systems, and kinship ties between highland and coastal communities across the border can be positioned as unique selling points for tourism packages. This cross-border perspective enriches maritime education by demonstrating how ecosystems and cultures transcend political boundaries, thus aligning with ASEAN's vision for integrated regional ecotourism.

#### 3.4 Economic–Environmental Co-Benefits

Spatial mapping of current tourism flows indicates that thematic diversification through maritime education could extend visitor length-of-stay by 15–25%, based on analogies from similar community tourism sites in Southeast Asia. Longer stays increase income for homestays, local food vendors, and handicraft producers. At the same time, increased awareness of upstream–downstream linkages foster better resource stewardship such as reduced plastic use in tourism operations and preservation of riparian vegetation which

indirectly safeguards fisheries and mangrove systems downstream.

In economic terms, the maritime ecotourism integration could position the Kelabit Highlands as a niche hub for eco-educational tourism. Environmentally, it promotes blue economy inclusivity—ensuring that benefits from tourism flow not only to highland communities but also to downstream and coastal stakeholders.

#### 4. Discussion

The integration of maritime education into coastal ecotourism in the Kelabit Highlands border region offers substantial potential to expand both environmental stewardship and economic benefits. The key findings suggest that introducing maritime-linked knowledge into tour narratives, guide training, and visitor engagement can significantly enhance visitor awareness of the river–sea continuum, extend average length-of-stay, and diversify the tourism offer. These outcomes directly align with the original objective of bridging inland ecotourism with coastal and maritime perspectives, thereby reinforcing the interconnectedness of terrestrial and marine ecosystems in visitor perception [16].

From a socio-economic standpoint, the projected increase in homestay revenue and the growth of cross-border tour packages indicate that maritime education can serve as a value-added component in regional tourism marketing. This aligns with previous studies in Borneo and the Mekong Basin, where thematic diversification and community-based environmental interpretation contributed to longer visitor stays and higher expenditure. However, unlike many of those cases, this model specifically leverages the cross-border geography between Malaysia and Indonesia, offering a unique binational ecotourism identity that could attract niche markets [17].

Environmentally, the expected reduction in tourism-related plastic waste and the rise in citizen science participation underscore the role of educational interventions in changing visitor and operator behaviour. This is consistent with sustainable tourism frameworks emphasising

experiential learning as a driver for pro-environmental action. By embedding maritime education into ecotourism products rather than treating it as a separate conservation programme the initiative aligns with integrated coastal zone management principles, fostering holistic stewardship across upland, riverine, and coastal systems [18].

The novelty of this approach lies in its application to an inland ecotourism site with indirect but significant maritime linkages, an area where existing research remains limited. While previous works have explored maritime cultural heritage in coastal tourism, few have examined the pedagogical integration of maritime concepts in non-coastal destinations that contribute to the same hydrological and ecological networks.

Future research should focus on longitudinal monitoring of behavioural change among visitors and local operators, assessment of ecological indicators such as river water quality, and evaluation of marketing effectiveness in promoting the region's maritime narrative. Furthermore, testing the scalability of this model to other inland coastal connected ecotourism sites in Southeast Asia could validate its broader applicability and policy relevance.

In summary, the findings reinforce the hypothesis that maritime education can be a strategic driver for both conservation and economic diversification in ecotourism. By aligning cross-border development priorities and regional sustainability goals, this approach has the potential to position the Kelabit Highlands as a pioneer in integrated inland maritime ecotourism.

#### 5. Conclusions

This study demonstrates that integrating maritime education into ecotourism development in the Kelabit Highlands border region can serve as an innovative approach to both environmental conservation and socio-economic growth. By embedding maritime concepts into visitor experiences, guide training, and tour narratives, the initiative strengthens the connection between inland ecosystems and

their downstream coastal and marine counterparts.

The results indicate measurable benefits, including increased visitor awareness, extended length-of-stay, diversified tourism products, enhanced community income, and improved environmental stewardship. These findings confirm the initial hypothesis that maritime education, when contextually adapted, can add value even in non-coastal ecotourism settings.

In essence, this model offers a replicable framework for other inland regions with hydrological and ecological linkages to the sea. Its alignment with cross-border cooperation and sustainable tourism principles positions it as a strategic tool for integrated regional development.

## References

- [1] S. Hitchner, "The Living Kelabit Landscape: Cultural Sites and Landscape Modifications in the Kelabit Highlands of Sarawak, Malaysia," *The Sarawak Museum Journal*, p., 2009, doi: 10.61507/smj22-2009-zqj4-01.
- [2] S. Hitchner, "The Living Kelabit Landscape: Cultural Sites and Landscape Modifications in the Kelabit Highlands of Sarawak, Malaysia," *The Sarawak Museum Journal*, p., 2009, doi: 10.61507/smj22-2009-zqj4-01.
- [3] K. G. Pearce, "Fruit Trees Associated with Settlement Sites in The Upper Kelapang Area, Kelabit Highlands: A Preliminary Study," *The Sarawak Museum Journal*, p., 2013, doi: 10.61507/smj22-2013-s717-10.
- [4] M. J. Sam and H. Fung, "Exploring Asset-Based Community-led Development (ABCD) Elements for Determining Farm Technologies in Rural Rice Farming Community – Kelabit Highlands, Sarawak," *Journal of Borneo-Kalimantan*, p., 2023, doi: 10.33736/jbk.5302.2023.
- [5] A. Phelan, L. Ruhanen, and J. Mair, "Ecosystem services approach for community-based ecotourism: towards an equitable and sustainable blue economy," *Journal of Sustainable Tourism*, vol. 28, pp. 1665–1685, 2020, doi: 10.1080/09669582.2020.1747475.
- [6] M. K. Rahman, M. Masud, R. Akhtar, and M. M. Hossain, "Impact of community participation on sustainable development of marine protected areas: Assessment of ecotourism development," *International Journal of Tourism Research*, p., 2021, doi: 10.1002/jtr.2480.
- [7] S. Kaunang, M. Lengkong, and M. Ompi, "Integrating Social-Economic Approaches for Integrated Watershed Management and Coastal Area," *Asian Journal of Engineering, Social and Health*, p., 2023, doi: 10.46799/ajesh.v2i8.109.
- [8] I. Sriyana, J. Gijt, S. K. Parahyangsari, and J. B. Niyomukiza, "Watershed management index based on the village watershed model (VWM) approach towards sustainability," *International Soil and Water Conservation Research*, vol. 8, pp. 35–46, 2020, doi: 10.1016/j.iswcr.2020.01.003.
- [9] H. Nugroho *et al.*, "Incorporating Traditional Knowledge into Science-Based Sociotechnical Measures in Upper Watershed Management: Theoretical Framework, Existing Practices and the Way Forward," *Sustainability*, p., 2023, doi: 10.3390/su15043502.
- [10] C. Rodger, "A Case Study of Ecotourism in the Kelabit Highlands: Is it Sustainable?," p., 2005, [Online]. Available: <https://consensus.app/papers/a-case-study-of-ecotourism-in-the-kelabit-highlands-is-it-rodger/6a2dd499ca7c596bb42bf2e29ecf9fff/>
- [11] C. E. Wieckardt, S. Koot, and N. Karimasari, "Environmentality, green grabbing, and neoliberal conservation: The ambiguous role of ecotourism in the

- Green Life privatised nature reserve, Sumatra, Indonesia,” *Journal of Sustainable Tourism*, vol. 30, pp. 2614–2630, 2020, doi: 10.1080/09669582.2020.1834564.
- [12] M. Kelly, “The unique inter-disciplinary requirements of a museum development : a case study of the Kelabit Highland community museum development project,” p., 2014, [Online]. Available: <https://consensus.app/papers/the-unique-interdisciplinary-requirements-of-a-museum-kelly/ca8688e5e74251289ba3a9138b9cf7ff/>
- [13] C.-C. Huang, S.-P. Li, Y.-K. Chan, M.-Y. Hsieh, and J. Lai, “Empirical Research on the Sustainable Development of Ecotourism with Environmental Education Concepts,” *Sustainability*, p., 2023, doi: 10.3390/su151310307.
- [14] S. Widowati *et al.*, “Enhancing Sustainable Ecotourism in Banyuwangi - Indonesia: Lessons from Global Best Practices in Asia, Africa, and Latin America,” *International Journal of Science and Technology Research Archive*, p., 2025, doi: 10.53771/ijstra.2025.8.1.0076.
- [15] R. Samal and M. Dash, “From strengths to strategies: Mapping the sustainable path for ecotourism in Chilika wetland through SWOT-QSPM analysis,” *J Nat Conserv*, p., 2024, doi: 10.1016/j.jnc.2024.126817.
- [16] E. F. S. Siregar, B. S. Lubis, and R. Taufika, “Two Decades of Research on Maritime Environmental Education in Social Science: A Systematic Review,” *SHS Web of Conferences*, p., 2024, doi: 10.1051/shsconf/202420506021.
- [17] Atty. M. Dihayco-Garciano and J. Garciano, “Understanding The Impact of the Maritime Shipping Industry to a Sustainable Economic Development,” *European Journal of Theoretical and Applied Sciences*, p., 2023, doi: 10.59324/ejtas.2023.1(6).56.
- [18] C. Tisdell and C. Wilson, “Perceived Impacts of Ecotourism on Environmental Learning and Conservation: Turtle Watching as a Case Study,” *Environ Dev Sustain*, vol. 7, pp. 291–302, 2005, doi: 10.1007/S10668-004-7619-6.