

Integration of Environmental Policies in Sustainable Management of Mangrove Ecotourism

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Abstract. Mangrove ecotourism has significant potential for environmental protection while also helping the local economy, but its success is strongly dependent on the implementation of appropriate environmental policies. This study investigates how environmental policies are used in sustainable mangrove ecotourism management in Sungai Apit District, Siak Regency. This study takes a qualitative approach, collecting data through stakeholder interviews, documentation studies, and field observations to analyze the problems, tactics, and effects of environmental legislation on ecotourism development. These findings emphasize the value of a community-based approach to mangrove ecotourism development by striking a balance between environmental conservation and economic development. The findings indicate that, while environmental policies such as municipal legislation and ecosystem management plans exist, important obstacles include inefficient institutional coordination, insufficient resources, and low community participation. Better integration of environmental policy can help create a balance between mangrove conservation and long-term ecotourism growth. This paper provides policymakers and practitioners with insights and ideas for establishing and implementing environmental regulations that promote sustainable mangrove ecotourism, with the goal of enhancing ecotourism program success while maintaining mangrove ecosystems.

1 Introduction

Mangrove habitats are one of Indonesia's most precious environmental assets, and they must be protected and managed wisely. The mangrove forest ecosystem in Sungai Apit District has unique potential because it is located in a broad area with magnificent topographic conditions and landscapes, as well as various mangrove forest flora and fauna. The mangrove forest ecosystem's potential for sustainable tourist development is projected to be realized as part of the endeavor to manage mangrove ecotourism. Mangrove

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ecotourism is aligned with the management concept, which combines environmental management, mangrove forest ecosystem management, and mangrove ecotourism.

Sungai Apit District in Riau Province offers a unique mangrove forest ecosystem with a diverse range of mangrove flora and fauna, with the potential to develop as a mangrove ecotourism destination. Sungai Apit District's mangrove forest ecosystems include Mengkapan Village, Sungai Kayu Ara Village, Kayu Ara Permai Village, and Tanjung Kuras Village. Mangrove forests contain a reasonably high species variety, as well as forest vegetation that develops on muddy soils, in coastal locations, and around river mouths that are impacted by seawater tidal currents [1].

Despite the generally known value of mangroves, the coastal area of the Apit River has considerable hurdles in ensuring the ecosystem's preservation. Population expansion, urbanization, mining, and unsustainable agricultural operations have all caused environmental damage and degradation, jeopardizing the long-term viability of mangroves and the well-being of local communities that rely on these natural resources. Rapid population growth and construction activities have placed significant strain on the mangrove ecology in this region. Furthermore, mangrove ecotourism in the Apit River area has not been properly maximized as a source of local revenue and environmental conservation.

This harm is caused by illicit logging, land removal and conversion, and charcoal wood manufacture. The primary causes of these losses are land clearing for aquaculture, rice production, and oil palm plantations. When a region is adequately managed with an effective focus on environmental balance, it has the potential to be a source of income [2]. the loss in mangrove forest area is caused by reclamation for shrimp ponds, fish, salt, deforestation, mining, pollution, river dams, agriculture, natural catastrophes, and oil spills. To rehabilitate the mangrove forest, the government, businesses, and the community must work together. Human activities are primarily responsible for the loss of mangrove habitat in certain parts of the world. The growing population around mangrove forests, as well as the active development that uses forest areas, have caused changes in mangrove forests. Economic incentives can dramatically boost conservation efforts and sustainable management practices. Community empowerment is critical in using mangrove habitats for sustainable coastal management, emphasizing the need to incorporate local populations in conservation efforts [3].

Mangrove conservation policies frequently collide with economic development and land use policies, resulting in ineffective policy implementation and conflicts of interest. According to the 2021 MoEF study, 30% of mangrove conservation strategies are not adequately supported by local governments due to their inconsistency with local development priorities. Conservation and local economic development agendas overlap. In accordance with the paper "Case Study of Mangrove Conservation Policy Coordination in Bengkalis Regency: 2023." Misalignments between local and national policy frequently impede the execution of mangrove management plans. Local policies encourage land conversion, while national policies emphasize protection. [4].

Conflicts between economic interests, such as the conversion of land to agriculture or plantations, and conservation goals can result in environmental damage. Oil palm projects frequently replace mangrove regions. Economic interests frequently conflict with mangrove conservation efforts. For example, converting mangrove land for development projects or plantations is frequently regarded as more economically advantageous than the long-term environmental benefits of preserving mangroves. Oil palm plantations or industrial projects on the coast are frequently prioritized over mangrove protection, even though the long-term implications on ecosystems and populations might be devastating [5].

In this context, mangrove ecotourism development has been recognized as one strategy for combining environmental conservation with long-term local economic growth.

However, complicated problems such as a lack of environmental awareness, regulatory instability, and limited community resources frequently impede the sustainable growth of mangrove ecotourism. Efforts to establish sustainable mangrove ecotourism in Sungai Apit District, with its many problems and complexities, necessitate a comprehensive and sustainable approach.

The development of mangrove ecotourism in Sungai Apit District provides major economic benefits for the local population by increasing tourism revenue and creating new jobs. However, this development presents significant issues in terms of environmental management. Without the proper policies, ecotourism development has the potential to jeopardize the survival of vulnerable mangrove ecosystems. Mangrove habitats have a critical role in preserving ecological equilibrium, defending coastlines, and providing economic resources to local communities[6]. This decline not only causes environmental damage, but it also threatens the livelihoods of those who rely on these natural resources.

Research reveals that the involvement of local communities in ecotourism management is very crucial to attaining sustainability goals [7]. However, community participation in decision-making is typically limited, and they do not have appropriate access to the information and resources essential to contribute effectively. In addition, another problem addressed is the lack of public education and awareness regarding the importance of mangrove ecosystems and the benefits of sustainable ecotourism. Many communities still regard mangroves as territory that may be transformed for agricultural purposes or infrastructure development without considering the long-term impact on their own environment and economy [8]. Several studies show that the development of mangrove ecotourism must be carried out using a community-based strategy that prioritizes local skills and traditional knowledge [9]. Community involvement in ecotourism management not only delivers economic incentives but also promotes a sense of connection and responsibility for environmental conservation.

Policy inconsistencies: While there are environmental policies and regulations in place, they are frequently implemented and enforced incorrectly. This may result in conflicts between ecotourism development and environmental conservation measures. The integration of environmental policies with ecotourism management is frequently inefficient due to a lack of cooperation among numerous entities and authorities. According to the 2022 BPK report, the audit report by the Audit Board (BPK) in 2022 exposes concerns in the implementation of environmental regulations, such as contradictions between rules proposed and implemented. **Lack of Community Participation:** Local populations are frequently underrepresented in ecotourism development and management. Lack of engagement can lead to a misunderstanding of the value of environmental protection and a lack of support for sustainable activities [10].

This research is important for a number of reasons. First, mangroves are coastal ecosystems that are critical to biodiversity, coastal protection, and local community livelihoods. However, these ecosystems are regularly imperiled by human activities such as land encroachment, illegal logging, and pollution. As a result, this research is crucial to safeguarding the long-term health of the Sungai Apit District mangrove ecosystem. Second, consider the impact of sustainable tourism development: Mangrove ecotourism has the ability to provide a long-term economic alternative for local people while also generating additional revenue. However, establishing sustainable tourism development requires a deep understanding of the challenges, community participation, and appropriate management measures. Third, the community's role in environmental management: Active engagement in mangrove ecotourism management is essential for long-term sustainability.

On the contrary, some argue that sustainable ecotourism development can encourage communities to protect their environment. In this context, ecotourism is viewed as a method for raising public awareness of the value of mangrove ecosystems and providing alternative

forms of income that can alleviate strain on natural resources [11]. According to research, persons who work in ecotourism management are more interested in environmental protection [12]. However, issues occur when it is unclear how the economic benefits of ecotourism will be allocated among many stakeholders.

The discussion also included concerns about institutional frameworks and the role of governments in ecotourism management. Several studies suggest that efficient management necessitates collaboration among the government, society, and the business sector, with a focus on building strong and transparent institutions [13]. However, there is criticism that many current policies are insufficiently inclusive and frequently overlook the opinions of local communities, resulting in conflict and discontent [14]. In this light, it is critical to investigate how regulations may be established to encourage increased community engagement in decision-making regarding mangrove ecotourism. [15] claimed in their book "Ecotourism Planning From Theory to Application" that there are seven principles of ecotourism, which include:

1. Minimize environmental and cultural damage caused by tourism activities.
2. Promoting environmental and cultural awareness among tourists, local communities, and tourism stakeholders.
3. Foster pleasant experiences for tourists and local people by promoting cultural exchange and cooperation in maintaining and conserving tourist attractions.
4. Provide financial support for conservation efforts through donations or additional tourism expenses.
5. Creating tourism products that promote local values can benefit local communities financially and empower them.
6. Consider the social, environmental, and political context of the tourist destination area.
7. Allowing tourists and locals to have freedom while adhering to local norms is consistent with human rights.

Furthermore, this discussion addresses the long-term viability of ecotourism as a conservation approach. Some scholars claim that if not properly managed, ecotourism can have a harmful influence on the environment, such as habitat destruction and worsening of ecosystem quality [16]. As a result, it is critical to create indicators that may be used to assess the sustainability of mangrove ecotourism, such as ecosystem carrying capacity and socioeconomic impact on local populations. The theoretical discussion over the integration of environmental policies in the long-term management of mangrove ecotourism illustrates the complexities of the conservation, economic, and social relationships. A comprehensive and collaborative strategy is required to design policies that not only promote economic development but also safeguard and conserve mangrove habitats for future generations [17]. More research is needed to determine how policies might be effectively integrated to accomplish the intended sustainability goals.

2 Method

This study was undertaken in Siak Regency, Sungai Apit District, where mangrove ecotourism faces sustainability challenges. This study adopts a qualitative strategy, namely the case study method. Primary and secondary data are gathered through in-depth interviews, observations, and documentation methods. Interviews were conducted with key informants from the Siak Regency Regional Government, Bappeda (Regional Development Planning Agency), Siak Regency Marine and Fisheries Service, and Siak Regency Environmental Service. Management teams, academics, and local communities all employ the purposive sampling approach. The selection of informants or key respondents is

deliberate, taking into account people participating in village forest management activities and their knowledge of them. The collected data is separated into two categories: main data and secondary data. Primary data was acquired through observations and interactions with key informants. Secondary data is obtained through literature reviews of policy documents, reports, scientific journal publications, and mass media stories. Using interview norms and in-depth interview techniques.

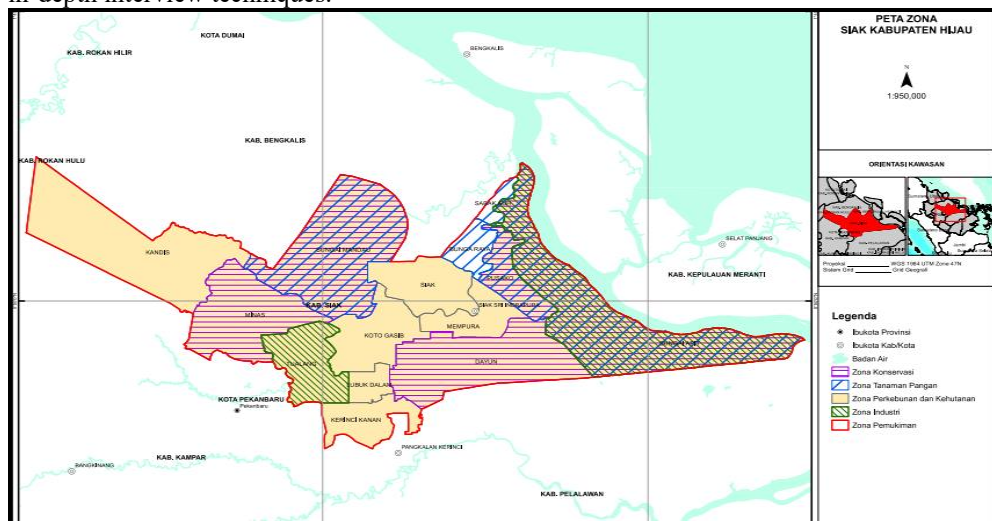


Fig. 1. Map of the research location in Siak Regency, Sungai Apit District

3 Results and Discussion

3.1 Integrating environmental policy with sustainable natural resource management.

According to research, environmental policies are not well integrated with mangrove ecotourism management. Data from the 2020 MoEF Report demonstrate that, while mangrove management rules exist, their execution is frequently inadequate due to a lack of data and cooperation among agencies. Sustainable Natural Resource Management shows that efficient management must strike a balance between economic extraction and environmental conservation. This approach highlights the significance of consistent monitoring and integrated strategies in preventing resource overuse and deterioration.

The findings show that erroneous data and a lack of coordination across organizations impede the implementation of mangrove management regulations. To accomplish sustainable management, an effective monitoring system and policy integration approach are required. Better policy implementation necessitates accurate data collection and continuous monitoring of the effects of human activities on mangrove ecosystems. Modern technology, such as Geographic Information Systems (GIS) and satellite surveillance, can be used to give reliable data and support evidence-based decisions.

Tabel 1. Law on the Conservation of Mangrove Ecosystems and Management Institutions

No	Law	Sector/	Mangrove Setting
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		Government department	
1.	Law No. 5 of 1990 on the Conservation of Biological Natural Resources and Their Ecosystems	Ministry of Forestry and Ministry of Law and Fisheries	The framework for implementing regional and species conservation in Indonesia. Indonesia has declared more than a million hectares of mangrove habitats as conservation reserves.
2.	Law Number 41 of 1999 on Forestry, partially changed in conformity with the text of Law Number 19 of 2004	Forestry Ministry	Mangrove ecosystem management laws in forested regions, including those that forbid logging and forest encroachment (article 50)
3.	The Regional Government Law No. 23 of 2014	Regency and Provincial Governments	Mangroves are not expressly regulated by it. The existence of mangroves as coastal boundaries with the designation of local protected areas is connected to giving regional leaders considerable autonomy in the administration of the environment and natural resources.
4.	Law Number 26 of 2007 pertaining to the Planning of Space	BAPPEDA is responsible for carrying out the Ministry of Public Works at the regional level.	Although it binds and governs coastal limits and status as local protected areas, it does not directly manage mangroves.
5.	Law No. 27 of 2007 pertaining to the Administration of Small Islands and Coasts	Fisheries and Marine Affairs Ministry	It binds or controls the beach boundary's breadth at least 100 meters from the highest tide, however it makes no explicit regulations regarding mangroves.
6.	Law Number 32 of 2009 pertaining to Management and Protection of the Environment	Environment Ministry	Regulatory AMDAL for operations that might change the terrain (such as the preservation of mangroves)
7	Government Forest Protection Regulation Number 45 of 2004	Forestry Ministry	Protecting forests, forest products, forest regions, and their surroundings is the goal of forest protection implementation in order to maximise and sustainably fulfil the protection, conservation, and production functions.
8	Government Regulation 76 of 2008 on Forest Rehabilitation and Reclamation.	Ministry of Forestry	Forest and land rehabilitation is an endeavour to repair, maintain, and improve the function of forests

			and land in order to preserve their carrying capacity, production, and role in providing life support systems.
9	Presidential Regulation Number 73 of 2012, covering the National Strategy for Mangrove Ecosystem Management.	National Coordination Team for Mangrove Ecosystem Management	The SNPEM includes policy directives, principles, visions, missions, and objectives.
10	Regulation No. 4 of 2017 by the Coordinating Minister for Economic Affairs of the Republic of Indonesia about Policies, Strategies, Programs, and Performance Indicators for National Mangrove Ecosystem Management	National Coordinating Team for Mangrove Ecosystem Management	The elaboration of SNPEM through policies, strategies, initiatives and performance indicators.

Riau Governor Regulation Number 7 of 2019 establishes the Regional Action Plan (RAD) for Mangrove Conservation. It is a regional norm that adapts the RAN to Riau Province's specific needs, such as mangrove conservation and restoration programs.

This study demonstrates that ecotourism management frequently fails to consider the supporting capacity of mangrove ecosystems, resulting in a deterioration in habitat quality. Management that fails to recognize the ecosystem's equilibrium might cause irreparable damage. As a result, before initiating an ecotourism project, an in-depth environmental impact assessment should be conducted, as well as a management plan that considers the ecosystem's balance. Periodic monitoring is also encouraged, as is adjusting strategies depending on monitoring results.

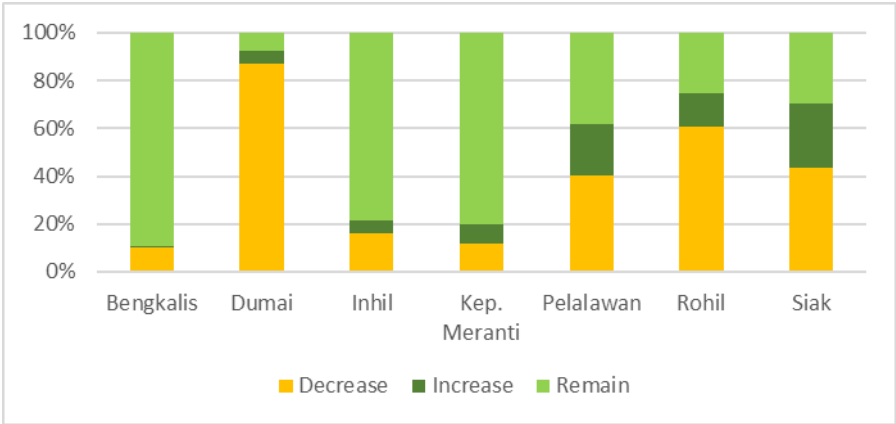


Fig 2. Mangrove existence in Siak and other districts: 2022

Figure 2 depicts a map of the presence of mangroves in Siak and the surrounding area, highlighting the distribution of mangrove forests that are critical to the ecology and society. Here are some major points about the map: Mangrove ecosystems provide habitats for a wide range of animals, including fish, birds, and other wildlife. They also contribute to

coastal conservation by mitigating erosion and facilitating carbon sequestration. Mangrove forests can be found along Siak Regency's shoreline and watersheds. The map depicts specific sites where mangroves thrive. The presence of mangroves in Siak is critical to supporting tourism and local fishing operations.

Local community involvement in ecotourism planning and execution is restricted, and existing policies do not completely support the concepts of sustainable ecotourism, according to the 2021 CIFOR Report. Sustainable ecotourism must incorporate environmental conservation, economic advantages to local communities, and visitor education. To achieve ecotourism success, all parties must participate, and ecotourism principles must be continuously applied. The study's findings indicate that local community involvement in ecotourism remains low, reducing the potential economic and conservation advantages. Involving local populations in ecotourism strategy and execution can boost conservation efforts while also maximizing economic advantages. Community training programs and effective engagement mechanisms must be created to guarantee that ecotourism adheres to sustainable ecotourism principles.

The presence of green open space (RTH) in urban areas is one of the criteria for implementing the green city idea. Green open space in a city must have at least 30% of the total land area, with 20% public and 10% private (Law No. 26 of 2007). Currently, the Siak Regency Government is creating a "mangrove econoista" region to support the Siak Green City or Green City program. This is clear evidence that the community's perspective and approach to the necessity of environmental conservation are critical. It is critical for both their personal environment and the community's well-being. Of course, this mangrove ecotourism area is an educational tourism destination for those who visit. Especially to learn about mangrove flora. Starting with learning to know the sorts, nurseries, plantings, and so on for visitors to Mangrove Ecotourism.

3.2 Integrated Management and Policy Coordination

Mangrove ecotourism management suffers from a lack of institutional coordination and policy inconsistency. The 2022 BPK study and the 2019 World Bank study both stated that policies are frequently not adequately coordinated. Integrated management highlights the importance of taking a comprehensive and integrated approach to environmental management. This demonstrates that sustainable resource management necessitates effective cooperation across many entities and stakeholders. The lack of coordination discovered in this study shows the difficulties in adopting integrated management. To address this issue, a multisectoral coordination forum and an effective communication system between institutions should be considered. This method will improve policy integration and mangrove ecosystem management effectiveness, including financial resource incorporation. Resources, budget, and capacity are limited.

According to the 2022 Riau Environment Agency report, many conservation efforts are impeded by a lack of funding and qualified professionals. According to the BRG 2022 report, 25% of mangrove conservation efforts face hurdles due to a shortage of qualified human resources. Limited resources, both in terms of finance and human capacity, impede the efficiency of mangrove area management and conservation efforts.

The Green Siak Policy is a project aimed at developing and preserving the environment in Siak Regency through a variety of sustainable programs. One of the policy's primary components is financing for environmentally friendly projects and sustainable natural resource management. The primary goals are to improve environmental quality and ecosystem sustainability, particularly mangrove forests, as well as to mitigate the effects of climate change through prudent natural resource management. Local governments allocate budgets to assist environmental projects and often cooperate with businesses and non-

governmental organizations to fund projects through CSR (Corporate Social Responsibility) schemes. In addition, monies from international institutions or donors concerned with environmental issues will be utilized.

Supporting activities include reforestation and conservation, which aim to replant trees and protect existing forest ecosystems. Ecotourism Development: Increasing the opportunities for environmentally friendly tourism, such as mangrove ecotourism. Education and Community Knowledge is an educational program designed to raise public knowledge about the importance of the environment. The economic benefits include promoting local economic growth through tourism and sustainable economic activities, as well as creating jobs in the environmental and conservation sectors. The Green Siak Policy and its funding are significant efforts toward sustainable development in Siak Regency. With the proper funding and involvement from all stakeholders, it is believed that this program would have a positive impact on the environment and society.

3.3 Community Involvement

Local community participation in mangrove ecotourism management remains low, limiting the effectiveness of conservation efforts. The 2020 Environmental Research Center report demonstrates that the community is not actively participating in planning. Community engagement highlights the importance of involving local communities in resource management in order for conservation and management projects to succeed. Local knowledge and community involvement can help to improve management and decision-making. This study demonstrates how a lack of community involvement can undermine the success of ecotourism management. Involving communities in management can boost support and ensure that policies are responsive to local needs. To promote engagement and support for mangrove ecosystem management, effective participation mechanisms, such as the formation of community consultative groups and empowerment initiatives, must be implemented.

Furthermore, the Siak Regency Government invites all stakeholders, including concessionaires, to support collaborative efforts to maintain peat ecosystems and improve community welfare in Siak Regency. To ensure human well-being, population growth necessitates an increase in food, shelter, and clothes. To achieve this welfare, progress occurs in all sectors. As growth accelerates, so will the use of natural resources to support it. The ecosystem's equilibrium should be preserved when using natural resources. In this dimension, knowledge of mangroves is the most sensitive attribute. The local community's knowledge of mangroves indicates better management of mangrove ecology. Socialization on how to maintain, develop, utilize, and process roots, bark, wood, leaves, and fruits into superior goods based on local wisdom must continue on a daily basis rather than as a seasonal activity. Public understanding of the function and benefits of mangrove forests is typically gained through experience and information from extension operations conducted by diverse parties such as universities, NGOs, and field extension officers.

4 Conclusion

Research on the Integration of Environmental Policies in the Sustainable Management of Mangrove Ecotourism in Sungai Apit District, Siak Regency reveals that, while policies exist to assist ecotourism management, their implementation confronts numerous substantial hurdles. One of the most significant issues highlighted was a lack of connectivity between existing environmental policies and ecotourism management methods on the ground. This frequently leads to ineffectiveness in meeting conservation goals and sustainable resource utilization. The degradation of mangrove habitats due to poorly

planned ecotourism development demonstrates how vulnerable ecosystems are to human activity. This study underlines the importance of doing a more extensive environmental impact assessment before beginning ecotourism operations in order to reduce potential damage and protect ecosystems. Local community involvement was also regarded as an undervalued feature. Minimal community involvement in ecotourism planning and execution results in a lack of support for the policies in place. As a result, it is critical to develop mechanisms that enable communities to actively participate, so that they feel valued and committed to the long-term viability of the environment on which they rely.

Furthermore, the study discovered that a lack of cooperation among institutions is a key barrier to mangrove ecotourism management. Policies are frequently fragmented due to a lack of collaboration among diverse parties, resulting in inefficient program execution. As a result, a more efficient coordination system among government agencies and other stakeholders is urgently required.

Overall, this study advocates a more holistic approach to mangrove ecotourism management, with environmental policies fully integrated, community involvement reinforced, and institutional coordination improved. With these procedures, it is envisaged that mangrove ecotourism in Sungai Apit District may be managed sustainably, benefiting not just the habitat but also the local community and general economic development. This work is critical to ensuring the sustainability of natural resources and improving the quality of life in local communities.

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