



Navigating Political Ecotourism through Quadruple Helix Collaboration: The Case of Lake Sebedang during Covid-19 Pandemic

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Abstract

Sebedang Lake is one of the mainstay natural tourist attractions of West Kalimantan Province, located between Sempalai Sebedang Village and Sepuk Tanjung Village, Sebawi District, Sambas Regency. When the Covid-19 pandemic caused world tourism activity to decline, Lake Sebedang continued operating with high tourist numbers. This research analyzed the quadruple helix collaboration on the development of Lake Sebedang ecotourism during the Covid-19 pandemic from a political ecotourism perspective. The method used in this research is descriptive qualitative, with data sourced from interviews and literature studies. The research results found that the success of Lake Sebedang in maintaining optimal tourism activities during the Covid-19 pandemic could not be separated from the quadruple helix collaboration, namely government, academicians, business, and community. Through this collaboration, a Covid-19 volunteer post and guard team are available, health protocols are implemented by checking temperatures, as well as providing hand washing equipment at the entrance to Sebedang Lake, and visitors are required to wear masks, including at cafes in the Sebedang Lake area by the Circular Letter of the Indonesian Minister of Trade Number 12 of 2020 concerning Restoration of Activities Carried Out During the Covid-19 and New Normal Period.

Keywords: Political Ecotourism, Quadruple Helix, Sebedang Lake

Introduction

West Kalimantan Province is divided into 12 districts and two cities: Pontianak City, Singkawang City, Kapuas Hulu Regency, Sintang Regency, Melawi Regency, Sekadau Regency, Sanggau Regency, Bengkayang Regency, Landak Regency, Kubu Raya Regency, North Kayong Regency, Ketapang Regency, Sambas Regency, and Mempawah Regency. Exotic natural wealth is a tourism potential that this province, including Sambas Regency, has.

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Sambas Regency offers various types of tourism. It has been recorded that Sambas Regency has 71 tourist attraction locations divided into marine tourism, cultural tourism, special interest tourism, agro-tourism, historical tourism, natural tourism, and religious tourism. Each type of tourism offers a unique and differentiated experience according to the traveller's interests and preferences. The tourist attractions of Sambas Regency as of 2023 can be seen in Table 1 below.

Table 1. Sambas Regency Tourist Attraction Objects Per 2023

No.	Subdistrict	Location	Tourist Attraction Name	Types of Tourist Attractions
1.	Selakau	Sui Rusa	Pantai Polaria	Marine tourism
		Semalagi Besar	Pantai Saadi Terigas	
			Makam Ratu Anom Kesuma Yuda	
		Makam Pangeran Timba Bayi	Cultural tourism	
2.	Pemangkat	Pemangkat Kota	Pantai Tanjung Batu	Marine tourism
			Pantai Sinam	Special interest tourism
			Toa Pekong Ular Putih	
			Toa Pekong Dewi Kwan Im	
3.	Salatiga	Parit Baru	Air Terjun Gunung Selindung	Natural tourism
4.	Tebas	Mak Jage Serindang	Taman Rekreasi Batu Mak Jage	Natural tourism
			Agrotourism Matang Nangka	Wisata Agro
5.	Tekarang	Tekarang	Perkebunan Sawo	Agrotourism
			Rumah Petinggi Tekarang	Cultural tourism
			Makam Petinggi Tekarang	
6.	Sambas	Dalam Kaum	Istana Alwatzikoebillah	Historical tourism
			Masjid Jami'	Historical tourism
			Water Front City	Artificial Tourism
			Makam Syech Abdul Jalil Al Fatani	Cultural tourism
			Kantor Wedana/Demang Sambas	
			Rumah Tinggal Maha Raja Imam Haji Muhammad Basiuni Imran	
			Rumah Tinggal Haji Siraj Sood (Dato' Kaya Lela Mahkota)	
			Museum Sambas	
Perkampungan Tenun Songket				
7.	Subah		Kebun Raya Sambas	Natural tourism
			Rumah Batu	
8.	Sebawi	Sempalai Sebedang	Danau Sebedang	Natural tourism
			Makam Bujang Nadi Dare Nandung	Cultural tourism
			Surau Peninggalan Raden Sulaiman	
		Sepuk Tanjung	Taman Istana Putri Danau Sebedang	Natural tourism
9.	Sajad	Segerunding	Makam Keramat Bantilan	Cultural tourism
10.	Jawai	Sarang Burung Danau	Pantai Kahona	Marine tourism
			Sentebang	
			Dungun Laut	
11.	Jawai Selatan	Jawai Laut	Pantai Putri Serayi	Cultural tourism
			Benteng Peninggalan Kolonial Belanda (Kalang Bau)	
			Pantai Pesona Bahari	Marine tourism
12.	Teluk Keramat	Sekura	Perkebunan Salak	Agrotourism
			Makam Keramat Sungai Kumpai	Cultural tourism
13.	Galing		Makam Ratu Sepudak	

			Makam Syech Muhammad Sattaruddin (Dato' Ki Puteh/Panglima Guntur)	
			Makam Dato' Timalar Tan Azis Bujang	
			Makam Keramat Dato' Sanggup	
			Batu Betarup	
14.	Tangaran	Pancur	Pantai Tanjung Terabitan	Natural tourism
		Arung Parak	Pantai Muare Jalan Indah	Marine tourism
		Simpang Empat	Pantai Dataran Merdeka	
			Pantai Venesia	
15.	Sejangkung	Piantus	Bukit Piantus	Natural tourism
		Semanga	TWA Gunung Senujuh	
16.	Sajingan Besar	Kaliau	Air Terjun Riam Merasap	
		Santaban	Goa Alam Santok	Natural tourism/ Religious tourism
		Sungai Bening	Air Terjun Riam Cagat	Natural tourism
17.	Paloh	Tanah Hitam	Pantai Tanjung Lestari	Marine tourism
			Pantai Harapan	
		Sebusus	Pantai Pulau Selimpai	
			Taman Rekreasi Batu Bejamban	
			Pantai Kampak Indah	
			TWA Tanjung Belimbing	Natural tourism
			T.W.A. Gunung Lintang	
			T.W.A. Gunung Asuansang	
		Temajuk	Pantai Tanjung Bendera	Marine tourism
			Pantai Tanjung Kemuning	
			Pantai Bayuan	
			Pantai Camar Bulan	
			Dermaga Asam Jawa	
			Pantai Telok Atong Bahari	
			Hutan Hujan Tropis Tanjung Dato'	
			Pantai Batu Pipih	
			Air Terjun Teluk Nibung	
			Air Terjun Gunung Pangi	
		Kalimantan	Pantai Kalimantan	

Source: Badan Pusat Statistik Kabupaten Sambas, 2023

Lake Sebedang is an ecotourism destination that attracts local and foreign tourists due to its natural beauty and high ecological value. Lake Sebedang offers a serene environment surrounded by lush forests and clear waters, making it an ideal destination for nature lovers. Its environmental significance lies in its diverse flora and fauna, contributing to the conservation of biodiversity in the region. The lake also serves as a source of livelihood for the local community, promoting sustainable tourism practices that balance economic growth with environmental preservation. Surrounded by green hills and clear waters, Lake Sebedang offers stunning views that are ideal for nature recreation. In addition, the area is rich in biodiversity, making it an essential habitat for various species of flora and fauna, as shown in Figure 1 below.

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Figure 1. Portrait of Sebedang Lake Ecotourism Area

Source: Researcher documentation, 2024

Lake Sebedang, a conservation-based ecotourism area, is also vital in encouraging environmental awareness while driving the local economy through community involvement in sustainable tourism management. The number of visitors to Lake Sebedang itself tends to fluctuate yearly, influenced by various factors, including tourism promotion, infrastructure, and local policies.

Before the COVID-19 pandemic, the trend of domestic and foreign tourist visits nationally showed a steady increase along with the efforts of local governments to promote ecotourism. However, when the world experienced the COVID-19 pandemic, Indonesian tourism became one of the sectors affected. The decrease in foreign tourists entering Indonesia was due to the implementation of the Large-Scale Social Restrictions policy. The graph can be seen in Figure 2 below.

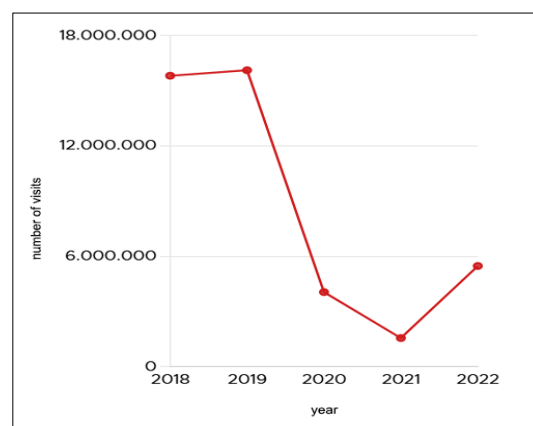


Figure 2. Number of Foreign Tourist Visits to Indonesia 2018—2022

Source: Badan Pusat Statistik Republik Indonesia in Armavillia, 2023

Looking at the graph, in 2018, the number of foreign tourists visiting Indonesia reached 15,810,300. Furthermore, in 2019, the number reached 16,106,954 arrivals. Unfortunately, the following year, due to the Covid-19 outbreak, the number of arrivals decreased, and until now,

the situation has not fully recovered. This is in line with the data that in 2020, the number of arrivals was only 4,052,923, and the smallest number was in 2021, which only had 1,557,530 arrivals. Furthermore, it was closed by the number of arrivals in 2022, which amounted to 5,471,277 arrivals, and most of them came from Ngurah Rai Airport, Bali (Badan Pusat Statistik Republik Indonesia in Armavillia, 2023).

Likewise, tourism in Sambas Regency, West Kalimantan Province. The number of tourists in 2018 was recorded at 99,490 domestic and 21,909 foreign tourists. In 2019, there were 26,496 domestic tourists and 33,586 foreign tourists. In 2020, there were 13,482 domestic tourists and 9,115 foreign tourists (Sambas Regency Tourism, Youth and Sports Office, 2021). This shows a decline as an impact of the Covid-19 pandemic. Furthermore, these figures can be seen in the graph in Figure 3 below.

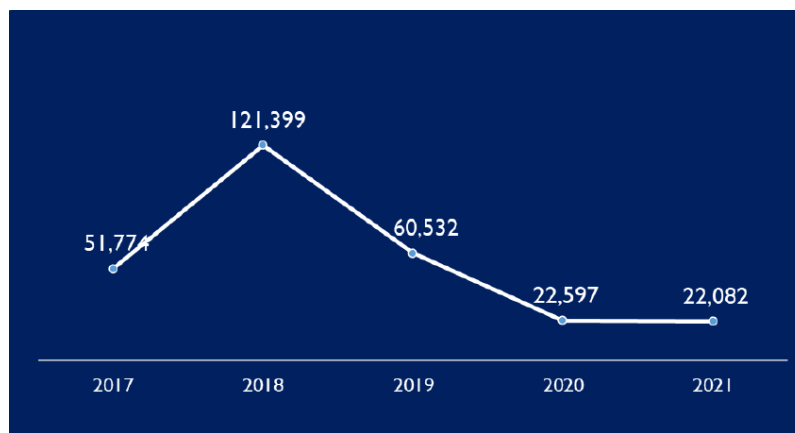


Figure 3. Number of Tourist Visits to Sambas Regency 2017—2021

Source: Dinas Pariwisata, Kepemudaan dan Olahraga Kabupaten Sambas, 2021

However, interestingly, the manager of the Sebedang Lake tourist destination in Sambas Regency, West Kalimantan Province, noted a significant increase in visitors during Eid compared to regular days, which was a blessing during the pandemic, especially for the surrounding community. The Manager of the Sebedang Lake Tourism Area, Didip, said that during Eid, the Sebedang Lake tourist destination in Sambas Regency experienced a spike in visitors. Meanwhile, there have been more than 1,000 visitors from two days of Eid. This is known from the tickets sold, but the number is still drastically down from the previous year (Dedi, 2021).

This research analyzed the quadruple helix collaboration on the development of Lake Sebedang ecotourism during the COVID-19 pandemic from a political ecotourism perspective. The analysis of the resilience of the Lake Sebedang Ecotourism destination in facing the pandemic, which can be said to be successful, is expected to be an example for other tourist destinations if they face similar conditions.

Several previous studies, such as the research conducted under the title "Tourism Development and Effects of Covid-19 on Tourism in Myanmar," have focused on economic and industrial aspects. The results of the study revealed that the COVID-19 pandemic and its prospects have caused business owners to experience depression, frustration, anxiety, and

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tension as social impacts. The overall analysis suggests the need for public-private partnership initiatives and stakeholder capacity building to develop and manage the tourism industry in the future (Htoo & Kyaw, 2023).

Another study, "The Impact of the Covid-19 Pandemic on the Tourism Industry and What Kind of Future this Industry Will be Led to," focuses on the tourism industry side. The study's findings first assess the extent of the epidemic's impact on the lodging and transportation sectors, particularly the latter's impact on the world aviation market, two central pillars of the tourism sector. After that, it describes how these two industries bounced back from the pandemic and assesses those strategies and other potential ones. In conclusion, it also explores these two industries' potential futures in the light of various global influences (Feng, Yu, Ren, & Yu, 2022).

Meanwhile, this study's novelty is focused on the political side of ecotourism and Quadruple Helix collaboration in observing the phenomenon of ecotourism destinations' success that does not collapse when facing situations such as the Covid-19 pandemic.

Literature Review

Ecotourism Politics

Ecotourism politics refers to the dynamics of power, policies, and decisions that influence the management and development of ecotourism (Zhan, 2024). It involves interactions between governments, the private sector, local communities, and environmental activists in maintaining a balance between nature conservation and resource exploitation for tourism. Ecotourism politics often focuses on how regulation, funding, and governance are implemented to ensure the sustainability of ecosystems and economic benefits for local communities.

The politics of ecotourism also encompasses how global policies, such as international environmental agreements and sustainability standards, influence the development of nature-based tourism in different countries. Key actors such as non-governmental organizations, international organizations, and large tourism companies can play a role in shaping the direction of these policies. At the local level, indigenous peoples and local communities often struggle to maintain control over their natural resources and ensure that the economic benefits of ecotourism do not damage their environment or displace traditional rights. The politics of ecotourism thus becomes an arena for negotiation between conservation, development, and social justice.

In addition, ecotourism politics often faces challenges in balancing short-term economic needs with long-term biodiversity protection. Among the most discussed topics worldwide are ecotourism, local livelihood, and the preservation of natural resources. Ecotourism is regarded as nature-based tourism that focuses on two main aspects: biodiversity conservation and livelihood enhancement (Samal & Dash, 2023).

In the local context, ecotourism politics often focuses on how local communities manage and utilize natural resources (Ibrahim, Zukhri, & Rendy, 2019). Local communities usually

play an essential role in maintaining the balance between economic benefits and environmental sustainability, including deciding the form of their participation, whether as direct implementers or beneficiaries. At the national level, ecotourism policies are influenced by government regulations related to conservation, infrastructure development, and tourism promotion. In the global context, climate change also influences ecotourism politics, which increases the urgency to develop sustainable tourism practices. Adaptation and mitigation policies, as well as international support for conservation, are crucial in dealing with threats to vulnerable ecosystems due to the impacts of climate change (Bianchi, 2014).

Quadruple Helix Collaboration

Quadruple helix collaboration involves four main actors in innovation and development: government, academics, industry, and society. This model expands the Triple Helix concept by adding community elements as crucial actors in creating knowledge and innovation (Hasche, Höglund, & Linton, 2019). The aim is to create synergies between these sectors to facilitate sustainable economic growth, technological innovation, and social solutions. In the context of regional development, this collaboration can strengthen local capacity through active community participation and ensure that the resulting innovations are relevant and beneficial to all stakeholders.

In addition, quadruple helix collaboration emphasizes the importance of reciprocal interaction between actors to create an inclusive innovation ecosystem. By integrating different knowledge and perspectives, this collaboration can produce more effective, relevant, and sustainable solutions (Zhan & Zhan, 2023).

In ecotourism politics, Quadruple Helix Collaboration is vital in ensuring sustainable ecotourism development. Governments can set policies that support conservation, academics can provide research on environmental and social impacts, and industry can offer innovative solutions for natural resource management. As key stakeholders, communities ensure these policies and innovations align with local needs and environmental sustainability. This collaboration helps balance economic exploitation and environmental protection, enabling more equitable, inclusive, and sustainable ecotourism development.

Research Method

This study employed descriptive qualitative methodology. Descriptive qualitative research describes phenomena comprehensively through qualitative data collection, such as interviews, observations, and documents (Furidha, 2023). This method focuses on an in-depth understanding of the subject's context, perspective, and experience without attempting to generalize or test hypotheses.

Literature reviews and interviews served as data sources. The informants in this study were Syopian Asthauri, S.E. from the Department of Tourism, Youth, and Sports of Sambas Regency, Arpandi, S.P. as the Director of the Regional Public Drinking Water Company (Perumda) Tirta Muare Ulakan Sambas Regency, Ardy Sanjaya, S.I.P. as the Head of the

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Paggong Tourism Awareness Group (Pokdarwis) of Sempalai Sebedang Village, and Uray Rizki Suhendra as the General Chairperson of the Generasi Pesona Indonesia (Genpi) Sambas.

Result/Findings and Discussion

Sebedang Lake as a Leading Ecotourism Destination in Sambas Regency and the Regulations that Govern It

One of the main tourist attractions in Sambas Regency is Lake Sebedang. Since 2008 and before, the direction of Lake Sebedang's development has been towards the concept of ecotourism, which was then attempted about its spatial planning, especially considering its position adjacent to the Regional Public Water Company (Perumda). Based on an interview conducted by the researcher with Mr Syopian Asthauri, S.E. from the Department of Tourism, Youth, and Sports of Sambas Regency, it was revealed that Lake Sebedang had been conceptualized as an environmentally based and sustainable ecotourism and efforts have been made so that it can continue to run side by side with clean water sources.

This lake has an area of up to 1 km² and is surrounded by hills with a height of up to 400 m above sea level (asl). Some of the mountains around Lake Sebedang are Mount Amor and Mount Majau. Apart from that, in the middle of the lake, there is an island called Panjang Island. Sebedang Lake, located in Sebawi District, can be seen in Figure 4 below.

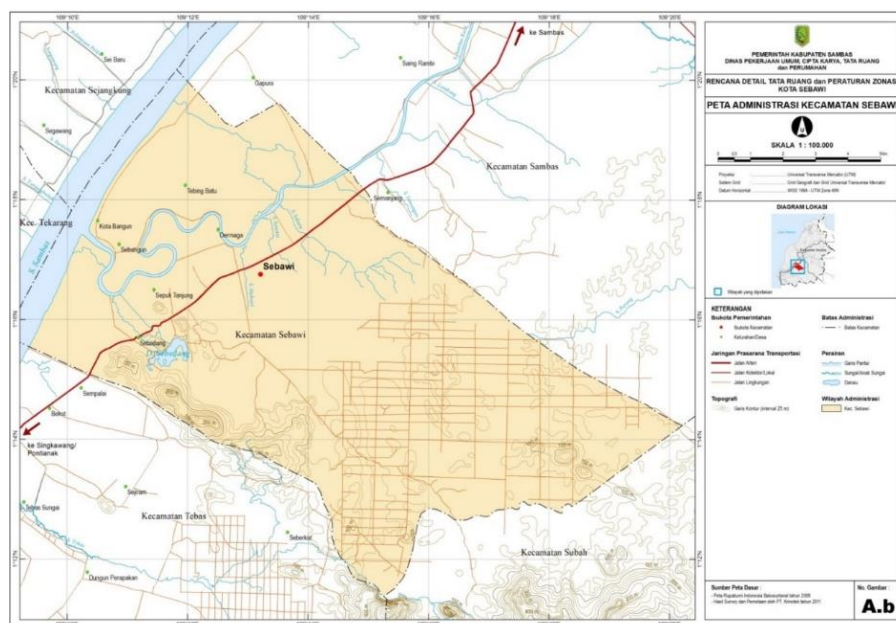


Figure 4. Location of Sebedang Lake in Sebawi District, Sambas Regency

Source: Dinas Kepemudaan, Olahraga dan Pariwisata Provinsi Kalimantan Barat, 2017

Lake Sebedang itself, based on the Sambas Regency Regional Regulation concerning the Sambas Regency Tourism Development Master Plan (RIPPARKAB) for 2016—2036, is included in the tourism group (KP2) consisting of Sambas, Sajad, Sebawi, Sejangkung, and Subah Districts as can be seen in Figure 5 below.

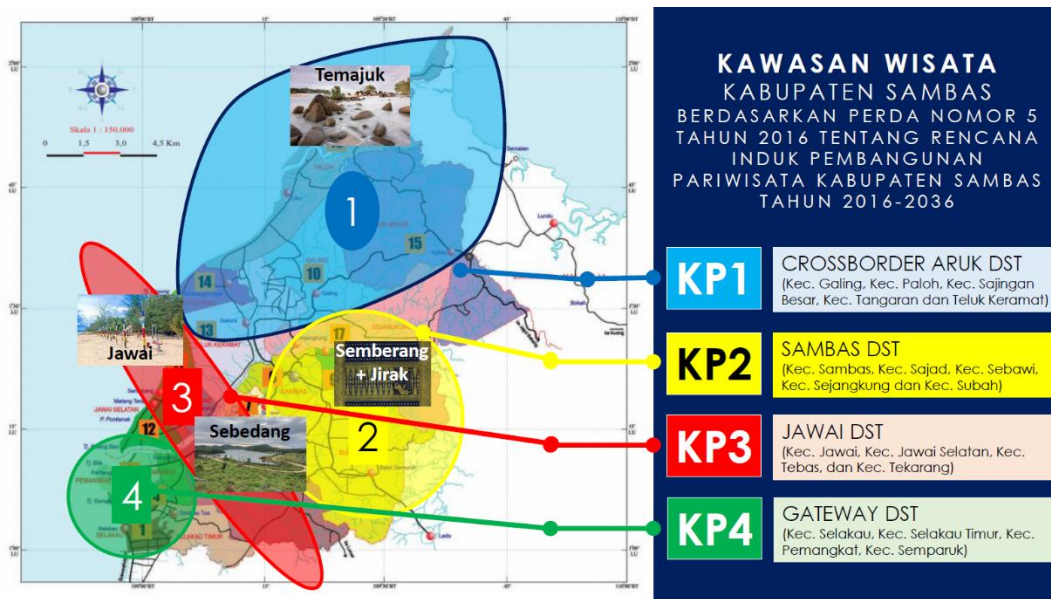


Figure 5. Mapping of Tourism Areas Based on RIPPARKAB Sambas

Source: Dinas Pariwisata, Kepemudaan dan Olahraga Kabupaten Sambas, 2021

RIPPARKAB is a plan for developing assets, opportunities, areas, priorities, and optimal tourist attractions that are compiled in a comprehensive and integrated manner. It analyzes their relationship with all aspects and factors of regional development. RIPPARKAB contains directions for district tourism development from 2016 to 2036, which are implemented in five-year stages covering the development of tourism destinations, tourism marketing, tourism industry, and tourism institutions.

Based on the RIPPARKAB, there is a draft on the development of superior tourist attractions (DTW) and thematic tourism products with the determination of tourism development areas based on the direction of the province of superior DTW Sambas district, namely the Alwatzikhobillah Palace Complex, Tanjung Batu Beach, Putri Serayi Beach, Santok Cave, and Sebedang Lake. The five DTWs were designed in the implementation years of the RPJMD 2016, 2017, and 2018 with the target of compiling the superior RIPOW (Master Plan for Development of Tourist Objects), feasibility studies, and technical plans by investors, provision of basic infrastructure; development of the Temajo tourism area; operation, coaching, supervision, monitoring, and evaluation. The program collaborates with Bappeda (Development Planning Agency), Disarpورا (Tourism, Youth and Sports Agency), Dispu (Public Works), Disperindagkop (Industry, Trade and Cooperatives Agency), Agriculture Agency, Fisheries Agency, BKPM (Investment Coordinating Board), investors, private sector, and the community (Zhan, 2017).

The Rise of Sebedang Lake Ecotourism During the Covid-19 Pandemic

During the COVID-19 pandemic, many tourist attractions experienced a decrease in visitors, but the number of visitors to Lake Sebedang remained stable. After the COVID-19 pandemic, many tourist attractions, such as Riam Sajingan and others, closed and were no longer operating. According to Mr. Syopian Asthauri, S.E., what caused Lake Sebedang to

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survive during the Covid-19 pandemic and after the Covid-19 pandemic was that access to Lake Sebedang was easy (accessible) and the image of Lake Sebedang as a typical Sambas tourist attraction had been known from generation to generation.

Despite the limited tourism activity due to the COVID-19 pandemic, Pokdarwis Paggong has successfully held an event with strict protocol standards. In addition, the cafes have also successfully obtained health standards from the ministry. Tourism management at Lake Sebedang has implemented the QR Barcode Peduli Lindungi. This is by the Circular Letter of the Indonesian Minister of Trade Number 12 of 2020 concerning the Restoration of Activities Carried Out During the COVID-19 and New Normal Period.

Pokdarwis Paggong Sebedang, the Tourism Awareness Group that manages Lake Sebedang tourist attractions, received the Land and Building Tax (PBB) award in 2023 for compliance with regional tax obligations through all events and entrance ticket activities at Lake Sebedang. The collection of entrance tickets for visitors at Paggong Sebedang cannot be carried out freely but by the Regional Regulation on Special Tourism Tax, which is focused only on when activities or entertainment are held at tourist locations with a tax of 15%.

This results from the absence of a unique tourism tax in Sambas Regency. The tax applied at the Sebedang Lake tourist attraction is called the Entertainment Tax. Any tourist destination with an admission fee must entertain, such as attractions, band music, and solo organs. The Entertainment Regulation is not applicable if the committee for the tourist area does not provide any entertainment (Sambas News, 2023). Furthermore, the 10% restaurant tax now applies to all cafes and canteens in Sebedang Lake. As a result, Sebedang Lake's tourism industry significantly contributes to initiatives aimed at raising regional original income (PAD).

The increasingly organized Paggong Tourism Awareness Group (Pokdarwis) of Sempalai Sebedang Village for the 2021–2026 Period, which Ardy Sanjaya, S.I.P., currently chairs, demonstrates numerous advancements in the development of the Sebedang Lake tourist attraction. The tourism industry around Sebedang Lake has benefited from well-organized management. According to the findings of an interview with Ardy Sanjaya, S.I.P., during one week of the 2023 Eid al-Fitr holiday, 24,185 people were visible from the entrance tickets, comprising 6,88 cars and 10,447 motorbikes. This encouraging development demonstrates the growing public interest in Sebedang Lake as a travel destination.

In addition, in a study conducted by the researcher with Bapak Arpandi, S.P., the head of the Umum Daerah Air Minum (Perumda) Committee of Tirta Muare Ulakan Kabupaten Sambas, it was revealed that the general public should also be involved in the management of aquatic resources near beaches, such as cleaning beaches, conserving air, and preventing algae blooms. The public can participate in various conservation programs, protect the surrounding environment, and ensure the ecosystem's health. This can hinder the development of the Danau Sebedang ecosystem, particularly when the COVID-19 pandemic strikes.

Then, there is also the role of the community, in this case, the younger generation through Generasi Pesona Indonesia (Genpi), a youth community that cares about tourism under the auspices of the Tourism Office. The Generasi Pesona Indonesia (Genpi) Community of Sambas

Regency has a vital role in developing tourist destinations in Sambas Regency. The Head of Genpi Sambas, Uray Rizki Suhendra, expressed this. In an interview conducted by the researcher, he revealed that Genpi Sambas members are very concerned about the existence of tourist destinations in Sambas Regency, especially Lake Sebedang, including during the COVID-19 pandemic. Genpi's role is to also participate in maintaining and preserving the surrounding area and the local community's culture to provide an opportunity for the surrounding community to improve their welfare.

Furthermore, the academic sector is vital in providing evidence-based research and recommendations to develop sustainability strategies for creating the Sebedang Lake ecotourism area, including during the COVID-19 pandemic. The educational industry examines the pandemic's impact on ecotourism and the environment and offers innovative solutions related to adaptation, such as developing digital ecotourism and better governance.

Academics also help governments and ecotourism players understand how to minimize negative impacts on ecosystems while promoting local economic recovery. In addition, academic research supports the development of local community capacity to adapt to the challenges of the pandemic through education and training in relevant new skills. Thus, the role of the academic sector is reflected in its function in the Tri Dharma of Higher Education, which consists of education, research, and community service.

In the industrial or business sector, cafes and lodgings in the Sebedang Lake ecotourism area implement support for the development of the area during the pandemic through the application of CHSE. (Cleanliness, Healthy, Safety, and Environmental Sustainability). CHSE is a set of principles and practices designed to ensure safety, health, and hygiene in the tourism and hospitality industry, especially during crises such as the COVID-19 pandemic (Prihastini & Jaya, 2024). Implementing CHSE in Danau Sebedang during the COVID-19 pandemic aims to maintain the safety and comfort of tourists and local communities.

Some steps include improving hygiene standards, such as providing handwashing facilities, routine disinfection of public areas, and physical distancing at tourist attractions. Health aspects are maintained by temperature checks, limiting the number of visitors, and requiring all parties to wear masks. Regarding safety, strict protocols are implemented to prevent crowds and excessive physical contact. In addition, the principle of environmental sustainability is maintained by prioritizing environmentally friendly practices in waste management and natural resources in ecotourism areas.

Thus, the quadruple helix collaboration is the key to the success of the Sebedang Lake ecotourism destination, which can continue to experience an increase in the number of visitors even though it was initially affected by the COVID-19 pandemic. The quadruple helix collaboration model based on ecotourism politics can be seen in Figure 6 below.

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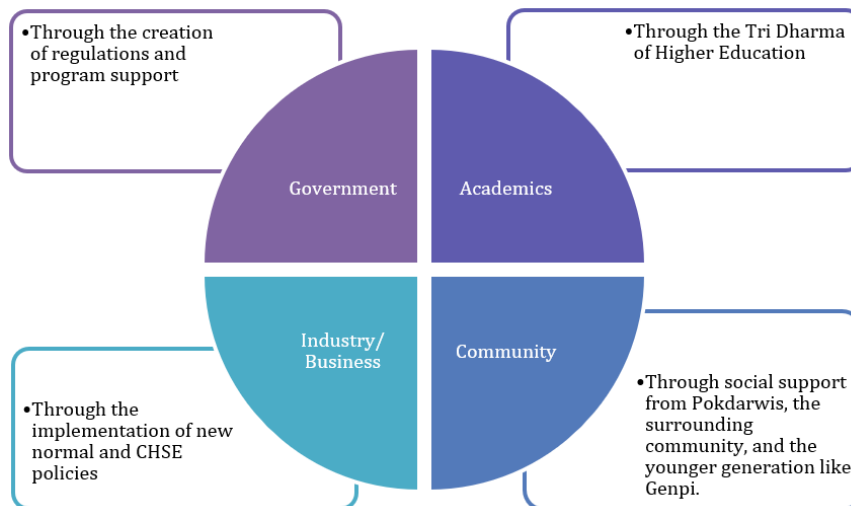


Figure 6. Quadruple Helix Collaboration Model Based on Ecotourism Politics at Sebedang Lake during the Covid-19 Pandemic

Source: Processed by researchers, 2024

Conclusion

This study shows that the success of Sebedang Lake ecotourism in maintaining tourism activities during the COVID-19 pandemic results from the effective collaboration of the Quadruple Helix model. Through the involvement of the government, academics, the industry sector, and the community, Sebedang Lake can continue to operate by implementing various adaptive strategies. One of the main strategies is establishing a COVID-19 volunteer post and security team, which ensures the implementation of health protocols by government regulations. This initiative is critical to maintaining tourist safety and building trust so they can continue visiting Sebedang Lake even during a pandemic.

In addition, collaboration with the academic sector provides scientific guidance on appropriate policies and protocols for ecotourism destinations. Academics play a role in analyzing the impact of the pandemic on tourism activities and providing relevant recommendations. On the other hand, the business sector, especially local cafes and businesses around Lake Sebedang, also plays a role by implementing strict health standards, such as checking visitors' body temperatures and providing handwashing facilities. These businesses adapt to the "new normal" environment while helping to minimize negative impacts on the local economy.

Through Pokdarwis Paggong Sebedang and Genpi Sambas, local communities also play a significant role in supporting the sustainability of tourism in Lake Sebedang. They help implement health protocols, protect the environment, and actively participate in ecotourism management. In conclusion, this study underlines the importance of Quadruple Helix Collaboration in creating a resilient ecotourism ecosystem during the pandemic, where multi-sector and local community involvement are critical factors for success. This shows that strong

and sustainable collaboration can be a model for other ecotourism developments in the future, even in a global crisis such as the pandemic.

Declaration of conflicting interest

The authors declare that there is no conflict of interest in this work.

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