

Collaborative Governance Networks Supporting Sustainable Ecotourism: A Case Study of Gili Iyang Island, Indonesia

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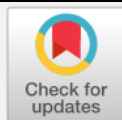
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ABSTRACT

The development of sustainable ecotourism on Gili Iyang Island, known for its high oxygen levels and unique local culture, requires collaboration among diverse stakeholders through effective governance networks. This study investigates the roles and contributions of key stakeholders – including the Sumenep District Tourism, Culture, Youth, and Sports Office (Dinas Pariwisata, Kebudayaan, Pemuda, dan Olahraga Kabupaten Sumenep or Disparbudpora), the Andang Taruna Tourism Awareness Group (Kelompok Sadar Wisata Andang Taruna or Pokdarwis), village governments, and local communities – in developing ecotourism on Gili Iyang Island, Indonesia. Using a qualitative case study approach, data were collected through in-depth interviews, observations, and document analysis. Findings show that governance networks are crucial in enhancing community empowerment, building local capacity, and improving infrastructure to support ecotourism. Nevertheless, challenges remain, including limited resources, conflicts between villages, and minimal private-sector engagement. Strengthening Pokdarwis' managerial capacity, fostering inter-community synergies, and attracting private sector involvement are identified as essential strategies to ensure sustainable ecotourism. This research contributes to the broader literature on collaborative governance in remote island ecotourism, offering practical insights for policymakers and stakeholders aiming to create resilient, community-driven tourism initiatives that can be adapted to similar island settings.

Keywords: Collaborative Governance; Ecotourism Development; Gili Iyang Island; Governance Networks; Sustainable Tourism

1. Introduction

Ecotourism is a form of tourism that prioritizes conservation, understanding, and appreciation of the environment and culture being visited. The main focus of ecotourism is the natural environment and includes various types of tourism, such as nature tourism, wilderness tourism, low-impact tourism, and sustainable tourism (Mathis & Rose, 2016; Rusli et al., 2011). Sustainable ecotourism development can support ecological conservation and provide economically viable and culturally and socially equitable benefits for the community (Harto et al., 2021; Wiyono et al., 2023). Recently, the concept of ecotourism has become a trend along with the implementation of tourism and the environment as a unity of interconnected activities and travel (Hariadi et al., 2022; Ibrahim et al., 2019; Wiyono et al., 2023).

One of the island tours in Sumenep Regency, which has the title of Oxygen Island, is Gili Iyang Island. This island is included in the work area of the Dungkek sub-district, which consists of 2 villages, namely Bancamara Village and Banraas Village. Gili Iyang Island, Sumenep, is known for its natural environmental potential and high oxygen levels, making it a leading ecotourism destination. The designation as “Oxygen Island” is because this island has natural potential and high oxygen levels (above the normal threshold of 20%) compared to other areas in Indonesia. Based on the latest research conducted by the Environmental Health and Disease Court Technical Center (BBTKLPP), oxygen (O₂) conditions reached 20.9-21.5% or above the normal threshold of 20%. The condition of carbon dioxide (CO₂) levels on the island ranges from 302-313 ppm, which is below the normal threshold allowed in the air of 387 ppm (Aida et al., 2017; Setiawan & Julistiono, 2014). In addition, on Gili Iyang Island, most of the population has reached a high age, looking young, fresh, and fit (Izzuddin & Ilahiyah, 2022).

The natural potential of Gili Iyang Island is the main strength that will be developed into tourism (Sholeh & Farid, 2021). The efforts of the Sumenep District Tourism, Culture, Youth and Sports Office (Disparbudpora) in collaboration with the Bancamara Village Government, Banraas Village Government, Andang Taruna Tourism Awareness Group (Pokdarwis), and the people of Gili Iyang Island explore and develop this potential to make Gili Iyang Island an ecotourism area (Musleh, 2023; Musleh et al., 2023).

Data findings in the field show that the role of the Sumenep district government is still not effective. This can be seen in several abandoned infrastructure development projects, such as the construction of a pier that has not yet been completed. Its condition has begun to deteriorate, and the Sumenep District Government has built homestays. However, they cannot be used because there is no clarity on who is authorized to manage them. There is no synergy between Bancamara Village and Banraas Village in the management of Gili Iyang Island Ecotourism. There is a conflict of interest between the two villages in the struggle for assistance programs provided by the Central and Local Governments, so the programs provided cannot be utilized properly.

Ecotourism on small islands such as Gili Iyang island faces particular challenges, including limited infrastructure, potential conflicts between stakeholders, and the risk of environmental degradation if governance is poorly managed (Lee & Son, 2017). In addition, collaboration between government and communities is often hampered by differences in interests and a lack of networking capacity (Mischen, 2015). Therefore, this research is relevant because by understanding and analyzing governance networks, strategies to strengthen collaboration between stakeholders can be formulated appropriately (Guerrero et al., 2015). In addition, this research is important to expand insights on how network-based governance can be applied in the local context of Indonesia, especially in remote ecotourism areas such as Gili Iyang, where the involvement of local communities and actors is crucial (Widaningrum & Damanik, 2018).

In order to realize sustainable tourism, the government requires cooperation with various actors and organizations related to tourism, which is understood as the Governance Network. Many governance network studies (Klijn & Koppenjan, 2016; Yi & Scholz, 2016) in the field of tourism have been carried out (Chan, 2017; Monintja et al., 2023; Prasetyanti & Nugroho, 2019; Widaningrum & Damanik, 2018). Governance networks play an important role in building multi-actor collaboration and encouraging active participation of local communities (Berkes, 2009). Through this network, various actors can share knowledge and resources and learn adaptively when facing management challenges (Crona & Parker, 2012). Therefore, the study of the Governance Network is very important because it is directed to support the principles of sustainable ecotourism on Gili Iyang Island so that ecotourism is not only economically profitable but also maintains ecological and social sustainability. Management by stakeholders must be synergistic, through a clear framework and with a common language, by making some kind of cooperation guidelines or regulations, namely community welfare and social and economic benefits.

Various studies have highlighted the importance of collaborative governance in ecotourism (Kumar et al., 2023; Mahadiansar et al., 2021). However, there is still limited understanding of the application of governance networks in ecotourism in small island areas with unique ecosystems, such as Gili Iyang island. Previous studies have mostly highlighted the role of government as the main driver, but few have examined the role of interactions between local and non-local actors in governance networks (Pittman & Armitage, 2017). Therefore, this study fills a gap in the literature by exploring how different actors work together in networks and learn socially to achieve sustainability (Berkes, 2009; Tolera & Senbeta, 2023).

This research is novel because it combines aspects of the governance network with the unique potential of environmentally-based ecotourism on the island of Gili Iyang, which has high oxygen levels. This approach not only enriches theoretical studies on tourism governance but also provides practical insights for policymakers and ecotourism industry players. Thus, this research is expected to be an important reference for the development of ecotourism in other areas that have similar characteristics.

This research aims to explore how the governance network can support the development of ecotourism on Gili Iyang Island. The main focus of the study is to identify the role and contribution of each actor involved, such as the government, community, private sector, and non-governmental organizations. In addition, this research will explore how the collaborative network affects the success of ecotourism programs, especially in the aspects of environmental sustainability and economic improvement of local communities (Cristofoli et al., 2014).

Based on the description above, the problem formulation in this study is: How can the governance network support the development of sustainable ecotourism on Gili Iyang Island, Sumenep Regency? This research is expected to help provide a better understanding of the importance of cross-sector collaboration in tourism governance and how the network mechanism can contribute to environmental conservation while improving the economic welfare of local communities.

2. Literature Review

Governance Network is the interdependence of actors who have autonomy in the public, private, and social sectors that work together to achieve the goals of the network organization (Klijn & Koppenjan, 2012). Governance network theory builds on the traditions of political science, organizational science, and public administration to explain how the idea of interdependence of networks is used in the concept of governance networks.

Governance network analysis framework, according to Klijn & Koppenjan (Klijn & Koppenjan, 2016), in order to produce the achievement of effective network performance and network management: 1) Actor Analysis, to analyze actors is done by (a) determining who is the most important actor in the group, (b) reconstructing actor perceptions, (c) types of resources, (d) level of dependence; 2) Process analysis is carried out with four stages of analysis, namely (a) identifying areas where actors meet and carry out predetermined strategies; (b) analyzing the interaction process carried out; (c) assessing the interaction process that occurs, and (d) identifying and initiating network management strategies; and 3) Institution Analysis is carried out with three steps, namely (a) making findings of the actors' interaction patterns, (b) analyzing perceptions and beliefs, (c) identifying the rules that apply in the network.

The governance network approach focuses on interactions and negotiations to resolve conflicts and governance strategies to bridge differences between actors in the resolution of public policies, programs, and services. The governance network concept sees conflict as a sequence of interactions between multiple actors that aim to influence the process of solving public problems and public services, involving various competing interests, perceptions, and values (Klijn & Koppenjan, 2016). This indicates that the interaction process occurs between individuals, groups, or organizations from the public, semi-public, and/or private sectors that can act as well as autonomously participate in the interaction process. They depend on each other to achieve their goals because resources (e.g., money, power, information, skills, and authority) are not concentrated in the hands of a single actor but are spread across multiple actors (Mandell, 2001).

The network in the governance network is considered successful when the interaction process between actors or actors adapts to each other and comes up with strategies so as to arrive at a joint solution that can qualify in terms of game-theoretic as a win-win solution situation. The solution implies improvements for all parties involved compared to the pre-existing situation (Klijn & Koppenjan, 2016).

3. Research Methodology

The following research uses a qualitative type (Creswell & Poth, 2016) with a case study approach (Yin, 2008) in an effort to develop ecotourism on Gili Iyang Island, Sumenep Regency in the perspective of network governance (Klijn & Koppenjan, 2016).

Data collection was obtained through 1) interviews conducted using questions focused on the problem so that the information collected is intact and in-depth. The selection of informants was done by purposive sampling to ensure the representation of various actors. Informants interviewed by researchers were (a) Banraas Village Head; (b) Bancamara Village Head; (c) Head of the Sumenep Regency Tourism, Culture, Youth and Sports Office; (d) Head of BUMDES Gili Iyang; (e) Head of the Andang Taruna Tourism Awareness Group (Pokdarwis); 2) observations made by observing directly or indirectly, formally or informally regarding activities related to ecotourism development on Gili Iyang Island. 3) documentation is done by collecting data and other data as complementary material from the use of observations and interviews in research. The documentation collected is in the form of regulations, archives, and other documents related to tourism on Gili Iyang Island.

In this study, the data analysis process was carried out simultaneously with data collection using the Interactive Model (Miles et al., 2014), namely 1) Data collection through observations, interviews, and documentation as well as other secondary data as supporting data from the implementation of observations, interviews and documentation in qualitative research; 2)

Condensation of data by selecting, centralizing, simplifying and abstracting action data from field notes, interviews, transcripts, various documents, and field notes; 3) Data presentation is presented in the form of narrative text; 4) Assertion of conclusions by analyzing finding the meaning of the data that has been presented.

4. Results and Discussion

4.1. Gili Iyang Island Overview

Gili Iyang Island is one of 16 islands off the coast of Madura. Administratively, it falls within Dungkek District, Sumenep Regency, covering an area of approximately nine km² and comprising two main villages: Banraas Village and Bancamara Village. Access to Gili Iyang is available by motorized wooden boat from Dungkek Port, with a travel time of around 45-60 minutes, depending on weather and sea conditions. The crossing spans about nine kilometers, with fares set at Rp. 15,000 per person or Rp. 600,000 per boat.

Dungkek Port, situated on the eastern end of Sumenep Regency, is about 30 kilometers from the center of Sumenep. Regular ferry crossings to Gili Iyang operate between 09:00 and 12:00 WIB. For chartered or rented trips, the last return crossing to the Sumenep mainland is at 16:00 WIB.

Gili Iyang has three main docks: one at Ropet Beach in Banraas Village, located on the island's eastern side and primarily used by fishermen, and two passenger docks. The passenger docks are in Bancamara Village, serving routes from Gili Iyang to Dungkek Port and in Banraas Village for trips from Dungkek Port to Gili Iyang.

The mention of Gili Iyang Island as an "Oxygen Island" is due to the natural potential of the island that produces high oxygen levels (above the normal threshold of 20%) compared to other regions in Indonesia (LAPAN). In addition, Gili Iyang Island also has supporting tourism objects located in Banraas Village and Bancamara Village. Tourist objects located in Banraas village are Ropet Beach and whale fossils. In Bancamara, there are attractions in the form of caves and cangguh stones. Other supporting facilities include homestays and eateries provided directly by residents. Another uniqueness of Gili Iyang Island is that many older people are still alive and healthy. According to data from the Sumenep District Government, in 2019, there were residents on Gili Iyang Island aged 60 years and over, reaching 1,285 people, and those aged 100 years and over reached 157 people.

The planning documents in the form of the 2014-2024 Spatial Detail Plan (RDTR) and the 2016 Gili Iyang Island Strategic Area Zoning Regulation state that Gili Iyang Island is designated as one of the integrated tourism areas. Ecotourism on Gili Iyang Island is also included in the Sumenep Regency Tourism Development Master Plan (RIPPARKAB) 2016-2030, and Gili Iyang Island is a leading natural tourist destination in Sumenep Regency.

4.2. Governance Network in Ecotourism Development

4.2.1. Actor Analysis

According to Klijn & Koppenjan, network governance involves analyzing the roles and interdependencies among actors within a network (Klijn & Koppenjan, 2016). Several key stakeholders play essential roles in the development of ecotourism on Gili Iyang Island, and they are responsible for creating a sustainable tourism environment.

1) Identifying of Actors

The Department of Tourism, Culture, Youth, and Sports (Dinas Pariwisata, Kebudayaan, Pemuda, dan Olahraga or Disparbudpora) of Sumenep Regency acts as the leading agency in

charge of strategic planning and development initiatives on Gili Iyang. Disparbudpora has established the island as a priority tourism destination, setting its direction through the Detailed Spatial Plan (Rencana Detail Tata Ruang or RDTR) for 2014-2024 and the Zoning Regulations for the Gili Iyang Strategic Area in 2016. These regulatory frameworks aim to integrate Gili Iyang into the region's broader tourism strategy. Additionally, Disparbudpora's Tourism Development Master Plan (Rencana Induk Pengembangan Pariwisata Kabupaten or RIPPARKAB) for 2016-2030 designates Gili Iyang as a key natural tourism site, focusing on both infrastructure development and human resource training. Disparbudpora also collaborates with local community organizations to support ecotourism potential through resource allocation and technical guidance. This partnership ensures that both local and regional priorities are considered in the island's tourism development.

The Andang Taruna Tourism Awareness Group (Kelompok Sadar Wisata Andang Taruna or Pokdarwis) plays a pivotal role at the community level, bridging the local community with the regional government's tourism objectives. In collaboration with Disparbudpora, Pokdarwis manages the daily operations of tourism sites and participates in ongoing human resource development. Through training and capacity-building initiatives provided by Disparbudpora, Pokdarwis members are equipped with the skills necessary for effective ecotourism management, thereby enhancing local expertise and encouraging sustainable practices within the community.

The village governments of Banraas and Bancamara work closely with Pokdarwis to ensure the preservation and maintenance of tourism sites. Their involvement is critical in aligning community interests with broader tourism goals. By working with Pokdarwis, these village governments support the infrastructure and resources needed for sustainable ecotourism, fostering a cooperative approach to managing the island's assets.

Lastly, the local communities of Gili Iyang contribute to the tourism sector through cultural preservation and service provision. Community members offer homestays, local culinary experiences, and other visitor services that enhance Gili Iyang's cultural appeal. This involvement not only supports the local economy but also reinforces a sense of shared responsibility in preserving the island's natural and cultural heritage.

The following table summarizes the roles of each actor in the governance of ecotourism on Gili Iyang Island:

Table 1. Actors and Their Roles in Managing Ecotourism on Gili Iyang Island

No.	Actor	Role
1	Department of Tourism, Culture, Youth, and Sports (Dinas Pariwisata, Kebudayaan, Pemuda, dan Olahraga or Disparbudpora) of Sumenep Regency	▪ Develop regulatory frameworks, including the Detailed Spatial Plan (Rencana Detail Tata Ruang or RDTR) 2014-2024 and Zoning Regulations for Gili Iyang. ▪ Establishes Gili Iyang as a tourism priority in the Tourism Development Master Plan (Rencana Induk Pengembangan Pariwisata Kabupaten or RIPPARKAB) 2016-2030. ▪ Provides infrastructure and training

No.	Actor	Role
		support for community-based tourism initiatives. ▪ Coordinates with local and central government agencies to ensure resource availability for tourism facilities.
2	Andang Taruna Tourism Awareness Group (Kelompok Sadar Wisata Andang Taruna or Pokdarwis)	▪ Collaborates with the Disparbudpora to develop and manage tourism resources. ▪ Undertakes maintenance of tourist attractions. ▪ Promotes community involvement and fosters sustainable practices among residents.
3	Banaras and Bancamara Village Governments	▪ Cooperate with Pokdarwis to maintain tourist sites. ▪ Support local tourism infrastructure.
4	Gili Iyang Island Community	▪ Engages in cultural preservation and provides tourism services (e.g., homestays, local cuisine). ▪ Reinforces community-led tourism initiatives, ensuring that local traditions are incorporated into visitor experiences.

Each of these actors contributes their specific expertise and resources to create a robust governance network. Disparbudpora provides strategic oversight and support, Pokdarwis lead community-based tourism efforts, village governments offer local support, and the community contributes directly through cultural and hospitality services. Together, they form a cohesive framework for sustainable ecotourism in Gili Iyang, aligning with both environmental conservation and community empowerment goals.

2) *Reconstruction of Actors' Perceptions*

The government, represented by the Department of Tourism, Culture, Youth, and Sports (Dinas Pariwisata, Kebudayaan, Pemuda, dan Olahraga or Disparbudpora) of Sumenep Regency, is a key stakeholder in managing tourism on Gili Iyang Island. Disparbudpora plays a significant role in optimizing tourism development, especially through pilot projects aimed at ecotourism enhancement. Recognizing Gili Iyang's natural asset of high-quality oxygen levels—unique compared to other Indonesian regions—Disparbudpora initiated a pilot project to leverage this potential as a health tourism attraction (Source: Disparbudpora Sumenep, 2023).

This initiative was enthusiastically embraced by the Gili Iyang community, particularly the Andang Taruna Tourism Awareness Group (Kelompok Sadar Wisata Andang Taruna or Pokdarwis), who branded Gili Iyang as "Oxygen Island." The island's oxygen levels, documented by the National Institute of Aeronautics and Space (LAPAN) in 2006, exceed the normal threshold of 20%, making it a valuable asset for health and wellness tourism. Disparbudpora has provided training to Pokdarwis to prepare them for tourism management, focusing on a "Golden Triangle" of islands: Gili Labak, Gili Genting, and Gili Iyang. This

collaborative training initiative aligns Pokdarwis's activities under the guidance and supervision of the Disparbudpora, ensuring cohesive efforts between government and community actors.

3) *Resource Type*

Gili Iyang Island boasts abundant natural resources, positioning it as a promising site for further ecotourism development. A standout feature is its exceptionally high oxygen levels, which have earned it the title of the island with the second-highest oxygen concentration after the Dead Sea in Jordan. This unique characteristic contributes to the health and longevity of the local population; as reported by the chairman of Pokdarwis, in 2018, the island had 57 residents aged between 100-125 years and 102 residents aged between 80-100 years (Source: Pokdarwis Andang Taruna, 2023).

In addition to its high oxygen levels, Gili Iyang Island has a variety of natural and cultural attractions, as outlined in Table 2.

Table 2. Gili Iyang Island Tourist Destinations

No.	Destination	Image	Description
1	Gili Iyang Island Pier in Bancamara Village		The main passenger dock that connects Gili Iyang to Dungkek Port.
2	Gili Iyang Island Pier in Banraas Village		An alternative passenger dock for travel between Gili Iyang and Dungkek Port.
3	Batu Canggih		A scenic natural attraction with karst cliffs jutting into the Java Sea, located in the northern part of Banraas Village.

No.	Destination	Image		Description
4	Ropet Beach			A coral beach with high cliffs, a clear blue sea, coral reefs, and sunrise views. Shaped like a bay and is located in Bancamara.
5	Oxygen Gazebo in Bancamara Village			A dedicated area for visitors to enjoy Gili Iyang's high oxygen concentration.
6	Whale Fossils in Banraas Village			Preserved whale bones from a specimen that washed ashore in 2010, adding scientific and cultural value.

Table 2 highlights the diverse attractions in Gili Iyang, located across Banraas and Bancamara villages. This rich array of natural and cultural resources not only enhances Gili Iyang's appeal as a unique destination but also holds the potential for driving the local economy, particularly by generating jobs within the tourism sector. The strategic location and distinct natural resources offer economic opportunities for the Madurese people, especially if local management can maintain a competitive edge with other regional tourism destinations.

Accessibility to Gili Iyang is primarily through Dungkek Port, located at the eastern end of Sumenep Regency. Boats to Banraas Village on Gili Iyang take around 45-60 minutes, with ticket costs of Rp. 15,000 per person or Rp. 600,000 per boat. For transportation within the island, visitors can rent 3-wheeled "Viar" vehicles for Rp. 150,000 per day, accommodating up to 8 passengers or bicycles for Rp. 10,000 per day. Additionally, local eateries, often located along the beach, serve various fresh fish dishes, with prices ranging from Rp. 7,000 to Rp. 17,000, allowing tourists to enjoy local cuisine against the scenic backdrop of Gili Iyang's coastline.

4) Dependency Level

Disparbudpora's pilot project aims to position Gili Iyang as a health tourism destination, leveraging the island's high oxygen levels for therapeutic purposes. However, achieving sustainable ecotourism in Gili Iyang requires the Disparbudpora to collaborate with multiple partners, given that it cannot manage all aspects of development alone.

The Sumenep District government has partnered with various agencies to support the development of Gili Iyang Island. In 2014, the Suramadu Regional Development Agency (Badan Pengembangan Wilayah Suramadu or BPWS) allocated funds for road paving, and in 2017, additional funding was provided for homestay development. In 2019, the East Java Provincial Government awarded Rp. 60 billion to construct docks at both Dungkek Port and Gili Iyang, improving accessibility for larger vessels and potential cruise ships. Despite these advancements, challenges remain. For instance, although the state-owned electricity company PLN (Perusahaan Listrik Negara) installed a diesel power plant (PLTD) in 2017, electricity is only available from 17:00 to 05:00, which limits access for both residents and tourists.

Additionally, Disparbudpora collaborates closely with Pokdarwis Andang Taruna to promote Gili Iyang's tourism. Together with the Ministry of Tourism of the Republic of Indonesia, Disparbudpora has conducted Homestay Management Training programs as part of its Human Resources (HR) development strategy. This training covers essential topics such as Accommodation Management, Housekeeping, Excellent Service in Tourism, Sapta Pesona (the seven charms of Indonesian tourism), Marketing and Promotion, and Hygiene and Sanitation. By equipping residents with these skills, the training seeks to professionalize homestay management, ensuring high-quality services that meet tourists' expectations.

Through these cooperative efforts, Gili Iyang's tourism development is sustained by a network of local and regional stakeholders, reinforcing the island's unique position in Indonesia's ecotourism landscape.

4.2.2. Process Analysis

Process analysis is carried out with the following stages: (1) identifying areas where actors meet and carry out predetermined strategies, (2) analyzing the interaction process carried out, (3) assessing the interaction process that occurs, and (d) identifying and initiating network management strategies.

1) Identify areas where actors meet and carry out the defined strategy.

Pokdarwis Andang Taruna is a connector of community complaints. People on Gili Iyang Island complain that maintenance of existing attractions is still not optimal because the budget obtained from entrance fees is still inadequate, so assistance is needed from the government. In 2019, Disparbudpora Sumenep Regency assisted in building the Batu Cangga tourist attraction and fostering the quality of human resources of Pokdarwis Andang Taruna to be better prepared to manage tourism and complete sanitation on Gili Iyang Island. The people of Gili Iyang Island still need to get assistance from related parties so that they can maximize the existing potential and ensure that the existence of ecotourism really has the maximum impact on the local community. If all the potential is utilized, it will be able to increase the income of the local community.

2) Analyze the interaction process.

The availability of various facilities that support Gili Iyang tourism cannot be separated from the role of Pokdarwis Andang Taruna in influencing local communities to accept and be open to the times, especially for the tourism sector and forming the character of caring for

tourism through various activities carried out by Pokdarwis Andang Taruna. The caring character of tourism is needed to help accelerate the development carried out by the government. So far, the obstacle in every tourism development lies in the main subject, namely the community. At the same time, sustainable tourism development requires the participation of the community itself.

The efforts made by Pokdarwis Andang Taruna to provide understanding to the community are part of empowerment, namely enabling and empowering the community. Empowerment includes not only strengthening individual community members but also their institutions. Instilling modern cultural values, such as hard work, frugality, openness, and accountability, is said to be part of the empowerment effort. With this empowerment, the community is slowly able to carry out various activities related to tourism, for example, by opening community houses and culinary specialties of the village community, and the community has been able to apply the concept of *sapta charm* in the ecotourism environment of Gili Iyang Island.

3) *Assessing the interaction process that takes place*

The creation of jobs in the tourism sector provides opportunities for local people to open new businesses. Economically, local communities earn income and receive benefits from the development of Gili Iyang Island tourism. The majority of people who make a living as fishermen and depend on catches can now develop other businesses in the tourism sector by opening new business fields, including opening places to eat, souvenir shops, and others.

The role of a partner between Pokdarwis Andang Taruna and the Sumenep District Government is needed in sustainable tourism development. The government, as a regulator and facilitator, provides space for the community to play a role in various developments. At the same time, as a working partner, Pokdarwis Andang Taruna represents the community to play an active role in the implementation of the development to be carried out. Pokdarwis Andang Taruna acts as a connector for the wishes of the community so that they are not disadvantaged by various kinds of development carried out, especially those related to tourism development. This is because the ownership of the land used for tourism is the original land of the village community.

4.2.3. Institutional Analysis

Institutional analysis is conducted by (1) making findings of the actors' interaction patterns, (2) analyzing perceptions and beliefs, and (3) identifying the rules that apply in the network.

1) *Making findings of the actors' interaction patterns*

In tourism management on Gili Iyang Island, there are several patterns of interaction between the actors involved. The following are some of the actors involved in managing island tourism:

The Sumenep District Disparbudpora has an important role in the management of Gili Iyang Island tourism. The office is responsible for making policies, rules, and regulations related to tourism management, including determining environmental rules, licensing, and supervising tourism activities. The regulations include (a) the Sumenep Regency Tourism Development Master Plan (RIPPARKAB) 2017-2025, Sumenep Regency experienced an increase in the number of new ODTW, which originally amounted to 13 ODTW increased to 20 ODTW. The addition of ODTW is mostly small islands around the mainland, including Gili Iyang Island, Gili Labak Island, Kangean Island Cluster, Mamburit Island, Masalembu Island, and Gili

Genting Island. (RTRW Sumenep District 2013-2033); (b) Sumenep Regent Regulation No. 15/2018 on the Determination of Tourism Village Areas in Sumenep District. Sumenep Regent Regulation No. 15/2018 is a regulation issued by the Regent of Sumenep, East Java, which establishes the Tourism Village Area in Sumenep District.

Local communities who are members of the Andang Taruna Tourism Awareness Group (Pokdarwis) in Banraas and Bancemara villages play a role in tourism management. They form groups or organizations to manage public facilities, such as cleanliness, security, and environmental maintenance. Local communities are also involved in local tourism promotion and hosting visiting tourists. The results of observations and interviews in the field found several problems with Pokdarwis Andang Taruna, namely: (a) Limited Resources: Pokdarwis Andang Taruna faces limited human, financial, and technical resources. Pokdarwis does not have enough members or trained labor to manage and develop tourist destinations. In addition, limited funds and access to financing can also be obstacles to implementing sustainable tourism development programs; (b) Lack of Management Capacity: Pokdarwis face a lack of understanding and management skills required to manage tourism businesses effectively. They do not have adequate knowledge of marketing, financial management, or business operations, which can affect the competitiveness and sustainability of tourism enterprises; (c) Conflict of Interest: Pokdarwis Andang Taruna faces conflicts of interest between different group members or with other parties involved in tourism management between Banraas and Bancemara villages. This leads to disputes over natural resource management, profit sharing, or strategic decisions in tourism development. These disputes hinder cooperation and interfere with sustainable management.

Tourists are important actors in tourism management. Tourist behavior and decisions can affect the local environment, society, and economy. Tourists need to be responsible travelers by respecting local culture, maintaining cleanliness, and complying with established rules.

The pattern of interaction between these actors may vary depending on the local context and dynamics. Synergistic cooperation, communication, and participation of these actors are key to sustainable tourism management on Gili Iyang Island. The unique, warm, and open culture of the local community can be a strength for developing tourism on Gili Iyang Island. Therefore, marine tourism development policies in this archipelago need to consider the interests of local communities and the function of coastal areas. In contrast, the development plan needs to consider regional and national interests.

2) *Analyzing perceptions and beliefs*

The Sumenep district government's perceptions and trust in the management of Gili Iyang Island influence tourism-related policies, supervision, and regulation. The Sumenep district government has strong beliefs and awareness of the importance of environmental conservation and sustainability and prioritizes sustainable management.

The commitment and perception built by the Sumenep District Government in order to realize sustainable tourism by involving local communities. Local communities' perceptions and trust in the management of Gili Iyang Island can influence their participation in development and conservation programs. If local communities feel involved and valued and benefit from management efforts, they are more likely to be committed to maintaining cleanliness, promoting sustainability, and maintaining good relations with tourists. However, if they feel ignored or uninvolved, this may lead to non-compliance or indifference to sustainable management practices.

In the context of managing Gili Iyang Island, the manager is led by the Andang Taruna Tourism Awareness Group (Pokdarwis), chaired by Ahyak Ulumuddin, who believes that Gili Iyang Island can increase community participation. However, there is still a dualism of perceptions and interests between the two villages on the island, namely Banraas and Bancamara. The two villages do not yet have a joint commitment to developing the island's tourist destinations, which affects the improvement of tourist destinations.

The perception and confidence of tourism entrepreneurs in the management of Gili Island can influence the measures they take to promote sustainability and protect the environment. The results of the observations show that the tourism entrepreneur Gili Iyang has not yet been aware of and committed to the practices to make the destination of Gili Iyang Island in the interest of the visitors. Tourist entrepreneurs in Gili Iyang Island are still limited in the management of Pokdarwis Andang Taruna.

The perception and confidence of tourists in the management of Gili Island affects their level of compliance with sustainable rules and practices. The results of the field observations show that tourists have a good understanding of the importance of preserving the local environment and culture, as well as respecting existing rules, and they become partners in the sustainability of the island.

Investors or private parties have not touched Gili Island in terms of tourism activities. However, based on the results of interviews with stakeholders, he said that part of the land that exists on the island of Gili Iyang has been bought and monopolized by individuals. During this time, the development of tourism activities relies on private funds of the community and assistance from the Regional Government.

The findings of this study confirm that cross-sector collaboration in the governance network plays an important role in the development of ecotourism on Gili Iyang Island. This is in line with Guerrero et al. (Guerrero et al., 2015), who emphasize the importance of social-ecological compatibility through the collaboration of local actors. Disparbudpora and Pokdarwis Andang Taruna successfully facilitated the development of tourist facilities and empowered the community. However, this coordination still suffers from budget constraints and conflicts of interest between villages.

The study by Cristofoli et al. (Cristofoli et al., 2014) highlights that successful network governance depends on openness and shared learning mechanisms. In this context, the government's training for Pokdarwis is an example of capacity-building efforts. However, limited human resources and funding remain a major challenge for the governance network on Gili Iyang Island.

Ecotourism on Gili Iyang Island has opened up new economic opportunities for local communities, in accordance with the findings of Kumar (Kumar et al., 2023), who emphasized the positive impact of ecotourism on community economic welfare. Communities that previously depended on the fisheries sector are now involved in the tourism sector by opening food stalls and homestays. However, limited facilities and lack of promotion mean that the economic impact has not been maximized. Dualistic perceptions and interests between Banraas and Bancamara villages add to the complexity of governance. This shows that while collaboration across actors is important, synergy between local communities is also a key success factor (Crona & Parker, 2012).

Another obstacle in the development of ecotourism on Gili Iyang Island is the lack of involvement of the private sector and investors. This is different from the findings of Ramos & Prideaux (2014), which show that the success of ecotourism is often supported by private investment. On Gili Iyang Island, the development of infrastructure and facilities only relies on

government funds and community self-help. The lack of commitment from the private sector makes tourism development slow.

In addition, Pokdarwis' limited management in marketing and business management is a challenge. As Mischen (Mischen, 2015) points out, the capacity of collaborative networks determines the success of governance. In the case of Gili Iyang, this capacity still needs to be improved so that the community is better prepared to face tourism competition at the regional level.

This research contributes to the application of network governance in ecotourism. This study confirms the importance of integration and collaboration of local actors to achieve sustainability, which is in line with Berkes' (Berkes, 2009) argument on the role of bridging organizations in adaptive governance. In addition, this study offers a new perspective on ecotourism management in Indonesian regions, especially in remote island areas, where good governance can be a solution to geographical and social challenges.

5. Conclusion

This research emphasizes the importance of implementing a governance network in the development of ecotourism on Gili Iyang Island, Sumenep. Collaboration between Disparbudpora, Pokdarwis Andang Taruna, village government, and local communities plays an important role in developing tourism potential. However, there are some challenges in the form of limited resources, conflicts of interest between villages, and the lack of private sector involvement.

Overall, ecotourism in Gili Iyang has had significant economic and social impacts, such as opening new business opportunities and improving community welfare. Local communities are transitioning from the fisheries sector to tourism, and through empowerment carried out by Pokdarwis, community involvement in tourism management is increasing. However, limitations in management capacity and promotion are still the main obstacles that need to be overcome so that ecotourism can develop sustainably.

The findings also show that effective ecotourism governance requires good interaction and communication between key actors. However, the dualism of perception between Banraas and Bancamara Villages is one of the obstacles that hinder synergy in the development of tourist destinations. The lack of private investment and investor involvement also makes facility development slow, so there is still room for improvement in this collaborative governance.

Based on the results of this study, some recommendations and suggestions for future research are as follows: (1) Capacity Building of Local Management and Human Resources needs to be carried out on an ongoing basis to improve the skills of local communities and Pokdarwis members in managing tourism independently and professionally. (2) Strategies to attract private investment, including providing incentives for investors interested in developing tourism facilities on Gili Iyang Island. (3) Conflict management and increased synergy between villages involved in tourism management. This will help create more effective and inclusive collaborative governance. (4) Utilization of Digital Technology for Tourism Promotion can be utilized to promote Gili Iyang tourist destinations, thereby increasing tourist visits and strengthening the local economy. (5) Long-term studies can be conducted to evaluate social, economic, and environmental impacts more comprehensively. This is important to ensure the sustainability of ecotourism in the future. (5) Future research could develop a more specific network governance model to be applied in remote ecotourism areas. Comparative studies with similar destinations in other small islands in Indonesia or the world could enrich this model and provide more comprehensive insights. (6) Long-term research on ecotourism impacts on

ecosystems and social aspects to observe long-term changes in ecosystems and social aspects on Gili Iyang Island. This will provide insight into the extent to which ecotourism is able to maintain sustainability and improve community welfare in the long term.

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7. Declaration of Conflicting Interests

The authors have declared no potential conflicts of interest concerning this article's research, authorship, and/or publication.

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