Journal of Sylva Indonesiana

Journal homepage: https://talenta.usu.ac.id/jsi

Ecotourism Development Strategy of Lhok Batee Jeumpa Reservoir, Bireuen Regency

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ARTICLE INFO

Article history:
Received August 10th, 2023
Revised January 10th, 2024
Accepted January 29th, 2024
Available online February 27th, 2024

E-ISSN: 2622-5093
P-ISSN: 2622-5158

How to cite:
Aziz F., H. Satriawan and C. Azizah, "Ecotourism Development Strategy of Lhok Batee Jeumpa Reservoir, Bireuen Regency" *Journal of Sylva Indonesiana*, Vol. 7, No. 1, pp. 30-39 Feb. 2024, doi: 10.32734/jsi.v7i01.13356.

http://doi.org/ 10.32734/jsi.v7i01.13356

ABSTRACT

Bireuen Regency has natural tourism that has the potential to be an ecotourism area, namely the Lhok Batee Reservoir, which is located in Seuneubok Lhong Village, Jeumpa District. This study aims to calculate the carrying capacity of tourist areas, analyze stakeholders based on their influence and importance, and formulate ecotourism development strategies at Lhok Batee Reservoir. The research method uses a survey approach through direct observation in the field with interviews with 50 respondents. The results showed that the carrying capacity of the area was 1,008 people per day. The analysis shows that two classifications of stakeholders play a role in the management of the area and the development of reservoir ecotourism, namely bystanders (Marine Fisheries Food Service; Public Works and Spatial Planning Service; Youth, Sports, and Tourism Service; Environmental Observation Group) and players (Village Government; Regional Development Planning Agency; Environment and Forestry Service). The results of the study formulated an ecotourism development strategy at Lhok Batee Reservoir to increase natural resource conservation efforts, develop the potential of natural resources owned by Lhok Batee Reservoir, develop ecotourism activities while maintaining biodiversity, involve the community to play an active role in tourism activities at Lhok Batee Reservoir, and optimize cooperation programs with stakeholders in marketing Lhok Batee Reservoir ecotourism and in providing environmental training.

Keyword: Conservation, Ecotourism, Reservoir, Stakeholder, Sustainable, Tourism, Tourist Attraction

1. Introduction

After the COVID-19 pandemic, Indonesian people's tourism activities have increased. Archipelago tourism showed a recovery, growing by 16.91 percent compared to 2020. In fact, in 2022, archipelago tourism exceeded pre-pandemic conditions, with the number of trips reaching 734.86 million, or 1.76 percent higher than in 2019. Therefore, it is appropriate that domestic tourism be seen as the driver of the recovery of the tourism sector in Indonesia. The development of tourist areas must be thoroughly planned so that optimal benefits can be obtained for the community [2]. Improving the quality of tourist attractions has a positive impact on the level of tourist visits [3]. In tourism development, it is necessary to have sustainable ecotourism (sustainable tourism) so that tourism management not only prioritizes the interests or benefits of certain parties but also conservation and environmental education [4].

Ecotourism is responsible travel to natural areas where the environment is protected and where the well-being of the local population is enhanced [5]. According to [6], ecotourism is tourism that relies more on the character of natural resources than other resources. Ecotourism resources consist of natural resources and human resources that can be integrated into an integrated component for tourism utilization. Aquatic ecotourism is a tour that has an ecotourism concept consisting of inland and marine water tourism. Inland water tourism is an activity carried out in inland waters and surrounding areas, such as rivers, lakes, reservoirs, swamps, waterfalls,

and other stagnant waters. The main objects of inland water tourism are water resources, the environment, scenery (view), and aquatic biota [6]. According to [7] tourism, the tourist attraction is everything that has uniqueness, beauty, and value in the form of diversity of natural, cultural, and man-made wealth, which is the target or destination of tourist visits. According to [8], ecotourism has five basic principles: nature-based (products and markets based on nature), ecologically sustainable (implementation and sustainable management), environmentally educative (environmental education for managers and visitors), beneficial to local communities, and providing satisfaction for visitors.

Bireuen Regency has natural tourism that has the potential to be managed into an ecotourism area, namely the Lhok Batee Reservoir, which is located in Seuneubok Lhong Village, Jeumpa District. The reservoir was built as a storage area for clean water reserves, a source of irrigation for surrounding agricultural land, to control water discharge to prevent flooding, and as a place for fish farming by the surrounding community. This reservoir area has the potential to be used as a tourist attraction because of the natural air and the beauty of the hilly area surrounding the reservoir (Figure 1). Based on observations, the Lhok Batee Reservoir area is currently not optimally utilized as a tourist attraction because, institutionally, the location of the Lhok Batee Reservoir has not been planned for priority development, and there are no facilities and infrastructure as a tourist attraction. For the development and utilization of the Lhok Batee Reservoir as ecotourism, a good strategy is needed so that it can be managed optimally to attract visitors (tourists) and maintain its ecosystem. In this case, there must be cooperation between the surrounding community, environmental groups (NGOs), and the Bireuen Regency government. In addition, the development of ecotourism must consider the sustainability value of the ecosystem. By analyzing the carrying capacity, the maximum number of tourists that can be accommodated by a tourist attraction without having to damage the environment (sustainable ecotourism) can be calculated. Therefore, this study aims to calculate the carrying capacity of tourist areas, analyze stakeholders based on their influence and importance, and formulate ecotourism development strategies at Lhok Batee Reservoir.

Figure 1. Panorama of the Lhok Batee Reservoir area (a) sluice gate, (b) anglers, (c) plantation crops, (d) water inlet, (e) fauna, (f) houses, (g) fish ponds, (h) road conditions, (i) community gardens

2. Method

2.1 Research Location

The research was conducted from September 2022 to May 2023 at Lhok Batee Reservoir, Gampong Seuneubok Lhong, Jeumpa District, Bireuen Regency, Aceh Province, Indonesia (Figure 2). Gampong Seuneubok Lhong has an area of 100 ha, with a distance of 6 km from the sub-district capital and 9 km from the district capital [9]. Geographically, Lhok Batee Reservoir is located at coordinates 5°09'53.5" N

96°40'12.5" E with an altitude of 35–50 meters above sea level with high rainfall and moderate average temperature, and is surrounded by a cluster of hills.

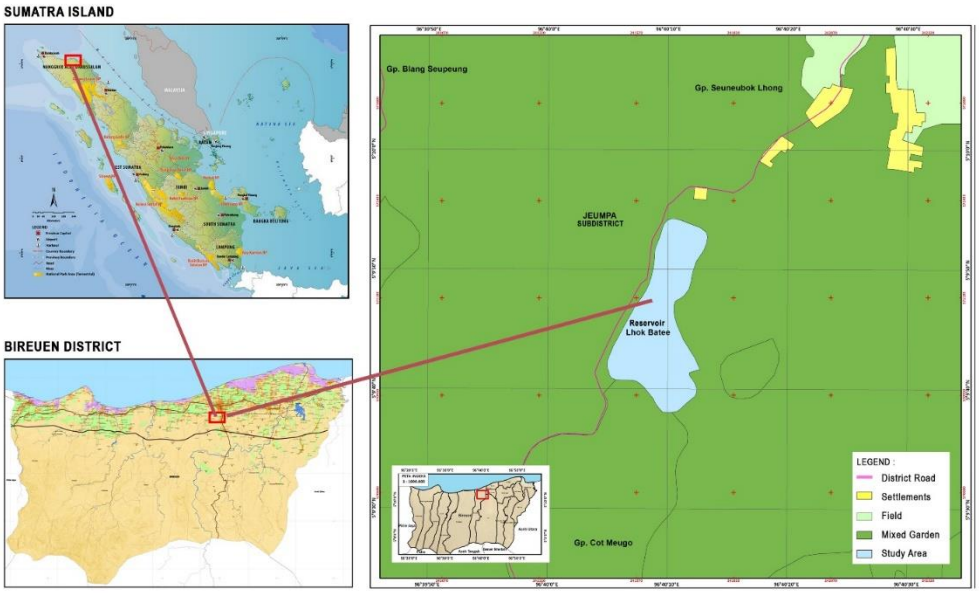

Figure 2. Lhok Batee Reservoir is located in Aceh Province (a) Bireuen District (b) which is included in Jeumpa District and is 9 km from the city center (c).

2.2 Data Analysis

The research used a survey approach through direct field observations. The data collected consisted of primary and secondary data. Primary data was obtained through direct field observations, in-depth interviews, and distributing questionnaires to obtain data on respondent characteristics. Secondary data was obtained from a second source, namely related agencies, and local village officials to obtain supporting information. The subjects of this research were the people of Seuneubok Lhong Village, visitors, and managers of the Lhok Batee Reservoir. Tools used to support this research include audio recorders, cameras, and questionnaires. The objects studied were the Lhok Batee Reservoir area and Seuneubok Lhong Village, Jeumpa District, Bireuen Regency. The research sample was the 50 respondents of the community in Gampong Seuneubok Lhong. Processing and analysis of research data were carried out qualitatively and quantitatively.

Table 1. Research Type and Method

Research Objective	Data Taken	Data Type	Method	Data Analysis
1. Identify natural resources that can be used as tourist attractions	• Flora • Fauna • Ease of access • Aesthetic value of the tourist attraction • Tourist visits • Social conditions of society	Primary	Field observations, interviews	Analysis of carrying capacity of the area
2. Identification and grouping of stakeholders based on their influence and importance in the development of Lhok Batee Reservoir ecotourism	Stakeholder interests and influence	Primary	Field observations, interviews	Stakeholder analysis (interest and influence analysis)
3. Formulation of ecotourism development strategy for Lhok Batee Reservoir	Strengths, weaknesses, opportunities and threats in the development of Lhok Batee Reservoir ecotourism	Primary	Observations, interviews	SWOT Analysis

Qualitative analysis was carried out to describe the characteristics of the phenomena found during the research, while quantitative data processing and analysis such as

2.2.1 Carrying capacity of tourist areas

The carrying capacity of the area is the maximum number of visitors that can be physically accommodated in the area provided at a certain time without causing disturbances to nature and humans [6]. The carrying capacity of an area has another definition, namely the convenience of visitors in carrying out activities (ecological potential) in terms of the area used for these activities, and this is influenced by the operating hours of the area and the time spent by visitors in carrying out these activities [10]. The carrying capacity formula for ecotourism development uses the concept of regional carrying capacity (DDK) [10]. The calculation of the carrying capacity of the area in the form of a formula (equation 1):

$$DDK = K\ (Lp/Lt \times Wt/Wp) \quad (1)$$

Note

DDK : is the carrying capacity of tourist areas (people per day)
K : the ecological potential of visitors per unit area (people)
Lp : the area or length of area that can be utilized (m/m^2)
Lt : the unit area for a particular category (m/m^2)
Wt : the time provided by the area for tourist activities in one day (hour)
Wp *:* the time spent by visitors for each specific activity (hour)

2.2.2 Stakeholders analysis

The method used to determine the intensity of stakeholders is stakeholder analysis [11]. Stakeholder analysis is used to analyze data about stakeholders. It used a model introduced by [12]. The stages in conducting stakeholder analysis are as follows: (1) identification of stakeholders (actual or potential) and their roles; (2) grouping and categorizing stakeholders based on their importance and influence; and (3) investigating the relationship between stakeholders.

2.2.3 SWOT analysis

SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis is used to analyze and identify environmental resources. Its analysis can be used in the strategic planning process of an organization or project [13]. The initial stage determines the internal factors (strengths and weaknesses) and external factors (opportunities and threats) of the analysis unit, namely the Lhok Batee Reservoir manager. Then the calculation of the weight of internal and external factors is carried out to determine the location of the strategic quadrant of development that is considered urgent. It is organized by tabulating the Internal Factors Analysis Strategy (IFAS) and External Factors Analysis Strategy (EFAS). The score results of the IFAS and EFAS matrix will provide an overview of the existence of the institution and form several possible implementation strategies for developing ecotourism at Lhok Batee Reservoir [11].

3. Result and Discussion

3.1 Ecotourism Area Supportability

The current ecotourism activity of the Lhok Batee reservoir is fishing. If it has tourist support facilities, then other activities that have the potential are boating, sitting, camping, outbound, and agrotourism, which are described in [6]. Each of them has a carrying capacity for tourism in Table 2.

Table 2. Supportability of Lhok Batee Reservoir Ecotourism Area

Activity	Area (m^2)	Tourism Carrying Capacity (people/day)	Tourism Carrying Capacity (people/year)
Boating	37,000	355	129,648
Fishing	240	144	52,621
Sitting	700	280	102,200
Camping	8,200	82	29,930
Outbond	2,445	70	25,498
Agrotourism	960	77	28,032
Total		**1,008**	**367,929**

Fishing tourism is a popular activity at various age levels that involves catching fish for recreational purposes, making a living, or making a profit. Likewise, in the Lhok Batee Reservoir area, with the type of fishing activity, the calculation of carrying capacity shows that the ecological potential (K) per unit area is one person for an area of 240 m^2 (Lt). The time spent by each fisher is an average of four hours (Wp), and the length of fishing time in one day is approximately eight hours (Wt). With an area designated for fishing tourism of 17,300 m^2 (Lt), the total carrying capacity of the area for tourism is 144 people per day. The concept of carrying capacity is expected to minimize or prevent damage to natural resources and the environment from utilization efforts carried out [14]. Efforts to maintain the number of visitors according to the carrying capacity must be made appropriately and consider the positive economic impacts that can be obtained by the community from visitors. Efforts to manage natural resources and the environment sustainably can be carried out while still paying attention to the welfare of resource users [15]. It has the benefit of conserving natural resources for the development of ecotourism so that the balance is maintained and continues to be sustainable, providing a positive impact on nature itself, and maintaining the satisfaction of visiting tourists [16]. By performing the analysis of the carrying capacity, stakeholders can easily make decisions on matters relating to the development of ecotourism in the Lhok Batee Reservoir without having to damage the existing ecosystem.

3.2 Stakeholders of Lhok Batee Reservoir Ecotourism Development

Based on the results of interviews with seven stakeholders, namely (1) the Regional Planning and Development Agency, (2) the Environment and Forestry Office, (3) the Public Works and Spatial Planning Office, (4) Food, Marine, and Fisheries Office of Bireuen Regency, (5) Youth, Sports and Tourism Office (6) Gampong Seuneubok Lhong Government, and (7) Non-Govermenmental Organisation/Environmental Observation Group (NGO). The analysis shows that two classifications of stakeholders play a role in the management of the area and the development of reservoir ecotourism, namely bystanders are the Marine Fisheries Food Service, Public Works and Spatial Planning Service, Youth, Sports and Tourism Service, NGOs, and players are the village government, Regional Development Planning Agency, Environment, and Forestry Service. The level of influence and importance of each stakeholder is in Figure 3.

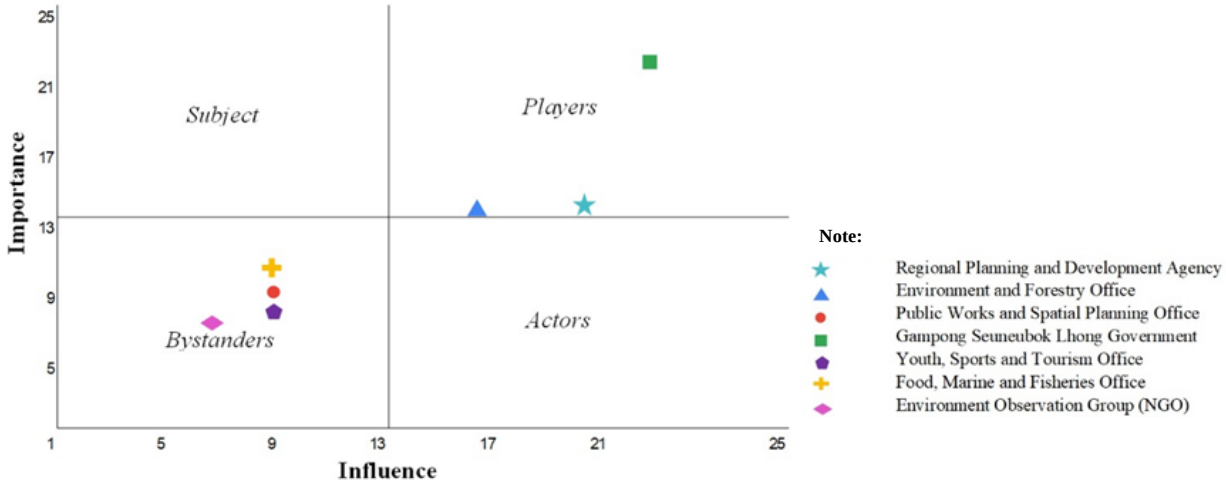

Figure 3. Level of stakeholder influence and importance

Key players are stakeholders who have influence and high importance. Stakeholders in this Key Players group are the most critical group because they have high importance and high influence on the success of management [17]. In developing tourism objects and attractions in the reservoir area, it is necessary to build cooperation with all stakeholders who synergize with each other to develop the region and the potential of natural tourism. Improving the performance of stakeholders requires changes and improvements in conditions related to roles and capacities, while the rules of the game factor are related to the division of authority [18]. Based on the results of the interview (deep interview), the following is a description of the involvement of each stakeholder both in management and in efforts to develop ecotourism at Lhok Batee Reservoir:

1. Regional Planning and Development Agency (*Badan Perencanaan Pembangunan Daerah*/Bappeda) of Bireuen Regency. Bappeda is a stakeholder-oriented player that has a very important role in the planning and technical development of ecotourism. Researchers interviewed the Head of Bappeda Bireuen Regency, and he said that Bappeda was also responsible for structuring, facilitating cooperation, funding, and supervision. Bappeda of Bireuen Regency can also encourage ecotourism

activities by inviting the private sector to participate through Coorporate Social Responsibility (CSR) programs.

2. Environment and Forestry Service (*Dinas Lingkungan Hidup dan Kehutanan*/DLHK) of Bireuen Regency. It is a player-category stakeholder. DLHK conducts monitoring and evaluation of surface water quality, air quality, and soil management. The activities carried out are reservoir rehabilitation, reforestation through tree planting, the provision of facilities, and waste management in order to preserve the environment in the area around the reservoir.
3. Seuneubok Lhong Gampong Government (Geuchik). It is included in the administrative area of Jeumpa District. Geuchik is a stakeholder in the player category. Activities carried out in the form of community assistance in matters of providing information and administration if there is cooperation with other parties and is directly involved in managing activities related to the reservoir through related agencies.
4. Non-Governmental Organizations/Environmental Observation Groups (NGO). In this case, the NGO is represented by Aceh Green Conservation (AGC). It is a stakeholder category. However, it plays an active role in the process of monitoring and controlling environmental pollution. Guidance and counseling for community members related to environmental awareness are also often carried out. The goal is to foster awareness in the community, especially of the importance of water resources and environmental management for life together. In addition, various activities are also aimed at increasing the participation of youth groups in becoming environmental care volunteers by conducting socialization and mentoring about healthy living and saving the environment for future generations, as well as providing early understanding to children about the importance of protecting the environment. Gampong Seuneubok Lhong currently also plays a role in the gampong proklim section. The Climate Village Program (Proklim) is a national climate and environmental program created directly by the Ministry of Environment and Forestry (*Kementerian Lingkungan Hidup dan Kehutanan*/KLHK). In the implementation of Proklim, KLHK directly cooperates with local governments as executors, NGOs, and the general public as active participants.
5. Food, Marine, and Fisheries Service (*Dinas Pangan, Kelautan, dan Perikanan*/DPKP) of Bireuen District. The DPKP is a bystander category stakeholder. The DPKP provides procurement of freshwater fish seeds, fish hatcheries, and fishing gear. Activities of DPKP in the gampong can be in the form of community assistance, training, rehabilitation, and the provision of freshwater fish seeds.
6. Bireuen District Youth, Sports, and Tourism Office. It is a bystander category stakeholder. From the interview results, it is known that the Tourism Office has never visited the Lhok Batee Reservoir because it is still a very new tourist attraction category. However, the Tourism Office stated that it would fully support efforts to develop the reservoir as an ecotourism object with assistance in the form of promotion, the provision of information and facilities, and infrastructure related to ecotourism. The location of the reservoir has also been stipulated in Bireuen Regent Regulation Number 10 Year 2021 concerning Tourism Attraction Objects of Bireuen Regency.
7. Public Works and Spatial Planning Office (*Dinas Pekerjaan Umum dan Perencanaan Ruang*/Dinas PUPR). The Dinas PUPR is a bystander category stakeholder. Its role at the research location is to establish the location as a tourist area in the Spatial Pattern Map of the Bireuen Regency (*Rencana Tata Ruang Wilayah*/RTRW). Therefore, the implementation of activities related to ecotourism is in accordance with spatial rules. In physical development, the Dinas PUPR this year will carry out asphalt road improvements to the reservoir location with the source of Special Allocation Funds (*Dana Alokasi Khusus*/DAK) with a road length of 3.1 km. If there are proposals for facilities and infrastructure from various parties, the PUPR office is authorized to develop the area as one of the supporting ecotourism areas.

Based on the results of the interview, it is known that the local government has made the Lhok Batee Reservoir Area part of the priority tourist attractions listed in the Regent's Regulation. However, the relevant agencies do not yet have a special program for the development of the reservoir area. This will have an impact on efforts to develop ecotourism, as one of the important aspects is strong institutional support, especially from the Youth, Sports, and Tourism Office.

The problem indicated is that there is no program related to the development of facilities and infrastructure to support tourism activities. This is very close to the availability of the budget, which is one of the most decisive factors in tourism development. This is in line with the limitations of the relevant agencies, which say that the allocation of funds and budgets is one of the problems in developing the tourism sector.

3.3 Lhok Batee Reservoir Ecotourism Development Strategy

The ecotourism development strategy uses SWOT analysis. It used IFAS and EFAS assessments of five factors weighted by each factor, in accordance with research conducted by [19], to get the right ecotourism development strategic point on the grand strategic matrix (Table 3 and Table 4).

Table 3. IFAS ecotourism of Lhok Batee Reservoir (Strengths-Weaknesses)

Internal Strategic Factors	Weight	Rating	Score
Strengths			
1. Lhok Batee Reservoir ecotourism has recreational and environmental conservation functions.	0.42	4	1.68
2. Varied landscapes create a visual impression in the form of typical natural scenery is the most potential object to attract visitors.	0.11	4	0.44
3. Has an unspoiled environment that is an attraction for visitors	0.33	4	1.32
4. Has the potential for all-ages tourism	0.05	3	0.15
5. The location of Lhok Batee Reservoir Ecotourism which is not too far from the center of Bireuen Urban has the opportunity to become one of the priority tourist destinations.	0.09	3	0.27
Total	**1.00**		**3.86**
Weakness			
1. Inadequate quality of infrastructure, especially roads to ecotourism sites	0.40	4	1.60
2. Tourist attraction supporting facilities are not yet available at tourist attraction locations	0.30	4	1.20
3. The low desire of the community to increase tourist attraction as a support for increasing the community's economy	0.10	1	0.10
4. Tourism service quality and visitor awareness of the environment are still low	0.09	2	0.18
5. Lack of promotion and marketing efforts	0.11	1	0.11
Total	**1.00**		**3.19**
Difference in IFAS factor		**0.67**	

Source: Primary data processed (2023)

Table 4. EFAS ecotourism of Lhok Batee Reservoir (Oppurtinities-Threats)

External Strategic Factors	Weight	Rating	Score
Oppurtinities			
1. Shift from mass tourism to ecotourism	0.22	4	0.88
2. Creating employment opportunities so as to increase community income	0.24	4	0.96
3. Potential development through Industry CSR	0.21	3	0.63
4. Contribution to the community as well as to the local government of Bireuen Regency	0.11	2	0.22
5. Attracting investors to develop the area with mutually beneficial collaborations	0.05	2	0.10
Total	**1.00**		**2.79**
Threats			
1. Tourism policy in Bireuen Regency does not clearly explain the position of Lhok Batee Reservoir Ecotourism, so it tends not to receive development priority.	0.28	3	0.84
2. The absence of the concept of tourism linkages in tourism development in Bireuen Regency at this time	0.22	3	0.66
3. Competition of similar tourist objects in Bireuen Regency	0.13	2	0.26
4. Tourism activities will have a negative impact on the socio-cultural life of the community	0.07	1	0.07
5. Tourism activities will have an impact on the environment	0.30	2	0.60
Total	**1.00**		**2.43**
Difference in IFAS factor		**0.36**	

Source: Primary data processed (2023)

The analysis of the IFAS and EFAS factors shows a coordinate value of 0.67 and 0.36. It means that the position of the grand strategy for the development of Lhok Batee Reservoir Ecotourism is in quadrant I (Figure 4).

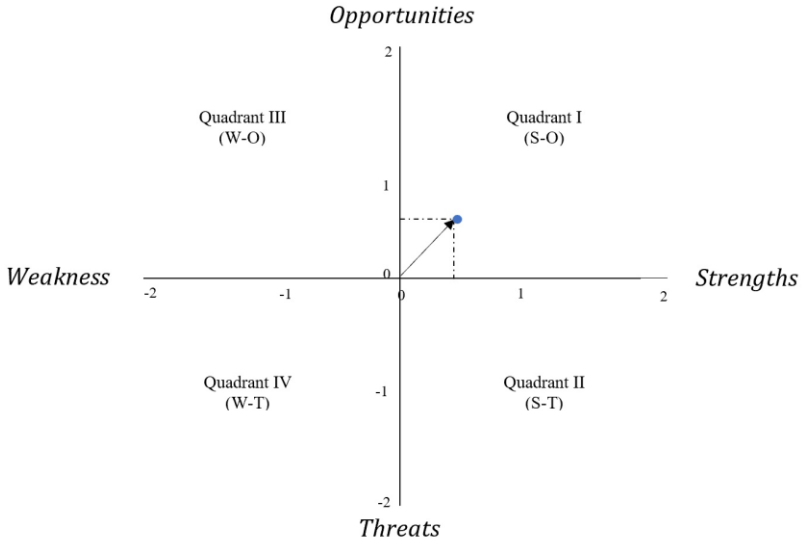

Figure 4. Grand strategy matrix for ecotourism development of Lhok Batee Reservoir

The position of the IFAS and EFAS factors in the grand strategy matrix shows that they are in a strength-opportunity (S-O) position, which means that the strategy that can be developed is to support an aggressive growth policy (growth-oriented strategy) by using the strengths possessed to take advantage of existing opportunities. This is in line with research conducted by [20].

From the results of combining external and internal factors, there are 30 alternative strategies that can be used in development efforts. Because development efforts are focused on the formulation of the S-O strategy, there are five recommended alternative strategies, namely: first, increase efforts to conserve natural resources in accordance with the concept of ecotourism. Conservation-based ecotourism is an ecotourism development that focuses on environmentally friendly tourism patterns. Ecotourism development must be able to maintain, protect, and be responsible for nature conservation [21]. Developing ecotourism activities while still paying attention to the natural environment as well as the biodiversity contained in the area. Second, the development of the potential of the Lhok Batee Reservoir with tourism activities and community economic movements (shops and cafes) around the reservoir can provide opportunities to increase regional genuine income (*Pendapatan Asli Daerah*/PAD) for Bireuen Regency. A tourism object can be developed as one of the mainstay sectors to encourage economic growth, increase regional income, empower the community economy, expand employment and business opportunities, and increase product recognition and marketing in order to improve community welfare [22]. Third, develop ecotourism activities while protecting biodiversity and the natural environment contained in the area. The concept of ecotourism must fulfill components such as contributing to the conservation of the diversity of living things, maintaining the sustainability of the lives of local communities, and supporting responsible actions in tourism and the tourism industry [23]. Fourth, involving the community to play an active role in tourism activities at Lhok Batee Reservoir is supported by the results of research by [24] that indicates that increasing human resources is needed through education to the community directly or providing pilots and socialization from the local government so that people are aware of the tourism potential that can be developed. Local communities have an important role in management [25] and preserve the environment around tourism objects so that they still pay attention to environmental sustainability [26]. Fifth, optimizing cooperation programs with other parties in marketing Lhok Batee Reservoir Ecotourism and in providing environmental training, especially through CSR programs. This is in accordance with the results of [27], which show that the development of tourism potential is related to various parties, from local communities to the government, and their funding sources.

4. Conclusion

The potential carrying capacity of tourism for current fishing activities is 1,008 people/day, meaning that the maximum environmental carrying capacity for fishing tourism activities can be carried out by as many as 1,008 people/day to minimize environmental damage. In the development of ecotourism at Lhok Batee Reservoir, stakeholders who have high interests and influence (players) are the village government, the regional development planning agency, and the environmental and forestry services. Stakeholders in this category must be more actively involved so that ecotourism development can run smoothly. The ecotourism development of

the Lhok Batee Reservoir supports an aggressive growth strategy (growth oriented strategy) with five alternative strategies, namely increasing efforts to conserve natural resources in accordance with the concept of ecotourism, the potential of the Lhok Batee Reservoir provides an opportunity to be developed better so that it will increase PAD revenue for Bireuen Regency, developing ecotourism activities while still protecting biodiversity, the natural environment contained in the area, involving the community to play an active role in tourism activities at Lhok Batee Reservoir, and optimizing cooperation programs with other parties in marketing Lhok Batee Reservoir Ecotourism and in providing environmental training, especially through CSR programs.

Acknowledgement
The authors would like to thank BRIN Talent Management through the Research and Innovation Talent Assistance Program (BARISTA) for providing research funding assistance.

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