

## MANGROVE ECOTOURISM DEVELOPMENT STRATEGY BASED ON IFAS-EFAS ANALYSIS: A CASE STUDY OF PURWOREJO MANGROVE EDUCATION PARK

Strategi Pengembangan Ekowisata Mangrove Berbasis Analisis Ifas-Efas: Studi Kasus  
Taman Edukasi Mangrove Purworejo

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### ABSTRACT

Demang Gedi Mangrove Education Park (TEM) in Purworejo Regency holds significant natural resource potential; however, it faces challenges such as declining visitor numbers and management constraints. This study aims to analyze the ecological condition of the mangrove forest by examining mangrove density and to formulate appropriate ecotourism development strategies using the IFAS (Internal Factor Analysis Summary) and EFAS (External Factor Analysis Summary) matrix approach. The research methodology involved field surveys to collect vegetation density data, alongside interviews and questionnaires for SWOT analysis. The results indicate that the ecological condition of the mangrove forest is classified as 'very good,' with vegetation density ranging from 3,466 to 4,366 ind/ha. Based on the strategic analysis, the development position of TEM Demang Gedi is located in Quadrant I (Growth-Oriented Strategy). This position indicates that the area possesses strong internal strengths to capitalize on existing external opportunities. The recommended priority strategy is a progressive strategy, specifically maximizing natural potential and government support to develop sustainable conservation-based educational tourism.

**Keywords:** Conservation, Development Strategy, Ecotourism, IFAS-EFAS, Mangrove.

### ABSTRAK

Taman Edukasi Mangrove (TEM) Demang Gedi di Kabupaten Purworejo memiliki potensi sumber daya alam yang besar, namun menghadapi tantangan berupa penurunan kunjungan dan kendala pengelolaan. Penelitian ini bertujuan untuk menganalisis kondisi ekologis hutan mangrove dengan melihat kerapatan mangrove serta merumuskan strategi pengembangan ekowisata yang tepat melalui pendekatan matriks IFAS (*Internal Factor Analysis Summary*) dan EFAS (*External Factor Analysis Summary*). Metode penelitian menggunakan survei lapangan untuk pengambilan data kerapatan vegetasi serta wawancara dan kuesioner untuk

analisis SWOT. Hasil penelitian menunjukkan bahwa kondisi ekologis hutan mangrove tergolong dalam kategori sangat baik dengan kerapatan vegetasi berkisar antara 3.466–4.366 ind/ha. Berdasarkan analisis strategis, posisi pengembangan TEM Demang Gedi berada pada Kuadran I (*Growth Oriented Strategy*). Posisi ini mengindikasikan bahwa kawasan tersebut memiliki kekuatan internal yang kuat untuk memanfaatkan peluang eksternal yang ada. Strategi prioritas yang direkomendasikan adalah strategi progresif, yaitu dengan memaksimalkan potensi alam dan dukungan pemerintah untuk mengembangkan wisata edukasi berbasis konservasi secara berkelanjutan.

**Kata Kunci:** Ekowisata, IFAS-EFAS, Konservasi, Mangrove, Strategi Pengembangan

## INTRODUCTION

Indonesia has approximately 3.31 million hectares of mangrove forests, accounting for approximately 23% of the world's total mangrove forest area (BPS, 2022). One coastal resource receiving attention is mangrove ecotourism (Fitriah et al., 2025). Mangrove ecotourism is a sustainable tourism development activity that integrates environmental conservation with improving the welfare of local communities (Nanda et al., 2025). The development of mangrove ecotourism is essential to increase community income and educate people about the importance of mangrove conservation (Hartati et al., 2021).

Central Java has a mangrove area of 42,862 hectares (KMKRI). One example of mangrove ecotourism is the Mangrove Education Park (TEM) in Gedangan Village, Purwodadi, Purworejo. Demang Gedi is the area with the largest mangrove area in Purworejo, covering 7 hectares (KTH Demang Gedi). TEM Demang Gedi is one of the tourist destinations in Purworejo Regency that has the charm of tourist attractions and education about the mangrove environment (Suryani, 2025). However, in recent years, this destination has experienced a decline in visits due to weak management because the management is mostly elderly and young people are not creative, damage to facilities and infrastructure such as damaged bridges for tracking, and low community participation in management only a few are willing to manage ecotourism (KTH Demang Gedi). In 2024 the number of visitors was 335 with an income of IDR 5,250,000 and in 2025 the number of visitors was 309 with an income of IDR 3,150,000 which experienced a decrease in visitors of around 7.76% and a decrease in income of 40% (PEMDES Gedangan Village). Furthermore, the impact of the Covid-19 pandemic and increased competition with other tourist destinations further worsened the condition of TEM Demang Gedi. These internal and external challenges require an appropriate development strategy for optimal and sustainable development (Widjajani et al., 2023).

To assess these issues, analyses such as the Natural Tourism Object and Attraction Operation Area Analysis (OODTWA), IFAS and EFAS analyses, and a SWOT analysis are necessary. A SWOT analysis can be used to identify internal and external factors influencing the sustainability of TEM Demang Gedi. According to Hidayat (2025), a SWOT analysis is a method for describing the condition and evaluating a problem, project, or business concept based on internal and external factors: Strengths, Weaknesses, Opportunities, and Threats. For example, a SWOT analysis using a descriptive qualitative approach can be used for Coastal Mangrove Ecotourism in Kertomulyo Village (Suharsono et al., 2024). Although a SWOT analysis can identify these factors, this study chose to use the Internal Factor Analysis Summary (IFAS) and External Factor Analysis Summary (EFAS) analyses to obtain more measurable results because each strategic factor is weighted and ranked (Anjani et al., 2024). This analysis aligns with various previous studies, for example, a study by Rupom (2021) in Bangladesh used the IFAS and EFAS matrix analysis to identify key factors and formulate maritime area development strategies. Similarly, a study by Jamal et al., (2025) in Parks Sea Beach, Chattogram, evaluated the environmental impacts of tourism and emphasized the need for

strategies to mitigate negative impacts through a SWOT analysis supported by the IFAS and EFAS matrices. At the national level, the same method was applied by Rumahorbo (2022) in formulating a mangrove ecotourism management strategy in Yotefa Bay, Jayapura, and by Handoyo *et al.*, (2023) who used IFAS and EFAS analysis to determine the economic feasibility and strategy for developing educational tourism at Seribu Ranting Beach, Jepara. This study was conducted to obtain a mangrove ecotourism development strategy, therefore, it is necessary to conduct IFAS and EFAS analysis and determine mangrove health by measuring the density.

## RESEARCH METHODS

This research was conducted in November-December 2025 at the Mangrove Education Park (TEM), Gedangan Village, Purwodadi, Purworejo (Figure 1).

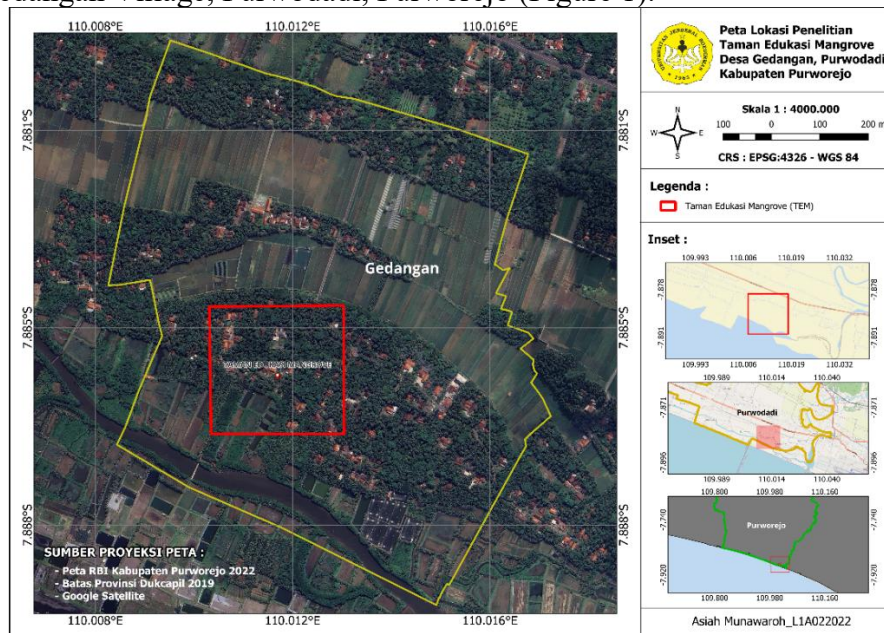


Figure 1. Research Location Map

### Analysis of Mangrove Ecological Conditions

Analysis of the ecological condition of mangroves. Primary data on mangrove density was analyzed descriptively to determine the health of the ecosystem in the Mangrove Education Park (TEM). Mangrove density is the number of stands of species *i* in a unit area. Based on Parmadi *et al.*, (2016), the formula used to determine the density of mangrove species is:

$$D_i = n_i / A$$

Information:

*D* = density

*n<sub>i</sub>* = number of individuals of type *i*

*A* = an area

Source: (Parmadi *et al.*, 2016)

The location map of the mangrove density station points can be seen in Figure 2 as follows:

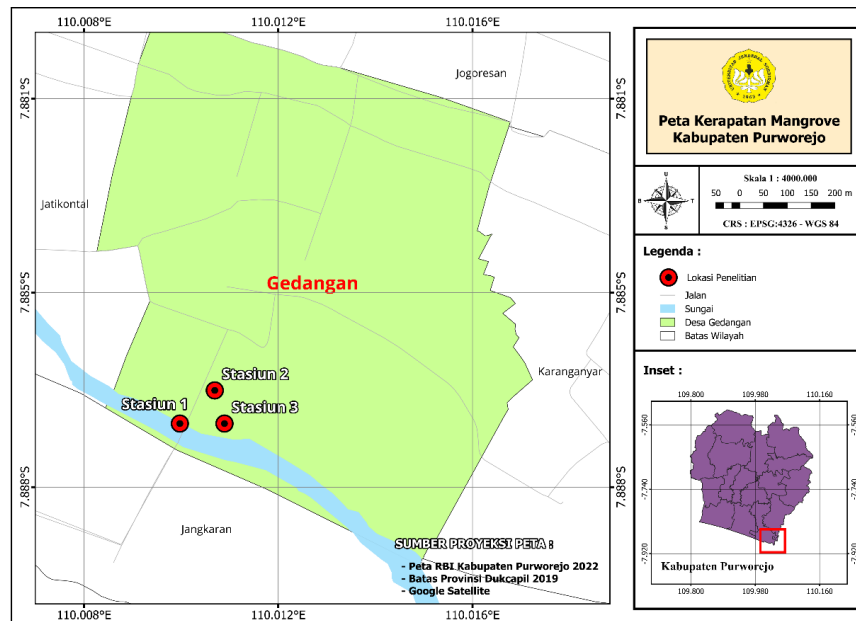


Figure 2. Mangrove Density Station Point

### Analysis of the Potential for Mangrove Ecotourism Development

Internal and external strategic factor analysis is the processing of strategic factors in the internal and external environment by assigning weights and ratings to each strategic factor. Analyzing IFAS to identify various potential strengths and weaknesses. Analyzing EFAS to identify various potential opportunities and threats (Pontonusa et al., 2019).

The sum of the weights on each internal and external environment must be = 1 (one):

$$\text{Total internal score} \square \text{total strength weight} + \text{total weakness weight} = 1$$

$$\text{Total external score} \square \text{total opportunity weight} + \text{total threat weight} = 1$$

“Scale 1.0 (very important) to 0.0 (not important)”. The average weight value depends on the number of strategic factors (5-10 strategic factors) used. The rating value is based on the magnitude of the influence of strategic factors on one's condition (Rangkuti, 2013) with the following provisions:

- The scale starts from 4 (very strong), 3 (strong), 2 (less strong) to 1 (not strong/weak).
- Positive variables (strengths and opportunities) are given a value of 1-4 compared to the average of competitors or other regional conditions. Conversely, negative variables (weaknesses and threats) are given a value of 1 if very large and 4 if small or below average.

### Analysis of internal and external strategic factors (IFAS - EFAS)

Strategic data processing is carried out by assigning weights and ratings to internal (IFAS) and external (EFAS) factors. This approach is used to map strengths, weaknesses, opportunities, and threats, while also determining priority strategic issues that impact future ecotourism development.

Table 1. IFAS EFAS Matrix

Strategic Factors	Weight	Rating	Score
Internal	S1 (0,0-1,0)	S2 (1-4)	S1 x S2 = S3
Strenght (S) Weakness (W)	W1 (0,0-1,0)	W2 (1-4)	W1 x W2 = W3
Total	1,0		
Eksternal	O1 (0,1-1,0)	O2 (1-4)	O1 x O2 = O3
Opportunity (O) Treaths (T)	T1 (0,0-1,0)	T2 (1-4)	T1 x T2 = T3

Total 1,0

Source: (Rangkuti 2015, in Pontonusa *et al.*, 2019)

- 1) Column 1: The company's strengths, weaknesses, opportunities and threats are arranged.
- 2) Column 2: Assigns a weight to each factor on a scale of 1.0 (very important) to 0.0 (not important) based on its impact on the company's strategy. According to Trianziani (2020), the weight of each variable is obtained by determining the value of each variable relative to the total value of all variables using the formula:

$$\alpha_i = \frac{x_i}{\sum_{i=1}^n x_i}$$

Information:

$\alpha_i$  = weight of the *i*-th variable

$x_i$  = value of the *i*-th variable

*i* = 1,2,3, ...

*n* = number of variables

- 3) Column 3: Calculate a rating (in column 3) for each factor on a scale from 4 (outstanding) to 1 (poor) based on the factor's impact on the relevant condition. Ratings for major opportunities are given a rating of +4, minor opportunities +1. Major threats are given a rating of +1, minor threats +4. Strengths compared to the industry average are given a rating of +1 to +4 (very good). Weaknesses, on the other hand, are given a rating of +1, minor weaknesses +4.
- 4) In column 4: Multiply the weights and ratings to obtain a score. Add the column 4 scores to obtain a weighted score, which reflects the company's response.

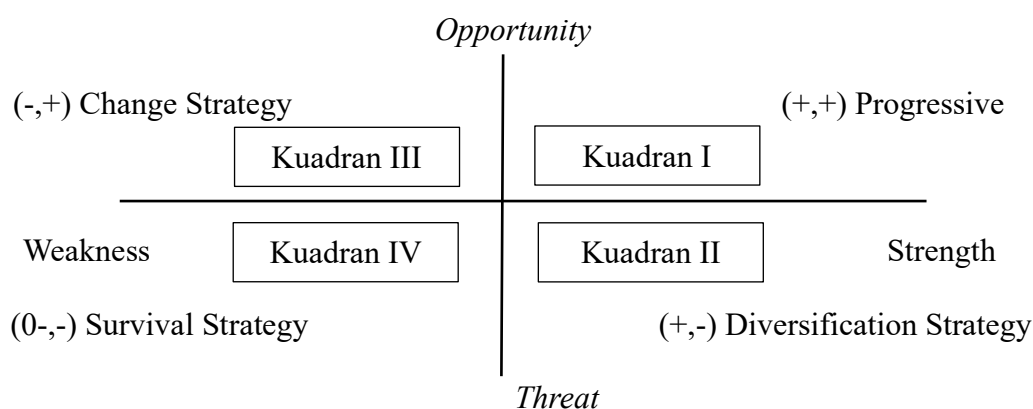


Figure 3. Position Matrix

Source: (Rangkuti 2015, in Pontonusa *et al.*, 2019)

According to Pontonusa *et al.*, (2019) the four strategy quadrant positions are:

1. Quadrant I (positive): Indicates a prime condition where the organization is strong and has opportunities. The main strategy is Progressive, which focuses on maximum expansion and growth.
2. Quadrant II (positive, negative): Indicates a strong organization but faces serious threats. Diversification strategies are needed to vary tactics to survive.
3. Quadrant III (negative, positive): Indicates a weak organization but has market opportunities. A strategic change (turn-around) is needed to improve performance and capture these opportunities.
4. Quadrant IV (negative): Indicates a dilemma (weak and threatened). Defensive strategies are implemented to improve internal conditions and avoid further losses.

Based on the strategy used in the SWOT matrix, the matrix model that will be used is based on the following table:

Table 2. SWOT Analysis Matrix Model

IFAS/EFAS	Strengths (S) internal strength factors	Weaknesses (W) internal weakness factors
Opportunities (O) external opportunity factors	SO Strategy Create a strategy that uses strengths to take advantage of opportunities	WO Strategy Create strategies that minimize weaknesses to capitalize on opportunities.
Threats (T) external threat factors	ST Strategy Create a strategy that uses strengths to overcome threats.	WT Strategy Create strategies that minimize weaknesses and avoid threats.

Source: (Rangkuti 2015, in Pontonusa et al., 2019)

Alternative strategies are the result of a SWOT analysis matrix, which produces SO, WO, ST, and WT strategies. A minimum of four alternative strategies are generated as a result of the SWOT matrix analysis.:

a. SO Strategy (Strenght-Opportunities)

This strategy is based on a way of thinking, namely by utilizing all strengths to seize and take advantage of opportunities as much as possible.

b. WO Strategy (Weankness- Opportunities)

This strategy is made by using all the strengths to overcome threats.

c. ST Strategy (Strength-Treaths)

This strategy is implemented based on utilizing existing opportunities by minimizing existing weaknesses.

d. WT Strategy (Weakness-Treaths)

This strategy is based on business activities to minimize existing weaknesses and avoid threats.

## RESULT

### Mangrove Forest Conditions

The results of observations to determine the condition of the mangrove forest in the Mangrove Education Park obtained several types of mangrove species in the measurements which can be seen in Table 3 below: Source: Primary Data.

Table 3. Mangrove Species

Observation Station	Types found	Amount
1	<i>Rhizophora mucronata</i>	92
	<i>Gymnanthera paludosa</i>	39
2	<i>Rhizopora mucronata</i>	80
	<i>Sonneratia alba</i>	24
3	<i>Rhizopora mucronata</i>	112

The results of this study revealed that *Rhizophora mucronata* was found at each station. Other species found in this study included *Gymnanthera paludosa*, which was only found at station 1 with 39 trees, and *Sonneratia alba*, which was only found at station 2 with 24 trees.

To determine the condition of the mangrove forest area, this study also carried out density measurements which can be seen in Figure 4 as follows:

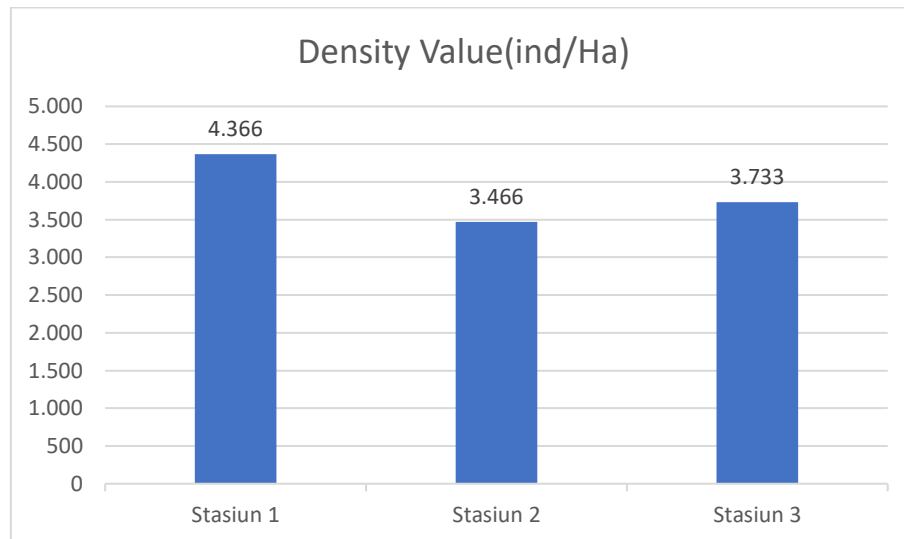


Figure 4. Mangrove Density

Mangrove density can be seen based on research stations consisting of 3 stations. Mangrove density is included in the very good criteria ranging from 3,466–4,366 ind/ha, this is in accordance with the statement by Hilmi *et al.*, (2020) that 0–390 ind/ha is included in the very rare criteria, 391–1,610 ind/ha is included in the rare criteria, 1,611–2,220 is included in the moderate criteria, 2,221–3,137 is included in the good criteria, and >3,137 is included in the very good criteria. The following results are to see the condition of the mangrove forest.

### **Mangrove Education Park Ecotourism Development Strategy Ecotourism Strategy Analysis**

Analysis of the potential feasibility of ecotourism using SWOT (Strength, Weakness, Opportunity, and Threats) analysis. The following are the results of the identification of internal and external factors.

#### **Internal Factors**

1. Strength
  - a. Has several tourist spots.
  - b. Natural potential that supports ecotourism activities.
  - c. Diversity of mangrove species.
  - d. Mangrove fruit can be processed by the community.
2. Weakness
  - a. Local communities are not yet fully involved in managing mangrove ecotourism.
  - b. There is no souvenir shop yet.
  - c. Lack of physical infrastructure such as breakwaters and waste management.

#### **External Factors**

1. Opportunity
  - a. Sufficient government support for the development of ecotourism areas.
  - b. There is a training program for the community in managing mangrove ecotourism.
  - c. Investment opportunities for investors and local residents for the development of natural resources in the field of ecotourism.
  - d. The high interest of tourists in carrying out mangrove tourism activities.
  - e. People's income increases.
2. Threats
  - a. Damage to the natural environment due to environmental destruction by visitors to ecotourism areas.

- b. Competition with other tourist attractions.
- c. Climate change has a negative impact on the mangrove ecosystem.
- d. Soil and water pollution due to garbage and waste.

### Entry Stage

Table 4. Internal Factor Analysis

No	Strength (S)	Weight	Rating	Score
1	Has several tourist spots	0,20	3	0,60
2	Natural potential that supports ecotourism activities	0,20	4	0,80
3	Diversity of mangrove species	0,13	4	0,53
4	Mangrove fruit can be processed by the community	0,10	4	0,40
Sub Total		0,63	15	2,33
No	Weakness (W)			
1	Local communities are not yet fully involved in managing mangrove ecotourism.	0,07	2	0,13
2	There is no souvenir shop yet	0,20	2	0,40
3	Lack of physical infrastructure such as breakwaters and waste processing	0,10	2	0,20
Sub Total		0,37	6	0,73
Total		1,00		3,07
Difference = Score (S) – Score (W) = 2,33-0,73		1,60		

Table 5. External Factor Analysis

No	Opportunity (O)	Weight	Rating	Score
1	Sufficient government support for the development of ecotourism areas	0,18	3	0,53
2	There is a training program for the community in managing mangrove ecotourism	0,12	3	0,35
3	Investment opportunities for investors and local residents for the development of natural resources in the field of ecotourism	0,09	3	0,26
4	The high interest of tourists in carrying out mangrove tourism activities	0,15	3	0,44
5	The income of the local community has increased	0,12	3	0,35
Sub Total		0,65	15	1,94
No	Threat (T)			
1	Damage to the natural environment due to environmental destruction by visitors to ecotourism areas	0,06	4	0,24
2	Competition with other tourist attractions	0,06	3	0,18

3	Climate change has a negative impact on the mangrove ecosystem	0,12	3	0,35
4	Soil and water pollution due to garbage and waste	0,12	2	0,24
Sub Total		0,35	12	1,00
Total		1,00		2,94
Difference = Score (O) – Score (T) = 1,94-1,00		0,94		

Based on the analysis of the TEM quadrant position, Demang Gedi is in Quadrant I (complete), as in Figure 5 as follows:

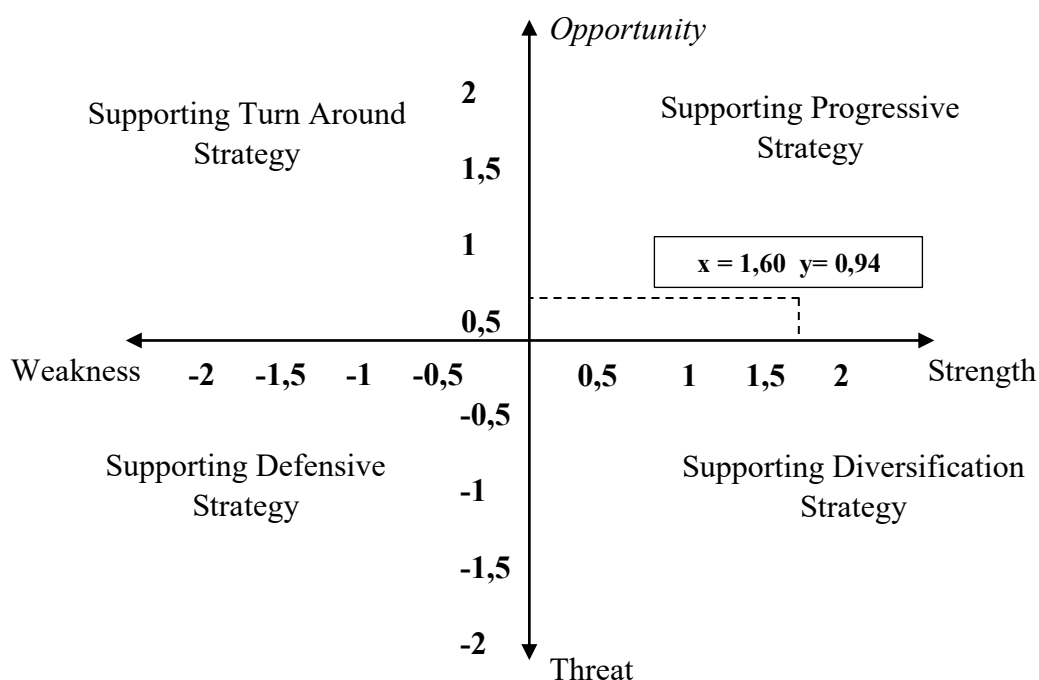


Figure 5. Position Matrix

### Decision Stage

Based on the results of the identification using the IFE and EFE matrices which describe the strengths and weaknesses of TEM Demang Gedi as well as the opportunities and threats faced using the SWOT matrix (Strength, Weakness, Opportunity, Threats), alternative strategies can be obtained by combining internal and external factors of the ecotourism potential of TEM Demang Gedi presented in the following table:

Table 6. Ecotourism Development Strategy

IFAS/EFAS	Strength (S)	Weakness (W)
	1. Has several tourist spots 2. Potential support for ecotourism activities 3. Diversity of mangrove species 4. Mangrove fruit can be processed by the community	1. Local communities are not yet fully involved in managing mangrove ecotourism. 2. There is no souvenir shop yet 3. Lack of physical infrastructure such as

		breakwaters and waste management
<p><b>Opportunity (O)</b></p> <ol style="list-style-type: none"> <li>1. Sufficient government support for the development of ecotourism areas</li> <li>2. There is a training program for the community in managing mangrove ecotourism</li> <li>3. Investment opportunities for investors and local residents for the development of natural resources in the field of ecotourism</li> <li>4. The high interest of tourists in carrying out mangrove tourism activities</li> <li>5. People's income increases</li> </ol>	<p><b>SO Strategy</b></p> <p>Utilizing existing tourist spots and processed mangrove products with government support and training programs to improve product quality and variety, while attracting investors for wider development and marketing, driven by high tourist interest.</p>	<p><b>WO Strategy</b></p> <p>Seeking government support and investment opportunities to overcome capital limitations and build supporting tourism infrastructure, including souvenir shops, as well as increasing promotions that utilize training programs for human resources managers.</p>
<p><b>Threat (T)</b></p> <ol style="list-style-type: none"> <li>1. Damage to the natural environment due to environmental destruction by visitors to ecotourism areas</li> <li>2. Competition with other tourist attractions</li> <li>3. Climate change has a negative impact on the mangrove ecosystem</li> <li>4. Soil and water pollution due to garbage and waste</li> </ol>	<p><b>ST Strategy</b></p> <p>Conducting education and outreach to friendly communities and tourists about the importance of protecting the environment and mangrove ecosystems around tourist spots, while empowering the community by introducing social media to promote this ecotourism.</p>	<p><b>WT Strategy</b></p> <p>Seeking adequate capital and infrastructure support to mitigate the impacts of climate change and address the problem of waste/garbage pollution, as well as increasing the promotion of activities based on environmental conservation to attract caring tourists.</p>

## DISCUSSION

The results of the mangrove research conducted at each station showed different species. The *Rhizophora mucronata* species was found at each station. According to Rahayu (2020), the *Rhizophora* spp. mangrove species is a type of mangrove vegetation that is often used for rehabilitation and has a fairly high chance of success. According to Hendrawan (2021), the distribution of individual mangrove species is strongly influenced by variations in environmental factors that can cause many mangrove species to gather in areas suitable for the

life of these mangrove species. The *Gymnanthera paludosa* species was only found at station 1, a station close to the estuary with sandy mud substrates and tidal areas (Wicaksono *et al.*, 2025). This is in accordance with the statement of Daris *et al.*, (2023) who stated that *Gymnanthera paludosa* can live on muddy and sandy mud substrates. Then, the *Sonneratia alba* species was only found at station 2, a station close to residential areas with soil substrates. This is in accordance with the statement of Syafitri and Siregar (2024) who stated that *Sonneratia alba* can grow on soil substrates mixed with mud, sand, sometimes on rocks and coral.

Station 1, located near the river mouth, showed the highest density value. This is due to the influence of nutrient supply carried by river sediment (Farrel *et al.*, 2024). River mouths are generally rich in nutrients such as nitrogen and phosphorus, which are essential for mangrove growth (Hendris *et al.*, 2024). Station 2 is in the very good category, but has the lowest value of the three stations. Its location close to residential areas indicates a slightly lower density. According to Partama *et al.*, (2024), mangroves close to residential areas have a low density level and therefore have a high level of vulnerability. Station 3 has a higher mangrove density, namely 3,733 ind/ha, also in the very good category. The location of this station is not too close to residential areas and has a muddy substrate, at this station only the species *Rhizophora mucronata* was found. According to Najih *et al.*, (2025), *Rhizophora mucronata* has excellent adaptation to soft muddy substrates, so station 3 has an excellent density. These results indicate that the mangrove forest in the Mangrove Education Park is in excellent condition.

The analysis of the mangrove ecotourism development strategy, based on data using the IFAS matrix, shows that the primary strength of the ecotourism potential lies in the natural environment supporting ecotourism activities (0.80). This indicates that the beautiful, supportive natural environment is a strength for the Demang Gedi Mangrove Education Park, offsetting its shortcomings. The main weakness of the Demang Gedi Mangrove Education Park is the lack of a souvenir shop (0.40). The IFAS table yields a total weighted score for strengths and weaknesses of 3.07. The EFAS analysis shows that a significant factor influencing the ecotourism potential is sufficient government support for the development of the Demang Gedi Mangrove Education Park (0.53). The main threat to the Demang Gedi Mangrove Education Park is climate change, which negatively impacts the mangrove ecosystem (0.35).

Figure 3 shows that various internal and external factors fall into quadrant I, "Progressive Strategy." According to Arfan (2022), this is an excellent situation where the utilization of the mangrove ecosystem as an ecotourism area has the strength to capitalize on existing opportunities. Furthermore, the final stage of this analysis is presented in Table 6, the decision stage, which formulates the ecotourism development strategy for the Mangrove Education Park. This strategy is designed as a development effort that aligns with the potential and challenges of the area and supports sustainable mangrove-based ecotourism. The results of this study align with the research of Zahrowaini *et al.*, (2026), which places ecotourism development in Quadrant I (Progressive Strategy), where the main strategy relies on strong natural potential to seize opportunities for government support.

## CONCLUSION

The condition of the mangrove forest in the Mangrove Education Park is classified as very good based on density analysis. Mangrove density is in the very good category at all stations, with a value of 3,466–4,366 ind/ha. The results of the EFAS and IFAS analyses indicate that the Demang Gedi TEM is in Quadrant I "Progressive Strategy." This position reflects the area's strengths in capitalizing on existing opportunities, particularly in the development of conservation-based educational tourism.

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