

# Ecologically-Based Economic Development Strategy on of Coastal Community of Pangpang Bay, Banyuwangi, Indonesia

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## ABSTRACT

In terms of area quantity and number of species, the population of mangrove in Indonesia is considerably abundant. Pangpang Bay of Banyuwangi is one of the concerned areas which also has high potentials economically and ecologically to the community around the area. Therefore, in managing the mangrove ecosystem, each sectors must be well coordinated. This study aims to optimize the economic development of community through community empowerment in utilizing the economic potential of the mangrove by keep maintaining the ecological sustainability as well as the coordination among stakeholders. This is a descriptive study using a SWOT analysis through Primary Survey and Focus Group Discussion (FGD). The results of the Grand Strategy analysis are in quadrant I. It indicates the importance of the institutions' role that can be utilized as an opportunity. In practice, this strategy plays a role in supporting the aggressive growth policy (growth-oriented strategy) by utilizing the appropriate technology to process the mangrove into finished products such as liquid soap, starch as food' raw material. In addition, it also has a comprehensive legal access and proper promotion with active participation of all parties to accelerate the sustainable growth of the region.

**Keywords:** utilization of mangrove, economic empowerment, institutional, appropriate technology

## 1. Introduction

Mangrove forests are one of the components of the ecosystem which is considerably important for the coastal resources. The mangrove forest is a typical tropical forest grows along the coast or estuaries and affected by the tide. It is one of marine ecosystems which potentially beneficial to community in terms of economic, social and environmental. Some of the economic benefits which are considered into timber and non-timber such as brackish water aquaculture, shrimp farming, tourism and etc. Mangrove forest products which are often exploited by human is wood used as firewoods, making the boat, glue, dye cloth, leaves as a medicine and etc (Dahuri et al., 2001).

The coordination among stakeholders are important in managing the potentials of mangrove ecosystem. (Saparinto, 2007). Mangrove forests need to be managed. The loss of mangrove species cannot be replaced by other land plants that will not survive in high saline areas. The scope of mangrove trees in the area along the coastline are becoming habitat of various flora and fauna which is irreplaceable. When mangrove forests are managed properly, the high economic value can be utilized using sustainable manner without risk of extinction (Murdiyanto, 2003).

The population of mangroves in Indonesia is considerably abundant in terms of area quantity ( $\pm 42.550$  km<sup>2</sup>) and number of species  $\pm (45$  species). People in some parts of Indonesia utilize the mangrove plants as food and also as a natural dye of batik. Many people do not know that the fruit can be consumed. In addition, the mangrove bark can be used as a fabric dye. Knowledge of the potential and benefits of mangroves as a source of food is still limited. The research which conducted by Mamoribo (2003) in the village community of Rayori, South Supriyori district of Biak Numfor provide information that people have used the fruit for food, it derived from *Bruguiera gymnorizha* or lindur whose fruit is processed into traditional cake, cooked and served with rice or eaten with coconut herbs (Sadana, 2007).

Based on the results of Landsat satellite imagery, in general mangrove ecosystem in Bay Area Pangang in 1989 covering an area of 207.5 ha +, then increased to +282.8 ha by 2011 (Raharja et al, 2014) which has long been used by the community in around forest areas either directly or indirectly. Directly, means that the society utilizes the mangrove for firewood, building materials, and materials for making charcoal, while indirectly, the community used it for seafood such as crabs, fish, and shrimp. Srimp farming (Grago) in mangrove of Pangpang Bay has been done by people for a long time, as well as the use of the fruit.

The threat of deforestation of mangrove forests for farm land development, especially for shrimp farming will result in a reduction or even stimulate the degradation of mangrove' growth (Gilbert and Janssen., 1998). Furthermore, it will lead decreasing of environment capacity. It will cause a stagnant farming productivity and even could be declined. Consequently, it will affect the welfare of the locals, as well as happen in Pangpang Bay (Raharja et al, 2014).

This study aims to optimize the economic development of community through community empowerment in utilizing the economic potential of the mangrove by keep maintaining the ecological sustainability as well as the coordination among stakeholders. Management efforts based on ecosystem can be the basis of spatial planning of Pangpang coastal Bay in response to the interaction of social, economic and ecological.

## **2. Reseach Method**

### **2.1. Data Collection**

The primary data were obtained by depth interviews with the informants, the observation was done by Focus Group Discussion (FGD). FGD was guided by the the researcher. The number of participants ranged between 8-12 people in unstructured form conducted as natural as possible. There were several aspects to be determined before conducting the FGD, such as, problems, research objectives and specific objectives of the study, then, followed by the specified variables or questions that will be answered by a focus group. A brief list of questions and an outline were also made to conduct the interview on Focus Group Discussions. The data recording is important to be conducted in regard on analysis of data which inferred from the existing findings and to determine further plans for the implementation.

Secondary data was the data which was already available which include: Spatial Plan (RT and RW), literature, scientific journals, and other reports.

### **2.2. SWOT Analysis**

SWOT analysis was preceded by the making of matrixs, namely, Internal-strategic Factor Analysis Summary (IFAS) and External-strategic Factor Analysis Summary (EFAS). Preparation of IFAS and EFAS matrix is based on the analysis of the system, ie by looking at factors which becoming internal strengths and weaknesses. In addition, the external opportunities and threats were also considered (Hunger & Wheelen, 2003). Preparations of IFAS matrix are as follows:

1. Identifying the factors which becoming the strengths and weaknesses of the system.
2. The quality of each factor, ranging from 1.00 (very important) to 0.00 (not important). Scores amount of the quality to the overall factor is 1.00.
3. Determining the rating for each factor based on its effect on the problem. The rating value ranging from 4 (outstanding) to 1 (poor). The larger the value, the greater the strength of the rating given, while for the weaknesses are otherwise.
4. Then, quality multiplication with rating are conducted to determine the weighted score for each factor.
5. The sum of the Quality's score determine the internal condition of the system. If the value of the score are > 2.5, it means that the internal state of the system has the power to resolve the situation.

Preparations of EFAS matrixs (David, 2002) are as follows:

1. Identifying the factors that affect the opportunities and threats.
2. Weighting of the individual factors quality associated with the effect on strategic factors, ranging from 1.00 (very important) to 0.00 (not important). Scores amount of weight to the overall factor is 1.00.
3. Determining the rating for each factor based on its influence on the state of the system. Rating value is ranging from 4 (outstanding) to 1 (poor). Scoring positive rating for the opportunity (the larger the value, the greater the chance the rating given), while for the threats are otherwise.
4. Then, the multiplication of the quality by rating is conducted to determine the quality's score for each factor.
5. The number of quality score determine the external conditions of the system. If the total quality score of > 2.5, it means that the system is able to respond to the existing external conditions.

The SWOT matrix is made to formulate alternative strategies. The alternative strategy is based on the logic of taking advantage from opportunities and the existing strength, eliminate the weaknesses and threats of the systems. The SWOT matrixs clearly describe how external opportunities and threats which we deal with can be customized to the strengths and weaknesses. From this matrixs, there are four possible alternative strategies will be formed. The resulting strategy is composed of several alternatives. The determination on strategy prioritization is conducted by sum of the score derived from the relationship between the elements of SWOT which contained in the alternative strategy. Total score will determine the priority ranking strategy of the development of pelagic fisheries in Muncar, Banyuwangi.

### 3. Results and Discussion

#### 3.1. The Potential Of Mangroves Ecosystem at Pangpang Bay.

Based on the analysis of image interpretation, the mangrove area was about 571.6858 hectares with 12 species of the mangroves spread in the region which is highly potential. For area in of WringinPutih village, there were identified at least six species of mangrove, including *Sonneratia alba*, *Avicennia marina*, *Barringtonia Asiatica*, *appiculata Rhizophora*, *Bruguieragymnorrizha*, *Ceriptagal*.

Some mangrove species can be used as alternative materials for industries which can boost the economy. One of them is Foodstuffs which is a basic human need and the fulfillment must be done wisely, fairly and equitably on the basis of self-reliance and not contrary to the belief as set out in Law No. 7 1996. Given the strategic role of knowledge as a source of the mangrove utilization is still very limited.

Based on several studies, the fruit of the mangrove namely, *Bruguieragymnorrizha* (lindur / tancang / tumu) can be processed into cakes. In addition, the community at Balikpapan Bay and MuaraAngke utilize some mangrove species such as *Rhizophoramucronata* as vegetable, such as *Acrostichumaureum*, *Sesbaniagrandiflora*. Moreover, *Avicenniaalba* can be processed into chips, then, *Sonneratiacaseolaris* also can be processed into syrup (Haryono, 2004).

#### 3.2. Community Empowerment Strategies Toward Mangrove's Fruit Processing by Using SWOT Analysis.

The analysis which conducted in this study was SWOT analysis to determine the strategy of community empowerment policy at WringinPutih Village toward Mangrove Fruit Processing in Pangpang Bay, Muncar District of Banyuwangi. In this case, the data that has been collected by using Focus Group Discussions (FGD) then became an input in determining the internal and external factors.

The results of focus group discussions and interviews that have been conducted formulated into several points that become entries in making the internal matrix of strategic factor analysis summary (IFAS) and external strategic factor analysis summary (EFAS).

The results of the identification of the Internal Factor Analisis Strategy (IFAs) that has been done during the FGDs are as follows:

##### *Strengths*

1. The mangrove forest area at Pangpang bay has a potential
2. Equitable distribution of the mangrove in Pangpang Bay
3. The conveniences in getting mangrove fruits as the raw materials
4. The diversity of biotic factors
5. There is a Regulations regarding to the conservation of mangrove areas in WringinPutih village
6. Having a model as a conservation village
7. There is awareness from local communities regarding with the sustainability of the mangroves

##### *Weakness*

1. People's knowledge on the mangrove utilization is still limited
2. Mangroves bear fruit in certain seasons (not all the time)
3. The difficulty of roads access to the site of the mangroves (in taking the fruits)
4. There is no special treatment to make use of the mangrove (including the fruit)
5. There is no integration between the stakeholders for enforcement actions to the Village's Regulations
6. Many groups concern by they own interest, moreover, they do not promote the sustainable conservation of mangroves
7. Overlapping claims in the management of the mangroves

**Table1. IFAS Matrixs.**

Internal Factors		Weight	Scale	Score
<b>Strength</b>			26	2,36
1.	The potential of mangrove forest area at Pangpang bay	0,15	4	0,6
2.	Equitable distribution of the mangrove in Pangpang Bay	0,1	4	0,4
3.	The conveniences in getting mangrove fruite as the raw materials	0,09	4	0,36
4.	The diversity of biotic factors	0,08	4	0,32
5.	There is a Regulations regarding to the conservation of mangrove areas in WringinPutih village	0,08	4	0,32
6.	Having a model as a conservation village	0,08	3	0,24
7.	There is awareness from local communities regarding with the sustainability of the mangroves	0,04	3	0,12
<b>Weakness</b>			14	0,77
1.	People's knowledge on the mangrove utilization is still limited	0,07	2	0,14
2.	Mangroves bear fruit in certain seasons (not all the time)	0,06	2	0,12
3.	The difficulty of roads access to the site of the mangroves (in taking the fruits)	0,06	3	0,18
4.	There is no special treatment to make use of the mangrove (including the fruit)	0,06	2	0,12
5.	There is no integration between the stakeholders for enforcement actions to the Village's Regulations	0,05	1	0,05
6.	Many groups concern by they own interest, moreover, they do not promote the sustainable conservation of mangroves	0,04	2	0,08
7.	Overlapping claims in the management of the mangroves	0,04	2	0,08
		1,00	26-14=12	3,13

Identification result of the External Factor Analisis Strategy (EFAS) that has been done with FGD is as follows: (Opportunities):

1. The potential of a large area of the mangrove forests become strategic source of food's raw materials
2. Establishing the urgency of utilization based on preservation of mangrove forest through mangrove species diversification until become products of small enterprices (UKM)
3. Environmental conservation programs of wetlands /mangroves are presented in the form of ecotourism
4. A good communication among stakeholders for sustainable utilization of the mangrove forests
5. High public awareness to the mangrove forest preservation can be used as the basis of sustainable programs both ecological and economic improvement
6. The location of Pangpang bay which is close from the core of Minapolitan (Muncar) area and popular tourism area(Bali) that can be used as promotion to improve eco-tourism by involving local people as the subject of the action
7. There is a forum of essential wetland ecosystem which is well developed around the bay of Pangpang

(Threats):

1. Legal aspects of the area that has not been socialized properly to stakeholders and the community
2. The closeness to the fisheries zone resulting in overexploitation in the region
3. Overclaims between shareholders make it vulnerable in rising conflicts in managing the use of the area
4. The transformation of forest land become farm land, agriculture and settlements give a great pressure on the mangrove forest

5. The model as conservation village that has not been fully applied
6. There are many mangrove leaves seekers for fodder and garem that threaten the mangrove forest
7. Conflict in the community related to the management and utilization needs to be resolved for regional sustainability

**Table 2. EFAS Matrix**

Exsternal Factors		Weight	Scale	Score
<b>Opportunity</b>			23	1,85
1.	The potential of a large area of the mangrove forests become strategic source of food's raw materials	0,12	4	0,48
2.	Equitable distribution of the mangroves in Pangpang Bay	0,1	4	0,4
3.	The conveniences in getting mangrove fruite as the raw materials	0,08	3	0,24
4.	The diversity of biotic factors	0,09	4	0,36
5.	There is a Regulations regarding to the conservation of mangrove areas in Wringin Putih village	0,05	3	0,15
6.	Having a model as a conservation village	0,05	2	0,1
7.	There is awareness from local communities regarding with the sustainability of the mangroves	0,04	3	0,12
<b>Weakness</b>		Weakness	15	0,98
1.	People's knowledge on the mangrove utilization is still limited	0,1	3	0,3
2.	Mangroves bear fruit in certain seasons (not all the time)	0,1	2	0,2
3.	The difficulty of roads access to the site of the mangroves (in taking the fruits)	0,1	1	0,1
4.	There is no special treatment to make use of the mangrove (including the fruit)	0,06	2	0,12
5.	There is no integration between the stakeholders for enforcement actions to the Village's Regulations	0,03	2	0,06
6.	Many groups concern by they own interest, moreover, they do not promote the sustainable conservation of mangroves	0,04	3	0,12
7.	Overlapping claims in the management of the mangroves	0,04	2	0,08
		1,00	23-15=8	2,83

### 3.3. Grand Strategy Analysis

Based on the analysis on Focus Group Discussion (FGD) with shareholders and the community that ranges respectively  $\pm 20$  samples, obtained results are included in the calculation as follows:

The total value internal factors:

$$\text{IFAS Score For Strength} + \text{IFAS Score For Weakness} \rightarrow 2,36 + 0,77 = 3,13$$

The total value external factors:

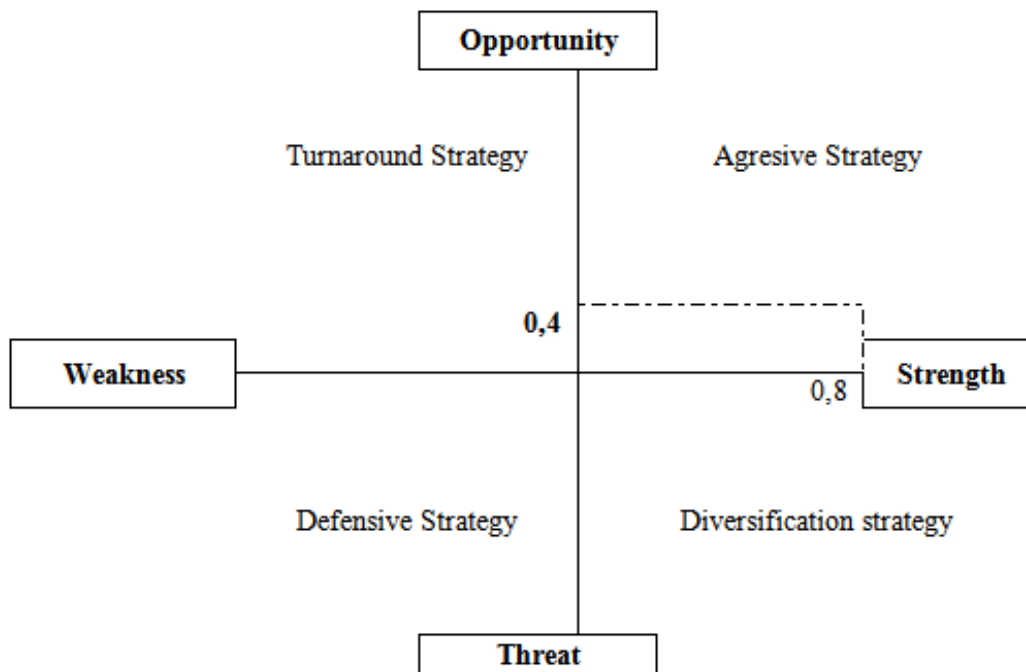
$$\text{EFAS Score For Opportunity} + \text{EFAS Score For Threat} \rightarrow 1,85 + 0,98 = 2,83$$

IFAS Score > EFAS score, it means that the internal factors are more influential than external factors. The result on factor score calculation of internal and external factors are used to determine the coordinates of the strategy. In this case, the "x" axis is an internal factor, while the "y" axis is the external factor.

$$\text{"x" value} = (2,36 - 0,77) : 2 = 0,795$$

$$\text{"y" value} = (1,85 - 0,98) : 2 = 0,435$$

So the coordinates of a grand strategy for the SWOT analysis is (0.8), (0.4), it is situated at quadrant 1, which is a very favorable situation. Institution or stakeholders have the opportunity and strength to take advantage of the existing opportunities. The appropriate strategy which should be applied in this condition is to support the aggressive growth program (growth oriented strategy) based on community ecology.



**Figure 1. Quadrant of the SWOT Analysis**

**Table3. Matrix of Grand Strategy**

IFAS/EFAS	Strengths (S)	Weakness (W)
Opportunities (O)	<p>Recommendation of SO:                      The mangrove forests area become a sustainable back up of raw materials processing products, as well as a conservation area basis with ecotourism as additional value that will uplift the local economy without leaving the conservation function of wetlands / mangroves.</p>	<p>Recommendations of WO:                      The construction of the access to mangrove forests by involving the community, in addition to become economically advantageous, it also can be a moment for communicating the preservation through groups / joint shareholder.</p>
Threats (T)	<p>Recommendation of ST:                      Strengthening and enforcement of the legal aspects of wetlands / mangroves which become solution of overclaiming among shareholders and the community in the region, in order to achieve a harmony, social welfare and sustainable management of wetlands / mangrove forests in a sustainable manner</p>	<p>Recommendation of WT:                      Active role in the improvement of the community's knowledge and the role of technology should be accompanied by the shareholders whom residing together around the region, including through education and the application of appropriate technologies that produce value-added products for the welfare of the community based on sustainable management of the local community (ekologisosiografi)</p>

#### 4. Conclusions and Recommendations

##### 4.1. Conclusion

Based on the analysis of grand strategy which situated at quadrant I, which is supporting the aggressive growth policy (growth oriented strategy). As a result, the application of appropriate technology in the community with the utilization of mangroves into finished products, such as liquid soap, starch as raw material for foods and accompanied comprehensive legal access with appropriate promotion of all parties that will accelerate sustainable growth in the region.

##### 4.2. Recommendation

Suggestions which were submitted related to the result of the study including the importance of unity and continuity of the performance of all sectors (the community, stakeholders, shareholders) in supporting the government policy of Banyuwangi on Wetland Region / Mangrove Forest at Pangpang bay, therefore the recommendation of this study were as follows:

- For the Government of Banyuwangi, the completion of the management in mangrove areas are required regarding with community empowerment in Wringin Putih village and surrounding. Consequently, the Pangpang bay management plan needs to be made as a reference.
- For the Community, there should be a holistic application programs related to the interests of the economic, social, institutional and contribute to harmonious resource conservation.
- For Higher Education, further research needs to be conducted. For instance, on the management model of Pangpang bay.



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