Economic Valuation of Ringgung Coast, Lampung Province: Does Small Area of Coast should be Abandoned?

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Abstract

The study in the Southeast Asia regarding fisheries, tourism, including aesthetic value estimated the sustainable economic benefits per km² of healthy coral reef ranging from US$23,100 to 270,000. The question is how this goes for limited area consisted of mangrove-sea grass-coral reef, which found in many coasts throughout Indonesia archipelago. Should it be ignored? The purpose of the study was to indicate the existing economic values of limited coastal area consisted of mangrove, sea grass bed, and coral reefs of the Ringgung coast of Pesawaran, Lampung Province. The results indicated that from coast length of 2.4 km, the total area of the wetland is approximately 78 ha consisted of 4.75 ha of mangrove, 22 ha of sea grass bed, and more than 50 ha of coral reefs. The economics values of the area study were predominantly used for grouper farms, with more than 15 individual farms, recreation, and Rhizophora culture (for seedlings) operated by locals. The economic values of the Ringgung coast by using direct use value of the grouper farms indicated that the yearly fish productivity was grossly of US$ 640,985. This number could be added up by the other economic values, such as recreation and saling of Rhizophora seedling. We can conclude that this economic values provided by the coastal ecosystem should be made to conserve the existing ecosystem. Besides, in order to maintain sustainable economic of the ecosystem, some consideration should be made in regard of carrying capacity for grouper farms in the area study.

Keywords: economic values, Ringgung coast, Lampung

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INTRODUCTION

Economic value of the coastal area with its healthy coral throughout the Southeast Asia is estimated ranging from US$23,100 to 270,000/km² (Conservation International, 2008). This value is benefitting from fisheries, tourism, recreation, and others including aesthetic values. With the healthy corals lies in many marine protected area (MPA) in Indonesia like those in National Park of Derawan, Wakatobi, Taka Bone or even Raja Ampat, this values might be true, but how about those of area which adjacent to inhabitants areas, which found in many coastal area throughout the Indonesia archipelago. Does the value fit with this kind of coastal area? Many coastal area of Indonesia archipelago consisted of coral reefs, sea grasses, and mangroves. Yet their condition varies correlated with local activities.

These three different ecosystems, however, connecting to each other building the coastal ecosystem more valuable not only for human benefits but also for the global ecosystem in large. For example, the coastal area of Ringgung, Pesawaran Regency of Lampung Province, Ringgung coast has these three different coastal ecosystems with its total area approximately 78 ha (Fig. 1), and it is to be considered as small coastal area.

The Ringgung coastal area has gradually increased in used, especially for the grouper cultures. In 2006, the total unit for grouper culture were not more than 20 units, but in 2011 the units has increased into more than 70 grouper culture units. It was predicted that the investment taken into that small area (78 ha) would be high enough if we look upon the price of the grouper itself in market. Therefore, their economic value should be taken into account or should it be ignored.

The purpose of the study was to indicate the existing economic values of the limited coastal area consisted of mangrove, sea grass bed, and coral reefs of the Ringgung coast, Pesawaran, Lampung Province.

METHODS

The economic valuation of the Ringgung coastal area was based on direct uses and market based method (OECD, 2002). Survey was made on the area study for its use and market price, in this case of study, was the market price of farmed fish (majorly groupers) which was adopted to determine the economic value of the existing ecosystems (mangrove, sea grass, coral reef). The transport cost was excluded, since the trading mostly occur in the place in where the fish farms are. When the fish are in the right grades, the fish farmers take direct contact to the buyers, so the fish are sold in very fresh condition.

For supporting the idea that good quality of environment would provide good productivity of the fish farms, the ecological condition of the area study was also

Fig 1. The Ringgung coastal area in circle (map provided by google earth).
evaluated by determining the coral reefs, mangrove, and sea grass conditions. The coral reefs condition was done by identifying life-form of corals from line intercept transect (LIT) of 50 meters line in 6–8 meter water depth. The mangrove and sea grass conditions were determined only for their plant compositions within a quadratic transect of 8 x 8 meters. Each ecosystem was sampled in 3 different sampling areas within the area study.

RESULTS AND DISCUSSION

Ringgung coastal area lies in 5° 33.44’ S and 105°15.10’E (Fig. 1). From the total wetland of the Ringgung coast of 78 ha, consists of mangrove with 4.75 ha, seagrass of 22 ha, and coral reefs more than 50 ha. The existing condition of the area study was listed as below:

1. Fish were farmed mainly the grace kelly grouper (Chromileptes sp.) and tiger grouper (Epinephelus fuscoguttatus).
2. The fish farms were owned by 57 individuals.
3. The total unit of the floating net was 78 units, in which each unit consisted of 8–12 cages/nets.
4. Each cage/net was filled with approximately 200 fishes.

For the market price of the farmed fish as follow:

1. Grace-kelly grouper US$ 40/kg (320.000 IDR/kg)
2. Tiger grouper US$ 20/kg (160.000 IDR/kg)

Other information in regard of the fish farming, which used to calculate any expenses and/or investment, made for the farms as follow:

a. Growth length time of grace kelly grouper > 12 months, tiger grouper ~ 12 months or less.
b. Fish are mostly sold in weight of 500 grams.
c. The survival rate of the fish was 80%, with food conversion rate (FCR) of 1:3 (FCR information was given by the sea-farming agency of Lampung, BBBL-Lampung) with addition of food supplement.
d. The groupers were fed with small fish (price for food fish was 8.000 IDR/kg).
e. The number of workers approximately 80 people with some assumption made for their salary was US$300/month (with currency change of US$1 was 8,000 IDR).

The economic value of the area of study used for the fish farming, then, was calculated based on the information collected and some assumption made. The value was presented in Table 1.

The economic values of the Ringgung coast by using direct use value of the grouper farms and some assumption made indicated that the yearly fish productivity was grossly produced of US$640,985. Yet this number could be added up by other economic values, such recreation and Rhizophora seedling (Fig. 2).

This economic value might not have a meaning if the coastal ecosystems were not supported by water or environment quality for the fish farming. From 4.75 ha of mangrove area only two species of the mangrove tree plants was found and it was dominated by Rhizopora apiculata (Table 2). This mangrove also provided some economic value, from which Rhizophora seedlings was managed and sold by some local people, in which each of Rhizophora seedlings was sold locally for 1,000 IDR. However, we are unable to present the real economic value from these seedlings. On the contrary from this activity some incentive income has been generated.

Meanwhile, the sea grass covered 22 ha of the coastal area of Ringgung. Three different species were found in sea grass of Ringgung coast (Table 3). Both of the mangrove and sea grass provide some services and could be accounted into dynamic model of the coastal ecosystem for further study.

The coral reefs of Ringgung coast cover almost more than 50 ha. From 3 different site of sampling, coral reefs were categorized in good (50–75% of living corals) to very good
Table 1. The economic value of the fish farm in Ringgung coast in a year.

<table>
<thead>
<tr>
<th>No.</th>
<th>Total Number of Fish</th>
<th>Price (in US$)</th>
<th>Salary (in US$)</th>
<th>Food and Suppl. (in US$)</th>
<th>Other (in US$)</th>
<th>First Investment (in US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>112,300</td>
<td>2,395,733</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>336,000</td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
<td>168,450</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>40,000</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>332,000</td>
<td>780,000</td>
</tr>
<tr>
<td>NETTO</td>
<td></td>
<td>2,059,733</td>
<td>1,752,985</td>
<td>1,420,985</td>
<td>640,985</td>
<td></td>
</tr>
</tbody>
</table>

Fig 2. *Rhizophora* seedling of the Ringgung coast.

Table 2. Mangrove plants of the Ringgung coast.

<table>
<thead>
<tr>
<th>No.</th>
<th>Species of Mangrove</th>
<th>Sampling #1</th>
<th>Sampling #2</th>
<th>Sampling #3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td><em>Rhizophora apiculata</em></td>
<td>80.00%</td>
<td>53.33%</td>
<td>82.36%</td>
</tr>
<tr>
<td>2.</td>
<td><em>Rhizophora mucronata</em></td>
<td>20.00%</td>
<td>46.66%</td>
<td>17.65%</td>
</tr>
</tbody>
</table>
condition (>75% of living corals) (Fig. 3) (Suharsono, 1998). The coastal ecosystems of the Ringgung coast seem in very good condition, this could be seen from the coral reefs condition by having living coral more than 67%. Whether the coastal ecosystems were supporting the fish farms or vice versa, it could be assumed that the fish farmers would not let any destruction made to their surrounding ecosystems. Farming fish was considerate to be sensitive with any environmental changes. Therefore, the fish farmers keep their surrounding water of any destructive activity.

The productivity of Ringgung coast, from fish farming only, was estimated of US$640,985 produced from total area of 78 ha. This economic value then should

<table>
<thead>
<tr>
<th>No.</th>
<th>Species of Seagrass</th>
<th>Sampling #1</th>
<th>Sampling #2</th>
<th>Sampling #3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td><em>Enhalus acoroides</em></td>
<td>42.45%</td>
<td>50.08%</td>
<td>94.93%</td>
</tr>
<tr>
<td>2.</td>
<td><em>Thalassia hemprichii</em></td>
<td>56.38%</td>
<td>46.88%</td>
<td>5.06%</td>
</tr>
<tr>
<td>3.</td>
<td><em>Halophila ovalis</em></td>
<td>1.17%</td>
<td>3.04%</td>
<td>-</td>
</tr>
</tbody>
</table>

Fig 3. Coral reefs condition in Ringgung coast.
be thought to be sustainably maintained and if this number so close to the actual productivity, then it was assumed that the environment has given some services. In order to maintain some conservation related to the environment of Ringgung coast to assure sustainability production, some payment should be made for environmental services, just like those promoted by Wunder (2005). However, some constrains might occur related to the economic value produced by this area of study, as the conservation made integrated with development, it would give some pressure for conversion (Ferraro, 2001). Therefore, for sustainable used of the Ringgung coast, some regulation and protection should be made by local authority agency/government. In order to improve the ecosystem diversity, its direct use values (such as recreation, research, and education) and its indirect values (such as biological support, physical protection) as well as its existence and option values should be also part of consideration in making policies (Ruitenbeek and Cartier, 1999).

Since Ringgung coast lies in the gulf and near to industrial vicinity of Bandar Lampung, some consideration should be taken care in regard of water pollutants either from industries or agricultural, such as fertilizer, changing in water current, and mass tourism. Those threats should be anticipated earlier before any plan is made, such as constructions of bridge over Selat Sunda or international harbor of Panjang or others.

Local people, who are mostly of coastal community, can take some lessons from the Ringgung coastal activity, starting from incentive income will provide some environmental protection. As it mentioned, in case of fish farming which is so sensitive to any environmental change, the surrounding area will be kept from any destruction. On the other hand, environmental protection will lead to improve restoration of nature, side by side these people will increase their awareness to protect even to preserve the nature itself. If this cycle is running well, it is predicted with improving of coastal community welfare and sufficiency, willingness to pay for environmental services will be performed. Since coral reefs of Ringgung coast seemed to be in good condition, thus this cycle might increase in biodiversity of the coral itself. This might be excluded from many market failures in valuing the biodiversity suggested by Dasgupta (2000).

**CONCLUSION**

1. Ringgung coast should be considered to be protected and regulated in order to maintain sustainable economic values of the ecosystem.
2. For sustainable economic and ecological values, some consideration should be made for carrying capacity of grouper farms in the Ringgung coast.
3. Economic values provided by the coastal ecosystem should be investigated thoroughly to conserve the existing ecosystem of mangrove – sea grass – coral reef.

**Acknowledgement**

We thank to our students, Nofitasari, FX Dwi Agung Widodo whose helping us with collecting some data. We also thanks to Directorate of Coastal Community Empowerment and Business Enterprise, Ministry of Marine Affairs and Fishery.

**REFERENCES**


