Supporting Capacity of Tugurejo Tread Mangrove Ecotourism

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Abstract. The mangrove forest on the coast of Tapak Tugurejo is one of the best mangrove forests in the city of Semarang which is inhabited by various species and has a high density. This mangrove forest is the main potential of coastal ecotourism in Tapak. This study aims to determine the carrying capacity of Mangrove Ecotourism on the coast of the Tugurejo Tread, Semarang. The method used is to assess the carrying capacity. The carrying capacity of Mangrove Tread Ecotourism is 668 people per day. This value is greater than the actual value of the number of tourists 136 people per day. Thus, the number of tourists who are expected to be able to travel in the Tugurejo Mangrove without causing disturbance to the ecosystem of the conservation area is a maximum of 668 people per day. Because the maximum number of visits in the Tugurejo Mangrove ecotourism area is 136 visitors.

1 Introduction

The condition of mangroves in Tapak Village, Tugurejo Village, Semarang City is currently quite good when compared to other areas around it [1]. This is because in the Tapak Area, mangrove planting activities are often carried out both by local communities and from government institutions, private sector, NGOs, students, and university students. However, this condition does not necessarily guarantee the safety of the mangroves in the village from various pressures of damage due to community activities, especially the people living around the mangroves to meet their daily needs.

The condition of mangrove forests on the coast of Semarang City has long been widely degraded, as a result of abrasion and land changes. Many efforts have been made by both the government and the community in several coastal locations in Semarang. However, there is still a lot of damage so that mangrove conservation must be preserved [2].
In tourism ecology, the ability of an area to receive tourist arrivals, so that the desire to develop the tourism sector, and basically an area has a certain ability is called environmental carrying capacity.[3] Carrying capacity of the tourism environment is determined by two factors, namely tourist destinations and biophysical factors of tourism locations. Recreation is the goal of tourists who want to get self-satisfaction both physically and spiritually, therefore it depends on the purpose of each tourist to get the results in accordance with the wishes. A strong ecosystem affects a high carrying capacity, which can receive large numbers of tourists. Biophysical factors that affect the carrying capacity of the environment are not just natural factors, man-made factors are also very influential, such as tourism facilities at the location while still paying attention to environmental and regional ecosystems.[4]

2 Literature Review

2.1. Ecotourism

Ecotourism is a type of tourism that became popular around the 1990s. Indonesia as a country with various kinds of natural uniqueness, Indonesia has quite good potential in the development of this type of ecotourism, most foreign tourists come to Indonesia because of its natural beauty, natural resources provide an increase in the competitiveness of Indonesian tourism, in the World Economic Forum Indonesia ranks third. 14 in Natural Resources Potential in 2017.[5] The concept of mangrove ecotourism is a principle of natural tourism development based on education to the community in solving existing problems and is an effort that focuses on activities or activities for human environmental health efforts and is an effort to foster and create a good condition for the environment, especially in integrated public health (collaboration) which is based on the interrelationship of the roles and functions of the community to its environment.[6]

2.2. Mangrove

The condition of mangrove forests on the coast of Semarang City has long experienced extensive degradation, as a result of abrasion and land change. A lot of effort has been carried out both by the government and by the community in several coastal locations Semarang. However, there is still a lot of damage, so conservation Mangroves must be preserved. Mangrove conservation is believed to be an effort to adapt to the impact of climate change in the most effective coastal areas. Many climate change experts are recommending that mangrove conservation activities are able to protect the area coastal areas from abrasion, rising sea levels, and also worsening weather due to climate change. In addition, the function of mangrove forests has long been believed to be part of the sustainable protection of coastal ecosystems. Tugu Subdistrict, Tugurejo Village, is located in the west of the city of Semarang which is one of the second-level areas in Central Java which has potential in the tourism sector. Ecotourism of the Tugurejo Tread Magrove Forest managed by the surrounding community and the Tread Environmental Love Youth Association (PENJAK) is one of the tourist attractions in the city of Semarang which has the potential for alternative tourism for traveling natural. Nature tourism of mangroves (mangroves) with the concept of ecotourism in the Tapak sub-district, urban village Tugurejo is intended in addition to being a place of recreation, as well as a place of education and training knowledge while growing a sense of love for nature and in line with the plan government, namely increasing welfare at the community level around the mangrove area.
The problem of mangrove forest ecotourism in the hamlet of the Tugurejo sub-district is the less than optimal arrangement so that the potential that should be used optimally is reduced. Facilities and infrastructure are also felt to be less available so that hinde for the development of this area.

Factors that affect the development of the mangrove forest area in the hamlet of the site Tugurejo village is none other than transportation, support activities, accommodation, and adequate infrastructure.

2.3. Carrying Capacity

Along with the growth of the human population, human activities also increase to meet their needs. In the process of fulfilling human needs, it is often done by exploiting natural resources, so that in some cases natural resources are depleted. The depletion of fossil fuels, polluted air and water, rising global temperatures that trigger climate change, changes in land use and function are critical issues for environmentalists and policy makers. Environmental degradation has accelerated in recent years because economic development activities are inconsistent with environmentally sustainable principles. As a life support system, naturally, the environment has the ability to restore its state in an effort to achieve a new balance. But the environment is not infinite, there are limits where the environment is not able to recover itself because of the magnitude of the “intervention” that must be accepted. Therefore the environment then loses its ability to support the life of the living things that live in it. These limits are then known as the concept of environmental carrying capacity.

Environmental carrying capacity as the maximum load that can be continuously supported. In ecology, carrying capacity is usually defined as the maximum population of a particular species that can be reliably supported in a habitat without permanently impairing habitat productivity.

The approach to the concept of tourism carrying capacity which is intended as the application of the concept of ecological carrying capacity solely for tourism purposes has several weaknesses, as mentioned by:

1. A tourist destination is a complex system, involving objective variables (eg availability of natural resources) and subjective variables (eg perceptions of tourists and local communities);
2. The definition of the maximum number of tourists who can visit a tourist destination without causing permanent damage must include the possibility of limiting access to visits. This concept may be true only for some places such as nature reserves and historical sites. This concept must be explained in more detail in order to have meaning at the operational level;
3. The magnitude of the impact caused by tourism activities does not uniquely depend on the number of tourists visiting, but may be caused more by the behavior of visitors and the characteristics of the local community;
4. A tourist destination does not have a unique carrying capacity, but a lot of carrying capacity (multiple carrying capacity), which is determined not only by the availability and physical nature of natural resources, but also by the characteristics of the management system, the typology of tourism used. the area, stakeholder perceptions (eg perceptions of visitor density) and other local conditions.

3 Research Methods

The method used is to assess the carrying capacity by calculating the effective carrying capacity value obtained from the calculation of Physical Carrying Capacity and management capacity.

To obtain the data contained in the above formulation, it will be carried out by conducting questionnaires and also conducting in-depth interviews with tourists, managers and also street vendors in the mangrove ecotourism area of Tapak Tugurejo.
4 Result And Discussion

Based on the data obtained in the field, both from primary and secondary data, it can be calculated the value of the carrying capacity of the Tugurejo mangrove ecotourism as follows:

\[ PCC = A \times \frac{1}{B} \times Rf \]

\[ A = 150500 \text{ m}^2 \] (area of mangrove in the mangrove ecotourism area [1])

\[ B = 65 \text{ m}^2 \] (Need for picnic area)

\[ Rf = 10 \text{ hours of opening time} / \text{duration of tourist visits on average 5 hours} = 2 \] (primary data)

\[ PCC = 150500 \times \left( \frac{1}{65} \right) \times 2 = 4.630 \]

\[ MC = \frac{R_n}{R_t} \times 100\% \]

\[ R_n = 2 \] (number of existing officers (primary data))

\[ R_t = 5 \] (number of officers needed (primary data))

\[ MC = \frac{2}{5} \times 100\% = 40\% \]

\[ RCC = PCC \times \frac{100-Cf_1}{100} \times \frac{100-Cf_2}{100} \times ... \times \frac{100-Cf_n}{100} \]

\[ ID = 1 - \lambda \]

\[ \lambda = \frac{\sum_{i=1}^{n} n_i(n_i-1)}{n(n-1)} \]

\[ N_i = 2367, 1100, 1900 \]

\[ N_i(n_i-1) = 5.600.322 + 1,208.900 + 3.608.100 = 10.417.322 \]

\[ N = 5367 \]

\[ N(N-1) = 28.799.322 \]

\[ \lambda = \frac{10.417.322}{28.799.322} = 0,361 \]

\[ IDS = 0,659 \]

\[ RCC = 4.630 \times 0,361 = 1.671 \]

\[ ECC = RCC \times MC = 1671 \times 0,4 = 668 \]

So the value of the effective carrying capacity (ECC) of the Tugurejo Mangrove natural tourism is 668 people per day. Thus, the number of tourists who are expected to be able to travel in the Tugurejo Mangrove without causing disturbance to the ecosystem of the conservation area is a maximum of 668 people per day. Due to the maximum number of visits in the ecotourism area of the Mangrove Tapak Tugurejo of 136 visitors in January 2021, it can be seen from table 1. The value of the effective carrying capacity obtained will then be able to change and be increased so that the environmental capacity can receive visits from visitors. tourists by expanding ecotourism land, planting and adding existing vegetation types as well as improving managers through technology and engineering so that the effective...
carrying capacity value can be increased and visitors can do more tourism in the Tugurejo Coastal Mangrove Ecotourism area. Activities to optimize tourism potential through increasing environmental carrying capacity and quality of life through technology and engineering are expected to increase the added value of natural resources.

Table 1.

<table>
<thead>
<tr>
<th>Month</th>
<th>Year</th>
<th>Number Of Visitors</th>
</tr>
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<tbody>
<tr>
<td>October</td>
<td>2020</td>
<td>87</td>
</tr>
<tr>
<td>November</td>
<td>2020</td>
<td>93</td>
</tr>
<tr>
<td>December</td>
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<tr>
<td>January</td>
<td>2021</td>
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<td>February</td>
<td>2021</td>
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<td>April</td>
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<td>August</td>
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<td>103</td>
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<tr>
<td>September</td>
<td>2021</td>
<td>97</td>
</tr>
</tbody>
</table>

4 Conclusion

The carrying capacity of Mangrove Tread Ecotourism is 668 people per day. This value is still greater than the actual value of the number of tourists 136 people per day. In this matter show that the supporting capacity of the mangrove tourism environment in the tugurejo site is still able to accept tourists who visit and do not cause the over accounting capacity of tourism place.

Reference

3. L. Muta'ali, Environmental and Regional Supporting Capacity, Publishing Agency of the Faculty of Geography, 333.7 (2013)
4. L. Muta'ali, Regional and urban spatial planning: a normative-technical review, (2013)