

# Study of Utilization of Mangrove Ecotourism, as Source of Learning for Conservation Education in Tugu District, Semarang City

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**Abstract.** Research objectives to find out utilization of mangrove ecotourism as conservation learning source viewed from infrastructures, implementation, **suitability** factor of mangrove ecotourism activities in Tugu District, Semarang City. The research's population is tourist who perform ecotourism activity in mangrove area at Tugu District, Semarang City. Sampling technique is accidental sampling. Data collection technique using **questionnaire**. Data analysis using descriptive statistics. Result showed physical and infrastructure condition in Mangrove Ecotourism at Tugu District, Semarang City classified in good condition with the supporting elements such as easiness of transportation and **accessibility**, presence of attraction and educative objects, satisfying service facilities provided by ecotourism manager, competent and well-educated tour guide, adequate landform presence which suit for conservation learning source, and information easiness presented in recreative activities made the existing information easy to be understand and help **enhance** tourist's knowledge and interest on importance of conservation. The only lacking of this ecotourism is type and quantity of public supporting and artificial educational supporting infrastructures which quite influencing the optimality of knowledge **absorption**. Through development on existing mangrove ecotourism area, the ecotourism manager and government integrating with local citizens should replenish educational and public supporting infrastructure, as well as addition of local culture attraction which expected to enhance the educational value of ecotourism.

**Keywords:** Ecotourism Mangrove, Learning Resources, Conservation Education

## 1 Introduction

The existence of mangrove ecosystems on the coast has three natural functions, namely protective beaches, spawning sites and sources of income. As a result of human intervention which converts into a factor of damage to the mangrove environment, it disturbs ecological balance. To reduce the intensity of damage, it is followed up with a systematic management method so that the mangrove ecosystem can be maintained. The purpose of this study was to determine the distribution, characteristics, quality and methods of mangrove management found throughout the Coastal Area of Semarang City.

Mangrove areas often experience excessive exploitation which damages ecosystem functions such as logging of mangroves, construction of aquaculture, establishment of commercial companies, land reclamation, sea storage, and other destructive efforts. Damage or loss of mangrove forest ecosystem can then eliminate all ecological and economic benefits.

Therefore, the existence and integrity of mangrove forests will greatly affect the sustainability of the coastal area and the human life system in the region.

The mangrove working group in Semarang City, argues that some people in Semarang City consider mangrove forests to be less useful areas, become mosquito nests and nest of pests and become a source of germs and slums. Because of this assumption, the mangrove forest is less developed and tends to shrink even towards extinction. The facts show that lately in the coastal area of the north coast of Semarang City, there are disturbances that tend to threaten forest sustainability and transform mangrove ecosystems into residential areas, aquaculture, agriculture, urban expansion and so on.

The typical mangrove ecosystem is the main attraction for various groups to know, study and research. This has resulted in an increase in the intensity of visitors to Mangkang Village which aims to conduct research activities, service in the context of environmental conservation, education and tourism where the Semarang City Government and Mercy Corps strive to develop the Mangkang Village mangrove area as an Eco-edu tourist destination and initiate establishment Community-based Mangrove Education and Conservation in Tugurejo which became known as the Mangrove Education Center managed by Non-Governmental Organizations and carried out the tourism activities of the mangrove area and the planting of mangroves that offered educational trips.

The mangrove planting activity itself in its implementation begins with a series of introductory and extension activities regarding plants and mangrove ecosystems. Here there is a transfer of knowledge from tourism officials from Pokdarwis who provide information for tourists about the benefits and importance of mangroves, where conservation / conservation of mangrove areas is very important to do. The use of mangrove areas in the knowledge transfer activities wrapped in tourism can be a learning resource for the community that is easily accepted and understood regarding mangrove conservation.

The purpose of this study is to find out a. Knowing the benefits of mangrove ecotourism in Mangkang Kulon Village, Tugu District, Semarang City as a source of learning conservation. b. Knowing the distribution of mangrove ecosystems in Mangkang Kulon Village, Tugu District, Semarang City. c. Knowing the characteristics and quality of mangrove vegetation that grows in Mangkang Kulon Village, Tugu District, Semarang City.

## **2 Research Method**

The research conducted is quantitative research. The research location was in Ecotourism Mangrove in Mangkang Village with a population of tourists conducting ecotourism activities. The sampling technique uses accidental sampling. The sample amounted to 52 people obtained from 10% data on the number of visitors during the last year from May 2019 to June 2019. Data collection techniques used were questionnaires. The data analysis technique uses descriptive statistics.

## **3 Result**

### **3.1 Overview of Research Sites**

This research was conducted at Ecotourism Mangrove Tugu City Semarang District. This

region is astronomically located at 110o 17 '15' BT - 110o 22 '4' BT and 6o 56 '13' 'LS - 6o 59' 14 'LS. Most of the area is pond area and mangrove forest. In the Semarang City Spatial Plan (RTRW) in 2011-2031 the Tapak area is included in the priority zone of the development of mangrove forested coastal areas with natural forest habitats that function to provide coastal and marine life [1].

The area of mangrove forests in Semarang has decreased from 2015 covering an area of 104.4 ha to 101.38 ha in 2016 and 99.44 ha in 2017. In 2018 mangroves in Semarang became an area of 97.56 ha. This is caused by the conversion of land in the area of Semarang City due to reclamation at the beach driver. Settlement land in Semarang city which caused less private entrepreneurs and local governments to reclaim the damaging mangrove forests in Semarang city and made settlements. Tugu Subdistrict is the most extensive area of mangrove forests in Semarang and the second is Genuk. (Department of Marine and Fisheries, 2019)

**Table 1** Mangrove area in the coastal area of Semarang City in 2019

sub-district	Area (Ha)
Tugu	44,30
Semarang Barat	19,10
Genuk	25,30
Semarang Utara	7,20
<b>Total</b>	<b>95,90</b>

Source: Results of Research Data Analysis, 2019

### 3.2 Benefits of mangrove ecotourism in Mangkang Kulon Village Tugu City District Semarang as a conservation learning resource

Add insight and understanding of the use of ecotourism as a source of mangrove conservation learning in the tourist area of Mangkang Kulon Village, Tugu District, Tugu City, Semarang, and can be a reference as literature in conducting relevant research in the future. Conservation and Rehabilitation efforts of Mangrove Tourism Areas in an effort to support the conservation policy of mangrove areas on the coast of Semarang City. In addition, the results of this study are expected to provide insight for tourists in ecotourism activities as a source of learning conservation. Distribution.

**Table 2 of Frequency of Mangrove Conditions**

No	Score Interval	Criteria	<i>f</i>	%
1.	32,51 - 40	Very good	10	19,23
2.	25,01 – 32,50	Good	33	63,46
3.	17,51 – 25	Bad	5	9,61
4.	10 – 17,50	Very bad	4	7,69
<b>Total</b>			52	100

Source: Results of Research Data Analysis, 2019

#### **a. Transportation and accessibility**

The results obtained by the majority of respondents (48.08%) a number of 25 people argued that the transportation and accessibility of the Ecotourism Mangrove area of Mangkang Village is classified as good. This classification of transportation and accessibility is influenced by the availability of concrete roads to the entry point of eco-tourism area, the availability of signposts to the location, and the availability of public transportation in the form of a motorcycle taxi that can take tourists from the main road to the ecotourism location.

#### **b. Attractiveness**

The results showed the majority of tourists (55.77%) argued that the number and type of attractions and educational objects in the Mango Eco-tourism of Mangkang Village were quite complete and interesting. The neatly arranged arrangement of mangrove ecosystems and organisms in them are very diverse and have a special attraction to be observed and can become objects of education for tourists who come about the mangrove ecosystem.

#### **c. Service Facilities**

The results of the study revealed that the service facilities provided by Mangkang Village mangrove ecotourism managers included satisfactory categories. As many as 61.53% of respondents thought that the services provided by managers were very satisfying, even 21.15% of respondents were very satisfied with the services obtained. The response from the manager who is fast and solution to questions, constraints, and preparation of activities is a driving factor for the high level of tourist satisfaction for the services provided.

#### **d. Infrastructure**

As one of the vital factors supporting the smooth operation, the availability of adequate infrastructure to be one important factor in an ecotourism region. Results of the study found there were negative responses from 60.45% of the respondents on the availability of existing infrastructure in the area of ecotourism Mangrove Village Mangkang with 44.23% thought incomplete and 17.31% thought the available infrastructure is not complete. The respondents' opinions are affected by the difficulty of the tourists who come to discover the supporting public facilities such as toilets, prayer, rest areas or stalls in the area of ecotourism. In addition, the presence of infrastructure or artificial objects is instructive also less prevalent in the area of ecotourism where there is only one observation post at the starting point of ecotourism locations.

#### **e. Tour Guide Ability**

As one of the vital supporting factors for the smooth running of activities, the availability of adequate infrastructure is one of the important factors in an ecotourism area. The results of the study found that there were negative responses from 60.45% of respondents regarding the availability of infrastructure in the Mangrove ecotourism area of Mangkang Village with 44.23% arguing that it was incomplete and 17.31% thought the available infrastructure was incomplete. The opinion of respondents was influenced by the difficulty of tourists who came to find supporting public facilities such as toilets, prayer rooms, resting places or food stalls in

the ecotourism area. In addition, the existence of artificial educational objects or objects is also less common in ecotourism areas where there is only one viewing post at the starting point of the ecotourism location.

The results showed that the conditions of Mangrove Ecotourism in the Village of Tugurejo Village, Tapak were included in the criteria of "Good". In order to find out the level of tourist satisfaction with the conditions of Mangrove Ecotourism, the Village of Tapak researchers used several indicators, namely; transportation, attractions, butler facilities and infrastructure.

**Table 3.** Frequency Distribution of Ecotourism Infrastructure Condition

No	Interval Score	criteria	<i>f</i>	%
1.	32,51 - 40	Very Good	7	13,46
2.	25,01 – 32,50	Good	38	73,08
3.	17,51 – 25	Bad	4	7,69
4.	10 – 17,50	Very Bad	3	5,77
Total			52	100
Average			28,60	

### 3.3 Tourist Responses to Suitability of Ecotourism as a Conservation Learning Resource

The response of tourists to tourism activities is a determining indicator of a tourist attraction said to be good / successful in selling recreational values from these activities. More focused, on the type of ecotourism the distribution of educational information from available objects that can be accepted by tourists becomes one with the recreational value to determine that ecotourism is classified as good and successful. The suitability of objects available in locations with information and knowledge that tourists want to obtain is an important point in an ecotourism activity that can be used as a source of learning in a field of science.

The results showed that the response of tourist tourists regarding the suitability of the Mangrove Ecotourism in Tugu District as a source of conservation learning was included in the appropriate criteria. In order to know tourists' responses to this, researchers used several indicators, namely ecotourism regional suitability, contents of mangrove learning materials, and learning-based tourism activities.

**Tabel 4** Frequency Distribution of Tourist Responses to Conformity Mangrove Ecotourism as a Conservation Learning Resource

No	Score Interval	Criteria	<i>f</i>	%
1	29,26 – 36	Very good	27	51,92
2	22,51 – 29,25	Good	17	32,69
3	15,76 – 22.50	Bad	5	9,62
4	9 – 15,75	Very bad	3	5,77
Jumlah			52	100

Source: Results of Research Data Analysis, 2019

#### **a. Fill in Mangrove Learning Materials**

As part of eco-tourist activities, the knowledge transfer process in the form of material delivered by tour guides and managers must be adapted to the tourists' catch. In addition, the relevance of the material to ecotourism activities also needs to be taken into account so that tourists can more easily understand the information without reducing the element of recreation from ecotourism activities. The results of the study found 46.15% of respondents argued that the material delivered by the eco-tourism manager was quite relevant to ecotourism activities that were followed and easily understood by respondents. 36.54% of respondents also thought that the material presented was very easy to understand and relevant to ecotourism activities.

#### **b. Ecotourism Based Learning Activities**

Ecotourism can not be separated from the delivery of educational values wrapped in recreational activities. In its implementation, ecotourism must implement the delivery of educational information both implicitly and explicitly prepared carefully both at the time of implementation, the strategy or method of delivering information used and material adjustments to the understanding of eco-tourism participants. The results of the study found that ecotourism activities in the Mangrove Ecotourism area of Mangkang Village were able / suitable to be a learning resource for respondents regarding mangroves and their conservation well. The majority of respondents as many as 24 people (46.15%) thought that eco-tourism activities based on learning about mangroves carried out in the Mangrove Ecotourism area of Mangkang Village were good and accordingly followed by 20 people (38.46%) respondents thought highly good and very suitable. There are only 5 people (9.62%) of respondents who think they are bad and inappropriate and 3 people (5.77%) think that it is very bad and inappropriate regarding learning-based ecotourism activities regarding mangrove conservation in Mangkang Village. This relates to the sub-indicators which are important factors for ecotourism-based mangrove conservation learning activities in the Eco-tourism Mangrove area of Mangkang Village such as the technical preparation of well-designed activities, the timeliness prepared and the suitability of the methods used in the provision of conservation material mangrove during ecotourism activities. These three factors have an effect on increasing respondents' understanding and interest in mangrove conservation, which indicates that the main essence / purpose of ecotourism activities in this case is that mangrove ecotourism is well conveyed.

## **4 Discussion**

Ecotourism is a tourist alternative that has many positive values compared to other types of tourism. In ecotourism activities, tourists are invited to become part of environmentally-based recreation-based learning activities by seeing, learning, understanding, and admiring the landscape, flora and fauna, local social and ethnic culture by participating in fostering the preservation of the surrounding natural environment by involving local residents. This research is a research focused on the suitability of Ecotourism Mangrove in Mangkang Village as a learning resource for mangrove conservation for tourists who carry out ecotourism activities in it. The research study material was obtained by researchers from dividing the sub-

variable suitability of mangrove ecotourism as a source of learning seen from the conditions of mangrove ecotourism, as well as the response of tourists to the suitability of mangrove ecotourism as a source of learning. The two sub-variables are analysis researchers per specific indicator which is a supporting factor for an ecotourism suitable as a source of learning or educational tourism facilities.

#### **4.1 Ecotourism of Mangroves**

The condition of the physical area and supporting equipment in the Ecotourism Mangrove area of Mangkang Village is in good condition. The majority of indicators that affect the quality of the conditions of the mangrove eco-tourism facilities and infrastructure have good ratings from visiting tourists.

The affordability of the area and the quality of the road to Ecotourism Mangrove in Mangkang Village are good. Mangkang Village concrete road assistance provided by the Tourism Office in 2016 provided a significant increase in the quality of accessibility for Ecotourism Mangroves in Mangkang Village. The road concretion made it easier for tourists to travel, especially those who came with large groups to the tourist area. In addition, the availability of motorcycle taxi facilities in the main gate of Mangkang Village, which is ready to take small groups of tourists to the Mangrove Ecotourism area, also contributes to the good quality of transportation and accessibility of Eco-tourism Mangroves. This is in accordance with the opinion of Oka A. Yoeti (2000)[2] that the availability of adequate accessibility to the ecotourism area is one of the important factors in a region that can be developed into an ecotourism area.

Attractions or objects and a series of activities that can be done in the Ecotourism area of Mangrove, Mangkang Village are included in the excellent category. Tourists who come are quite interested in various objects found in the ecotourism region and actively engage in ecotourism activities, one of which is the main planting of mangroves. The activity of tourists in ecotourism activities can be seen from the response of tourists following the direction of the tour guide in the activity, and the questions asked regarding mangroves and their conservation. The availability of attractions that have educational value encourages interest in wanting to know tourists studying enough mangrove conservation and being able to provide educational information needed by tourists. However, the researchers found that there was a lack of boards or infograms / infographics in tourist areas that were actually able to provide a deeper picture of the benefits of mangroves and their conservation which could be a source of learning with message classifications presented in informative material.

A high level of satisfaction from the quality of eco-tourism management services influences the management services regarding the preparation of schedules / plans for ecotourism activities with tourists, management services during activities, resolution of problems that may occur before, during, or after ecotourism activities, as well as bait back and the solutions provided by the manager of Ecotourism Mangrove Village Mangkang to the questions and constraints that exist. Waiter management also involves the surrounding community such as in jukung boat rental for ecotourism activities that contribute positively to community income.

The low quality of supporting infrastructure in the Ecotourism area of Mango Village Mangkang in this region is influenced by the incomplete availability of infrastructure that makes it easier for tourists to enjoy ecotourism areas such as public toilets, places to wash hands and feet considering activities in the mangrove ecotourism area mud and sand, inadequate resting place, absence of shops / stalls selling food and / or drinks, and

unavailability of places of worship / prayer rooms so that tourists who want to worship must go to the settlement first. In addition, the availability of infrastructure that is capable of being an educational tool is also lacking in this region. The researcher only found one third-level viewing post about 13 meters high. Indeed, the viewing post can be a means for tourist help to enjoy mangroves from a height and allow for the activity of bird watching, but with only one fruit that is considered to lack optimal benefits.

Tour guides in the Mangrove Ecotourism area of Mangkang Village have good competence in managing and driving tour groups from one object to another while providing information about the object and instilling knowledge specifically about mangroves and their conservation while accompanying respondents to take part in ecotourism activities. Mango Eco-tourism guide Mangkang Village is also able to generate interest in curious tourists about mangroves and encourage tourists to develop the knowledge they have obtained about mangrove conservation into an attitude that tourists can have on the importance of maintaining and preserving mangrove ecosystems, where it is packaged in an activity recreation that still provides entertainment value for tourists. The competency of the tour guide was obtained from the training obtained from the tourism and environmental agencies and related NGOs. In addition, only people who have passed the Indonesian National Work Competency Standards (SKKNI) test in the Tourism Guidance sector may be tour guides on this ecotourism.

#### **4.2 Tourist Responses to the Suitability of Ecotourism as a Learning Resource for Mangrove Conservation**

The mangrove area found in Mangkang Village is very suitable as an ecotourism area. The landscape of the landscape, especially the existing mangrove and coastal ecosystems, the area, the composition of the mangrove area that has been arranged with coastal open land, and the existing coastline is very good and has great potential to be developed more widely in the field of ecotourism. - such as the addition of supporting facilities and educational infrastructure for example. In this ecotourism area visitors also have no difficulty in interacting directly with existing objects so that the presentation of information in the form of an existing natural setting goes well and can involve tourists in activities directly.

This condition is in accordance with the Nature-based Setting point proposed by Daniel A. Friess (2017) [3] in the Journal of Ecotourism on Mangrove and Coastal Areas which states that an ecotourism area must contain natural components that are conducive to being surrounded and explored, interesting and educative and suitable as a rehabilitation and conservation area through tourism activities. All these points can be found in the Mangrove Eco-Tourism Area of Mangkang Village.

The material provided by the tour guide related to information about mangroves and their conservation is in accordance with ecotourism activities that are followed by tourists. Explanation of the guide covers all the material about mangrove in the form of species, how to grow and plant, benefits, and its preservation process is explained by straightforward and easily understood language combined with the environment in the ecotourism area making it easier for tourists to absorb the information and knowledge delivered.

Packaging activities that can be followed by tourists based on learning about mangrove conservation in Ecotourism Mangrove in Mangkang Village is good. Technical preparations carried out by mangrove ecotourism managers regarding planning activities, preparation of equipment and mangrove seedlings for planting activities, as well as preparation of transportation in the area in the form of jukung which is used for palm trees and beaches have



been arranged neatly and comfortably. During the eco-tourism activities, the portion of time provided by the tour guide in presenting the material has been in line with the tourists who observe and practice directly the mangrove conservation process without reducing the recreational value and comfort of tourists.

The use of the lecture method in delivering material while inviting tourists to see, understand and practice the mangrove conservation process is considered appropriate in ecotourism activities. In addition, a tour guide will also provide a break time for tourists to enjoy the mangrove area without delivering material to avoid tourist saturation in ecotourism activities. Tourists feel that the use of this method is very suitable for use in a series of ecotourism activities that are followed where the delivery of material using this method is able to facilitate the increase of tourist knowledge about mangrove conservation.

The series of activities that tourists participated in at Ecotourism Mangrove in Mangkang Village in general contained educative information about the types, terms and conditions of growth, care, benefits, and preservation of mangroves that are arranged in recreational activities. The activities that were followed directly helped to increase the understanding of tourists regarding the importance of mangrove conservation, where in the ongoing activities tourists were invited to see how mangroves protect coastal areas from damage caused by abrasion by acting as natural dikes, strengthening mud-sand soil structures that are characteristic coastal areas with their maritime systems, supply oxygen through photosynthesis, provide their own environment / ecosystem wherein various organisms can also be consumed, and have an ecosystem characteristic that is interesting to see, observe, and learn. From the series of activities, tourists will be able to develop awareness of the importance of the conservation of mangrove areas, and encourage tourists to be actively involved in the conservation process, even on an ongoing basis interested in participating in mangrove conservation activities at a later time.

Submission of the concept of Encouraging Awareness Conservation or inviting to be aware of the importance of conservation as stated by Daniel A. Friess (2017) where tourists will feel themselves to be volunteers who contribute to conservation programs and develop conservation of an area, ecosystem restoration will make tourists get a sense of satisfaction helping conservation nature and development of a region and community and provide benefits for tourists themselves in the form of satisfaction and the value of recreation and education, and give benefits to local communities in the development and preservation of their territory. The concept is the main essence in the eco-tourism activities of mangroves in Mangkang Village with satisfaction and the benefits of recreation and education on tourists' access to mangrove, the benefits help drive the economy of the local community, and the benefits of the mangrove area that can be enjoyed by the local community or widely.

## **5 Conclusion**

The Mangrove Ecotourism condition in Tugu Subdistrict is relatively good with supporting elements such as transportation and good regional accessibility, the availability of complete recreational and educational attractions, well-provided services by managers, and competent tour guides. It's just that the types and quantities of supporting infrastructure and artificial infrastructure that help process the absorption of information and knowledge about mangroves are not fulfilled so that the utilization of mangrove ecotourism in Mangkang Village becomes less optimal.

The tourists' response to the suitability of the Ecotourism Mangrove Village in Mangkang as a learning resource for mangrove conservation is classified as good to very good. The suitability of the region with the profile of nature and the existing ecosystem is very suitable to be used as a setting or background environment where tourists can directly observe and understand how mangroves are beneficial to human life so they must be preserved. Along with this, the Ecotourism Mangrove manager and guide in Mangkang Village was able to become a field facilitator in providing detailed information and knowledge about mangrove conservation carried out by ecotourism managers regarding mangrove conservation in a series of recreational activities and a pleasant learning environment that made existing knowledge and information become more easily absorbed by tourists, and contribute to the view that natural conservation, especially mangrove conservation must be carried out and increase the interest of tourists to take part in conservation activities again in the future.

The advice that can be given is the addition of ecotourism supporting infrastructure and developing local cultural attractions to increase the attractiveness and optimality of the ecotourism area as a learning resource for conservation.

## References

- [1] F. F. Rutana, "Studi Kesesuaian Ekosistem Mangrove Sebagai Objek Ekowisata Di Pulau Kapota Taman Nasional Wakatobi Sulawesi Tenggara," *Univ. Hasanuddin. Makassar*, 2011.
- [2] O. A. Yoeti, "Ekowisata: Pariwisata Berwawasan Lingkungan Hidup," *Jakarta PT Pertja*, 2000.
- [3] D. A. Friess, "Ecotourism as a tool for mangrove conservation," *Sumatra J. Disaster, Geogr. Geogr. Educ.*, vol. 1, no. 1, pp. 24–35, 2017.

Ahmad, Rohani. 2010. *Pengelolaan Pembelajaran*. Jakarta: Rineka Cipta

Alfira, Rizky. 2014. *Identifikasi Potensi dan Strategi Pengembangan Ekowisata Mangrove pada Kawasan Suaka Margasatwa Mampie di Kecamatan Wonomulyo Kabupaten Polewali Mandar*. Makassar: Universitas Hasanuddin.

Irwanto. 2008. *Hutan Mangrove dan Manfaatnya*. Ambon. [www.irwantoshut.com](http://www.irwantoshut.com)

Kaimuddin, 2008. "Studi Kelembagaan Lokal Masyarakat dalam Pembangunan Hutan Mangrove di Desa Munte, Kecamatan Bone-Bone", *Jurnal Hutan dan Masyarakat*, Vol. III, No. 1:37-43

*Rencana Tata Ruang Wilayah Pesisir Kota Semarang 2019*. Direktorat Jenderal Kelautan, Pesisir dan Pulau-pulau Kecil: Dinas Kelautan dan Perikanan Kota Semarang

Saputro, B.G. 2009. *Ekologi Mangrove Indonesia*. Bogor: Pusat Survei Sumber Daya Alam Laut dan Pemetaan Nasional.