The impacts of mangrove ecotourism management on the socio-economic conditions of people in kulonprogo regency

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Abstract. Jangkaran Village is one of areas in the Special Region of Yogyakarta that has mangrove forests. Mangrove forests have unique characteristics and values of natural beauty so that they have the potential to be managed into mangrove ecotourism, particularly in Pasir Mendit and Pasir Kadilangu hamlets. Since mangrove ecotourism management also involves the surrounding communities the purpose of this present study was to assess the extent of community participation and mangrove ecotourism impacts on the socio-economic conditions of the surrounding communities. The study was conducted with survey methods using questionnaire instruments to collect the data. The research subjects were people who are involved or not involved in mangrove ecotourism management. The number of respondents sampled with quota sampling method was 40. The data were processed into frequency tables from scoring with Likert scale to determine the extent of community participation. The data were quantitatively-descriptively analyzed with the Spearman Ranking Test to determine the relationship of internal factors with the level of community participation and the T-test to see the differences in the community conditions before and after the existence of the mangrove ecotourism and the differences between those people who are involved and not involved in the mangrove ecotourism management. The results showed that the levels of community participation in mangrove ecotourism management was moderate during the planning stage (3.05), very high during implementation and benefit taking (4.24 and 4.60, respectively), and high during evaluation (3.56); the impacts of mangrove forest ecotourism management to the community condition in the forms of additional income generating activities related to mangrove forests and social interaction in the form of voluntary works before and after the existence of mangrove ecotourism were similar, i.e. 47.5%; there was binding regulation that was moderate adhered (52.5%) by the community, and; there were social conflicts (67.5%). The T-test statistics showed differences in the community incomes before and after the existence of mangrove tourism and between those who are involved and not involved in the mangrove ecotourism management.

1. Introduction

Based on data from the Ministry of Maritime Affairs and Fisheries, the area of mangrove forests in Indonesia is 3.7 million hectares in 2016. The Special Region of Yogyakarta is among areas with the smallest mangrove forest in Indonesia, which is 40.1 ha [1]. One of the locations of the mangrove forest is in Jangkaran Village which belongs to Kulonprogo Regency, around the mouth of the Bogowonto River.

The existence of mangrove forests in some areas is not currently utilized optimally, while mangrove forests have important values for humans such as protecting surrounding communities from strong...
winds and coastal disasters, being used for consumption as well as for its monetary and environmental values [2]. Mangrove forests also have unique characteristics and the value of natural beauty, so that many mangrove forests have been developed into nature tourism or what is known as mangrove ecotourism [3].

Activities related to ecotourism can play a role in developing local communities. This is because local community and its environment are integral parts of an ecotourism area, so that the potential and community participation need to be developed to gain benefits from it and to encourage community participation in conserving the environment [4]. Community involvement in the management, especially in terms of mangrove ecotourism, may have impacts on the social and economic conditions of the community from their involvement in the community-based mangrove ecotourism management.

A community-based mangrove ecotourism management means that there is a people empowerment by building a community to manage the ecotourism to make it attractive to while the sustainability of mangrove forests is preserved. Community empowerment through tourism activities also includes increasing community’s awareness and roles in improving the quality of life and welfare[4]. The community who are directly involved includes people who live around the ecotourism areas which are administratively located in Pasir Mendit and Pasir Kadilangu hamlets.

The purpose of ecotourism development is to develop tourism that promotes environment preservation, and empowers and benefits the local community [5]. Some of positive impacts of ecotourism management include increases in the income and foreign exchange, employment opportunities, business opportunities, local community’s and visitors’ awareness of natural resources preservation, local community participation, and local economy [6]. Therefore, a community-based mangrove ecotourism management might affect the socio-economic conditions of the community themselves.

Community participation in the management of mangrove ecotourism is needed to move the community to take part in tourism development. It was found necessary to study mangrove ecotourism management in order to analyse the impacts of mangrove ecotourism on the socio-economic conditions of the surrounding communities. The purpose of this present study was to determine the level of community participation and the impact of mangrove ecotourism management on the socio-economic conditions of the communities in Pasir Mendit and Pasir Kadilangu hamlets.

2. Methods
The research locations were Pasir Mendit and Pasir Kadilangu hamlets in Jangkaran Village, Temon District, Kulonprogo Regency. These locations were chosen because there were community-based mangrove ecotourism management in these hamlets. The mangrove ecotourism is managed by several managing groups, including Kelompok Wisata Mangrove Wana Tirta, Maju Lestari, Mangrove Jembatan Api-api, and Pantai Pasir Kadilangu.

The data used in this present study consisted of primary and secondary data. The primary data were obtained through structured interviews. The data included the forms of community participation and the impacts socially and economically gained by the community from the existence of mangrove ecotourism. The indicators for levels of community participation and socio-economic conditions are shown in Table 1.

| No | Variables               | Parameters               | Indicators                                           | Source of data                                                  |
|----|-------------------------|--------------------------|------------------------------------------------------|-----------------------------------------------------------------|
| 1  | Community participation | Planning stage           | -attending meetings or socializations                | Primary data (structured interviews with community members)     |
|    |                         |                          | -participating in activity plan development         |                                                                  |
|    |                         |                          | -participating in deciding on budget and source of budget |                                                                  |

Table 1. Research variables and indicators
Structured interviews were conducted using questionnaires as the instrument. The subjects of this study were household members who are involved and not involved in mangrove ecotourism management. The number of samples determined by quota sampling was 40 respondents. The number was determined in advance based on on certain considerations, that was because the respondents had the opportunity to give the same answers. The determination of the number of samples did not consider the proportions of the members in the sub-populations because it was considered not too important [7].

The level of community participation was obtained through scoring with a Likert scale. The relationship of internal factors with the level of community participation was known by the Rank Spearman correlation test. The socio-economic impacts were processed into frequency tables, while the income level data were processed using the T-test statistics to determine the differences in the community conditions before and after the existence of mangrove ecotourism and between community members who are involved and not involved in the mangrove ecotourism management.

3. Results and Discussion

3.1. Mangrove Ecotourism Management History

The mangrove forest in Jangkaran Village as a whole is managed by the local community assisted by several parties such as academicians, the private sector, and Non-Governmental Organizations. Mangrove forests around the mouth of the Bogowonto River have naturally grown since decades ago. The preservation of mangrove forests requires the involvement of the community as the main component in its management.
Mangrove management has now developed into mangrove ecotourism management from what was originally mangrove planting. Mangrove ecotourism activities were initially pioneered by the Wana Tirta Group in 2016 from which the income is used to support mangrove conservation activities. The ecotourism activities were then followed by several other mangrove ecotourism groups, including Kelompok Wisata Mangrove Maju Lestari, Mangrove Jembatan Api-api, and Pantai Pasir Kadilangu.

Table 2. Mangrove Ecotourism Area

| Mangrove Ecotourism Groups       | Location (Hamlet)         | Area (ha) | Area (km²) |
|----------------------------------|---------------------------|-----------|------------|
| Wana Tirta                       | Pasir Mendit              | 19.89     | 0.20       |
| Maju Lestari (already closed)    | Pasir Mendit              | 9.79      | 0.10       |
| Mangrove Jembatan Api-api        | Pasir Mendit dan Pasir Kadilangu | 9.46   | 0.09       |
| Pantai Pasir Kadilangu           | Pasir Kadilangu           | 21.17     | 0.21       |
| **Total**                        |                           | **60.31** | **0.60**   |

*Source: Government Tourism Office of Kulonprogo Regency, 2017*

3.2. Community Participation

What was meant by community participation in this present study was the community’s involvement in the activities or processes during the implementation of development which included planning, policy formulation, and program implementation [8]. Community participation also included identifying problems and potentials. The potential in Jangkaran Village is the mangrove forests managed as mangrove ecotourism in Pasir Mendit and Pasir Kadilangu hamlets. The main objective is managing mangrove ecotourism that actively involves the community in order to empower the community which in turn improve their economy with the opening of new job opportunities.

Community participation in the management of mangrove ecotourism is inseparable from various factors, especially the characteristics of the community and the surrounding environment. According to Ross, the internal factors that influence community participation an activity include age, gender, education level, occupation and income, and length of stay in the area [9].
The level of community participation in the mangrove ecotourism management was known through interviews with 30 community members involved in managing ecotourism. The level of community participation in ecotourism management was indicated by the involvement of these 30 respondents in each management activity indicator.

**Table 3. Level of Community Participation in the Mangrove Ecotourism Management**

| No | Stages       | Scores | Level     |
|----|--------------|--------|-----------|
| 1  | Planning     | 3.05   | Moderate  |
| 2  | Implementation| 4.24   | Very high |
| 3  | Benefit taking| 4.60   | Very high |
| 4  | Evaluation   | 3.56   | High      |

*Source: Primary Data, 2019*

3.2.1. The Planning Stage
Planning was the initial stage carried out in the management of mangrove ecotourism. Palimbunga in his research showed community participation at the planning stage of Tabalansu Tourism Village ecotourism, i.e. in the deliberation in which they expressed their aspirations to tourism activities, although the final decision was left to the government [10]. The average score of community participation in the planning stage was 3.05 which was considerably moderate. This was because the mangrove ecotourism planning only involved community leaders such as heads of and heads of villages. The outcome of the planning was followed up by the government.

3.2.2. The Implementation Stage
The implementation stage was where the community actively participated in the mangrove ecotourism management activities. The community participation in implementing mangrove ecotourism management was considerably very high with the average score of 4.24. The community informed about their involvement in infrastructure improvement activities such as repairing or widening the road to ecotourism area, building public ecotourism facilities, as well as building bamboo bridges and photo spots.

The surrounding environment has also been well organized for the sustainability of mangrove ecotourism. This includes the layout of each ecotourism site which is shown through floor plans and signposts to navigate the site. The improvement of infrastructures and the maintenance of mangrove ecotourism site are done with donations and contributions from the community.

3.2.3. The Benefit Taking Stage
The benefit taking stage can be an indicator of the success of community participation in the planning and implementation stages [11]. The community as the subject of participation in mangrove ecotourism management should benefit from it. Community participation at the benefit taking stage was very high as well as indicated by the average score of 4.60.

Mangrove ecotourism opens business opportunities for the surrounding communities, such as selling food or beverages around ecotourism area to increase income. The existence of mangrove ecotourism in Wonorejo is well utilized by the local community in that the income they get from his work in the ecotourism can meet their daily needs [9].

3.2.4. The Evaluation stage
The community participated in the evaluation phase by providing evaluations on each of the mangrove ecotourism management activities. Community participation at the evaluation stage was found considerably high with the average score of 3.56. The community also supervises ecotourism activities and oversees negative actions including maintaining the security of the site and the convenience of visitors.
3.3. The Correlations between Internal Factors and Level of Community Participation

Table 4. The Correlation between Age and Level of Community Participation

| Age       | Low | Medium | High | Very High |
|-----------|-----|--------|------|-----------|
| < 25 years| 0   | 0      | 0    | 0         |
| 25 - 54 years| 5.56| 27.78  | 50   | 16.67     |
| > 54 years| 8.33| 33.33  | 33.33| 25        |

Correlation coefficient = 0.004
Sig. (2-tailed) = 0.983

Source: Primary Data, 2019

Younger age would enable higher productivity [12], in this case the management of mangrove ecosystems into mangrove ecotourism studied in this present research. The Spearman Rank correlation test showed no significant correlation between age and level of community participation and those community members who are at the productive age category dominates in the mangrove ecotourism activities both in Pasir Mendit and Pasir Kadilangu hamlets.

Table 5. The Correlation between Level of Education and Level of Community Participation

| Level of Education | Low | Medium | High | Very High |
|--------------------|-----|--------|------|-----------|
| Elementary         | 0   | 60     | 40   | 0         |
| Junior High        | 20  | 40     | 40   | 0         |
| Senior High        | 0   | 23.08  | 46.15| 30.77     |
| College            | 14.29| 14.29  | 42.86| 28.57     |

Correlation coefficient = 0.305
Sig. (2-tailed) = 0.101

Source: Primary Data, 2019

Level of education has an important role in someone's life with the higher the level of education the more knowledge he/she has. The higher the level of education of an individual, the higher his/her ability to filter knowledge, in this present study this was indicated by their participation in the management of mangrove ecotourism [13].

The Spearman Rank correlation test showed a strong correlation between level of education and level of community participation, where community members who have high school and college educations showed higher level of participation than those with lower levels of education.

Table 6. The Correlation between Income and Level of Community Participation.

| Income (IDR)       | Low | Medium | High | Very High |
|--------------------|-----|--------|------|-----------|
| < 2,500,000        | 5.56| 27.78  | 61.11| 5.56      |
| 2,500,000 – 5,000,000 | 9.09| 36.36  | 18.18| 36.36     |
| > 5,000,000        | 0.00| 0      | 0    | 100       |

Correlation coefficient = 0.341
Sig. (2-tailed) = 0.066

Source: Primary Data, 2019
Community income can influence community participation in environmental management [12]. The Spearman Rank correlation test showed a fairly strong correlation between level of income and level of community participation.

| Table 7. The Correlation between Length of Stay and Level of Community Participation |
|--------------------------------------|---------------------------------|-----------------|-----------------|-----------------|
| Length of Stay (years)               | Level of Participation (%)      |
| Low                                  | Medium | High   | Very High   |
| <10 years                            | 25     | 50     | 25           | 0               |
| ≥20 years                            | 25     | 25     | 25           | 25              |
| Since                                | 0      | 27     | 50           | 23              |
| Correlation coefficient = 0.359      | Sig. (2-tailed) = 0.051          |

Source: Primary Data, 2019

Among factors that influence community participation is length of stay. People who live longer in an area have a greater sense of belonging and being part of the surrounding environment. This raises a sense of desire to maintain and preserve the environment, including participating in the management of an activity in the area. The Spearman Rank correlation test showed a strong correlation between length of stay and level of community participation according to which the longer the community had lived in the respective hamlet, the higher their level of participation.

3.4. The Social Impacts of Mangrove Ecotourism

Mangrove ecotourism management activities in Pasir Mendit and Pasir Kadilangu hamlets affect the social conditions of the community because the management of mangrove ecotourism relates to and has influence on the community. The pattern of community activities, especially around mangrove ecotourism sites, changes with some additional types of income generating activities either as main or side jobs.

| Table 8. The Impacts of Mangrove Ecotourism on the Social Condition of the Surrounding Communities |
|-----------------------------------------------|-----------------|-----------------|
| No   | Parameter                          | Impacts                   |
| 1    | Income generating activities       | There are additions or changes in the income generating activities with 90% currently related to mangrove ecotourism. |
| 2    | Social Interaction                 | There are routine activities held by the community, including voluntary works (47.5%), neighborhood night watch (45%), and regular gathering at hamlet level (7.5%). |
| 3    | Actions or attitudes               | There are binding rules that are highly or moderately adhered by the community (47.5% and 52.5%, respectively). |
| 4    | Social Conflicts                   | Social conflicts arose in relation to mangrove ecotourism (67.5%). |

Source: Primary Data, 2019

3.4.1. Income Generating Activities

Mangrove ecotourism management which involves the local community can create jobs for them. Setiyawan and Saraswati found in their research that the existence of mangrove ecotourism in Karangsong Village gave rise to several activities around mangrove ecotourism, such as trading [14]. Community’s income generating activities after the existence of mangrove ecotourism mostly relate to mangrove ecotourism, including as ecotourism managers, traders, and parking attendants.
3.4.2. Social Interactions
Social interactions that occur in the community are in the forms of cooperative activities. These include voluntary work (*kerja bhakti*), a routine activity held cooperatively by the community in relation to mangrove ecotourism infrastructure improvement and mangrove forest maintenance efforts; neighborhood night watch (*ronda*) is done to maintain the security of the environment and surrounding communities; and routine hamlet gatherings to discuss various activities to be carried out at the hamlet level.

3.4.3. Actions or Attitudes
The management of mangrove ecotourism also has a positive impact as shown by the actions or attitudes of the people which indicate that they care about their environment. Ecotourism activities also aim to build community awareness of the environment [15]. The management of mangrove ecotourism raises several rules to maintain the good environment around mangrove ecotourism. Study on maritime ecotourism in Meos Mansar in which he found that maritime ecotourism influences people's behavior to preserve the environment [16].

3.4.4. Social Conflict within the Community
The management of mangrove ecotourism may lead to conflicts with the surrounding community. Development of tourism could lead to community conflicts [17]. Some people felt that the management of mangrove ecotourism only benefits some parties, especially the ecotourism management groups, and according to their opinion the three ecotourism sites should be managed by the government to benefit all parties.

The village government attempt to deal with community conflicts by forming a coordination forum. The coordination forum includes representatives from each ecotourism management group, heads of hamlet, with the head of village as chairman. The coordination forum aims to monitor the mangrove ecotourism activities. This is done to improve communication between management groups and if it continues to run well the level of community conflict would be reduced.

3.5. The Economic Impacts of Mangrove Ecotourism

| No | Parameter            | Impacts                                                                 |
|----|----------------------|-------------------------------------------------------------------------|
| 1  | Income               | There was a difference in the average incomes before and after the existence of mangrove ecotourism and between community members who are involved and not involved in ecotourism. |
| 2  | Business opportunities | Arising opportunities of businesses related to mangrove ecotourism including food and beverage selling, boat rent, homestay, etc. |

*Source: Primary Data, 2019*

The main goal of mangrove ecotourism management is to have a positive impact on the local people’s economy and improve their standard of living by the potential of nature to attract tourist visits. The management of ecotourism had positive impacts including raising business opportunities, increasing income, accelerating income distribution for surrounding communities, and positive impacts on other economic sectors [18].
3.5.1. Income

![Graph showing income distribution before and after the existence of mangrove ecotourism](image)

**Figure 2.** Community Average Incomes Before and After the Existence of Mangrove Ecotourism (1) and Between Community Members Involved and Not Involved in Mangrove Ecotourism.

*Source: Primary Data, 2019*

The paired T-test of the community incomes before and after the existence of mangrove ecotourism obtained a p value (2-tailed significance) of 0.000, indicating that the null hypothesis was rejected. This means that the community incomes before and after the existence of mangrove ecotourism were different with community income after ecotourism was greater than that of before the existence of mangrove ecotourism (Figure 2a). As for the paired T-test of the incomes of community members who are involved and not involved in mangrove ecotourism obtained a p value (2-tailed significance) of 0.001, indicating that the null hypothesis was rejected. This means that the income of community members involved in mangrove ecotourism is different from that of those who are not with the income of those who are involved in ecotourism was greater than that of those who are not (Figure 2b).

### 3.5.2. Business Opportunities

Business opportunities provide opportunities for people to carry out activities related to the supply of goods or services. All respondents (100%) stated that there were business opportunities provided by the existence of mangrove ecotourism activities. Business opportunities that exist in mangrove ecotourism activities in Pasir Mendit and Pasir Kadilangu hamlets include as street vendors who sell food or beverages in Mangrove Beach Tourism of Pasir Kadilangu, running food stalls in Mangrove Tourism of Jembatan Api-api, and renting boats in Mangrove Tourism of Jembatan Api-api.

### 4. Conclusions

The research results show a moderate community participation during the planning stage with an average score of 3.05, a very high participation both during the implementation stage and benefit taking stage with average scores of with an average score of 4.24 and 4.60, respectively, and a high participation during the evaluation stage with an average score of 3.56.

The mangrove ecotourism management have various impacts including (a) the emergence of additional income generating activities related to mangrove ecotourism, (b) similar levels of social interaction in the form of voluntary work before and after the existence of mangrove ecotourism, i.e. 47.5%, (c) binding rules moderately adhered (52.5%) by the community, (d) social conflicts related to mangrove ecotourism management (67.5%), (e) the average community income after the existence of mangrove ecotourism was greater than that of before the existence of mangrove ecotourism, i.e. IDR 2,826,250.00 and the income of community members who are involved in mangrove tourism was greater than that of those who are not, i.e. IDR 3,101,667.00.
Acknowledgement
The authors would like to thank the Research Directorate of Universitas Gadjah Mada for funding this research through the Rekognisi Tugas Akhir (RTA) program 2019. The authors also would like their gratitudes to the local governments and communities of Pasir Mendir and Pasir Kadilangu hamlets for the assistance they provided during the data collection.

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