

**SUSTAINABLE INDICATORS OF MANGROVE ECOSYSTEM MANAGEMENT
FOR TOURISM DEVELOPMENT AT THE MAROON MANGROVE EDUPARK,
SEMARANG, CENTRAL JAVA**

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ABSTRACT

Maroon Mangrove Edu-park (MMEP) located nearby Maron beach and the Semarang' airport has an area of 1.5 ha. Mangrove ecosystem in the park has been developed through CRS program of PT Phapros as a new nature tourist destination at Semarang city which intended to raise awareness on coastal ecosystem conservation as well as to give experience on nature tourism attraction. Determination of sustainable indicators is important in managing the park for conservation and tourism development. The research was conducted from May to Aug 2017, with the aims to determine sustainable indicators for management of the park. Data were collected by conducting field survey and interviewing 61 respondents consist of 51 tourist and 10 key persons. From the data collected, 23 indicators were applied under four variables of ecology (7 indicators), economy (5 indicators), social (7 indicators) and institutional (4 indicators). Sustainability indicators were examined by experts judgment and be analyzed using confirmatory factor analysis. The research shows that important indicator of ecology variable extracted in three component i.e. biodiversity conservation (37%), land use management (20.7%), and carrying capacity (14.6%). The important indicator of economy variable extracted in two component i.e. exploitation level (41.4%), and varying tourism asset (19.7%). The important indicator of social variable extracted in three component i.e. participation and appreciation (39%), services (32.6%), and awareness (14.6%). The important indicator of institutional variable extracted in two component i.e. collaboration and regulation (35.2%), and management capacity (31.2%). In sequence, variable of sustainable mangrove management of the park are ecology, economy and institutional, social.

Key Word :MMEP; Mangrove; Sustainability, Management, tourism

INTRODUCTION

Mangrove is one of the vital coastal ecosystem that serve to economic development of coastal areas. The current thriving ecosystem services of mangrove is being a special interest of tourist destination. Ecotourism is a form of tourism activities that highlight nature conservation, community participation, economic development and environmental education.

Ecotourism as part of tourism development that emphasized sustainable development, by integrating the principle of sustainability, taking account into account carrying capacity and capability of the environment through an effort to controll detrimental effect that cause environmental damage. This is taken to ensure environmental conservation in order to keep the safety, ability, welfare and the environment quality for the present and the future generation.

One mangrove ecosystem in the north coast of Semarang that be developed as a tourist destination is Maroon. As the location next to the Ahmad Yani airport being limited free area to be developed. Management of the area handed to CSR PT Paphros Tbk that already committed to greening the Maron coast since 2011 by mangroves plantation and in 2016 has been declared as Maroon Mangrove Edu-park (MMEP)

The MMEP was built for the purpose of giving space to people who want to enjoy the beauty and the unique site of mangrove panorama and to learn, understand the functions and benefits of mangrove ecosystem so that eventually can raise conservation awareness. Promotion of tourism in MMEP through diverse social media has escalate the number of tourists visitation.

In managing MMEP, PT Paphros cooperate with Ikamat foundation and the local community group "Mekar Tani Lindung" (metal) which have won an award on social business innovation in 2016. In order to grow the passion of mangrover, every month MMEP held a joint activity for the surrounding community in Semarang. Some activities to build competence and capacity on management has also done by training and comparative studies as a form of lesson learn of the concept of ecotourism management.

However, limited knowledge and understanding of the community groups on sustainability indicators of mangrove ecosystem management to support ecotourism development in MMEP could be obstacles in developing MMEP tourism.

Determination of sustainability indicators for management of mangrove ecosystem to develop tourism in MMEP is important stage to conserve mangrove. According to Boyes (2016), sustainability indicators determination is a critical stages for development of ecosystem conservation comprehensively as well as be a useful strategy to accomplish ecological, economy and social effectively that be used in process of monitoring decision making.

The research aims to identify sustainability indicator in managing mangrove forest for tourism development in the MMEP. The results of the study is expected to work as a feedback consideration to stakeholders, both the government and tour operators in developing and making programs on ecotourism activities that supports sustainable management for mangrove ecosystem and economic development of Maron's community .

MATERIAL AND METHOD

Material in this research include stakeholders perception on important factors as sustainable indicators to mangrove ecosystem management for tourism development in MMEP.

The research approached used descriptive qualitative data based on situation, status, action and relation to problem that be a research object (Suratmo, 2000). Research conducted with the main purpose to describe situation of being objectively to solve or answering the problems currently faced by in a situation now (Indriantoro and Supomo, 2009). Facts and relationship properties between phenomenon that researched, then be reviewed and analyzed rigorously one to another.

Hasil analisis akan disajikan secara faktual dan akurat dengan membuat deskripsi dan gambaran yang sistematis, sehingga mendapatkan makna dan implikasi dari masalah yang ingin dipecahkan. Metode deskriptif yang bersifat studi kasus (*case study*) yaitu penelitian masalah secara mendalam hanya pada waktu dan tempat tertentu yang terbatas dan hasil penelitiannya tidak berlaku di tempat berbeda.

Collection of primary data were done by survey and interviewing stakeholders, ie the visitors, community groups and management staffs as well as expert who identify the sustainable indicators using closed questionnaire type.

Variable to identify sustainable indicators as important factors in management and development of edu-tourism in MMEP include ecology, economic, social and institutional variables in accordance with sustainable development for tourism in MMEP.

Determination of important factors on mangrove management for edutourism development conducted in some stages. First, by testing reliability and validity to measure a questionnaire variables that constantly be answered in which the result be compared to another question for measuring correlation across questions. Questionnaire variables expressed reliability when the Alpha & Cronbach $> 0,70$ (Ghozali, 2011) .While validity test to know how data accurate to perform its function .The correlation between indicators to the total construction score showed significant results, so can be concluded that the question is valid (Ghozali , 2011) .The process of testing validity was assisted by SPSS software

Factor Analysis

Factor analysis is a technique that used to look for factors that can explain relation or correlation between various independent indicators that be observed so would give simple description through reduction the number of variables called factors. A factor analysis used to identify number of factors that relatively small to be used to examine a large number of variables that interact one another based on its resemblance.

Process of analysis factors trying to find the relationship between a number of independent variables one to the other so can be made one or some variables collection that less than the early variables number (Santoso, 2004) .

The interpretation of analysis factors results based on loading significance factor. Validation of the analysis factor by dividing a whole sample into two parts with the same number to be formation of factor using the same method that is principal component assisted by SPSS software.

RESULT AND DISCUSSION

Ecological Parameters

Table 1. Total Variance Explained of Ecological Parameters

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.594	37.055	37.055	2.594	37.055	37.055	1.929	27.551	27.551
2	1.451	20.727	57.783	1.451	20.727	57.783	1.862	26.605	54.156
3	1.028	14.688	72.471	1.028	14.688	72.471	1.282	18.315	72.471
4	.878	12.547	85.018						
5	.594	8.491	93.509						
6	.351	5.016	98.525						
7	.103	1.475	100.000						

Extraction Method: Principal Component Analysis.

The table 1 and 2 show 7 items of ecological parameters be extracted under 3 factors (component). The variable of conservation of biodiversity, ecosystem function and water quality are substantially loaded on Factor 1 that able to explain 37.05% of the variance data, while variables of waste management, land use and environmental damages are substantially loaded on Factor 2 that able to explain 20.73% of variance data. Partially variable of carrying capacity loaded on factor 3 that is able to explain 14.69% of variance data.

Table 2. Rotated Component Matrix^a of Ecological Parameters

Ecological Parameters	Component		
	1	2	3
Carrying capacity	.052	.052	.697
Conservation of biodiversity	.848	.072	.265
Ecosystem Function	.868	.009	-.222
Water Quality	.644	.248	.490
Waste Management	.022	.778	.193
Land use	.083	.782	-.407
Environmental damages	.174	.759	.483

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 5 iterations.

Economic Parameters

Table 3. Total Variance Explained of Economic Parameters

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.070	41.393	41.393	2.070	41.393	41.393	1.767	35.331	35.331
2	1.393	27.865	69.258	1.393	27.865	69.258	1.696	33.927	69.258
3	.815	16.308	85.566						
4	.564	11.281	96.847						
5	.158	3.153	100.000						

Extraction Method: Principal Component Analysis.

The table 3 and 4 shows 5 social parameters be extracted under 2 factors. The variable of visitation number, exploitation level and operational cost effectiveness are substantially loaded on Factor 1 that able to explain 41.39% of the variance data, while variables of available tourism product/attractions and strategy on marketing/promotion are substantially loaded on Factor 2 that able to explain 27.86% of variance data.

Table 4. Rotated Component Matrix^a of Economic Parameters

Economic Parameters	Component	
	1	2
Visitation number	.892	-.067
Exploitation level	.554	.514
Available Tourism product/attractions	.205	.854
Operational cost effectiveness	.774	.080
Strategy on marketing/promotion	.151	-.832

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

Social Parameter

Table 5. Total Variance Explained of Social Parameter

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.733	39.039	39.039	2.733	39.039	39.039	2.510	35.854	35.854
2	2.285	32.643	71.682	2.285	32.643	71.682	2.198	31.402	67.255
3	1.381	19.723	91.404	1.381	19.723	91.404	1.690	24.149	91.404
4	.307	4.382	95.787						
5	.234	3.342	99.129						
6	.061	.871	100.000						
7	2.020E-16	2.886E-15	100.000						

Extraction Method: Principal Component Analysis.

The table 5 and 6 shows 7 social parameters be extracted under 3 factors. The variable of safeguarding socioculture, sertification & award and participation in management are substantially loaded on Factor (Component) 1 that able to explain 30,04% of the variance data, while variables of services, visitor satisfaction and Safe and secure are substantially loaded on Factor 2 that able to explain 32,64% of variance data. The remaining variables (Educational & information) loaded on factor 3 that is able to explain 19.72% of variance data.

Table 6. Rotated Component Matrix^a of Social Parameter

Social Parameters	Component		
	1	2	3
Safeguarding socioculture	.906	.066	.053
Services	-.049	.911	.214
Visitor satisfaction	-.083	.904	-.330
Educational & information	-.088	-.128	.969
Sertification & award	.719	.041	.615
Participation in management	.931	-.105	-.200

Safe and secure .537 .720 -.419

Extraction Method: Principal Component Analysis.
 Rotation Method: Varimax with Kaiser Normalization.
 a. Rotation converged in 5 iterations.

Institutional Parameters

Table 7. Total Variance Explained of Institutional Parameters

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.407	35.172	35.172	1.407	35.172	35.172	1.394	34.862	34.862
2	1.247	31.166	66.338	1.247	31.166	66.338	1.259	31.477	66.338
3	.903	22.567	88.905						
4	.444	11.095	100.000						

Extraction Method: Principal Component Analysis.

CONCLUSION AND RECOMMENDATION



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