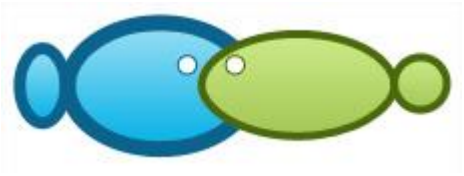

Strategies for sustainable ecotourism development in the marine waters of Bontang City, Indonesia

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Abstract. The primary objectives of this study are evaluating the internal and external factors and determining the required sustainable ecotourism management strategies in Bontang marine waters (BMW), Indonesia. Comprehensive data for asnalysis, including secondary data and primary data, provided through focus group discussion and questionnaires for local people and visitors, were employed to identify the alternative strategies by using the strengths, weaknesses, opportunities and threats (SWOT) analysis and the quantitative strategic planning matrix (QSPM) analysis. Results showed that the current management of ecotourism activities in the study area is not following sustainability requirements. BMW still has the opportunity to be part of a sustainable ecotourism management, if management maximizes its strengths and its opportunities by implementing diverse and aggressive strategies.
Key Words: ecotourism, small islands, SWOT, QSPM.

Introduction. Tourism grew into one of the primary sectors for many national economies at the end of the last century (Lopez Espinosa de los Monteros 2002). However, the growth of the economy because of the development of tourism is followed by the inevitable damage to the environment, wildlife and aesthetics in the areas where massive activities of tourism occur (Goodwin 1996; Weaver 2002). The environmental problems produced by tourism activities, like damage to the biodiversity, water pollution, coral reef destruction and wetland degradation resulted in the global government and NGOs considering ecotourism as one of the most significant threats to natural landscapes. Thus, tourism management should consider the principles of sustainable eco-tourism that accommodates the socio-economic and ecological impacts of tourism (Das & Chatterjee 2015; Ghorbani et al 2015). The new approach to sustainable tourism, which supports the environmental protection and economic development, was broadly introduced in the early 1990s. Some terms such as 'sustainable tourism' and 'environmentally-sensitive tourism', including 'ecotourism', are used as concepts for preserving the values of natural resources and the benefits of the local economy in the tourism areas (Diamantis & Ladkin 1999; Honey 2008; Hill & Gale 2009).

Ecotourism is designated as environmentally responsible travel and visitation to natural areas supporting the protection of environmental and natural resources, as well as enhancing the welfare of local people (Jalani 2012). The implementation of ecotourism should deal with the ecotourism principles: reducing adverse environmental impacts; contributing to economic profits for conservation and for the welfare of local people; giving a good impression for both owners and visitants; developing an empowerment of local people; increasing sensitivity to the culture of the country, socio-economic and political characteristics (Higham 2007; Das & Chatterjee 2015; Ghorbani et al 2015). One of the worldwide most visited tourist destinations are small islands. They are commonly

categorized as islands less than 10000 km^2 in size and have populations up to half a million people (Hess 1990). The potential of ecotourism in small islands is important. They have high biodiversity, attractive landscapes and unique geological features (Daby 2003). Nevertheless, damage to small islands is alarming due to inaccessibility, poor infrastructure and low awareness on sustainable development from stakeholders.

As one of the biggest archipelagic states worldwide, Indonesia has 17408 small islands having the potential to develop ecotourism (MMAF 2013). However, they are highly vulnerable to natural disasters and human activities. Although the country has many small islands, yet only a few studies have explored the problems arisen in small islands in Indonesia related to ecotourism in Dragon Island (Walpole & Goodwin 2000); in Bunaken National Park (Tangian et al 2015); in Gili Timur Island (Hidayah et al 2016); in Gili Matra Islands (Kurniawan et al 2016); in Dodola Island (Hengky 2017); in Karimata Island (Rudiastuti et al 2018). Most problems are related to the degradation of natural resources due to visitor activities exceeding the environmental carrying capacity. Furthermore, ecotourism areas have converted into commercial areas associated with poor management. Lastly, ecotourism management is currently not sustainable, only focusing on improving the economic aspect.

Tourism activities based on small island resources are progressively becoming attractive in Indonesia including in the Bontang Marine Waters (BMW), Indonesia. BMW have potential as tourist attractions due to natural resources such as mangroves, coral reefs and beaches, as local and foreign tourism destinations. Some of the ecotourism activities in BMW are mangrove tourism, snorkeling, diving and beach tourism. Thus, better management is required to provide not only for the economic needs of local people, but also for other services, like protecting against erosion and abrasion (Susilo 2017). Sustainable ecotourism, therefore, is one of the appropriate ways to resolve the management problems of tourism on small islands in Indonesia. This approach focuses on maintaining sustainable use of resources for tourists, as well as on providing a sustainable alternative source of livelihood to the local community.

Regardless of the ecotourism potential of small islands in BMW, very few studies have been conducted to analyze the current situation and to determine strategies of sustainable ecotourism in BMW. Therefore, this study aims at evaluating sustainable ecotourism development by identifying internal and external factors and providing prioritized strategies to find alternative recommendations to decision-makers in the planning and management of sustainable ecotourism.

Material and Method

Description of the study sites. Administratively, BMW are part of Bontang City, East Kalimantan, situated between longitudes $117^0$23' – $117^0$38'E and latitudes $0^0$01' – $0^0$12'N (Figure 1). It has an area of 49.757 ha, where approximately 70.3% or 34.977 ha is marine area. Small islands found in BMW include Beras Basah Island (3.51 ha), Karang Kiampau Island (1.32 ha), Badak-Badak Island (5.02 ha), Melahing Island (2.15 ha), Kedindingan Island (40.59 ha), Tihik-Tihik Island (1.56 ha), Panjang Island (62.87 ha), Siaca Island (4.84 ha), Agar-Agar Island (4.83 ha), Gusung Island (2.54 ha), Manuk-Manukan Island (13.92 ha) (BFMAA 2015a). BMW have mangroves, fishery resources, sea grass, coral reefs and beaches. There are about 2.935 ha of mangrove forests, with several mangrove species, like *Avicenia* sp., *Sonneratia* sp., *Rhizophora apiculata*, *Rhizophora mucronata* and *Bruguiera* sp. About 21 families of demersal fish were found in BMW such as Acanthuridae, Caesionidae, Chaetodontidae, Fistulariidae, Holocentridae, Labridae, and Pomacentridae (BFMA 2015b). Furthermore, there are 741 ha of seagrass, including *Enhalus* sp., *Thalassia* sp., *Halodule* sp. and *Thalassia* sp. BMW also have 6454 ha of coral reefs consisting of several species: *Acropora* sp., *Porites* sp., *Pachyseris* sp., *Fungia* sp., *Sinularia* sp., *Sarcophyton* sp., *Pectinia* sp. and *Echinopora* sp. (BFMA 2015b).

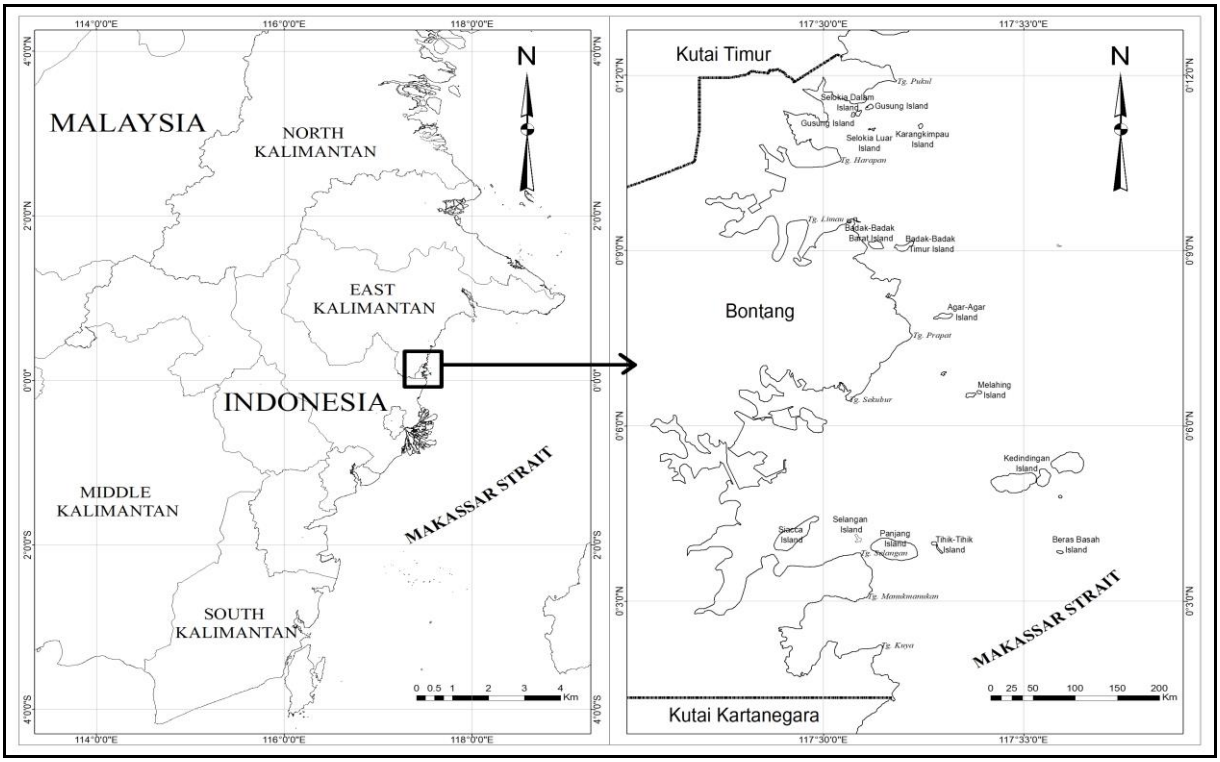

Figure 1. Study sites.

Data collection. The survey was conducted for eight months, from January to September 2018. Conducting the alternative strategies of sustainable ecotourism management (SEM) requires comprehensive data for analysis. Data collection in this study used mixed data consisting of primary data (focus group discussion and questionnaires for local people and visitors) and secondary data collected from related institutions and literature studies. Focus group discussions (FDGs) were employed to obtain qualitative information. The FDGs were operated with the participation of representatives of stakeholders including provincial and district authorities, university representatives, private sectors and local people to identify the current of strengths, weaknesses, opportunities and threats of the SEM in BMW. By the information and idea exchange during FGDs, internal and external factors could be organized and used to design the questionnaire surveys.

Furthermore, based on the outputs from the FDG, questionnaires were created to obtain the primary data by using face-to-face interviews with visitors and local people as respondents. One hundred questionnaires were filled out by 50 visitors and 50 local people in the study area. The results from the respondents were applied to identify the planning strategies using SWOT analysis. Finally, the quantitative strategic planning matrix analysis (QSPM) was conducted using survey data by applying questionnaires from representatives of previous FDGs to determine the feasible alternative strategies for developing sustainable ecotourism in the study area.

SWOT analysis. SWOT analysis is a structured planning approach to formulate the strategy by recognizing the strengths, weaknesses, opportunities and threats of a case of strategic planning and identifying the priorities of procedure for planning and development (Buta 2007). The SWOT analysis has been used for analyzing natural resource management to support a systematical decision making and also the appraisal of sustainable tourism (NOAA 2011; Ghorbani et al 2015). In this study, the strengths and weaknesses are included in the internal (controllable) factors supporting and inhibiting SEM to accomplish an objective respectively. Opportunities and threats are involved in the external (uncontrollable) factors implementing and impairing SEM from achieving a goal.

Internal and external factors are tabulated in the internal factor estimate matrix (IFEM) and the external factor estimate matrix (EFEM), respectively. Then, these factors are given a score by a panel of stakeholders, representatives of the FDGs. Following Ghorbani et al (2015), the scoring process is as follows:

1. The internal and external factors are given a coefficient between 0 and 1 ("not important" and "most-important", respectively) that describes the relative significance of the factor in the completion rate and is expressed by the term "weight in the IFEM and EFEM". A higher weight depicts a more effective factor in developing sustainable ecotourism.
2. Each factor is calculated by scoring from 1 to 4, representing the meaning of fundamental weakness, minor weakness, strength and high strength, respectively.
3. The final score for each factor is determined by multiplying its weight with the obtained score.
4. After the total score of each factor is counted, they are aggregated to determine the total final score of IFEM and EFEM.
5. The total final score is interpreted. If the value is more than 2.5, it indicates that strengths outweighed weaknesses or opportunities excelled threats. Otherwise, when the value is less than 2.5, it is the other way around (David 1986).

QSPM analysis. QSPM analysis is a method to accurately evaluate the best alternative strategies by applying input information from critical success factors, both external and internal, that have been recognized previously (David 1986). Strategy formulation procedures can be combined into a decision-making framework. More explicitly, David (1986) recommends three steps to recognize, appraise and elect the strategies in a structure, which are the input step, matching step and decision step.

QSPM analysis is included in the decision step of the strategy formulation techniques. To objectively evaluate appropriate alternative strategies identified in the second step, QSPM employs input information obtained from the first step. In this step, evaluations can be conducted using IFEM and EFEM. After evaluating key alternative strategies as inputs for QSPM, the next step (step 2) is to formulate the most attractive strategy as well as present the objective basis for deciding the best policies. In step 2, the formulation can be determined by employing SWOT analysis as a strategic management tool. Mostly, there are six necessary components of QSPM (Nasab & Milani 2012), consisting in key factor statements, evaluated strategies, ratings, attractive scores, total attractive scores and sum-total attractive scores.

Results and Discussion. After collecting primary and secondary data, evaluation and determination of alternative strategic priorities were analyzed using SWOT and QSPM analyses. The results are presented below.

Internal factor estimation matrix (IFEM). Concerning internal factors, FGD results recommended six strengths and four weaknesses to be selected and surveyed. Survey results showed that, for strength factors, the weights varied between 0.05 and 0.15, and the effectiveness score reached between 3 and 4. For weakness factors, the weights were among 0.04 and 0.20, and the effectiveness score fluctuated between 1 and 2. Some strengths such as "the diversity of marine resources (marine biota, beaches, coral reefs, mangroves, seagrass beds)", "local government support", "having relatively safe sea and weather conditions" and "suitability and carrying capacity of the area for sustainable ecotourism is feasible" had the highest final scores. Whereas "the area is included in the district planning of marine protected areas" and "the significant participation of local people toward sustainable ecotourism" had the lowest final scores. Relating to the weaknesses, "lack of the quality and quantity of human resources" had the highest final score, followed by "lack of tourism supporting facilities and infrastructure" and "lack of stakeholders' coordination in sustainable ecotourism management". In contrast, "limited tourism information and promotion" had the lowest final score. The total value of internal factors was estimated as 2.40, which is less than 2.50, implying the strengths were

overcame by weaknesses. This value provides an understanding that ecotourism management has not optimized its strengths to resolve the weaknesses (Table 1).

Table 1

Internal factor estimation matrix (IFEM)

	Internal factors	*Weight*	*Effectiveness score*	*Final score*
	Strengths			1.78
1	The diversity of marine resources (marine biota, beaches, coral reefs, mangroves, seagrass beds)	0.15	4	0.60
2	Having relatively safe for sea and weather conditions	0.06	4	0.26
3	Local government support	0.10	3	0.30
4	The area is included in the planning of district marine protected area	0.05	3	0.15
5	The significant participation of local people toward sustainable ecotourism	0.06	3	0.20
6	Suitability and carrying capacity of the area for sustainable ecotourism is feasible	0.06	4	0.26
	Weaknesses			0.62
1	Lack of the quality and quantity of human resources	0.20	1	0.20
2	Limited tourism information and promotion	0.04	2	0.08
3	Lack of tourism supporting facilities and infrastructures	0.08	2	0.16
4	Lack of stakeholders' coordination in sustainable ecotourism management	0.16	1	0.16
	Total	1.00		2.40

External factor estimation matrix (EFEM). Table 2 shows that external factors recommended by FGD consisted of four opportunities and five threats. The four factors of opportunities have weights between 0.04 and 0.16, with effectiveness scores ranging from 3 to 4. Five elements of threats have weights between 0.05 and 0.15, with effectiveness scores ranging from 1 to 2. Table 2 also presents that the most significant opportunities factor with the highest final score was "employment creation and welfare to local people", followed by "potential of contributing to the original regional income" and "regional economic growth as a result of involved tourist investors". Contrary, "potential of becoming an education center for natural resources management based on ecology, economics, and local people empowerment" was the least important opportunities factor. The highest final score of threats was "the unstable domestic political situation", followed by "changes in socio-cultural local people of the area". Whereas, "conflict in area utilization and livelihoods between local people, tourism managers, and tourism visitors" was the least essential threats factor. The total value of external factors was estimated at 2.49, which is less than 2.50, indicating the opportunities were overcame by the threats.

Developing strategies. After the evaluation and identification of the most essential internal and external features, SWOT analysis is employed to analyze and formulate alternative strategies by combining all factors. The combined results are strengths and opportunities (SO), weaknesses and threats (WT), strengths and threats (ST), and weaknesses and opportunities (WO). By pairwise matching of SO, WO, ST and WT strategies, eight important strategies were arranged for sustainable ecotourism management in BMW. The SO strategies offered strengths matching with the opportunities of ecotourism. The two best SO strategies were recognized as "economic empowerment of communities related to cultural services" and "enhancing the economy of ecotourism based on carrying capacity". Furthermore, the ST strategies recognize the ways to use strengths to resolve threats coming from external factors. The best suggestions in these strategies include "rehabilitation for supporting coastal and small islands ecosystem services" and "improving community awareness in supporting ecotourism". The WO strategies identify the actions to maximize opportunities by overcoming weaknesses. The two best WO strategies were "improving the competitiveness of ecotourism" and "improvement of ecotourism facilities and

infrastructures". Lastly, the WT strategies organize a defensive to avoid the weaknesses vulnerable to external threats. The two best WT strategies were "development of stakeholder partnerships" and "development of a promotional information system for ecotourism". Table 3 presents the results of all strategies.

Table 2

External factor estimation matrix (EFEM)

	External factors	*Weight*	*Effectiveness score*	*Final score*
	Opportunities			1.79
1	Potential of contributing to the original regional income	0.12	4	0.50
2	Employment creation and welfare to local people	0.16	4	0.66
3	Regional economic growth as a result of involved tourist investors	0.16	3	0.50
4	Potential of becoming an education center for natural resources management based on ecology, economics, and local people empowerment	0.04	3	0.12
	Threats			0.70
1	Changes in the diversity of marine resources due to an increase in tourists exceeded the carrying capacity	0.10	1	0.10
2	Conflict in area utilization and livelihoods between local people, tourism managers, and tourism visitors	0.05	1	0.05
3	The unstable domestic political situation	0.15	2	0.30
4	Changes in socio-cultural local people of the area	0.15	1	0.15
5	Competition with other tourists in one region	0.05	2	0.10
	Total	1.00		2.49

QSPM strategies. The QSPM analysis was applied to provide final advice and for ranking the best strategy for sustainable ecotourism in BMW. The results of the QSPM analysis were presented in Table 4. In this table, ranking is based on the value of the total attractiveness score (TAS). The highest TAS value can be the best strategy for SEM in the BMW.

Table 3

Essential strategies determination based on SWOT analysis

	Types of strategies
	SO strategies
1	Economic empowerment of communities related to cultural services
2	Enhancing the economy of ecotourism based on carrying capacity
	ST strategies
1	Rehabilitation for supporting coastal and small islands ecosystem services
2	Improving community awareness in supporting ecotourism
	WO strategies
1	Improving the competitiveness of ecotourism
2	Improvement of ecotourism facilities and infrastructures
	WT strategies
1	Development of stakeholder partnerships
2	Development of a promotional information system for ecotourism

Note: SO - strengths and opportunities; ST - strengths and threats ; WO - weaknesses and opportunities ; WT - weaknesses and threats.

The best strategy for SEM in the study area was the ST1 strategy (rehabilitation of coastal resource ecosystems and small islands) with a TAS value of 7.75, followed by the

SO1 strategy (economic empowerment of coastal communities and small islands) and WO2 strategy (improvement of ecotourism facilities and infrastructures), with TAS values of 7.01 and 6.91, respectively. Besides, the strategies that included WT1 (development of stakeholder partnerships), WO1 (improving the competitiveness of ecotourism) and WT2 (development of a promotional information system for ecotourism) were identified as the least essential strategies affecting SEM, with TAS values of 6.71, 6.66 and 6.46, respectively. The final decision of the QSPM analysis is presented in Table 4.

Table 4

The final decision of QSPM analysis for SWOT strategies proposed

Code	*Strategies*	*Total attractiveness score*
ST1	Rehabilitation for supporting coastal and small islands ecosystem services	7.75
SO1	Economic empowerment of communities related to cultural services	7.01
WO2	Improvement of ecotourism facilities and infrastructures	6.91
ST2	Improving community awareness in supporting ecotourism	6.85
SO2	Enhancing the economy of ecotourism based on carrying capacity	6.79
WT1	Development of stakeholder partnerships	6.75
WO1	Improving the competitiveness of ecotourism	6.66
WT2	Development of a promotional information system for ecotourism	6.46

Conclusions. BMW have a unique potential to offer sustainable ecotourism destinations as a result of the diversity of marine resources, including opportunities to create employment and develop welfare in the area. However, BMW are profoundly vulnerable to unsustainable ecotourism activities. Despite its current unsustainable condition, BMW still have the opportunity to have sustainable ecotourism management by applying the appropriate strategies. The best course of action would be to implement the diverse strategies that consider the crucial relationships between strengths and threats. The alternative strategy is the rehabilitation of coastal resource ecosystems and small islands. Another alternative course could be the aggressive strategies implying dominant connections between strengths and opportunities. The strategies consist in the economic empowerment of coastal communities and small islands. This study is expected to provide essential information for decision-makers in the study area for achieving sustainable ecotourism. Also, this study shows that combined analysis between SWOT and QSPM could be considered as an alternative method to identify factors influencing sustainable ecotourism in BMW and other related ecotourism destinations.

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