Policy analysis of marine tourism of Gili Iyang Island, Madura, Indonesia

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Abstract. Gili Iyang is a small island located at east of Madura, Indonesia that has extraordinary air with high oxygen content which is one of the best in the world. Furthermore, the island has attractive coastal resources that make the island reasonable to be developed becomes marine tourism. The purpose of this study is to determine the scales of priorities in developing tourism of the island and to determine the strategy of empowering communities in supporting the tourism. This research were conducted on October to December 2017 at Gili Iyang Island using Analytic Hierarchy Process (AHP) method to determine the priorities in developing the marine tourism, and SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis to formulate the strategy. The data were collected by questionnaire and interviewing 200 respondents. The respondents are stakeholders including the local government, investors, communities, and visitors. The results of AHP data processing concluded that the priorities of developing marine tourism of Gili Iyang are as follows: The diving tourism is the top priority of 24.1\%, followed by surfing tourism (17.3\%), beach tourism (16.2\%), fishing (15\%), maritime docks (14.1\%) and sailing (13.4\%), and the SWOT-recommended strategy is to maximize community engagement of tourism supported by special characters of local people.

1. Introduction
Indonesia is an archipelago with a total of 17,504 islands [8]. With this potential, coastal resources are a big capital for the development of the Indonesian economy. The United Nations World Tourism Organization (UNWTO) states that islands are the most tourism destinations per year. In small island developing states (SIDS), tourism is an main economic sector, which indicates a remarkable growth rate worldwide [19]. In addition, tourism increases significantly by the economic and social performance of SIDS, with 40.83 million overnight visitors and receipts of US$ 53,418 million in 2013 [21]. East Java is one of the provinces in Indonesia which has the potential for reliable coastal and islands resources. East Java has 446 small islands [4] which is one of them is Gili Iyang Island. Gili Iyang is a small island located at east of Madura, Indonesia that has extraordinary air with high oxygen content which is one of the best in the world. Furthermore, the Island has attractive coastal resources that make the island reasonable to be developed becomes marine tourism. The potentials of coastal and marine resources in the coastal and marine areas of East Java have been partly exploited. One of the uses of coastal and marine resources in East Java is the use for marine tourism, but the utilization is not optimal because of their remotely isolated location, poor infrastructures and lack of knowledge of sustainable management of local governments [22].
Therefore, from this background we need a model to develop marine tourism objects in East Java with all the existing potentials while still considering ecological factors. To develop ecotourism, it is necessary to analyze the development and management of areas for ecotourism through the creation and development of management models that are scientifically studied, taking into account the needs and realities of community dynamics. Marine tourism development and ecology have been noticed that they are relatively unbalanced. The tourism development frequently have not yet been accompanied by environmental management efforts [11]. Furthermore, the development requires accurate planning and simulations to anticipate possible stages in the future and to assess the implications of management decisions. Several models have been applied in estimating the possible futures of tourism objects, however the models have been just forecasting models, such as time series models [6][16][17]. In addition, small island management in Indonesia often face threats both from ecological (e.g environmental degradation, pollution, destruction of ecosystems and overfishing) and social factors (e.g low accessibility and lack of acceptance from local communities). Therefore, tourism management of small islands should be comprehensive and integrated regarding the strengths, weaknesses, opportunities, and threats of the islands [1]. This study aims to determine the stages or priority scale in the development of marine tourism on Gili Iyang Island and to determine strategies for empowering coastal communities in supporting marine tourism on Gili Iyang Island.

2. Material and Methods
The research activity was carried out on the Gili Iyang Island, Sumenep Regency, Madura, Indonesia. Field activities were carried out from October to December 2017 by taking field data both primary and secondary data at the location of study and in various related agencies in Sumenep Regency and East Java Province in Surabaya from various other related agencies to support the activities carried out. Such as the Regional Development Planning Agency, the Tourism Office, the Fisheries and Maritime Affairs Office, and the Environment Agency.

2.1. Data and Data Source
The data collected in this study include primary data and secondary data. Primary data are collected through the method of observation of the object of research as well as interviews and questionnaires with stakeholders related to the research material which included 200 respondents, while secondary data are collected by searching various literatures and libraries at various related institutions according to the material to be studied.

2.2. Data Collection
The method of observing the condition of the research object is carried out directly to obtain data that supports the research objectives. Data collection through interviews was carried out by giving questionnaire and deeper interview to stakeholders. The questionnaire contains a list of questions about the characteristics of tourists and the condition of the marine tourism resources of Gili Iyang Island. The interview asks respondents’ view of how to develop marine tourism on Gili Iyang Island. The sampling method was carried out using purposive sampling method, the technique of determining the sample for specific purposes only. The purposive sampling method is taken because it is normally used in qualitative social or economics surveys as this study relates to social-economics, furthermore the study requires specific samples (not random samples) that have particular characteristic suitable with study purposes including respondents that have social-economics and environmental views relating to the tourism such as local peoples, local government departments staffs, and local tourism agency staffs.

2.3. Data Analysis
The data analysis of this study includes Analytic Hierarchy Process (AHP) and SWOT (Strengths, Weaknesses, Opportunities, and Threats).
2.3.1. Analytic Hierarchy Process (AHP)
The data obtained are then processed using the Analytic Hierarchy Process (AHP) method supported by Microsoft Excel and Expert Choice Professional version 9.0 programs. The sequence of AHP processing can be seen in Figure 1 as follows:

![Figure 1. Sequence of Analytic Hierarchy Process (AHP) method](image)

2.3.2. Strengths, Weaknesses, Opportunities, Threats (SWOT) Analysis
SWOT analysis is the systematic identification of various factors that are used to formulate a strategy. This analysis can clearly describe the opportunities and external threats faced by subjects such as marine tourism. That can be adjusted according to the strengths and weaknesses it has. The SWOT analysis is an important tool to help managers develop four types of strategies.

3. Result and Discussion
Result of the study explained in details in subsections as follows:

3.1. Priority for the Development of Archipelago Marine Tourism
The data used in the process hierarchy analysis is the questionnaire answer data obtained from 200 respondents. The two hundred respondents are stakeholders ranging from local government, investors, communities, and visitors / tourists. From the results of AHP data processing, it is known that stakeholder perceptions of what tourist objects are most important to develop. Stakeholders considered that the priority of developing a marine tourism village on Gili Iyang Island was the development of diving tourism as a top priority for 24.1%, then the second priority was the type of surfing tourism (17.3%), the type of beach tourism (16.2%), fishing (15%), marine jetty (14.1%) and the last is sailboat tourism at 13.4%.

3.2. Marine Tourism Development Strategic Policy
The data used in the SWOT analysis are the answer of interviews obtained from 200 respondents who are stakeholders ranging from local government, investors, communities, and tourists. In developing the strategic policy, this study analyze the tourism issues based on strengths, weaknesses, opportunities, and threats that Gili Iyang Island has that explained in the following subsections. In principle, the development and management of archipelagic marine tourism areas is a management that can provide sustainable optimal economic and social benefits without degrading ecological quality. Therefore, in managing the marine tourism, it should consider ecological, economic and socio-cultural aspects. Policies for the development of marine tourism in the archipelago have to be environmentally friendly, meaning that it should suitable with principles as folllows: (a) Using tourism as a means of achieving nature conservation goals (b) Implement a selective marine tourism marketing system with the aim of attracting environmental awareness from tourists. (c) Maintain a controlled
tourism growth. However the strategic policy development then divided into 3 categories which are ecological, economics, and cultural-social explained as follows:

3.2.1. Islands Ecological Policy
3.2.1.1. The policy in mangrove management
The threat of the Gili Iyang’s mangrove can be described as follows: As a result of the increased exploitation of tourist islands, environmental problems due to pollution and other sources of environmental damage have become increasingly common. Some of the factors that cause environmental destruction in coastal areas are deforestation and erosion. Therefore, the right policies in mangrove forest management in supporting the development of marine tourism in the archipelago are as follows: (1) Tourism object management such as (a). Maintaining the uniqueness and beauty of nature, as the strength (b) Development of activity events as an effort to provide non-monotonous attractions and make them an effective promotional media, as the opportunity. (c) Developing community traditions to become a tourist attraction as the strength (d) Conducting research as an effort to find a form of prevention of abrasion and erosion to cope with the weakness (2) Visitors management.

3.2.1.2. Fresh water management
Fresh Water availability is a threat in developing tourism in the island. Therefore, to maintain sustainable water availability, it is necessary to anticipate it as early as possible. One of the policies that needs to conduct is to make efficient the existence of water sources and their watersheds. And also reforestation must be done in the catchment area. To achieve environmental health goals in archipelagic marine tourism objects, parties who have a strong interest in the provision of clean water and sanitation need to be involved in conserving water, such as residents, tourists and tourism managers.

3.2.1.3. Trash Management
The increasing number of tourists is a threat that usually causes waste problems such as food wrappers, plastic leftovers, banana leaves, fruit peels and so on. Besides that, it is also caused by the behavior of tourists who do not heed cleanliness. Policies needed to tackle this waste problem include providing trash bins along the tourist attraction, making slogans about the importance of cleanliness and preparing workers for environmental cleanliness of the tourist attraction. In addition, the government should provide a planned final waste disposal site (TPA) in the archipelago. Garbage can be used as raw material for compost, natural fertilizer to build soil fertility. For this reason, it is necessary to build a modern compost factory that functions to process waste collected at the TPA. Meanwhile, in places where organic waste is produced, composting centers are established for traditional systems.

3.2.1.4. Sea water quality management
Water quality could be a weakness if there are not a good management on this issue. In marine tourism areas, if the zoning of marine ecosystems is not given attention, it will reduce the aesthetic value of tourist objects. Marine tourism activities have the potential to produce marine pollution, thus reducing the quality of the archipelago's marine tourism objects. One of the alternatives is to reduce the pressure on the waters of the archipelago marine tourism areas: (1) improving the waste management system and recycling to reduce the amount of pollutants being carried into the sea; (2) sustainable socio-economic development of the people living in the coastal areas of islands.

3.2.1.5. Coral reefs management
Coral reefs’ future would be a threat if it is badly managed, consequently, it needs a good policy to tackle with. To preserve coral reefs in the archipelago, coral reef management must be carried out properly, by prohibiting fishing with bombs and chemical drugs as well as prohibiting the taking of corals, and preventing pollution. Other policies that need to be carried out to conserve coral reefs in the archipelago are programs to increase public awareness, procurement of legal products, regional autonomy rights, and protection of coral reef conservation.

3.2.2. Islands Economics Policy
Archipelagic area managers are required to make regulations on other economic activities that will develop, such as the increasing demand for shelter for workers in the tourism sector, the emergence of
various accommodation facilities ranging from daily boarding houses, guesthouses, homestays to star hotels. Likewise with the growth of food stalls and restaurants; an increase in the number of residents who live as tourism workers; the increasing number of vehicles for operational tourism management as well as for tourist mobilization facilities so that the development of infrastructure and public facilities that will be built requires careful planning. The above issues are the challenges and also opportunities of tourism development of Gili Iyang Island. The strategic policy of making the tourism area that are safe, comfortable and free of charge will provide final satisfaction for tourists because of the resulting impact besides feeling at home with their maintained privacy. In general, it can be stated as the implementing policy of making visitors generous in using tourism-related facilities and activities. The Local Economic Development policy through the basic participatory development program is one of the policy recommendations that needs to be applied to economic activities in the islands. The stages would include 6 strategic steps, namely (1) creating a business climate; (2) selecting potential clusters; (3) build stakeholder partnerships; (4) strengthening partnerships; (5) promoting cluster and (6) cluster replication. In order to develop economic activities in the archipelago, innovative and functional policies need to be implemented, for example for citizens / people who are doing business in the tourism sector, incentives are given in the form of ease / relief of licensing fees when doing business in a planned location, for example a craft market for souvenir craftsmen, localize marine sports entrepreneurs such as rental tires, surfboards, jet skis, boats, petahu and others and are accustomed to working in groups in one cluster. The local government must facilitate a competitive cluster to become an icon for the islands.

3.2.3. Islands cultural-social policy

The unique, warm, and open culture of local communities could be the strength for developing tourism at Gili Iyang Island, therefore, the policy for developing marine tourism in the archipelago should consider the interests of the local community and functioning of the coastal area, while the development plan needs to consider the interests of the region both regionally and nationally. These interests are relying on resources in the coastal area and the social life of the people, that can be conjuncted by maintaining the social balance of the community. One indicator of this social balance is to protect the morality of the community from things that are contrary to religious norms. One way is by accommodating religious activities that are developing in the islands. This includes accommodating routine religious activities and supporting events of other religious activities. For example, by limiting the number of nightspots and their operating hours. Prioritizing the role of scholars in daily life. The policy of cluster formation / designation based on regional functionalization will play a major role in reducing the potential for social upheaval that may arise such as striking differences in social strata, gradations of local customs and cultural morals only because of the entry of culture brought by tourist visitors. Likewise, by minimizing the potential for conflict between tribes that might occur, it can be anticipated by creating activities that uphold the culture. Education policies for the community should be intensified, especially those related to the tourism sector. Starting from expertise in serving tourists in a professional manner with international authority to mastering English, which for tourist areas is something that is vital. The role of the island community is very influential in the strategy of developing marine tourism in the Islands. The local wisdom of the religious people of the East Java archipelago which is dominated by the Malay Islamic culture is able to build awareness and responsibility of the community in preserving the natural ecosystem of marine tourism and other infrastructure. What tourists remember is not only the beautiful nature or buildings that have historical value, but the friendly local people who have many stories to tell how they came together and how they took care of nature and culture. For example fishermen, they really uphold local wisdom. The fishermen are not willing to use sophisticated tools to catch fish. In fact, they are actually capable of buying such a tool. The continuity of the fate of their children and grandchildren is a strong reason for the island community to remain faithful in maintaining their traditions. From this, the government should provide even greater opportunities for local people with their local wisdom to participate in the development of marine tourism in the archipelago, starting from the planning, implementation, monitoring, and receiving benefits and profits.
From above analysis, the marine tourism strategic policy in brief could be stated as follows: The right strategy to support the development of marine tourism on the Gili Iyang Island can be formulated in the following points: (1) Utilizing the character of the community that is open to marine tourism and the religious values of the people on the island of Gili Iyang which consciously maintain the quality of the natural environment through a social-religious institutional approach. (2) Optimizing community involvement in the development process of marine tourism villages on Gili Iyang, starting from planning, implementing and evaluating, for example regarding regulations regarding tourism villages in each tourism area; (3) Make optimal use of village funds for the development of BUMDes (the village’s enterprise) based on tourism (4) Designating coastal areas, especially coral reef ecosystem areas, as marine protected areas. (5) Increase the number of facilities and infrastructures for marine tourism by cooperating with investors in supporting the development of marine tourism on Gili Iyang Island.

4. Conclusion
The conclusion of the research are as follows:

4.1. The Marine Tourism Priority
The priority of marine tourism development on Gili Iyang Island is the development of diving tourism to be a top priority for 24.1%, then the second priority is surfing tourism (17.3%), beach tourism (16.2%), fishing (15%), marine jetty (14.1%) and the last one is sailboat tourism at 13.4%.

4.2. The recommended Strategy
The right strategy to support the development of the marine tourism on the island of Gili Iyang can be formulated as follows: The first, utilizing the character of the community that is open to marine tourism and the religious values of the people on the island of Gili Iyang which is to consciously maintain the quality of the natural environment through a social-religious institutional approach. The second, Optimizing community involvement in the development process of marine tourism villages on Gili Iyang, starting from planning, implementing and evaluating, for example regarding regulations regarding tourism villages in each tourism area. The third, make optimal use of village funds for the development of village’s enterprise based on tourism. The fourth, designating coastal areas, especially coral reef ecosystem areas, as marine protected areas. The fifth, increase the number of facilities and infrastructures for marine tourism by cooperating with investors in supporting the development of marine tourism on Gili Iyang Island.

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