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Regional Development of Tourism in Ponorogo Regency, East Java

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Abstract

Ponorogo Regency in East Java has natural resources, as well as the potential typical culture, and a society that can be developed into tourism attractions. This study was aimed to assess these potentials that can be then optimally developed, with factors that support the construction of tourism in Regency of Ponorogo. In carrying out the development of tourism in Ponorogo, there are several constraint or barrier factors, including access to transportation facilities and infrastructure which are still minimum and not optimal, access of the road and cross facilities is still less than the expectation, make it difficult for visitors to access tourism in Ponorogo. To solve this problem, we should implement the good cooperations, for all parties to jointly together in solving those problems.

Keywords: community development, development of tourism, potential of the region.

INTRODUCTION

Since *Nawacita* concept is implemented by government era of Joko Widodo and Jusuf Kalla, the village recurs different superior, innovative and also creative program variants as successor program. They put the fundamental base on village's institutional strengthening in order to create a prosperous community [1].

Several factors trigger the emergence of various types of empowerment and development programs in the village area. The programs were related to the issued of village's act, which states that village as the source of funds from various allocation reached 2 (two) billion rupiah. In addition to this, the village also has the right to manage the funds independently and in accordance with the autonomy policy, one important thing that is listed in the regulation of the village is also obliged to do transparent, accountable, and systematic accountability through the accountability system which is managed online.

Seeing the phenomenon, a notion appeared on how the process related to the evaluation of the program that produced by the village. Thus it can inflict the double effect on the welfare of society, and also the program utilization that can be a self-sustaining program and its management can be maximized.

All this time, in running regulations on the village and regarding the utilization of village's funds, many experts believe that the village still

has many deficiencies, including in the planning process, implementation of the program until the evaluation. Moreover, the lack of qualified human resources to run the programs leads to ineffective village's program.

The programs that normally used by the village, mostly construction, such as build the football field, volley field, the purchase of the arts, procurement of the village's health vehicle (mobile clinic), and lavatory, etc. However, with sufficient potential fund of the village, the programs more emphasize on greater involvement of all citizens to achieve the joint purposes.

A program that can be implemented by the village administration is the eco tourism program which insists on the exploration of local potential that existed in the village. It is expected easy for tourism sector in helping to increase the economy of village community, thus the village will be more independent without had to remove characteristic of the village, which tended to be traditional, agrarian or nautical, as well as their complex social system. The aim of the study was to analyze the potential of tourism attraction in Regency of Ponorogo.

STUDY AREA

Regency of Ponorogo is one of the areas that administratively part of East Java. The regency has some districts consisting of several villages (Fig. 1). Regency of Ponorogo has 1,371.78 km² wide area which lies between 111°17' – 111°52' East and 7°49' – 8°20' South with altitude 92 – 2,563 feet asl. Bordering of the area in the north is with Magetan and Nganjuk Regency, while in the east is Tulungagung and Trenggalek Regency,

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south with Pacitan Regency and west with of Pacitan Regency and Wonogiri Regency (Central Java). Seen from the state of geographical size, Regency of Ponorogo divided into two sub areas, i.e. highland area included Ngrayun, Sooko, Pulung and Ngebel District, while the rest of the area is lowland.

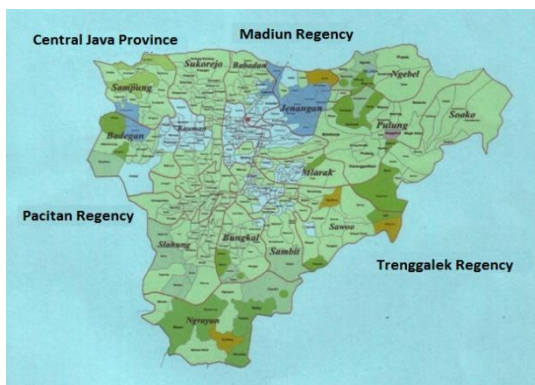


Figure 1. Map of Ponorogo Regency [2]

River that passed the area is 4 - 58 km long. The river functioned as a source of irrigation for agricultural land to the production of rice and horticulture. Most of the area was used for forestry or farming, and the rest used to *tegal* (garden), settlement and others.

Administratively, Ponorogo Regency divided into 21 districts and 305 villages. The total number of officials is 3,795 personal consisted of 301 head of villages, 265 secretary of village, head of subvillages 1,038 (called *kamituwo*) and 2,191 technical affairs officers. Each village was handled by 12 officers (average) to implement governmental activities at the village level [3]. Ideas about making tourism village in Ponorogo Regency certainly need innovation on the phase of preparation, mapping areas, an analysis of strength and weakness, and the village's tourism attractions accordance with the type of what is fitted to be applied in several villages in Ponorogo.

Tourist village is a rural area which offer the authenticity, both in terms of social and cultural, customary, daily activities, traditional architecture, the structure of spatial planning of the village which are presented in a form of integration between tourism components such as attraction, accommodation and supporting facilities [4]. There are two important components for tourism village, i.e. accommodation and attraction [5].

Population of Ponorogo

According to a socio economic survey in 2009, the district population in Ponorogo was 899,328 inhabitants. It is consisting of 456,023 men and 443,305 women, increased 0.38% from 2008 [6].

POTENTIAL OF THE VILLAGES IN PONOROGO

Agricultural Potential

Ponorogo is geographically has agricultural potentials in various fields, such as farming in the form of paddy fields and also onion plants (Fig. 2). Ponorogo is one of the buffer zones of food in East Java, with rice-fields area 34,800 ha. It consisted of the area for technical irrigation 30,091 ha, the technical area of 625 ha, non technical 2,228 ha and rainfed paddy field area 1,856 ha. While the dry land of 102,378 ha area, 21.15% are used for settlements and building, 29.57% for orchards or fields, 45.85% to wood plantation and the remaining 3.43% used as community forest, plantation and other. Area for paddy field increased by 1.08% with production of 4,222,813 quintal, increased compared to the previous year 3,942,780 quintal [3].

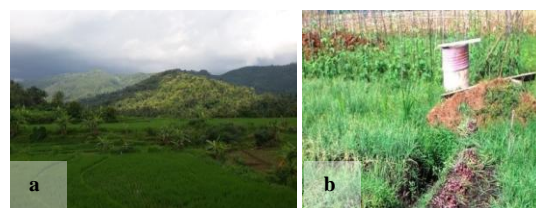


Figure 2. Rural Majority Farming of Ponorogo
a) paddy field for rice cultivation [7], b) onion plant [8]

Natural Resources Potential

Geographically, Ponorogo Regency is fertile. This area consisted of areas with the contours of low or high altitude. This gives descriptions of natural resources in Ponorogo, in the form of: mountains, lake, hot springs, waterfall, natural rocks and several others of natural resources (Table 1).

Cultural Potential

Discussing about Ponorogo, it will associate to the well-known culture Art, i.e. Reog Ponorogo. Nevertheless, there is another art from Ponorogo Regency, i.e. the elephant art (*Gajahan*) which has unique and cultural value (Fig. 3).

Religious Site

In Ponorogo, Muslim residents was accounted for total 1,004,899, Christian 3,475, Catholic 3,428, Hindu 2,734, and Buddhism 5,872. From

the distribution of community religion in Ponorogo, we can witness several religious relics [3] as shown in Figure 4.



Figure 3. Cultural Potential of Ponorogo
a) Reog [9], b) Gajahan [10]



Figure 4. Religious Site in Ponorogo
a) Cave of Maria Fatima Sendang Waluya Jatiningih for Catholics Worship in Klepu Village, Sooko District [11]
b) Tomb of Kyai Ageng Mohammad Besari, in Jami' Mosque, Tegalsari [12]

Potential Culinary

Besides famous for its Reog art, Ponorogo has the culinary *Sate Ayam* (Chicken Satay) and also *Dawet Jabung*, and *Serabi* (stew pancake). These menu are interesting to be tasted if tourist visiting Ponorogo (Fig. 5).



Figure 5. Cultural Potential of Ponorogo
a) Dawet Jabung HJ. Sumini (personal documentation),
b) Chicken Satay Ponorogo H. Tukri Sobikun (personal documentation), c) Serabi (stew pancake) [13]

Festival and Events

Besides the existed potential attractions that previously explained, e.g. natural resources, culture, agriculture, and culinary, the least we illustrate the amendable potential attraction and also directed easily as development model pilot of tourism in local level. Moreover, Ponorogo have various events or festivals which are scheduled annually (Table 2). Thus it is easy to describe it to the travelers. The events also featured attractions which are made to entertain Ponorogo's residents and visitors who took time to visit Ponorogo.

Barrier Factors

Factor that hampers the tourism in Ponorogo is related to the supporting access to tourism. If we review carefully, there are sectors that needs to be improved, because it is strongly affected the number of visits and comfort for tourists, i.e. transport, traffic and street lighting.

Traffic and Transportation systems

Transportation to the Ponorogo is very limited, besides the number, the quality of vehicles was also not sufficient. The problem beside unsuitable transportation is the traveling route that could not access into the tourism areas directly or along the main road only. Transportation system is considered bad. The government of Ponorogo has record that the road either in districts or village in Ponorogo Regency is bad. The access was disturbing to the local attractions.

Analysis of Tourism Village in Ponorogo

Ponorogo has prerequisite to create tourism villages, considering the potential nature resources, peculiar people characteristics, and culture. However, it is minus in some aspects, related to facilities and infrastructure of the traffic and road, as well as vehicle which is still limited and minimal.

Tourism village is rural areas that have some specific characteristic to be tourism destinations. In this area, the citizens are also has tradition and cultural, which is still relatively native. In addition, some supporting factors are special culinary, system of farming and social system also becomes diverse attractions in the tourism village. Beside these factors, nature and environment are still original and preserved well as the major tourism destinations [3].

Table 1. Potential Natural Resources in Ponorogo






No.	Natural Resources	Area View	No.	Natural Resources	Area View
1	Ngebel Lake Location: Ngebel District [14]		8	Coban Lawe Waterfall Location: Pudak District [19]	
2	Ngebel Waterfall Location: Ngebel District [15]		9	Valley of Tanah Goyang (Rocking Land) Location: Village of Pudak Wetan [20]	
3	Watu Semaar Location: Ngrayun District [16]		10	Kedung Kethus (Natural water) Location: Ngambang Jenangan District [16]	
4	Mt. Gajah Location: Sambit District [16]		11	Curug Pitu Location: Baosan Kidul Village, Ngrayun District [21]	
5	Teletubbies Hill Location: Balong District, Slope of Mt. Masjid [17]		12	Pletuk Waterfall Location: Sooko District [11]	
6	Cave of Lowo Location: Teak Forest, Boworejo Village, Sampung District [11]		13	Naungan Mountain Feet of Mt. Bedes Location: Ngadirojo Village, Sooko District [11]	
7	Hot Springs of Tirta Husono Location: Ngebel District [18]		14	Watu Putih Location: Ngrayun District [22]	

Table 2. Festival and Events in Ponorogo

No.	Festival and Events	Time	Location (Districts)
1	Reog and <i>Bulan Purnama</i> (Full moon) Dance	Beginning or end of the month	Badengan, Sambit, Sampung, Balong, Sukorejo, Pudak, Kauman, Slahung, Miarak, Babadan, Ngrayun, Siman
2	Reog Telaga Ngebel	1 st and 2 nd week of the month	Ngebel, Jenangan, Pulung, Sooko, Pudak,
3	Reog Bantarangi Sumoroto	3 rd and 4 th week of the month	Sumoroto (village), Jambon, Sukorejo, Sampung, Badegan, Kauman
4	Grebeg Suro –National Festival of Reog Ponorogo	Annually, 1 st Muharam (1 st Suro in Java Calendar)	Main Square of Ponorogo
5	Regent Cup Road Race Ponorogo	Annually, September	Conditional

Source: Asliponorogo [16]

In case of Ponorogo, villages can be developed as rural tourism destination through some criteria and conditions, namely: 1). Good accessibility, thus it is easy to be visited by tourists with use various kinds of transportation means; 2). Has attraction in the form of the objects of nature, art and culture, legend, local culinary, and etc to be developed as a tourism attraction; 3). The society and village officers give high support for the tourism village and accept evaluation on their tourism from tourists who come to the village; 4). guaranteed security in the village; 5). provide adequate accommodation, telecommunication, and labor; 6). cool or cold temperate; 7). Closely connected with other tourism attractions that which is already well known by the public [23].

From the seven criteria, six indicators was fulfilled, thus it can be considered that Regency of Ponorogo is potential tourism destinations. Due to its objects of attraction that still natural and well maintained, thus it can be further developed.

Residents' attitudes towards tourism were positive. Positive attitudes were connected with the belief that tourism creates community development, opportunities for earning income, improved agricultural markets, and a chance at good fortune. Similar case was found in Bigodi, Uganda. In the discussion of residents' attitudes, several strategies emerged which can be used to develop an appropriate form of tourism for poor, rural people: encourage cooperatives; encourage the use of local materials and local design; target backpackers and other tourists that eager to adapt to local conditions; foster local decision making; integrate tourism with local agriculture; and use tourism revenue for community development. In Bigodi, these strategies have created positive attitudes towards tourism and an apparently increase the pro-tourism behavior [24].

CONCLUSION

The tourism development in Ponorogo, regency should emphasize on the readiness infrastructure and also superstructure to create the tourism. The tourism needs to be sustainable, thus all related parties should actively participate. In the terms of government policy, the control related to the procurement of physical development and also further supports that local attraction should be brought into a better quality.

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Bawean Island: The Potential for Ecotourism and Local Knowledge on Plant Diversity Supporting Ecotourism

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Abstract

Bawean Island has attractive biodiversity and natures that are potential for development. The present study was aimed to investigate (i) the potential of Bawean Island's natural resources for ecotourism (ii) local knowledge of Bawean people on plant diversity and uses, and (iii) the potential of plants for commodities supporting ecotourism development. The potential of Bawean Island for ecotourism was examined based on data of attractive natural environments, while the local knowledge was obtained by interviewing Bawean people and observation of the daily practical use of plants. Various plants were analysed for their potential as commodities supporting ecotourism. The results showed that Bawean Island has high potential resources for ecotourism. It is ranging from beaches, mountains, rivers, plant diversity, and endemic animals. The local knowledge showed that Bawean has plant diversity with various potential uses. There were 81 plant species traditionally used by Bawean people, including plants for foods (40 species), ornamental plants (15 species), timbers for housings and buildings (9 species), medicines (8 species), natural dyes (4 species), and other uses (5 species). Various plant species potential as the commodity supporting ecotourism development included *Abelmoschus manihot* (traditional food), *Diospyros discolor* (fresh local fruit), *Nypa fruticans* and *Pandanus tectorius* (local handicrafts), *Phalaenopsis amabilis* (ornamental plants or cutting flowers). The use of plants in Bawean Island needs to consider the sustainable use of plants and conservation approaches.

Keywords: Bawean, conservation, ecotourism, local knowledge, plant diversity.

INTRODUCTION*

Bawean Island is a small island located between Java and Kalimantan. It has many attractive natural environments and resources include Solomon River, Ria Beach, Tanjung Ori Beach, Pacinggahan Beach, Mayangkara Beach, Bangkuang Mountain, Laccar Waterfall, and Bawean Deer Sanctuary that are potential in the development of Bawean for ecotourism. Various natural sources such as mountains, forests, plateaus, shores, lakes, rivers and the diversity of flora and fauna are known as a part of ecotourism sources [1].

The principles of ecotourism are based on the sustainable tourism with awareness to natural environment protection and conservation; the increase of economic growth of local community; and community social progress [2, 3, 4]. With the attractive natural environment and sources and people resources, Bawean Island is potential to be developed as ecotourism.

Bawean is also endowed with plant diversity that has many potential uses. Local knowledge on plant diversity is important to increase

understanding of the uses of plants based on the empirical experience of the people and to improve the utility of the plants that can be developed as commodities that support the development of ecotourism in Bawean.

Local knowledge is knowledge and beliefs that are embedded in community practice, based on experience that are transmitted through generations [5,6]. Local knowledge is related to ethno botany that explores the relationships between people and plants, and the environments [7]. Plants are a part of biological resources for human beings that can be used to obtain the benefits and to supply all basic needs (food, health, and industrial products) [6]. Research on ethno botany that explore the local knowledge of the indigenous people on plants has been widely conducted, such as in Sumatra [7], Kalimantan [8], Jambi [9], Maluku [10], even across the world; such as in North America [11], Nigeria [12], Russia [13], Pakistan [14], and India [15].

Plant diversity and uses can be used to support the development of ecotourism. Various plant species that have unique uses can be developed as commodities in the development of ecotourism in Bawean, such as traditional food and handicrafts.

The aims of the present study were to investigate (i) the potential of Bawean Island for ecotourism, (ii) local knowledge of Bawean

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people on plant diversity and use, (iii) the potential of plants for commodities supporting ecotourism development. The general aims of the present study were to support Bawean for ecotourism and to increase awareness of conservation and socio-economic progress of Bawean people as well as the conservation of plant diversity in Bawean through sustainable use of the plants to support the development of ecotourism in Bawean.

METHODS

The potential of Bawean Island (Fig.1) for ecotourism was analysed by exploring attractive natural environments in Bawean including beaches, rivers, waterfalls, lakes, and sanctuaries. This exploration was through direct observation and visit to the natural environments and through data from website.

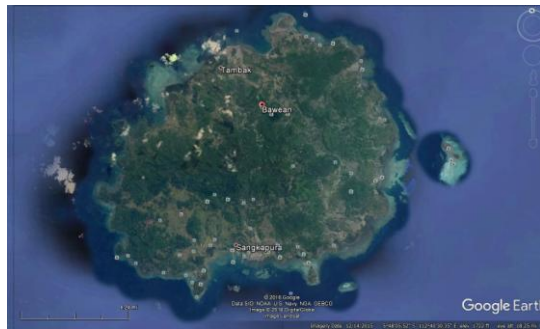


Figure 1. Bawean Island (Source: Google Earth)

The local knowledge of Bawean people was investigated through interview, questionnaire, freelist, and direct observation. Focus of the investigation was the use of plants in local people daily life in Bawean. The study was conducted in two districts in Bawean, Tambak and Sangkapura [16]. Respondents were randomly sampled in several villages in both districts Tambak and Sangkapura. Several villages sampled were Patar Selamat, Pudakit Barat, Pudakit Timur, Dekat Agung, Bulu Lantang (Sangkapura), Tanjung Ori, Paromaan, Tambak (Tambak). Total of sampled respondents were 100 adults. The interviews were conducted by asking several information of plants, the use, how to use, and how to cultivate or propagate the plants.

Direct observation was conducted on how to use the plants and how to cultivate some particular plants. Cultivated plants were observed in Bawean people's home gardens. Wild plants used by Bawean people were also observed the wild (forest area in Bawean). Field survey was supported by elder Bawean people

who have local knowledge about the wild plants. Each sample of ethnobotanical plant specimen was documented. Data were analysed descriptively. The potential of plants that can be developed as commodities to support ecotourism in Bawean was analysed through selection of the uniqueness of the plants and their uses.

RESULT AND DISCUSSION

The Potential of Bawean for Ecotourism

The results showed that Bawean has many natural environments that are potential in ecotourism development (Table 1). There are several attractive natural environments in Bawean including beaches (Fig. 2), lake, waterfall, sanctuary, mountains (Fig. 3) and small island near Bawean island. Some beaches in Bawean such as Ria beach, Mayangkara Beach, Kuburan Panjang beach, and Tanjung Gaang beach with their white sands are important objects for the ecotourism development. Apart from beaches, there are Kastoba lake, Laccar waterfall, Bawean deer sanctuary (Fig. 4), and small island near Bawean. These can support ecotourism development in Bawean.

Table 1. Natural Environments in Bawean for the Development of Bawean for Ecotourism

No	Natural environments	Products of ecotourism
1	Ria beach	Beach
2	Mayangkara beach	Beach
3	Kuburan Panjang beach	Beach; mangrove forest
4	Tanjung Gaang Tanjung Anyar beach Tanjung Ori beach	Beach Beach; prawn farming Beach
5	Kastoba lake (protected area)	Lake; primary forests, flora, fauna
6	Nypa forest	Nypa forest
7	Solomon River	river
8	Gunung Panjang Mountain (protected area)	Forest, flora with the dominant flora <i>Ficus variegata</i> , <i>Irvingia malayana</i> ; endemic pig, deer, protected areas
9	Bangkuang Mountain (protected area)	Mountain, forest, flora and fauna
10	Mandala Mountain (protected area)	Mountain, forest, flora and fauna, with the dominant flora <i>Fagraea fragrans</i>
11	Laccar waterfall	waterfall
12	Bawean deer sanctuary	Sanctuary of endemic deer of Bawean
13	Gili Island	Small island near Bawean
14	Noko island	Small island near Bawean
15	Noko Selayar island	Small island near Bawean



Figure 2. View of Tanjung Anyar Beach in Bawean



Figure 3. One of Beautiful Views of Mountains in Bawean

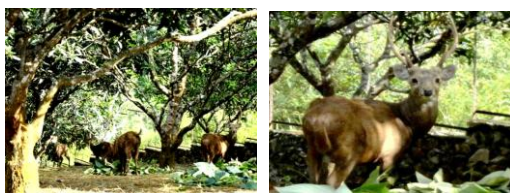


Figure 4. The Sanctuary of Endemic Deer of Bawean

In line with the definition of ecotourism that was coined by Ceballos Lascurain in 1993 that ecotourism is a journey to visit and enjoy natural environments that hold principles on the conservation and minimum visitor impacts, and increase the involvement of local community for their socio-economic progress, the plans of the development of Bawean for ecotourism should be made by involving the local authorities government and the local community. Appropriate policy for ecotourism is required to protect environment for conservation, to lower adverse impacts of visitors, and to regulate the involvement of the local people in the development of ecotourism [17,18,19].

Local Knowledge of Plant Diversity and Uses

The present study also showed the local knowledge of Bawean people on the plant

diversity and uses. Based on the data of interviewing Bawean people, there were 81 plant species used by Bawean people for various purposes in their daily life. Commonly, Bawean people conducted conservation approaches in using the plants, through plant cultivation for the sustainable use of the plants, especially plants that have important values, such as plants that are potential as food resources. They grew the plants in the home yards or fields around their houses. A large area of rice field is located near settlements.

The patterns of the use of plants by Bawean people can be categorised as plants for consumption, medicines, timbers for housings or buildings, ornamental plants, natural dyes, and other uses (Fig. 5; Table 2-9). The majority of plants (40 species) were used by Bawean people for consumption (staples, vegetables, and fruits). The proportion of the use of the plants for food resources is the highest (Fig. 5).

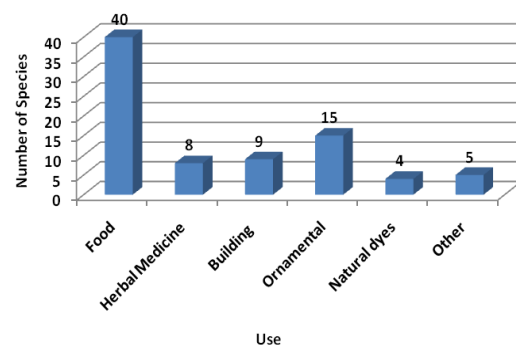


Figure 5. Number of Plants Species Traditionally Used by Bawean People

Based on the place in which the plants grow, the plants can be categorised as (i) the wild species and (ii) the cultivated species (Fig 6). Bawean people mostly used cultivated plant species (69 species; 85%) compared to the wild ones (12 species; 15%).

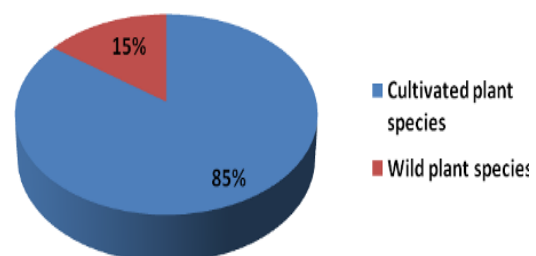


Figure 6. Percentage of Wild Plant Species and Cultivated Plant Species Traditionally Used by Bawean People

The highest proportion on the use of plants by Bawean people is for consumption or as food resources. Fourty one plant species often used for food has been documented. The use of these plants are for main food (staples), fruits, vegetables, and flavors, etc. Rice (*Oryza sativa*) is the main food source (staple) of Bawean people, therefore, the majority of fields are planted with rice. Romo variety is the most chosen rice variety by Bawean people (Fig. 7). Many Bawean people grow rice for their own need of food. Our observation on the rice cultivation by Bawean people showed that the cultivation methods they used was simple and classic including the system of the application of fertilisers, the management of treatments of pests and diseases, and inefficient methods of harvesting. Therefore, the yields from rice harvesting is not optimal. Best management practices for high yield rice needs to be introduced and practiced in Bawean. Other plant species used as food alternatives are corns (*Zea mays*), *Canna indica*, sweet potatoes (*Ipomoea batatas*), *Xanthosoma sagittifolium*, etc. Food source from tuber-producing plants can be potentially developed in this island as the typical soil in this island is relatively loamy and dry.

Various plant species were also consumed for fruits (Table 2). These commodities are vital for Bawean people as Bawean Island is far from other places. To meet the basic needs on fruits and vegetables, Bawean people grow some plants as the source of fruits (Table 3) and vegetables (Table 4) for their own consumption. Banana is a popular fruit in this island. At least more than 10 banana cultivars we found in Bawean island, such as banana Elang, Molin, Lampeneng, Klombu, Sanah, Kismis, Keleng, Kepok, Sepet, Alas, Biji, Kapal, Sobo, etc. They

cultivated these bananas in their garden. Some mango cultivars were also grown in this island. Other local fruits that we found were *Diospyros discolor*, *Limonia acidissima* (Kawista), *Psidium guajava* (guava), *Manilkara zapota* (sawo kecil), *Salacca zalacca* (salacca). Local fruits are also commodities for sale in their traditional markets.



Figure 7. Rice Cultivation in Bawean Island
a) Traditional rice cultivation by Bawean people; b) Romo variety, the most chosen rice variety in Bawean Island

Some vegetables are grown in the home yard or in the field and used for daily consumption. The characteristic vegetables of Bawean people are *sayur kacang lendir* made from (*Abelmoschus manihot*) that are cooked in soup. Other vegetables often consumed were the stolon of *Colocasia esculenta*, *Vigna unguiculata*, *Sesbania sesban*, *Psophocarpus palustris*, *Muntingia calabura*, and *Momordica angustisepala*. Some plants were grown for spices and cooking ingredients such as celeries, chilies, tomatoes, cumins, and other plants of a family Zingiberaceae, etc. The availability of vegetable plants in their homes are important as the price of vegetables in the markets is relatively expensive. The various food sources in Bawean Island are potential for food diversification, which is important for the sustainable food security in this island on the basis of the diversity of Bawean local food source.

Table 2. The Use of Plants for Food

No	Latin Name	Vernacular Name	Family	Uses	Categories
1	<i>Canna indica</i>	Ganyong	Cannaceae	The tubers are boiled for consumption and as the carbohydrate source.	Cultivated
2	<i>Dioscorea hispida</i>	Gadung	Dioscoreaceae	The tubers can be cooked for crackers	Wild
3	<i>Ipomoea batatas</i>	Ketela	Convolvulaceae	The tubers can be cooked by boiling or can be processed to make crackers	Cultivated
4	<i>Oryza sativa</i>	Padi	Poaceae	The rice seeds are the main food source (staple) of Bawean people	Cultivated
5	<i>Xanthosoma sagittifolium</i>	Patet	Araceae	The tubers are cooked by steaming	Cultivated
6	<i>Zea mays</i>	Jagung	Poaceae	The fruits are used as the main food source that can be cooked by steaming or processed as corn flour	Cultivated
7	<i>Cucurbita moschata</i>	Waluh	Cucurbitaceae	Ripe fruits can be boiled or steamed for consumption	Cultivated
8	<i>Manihot esculenta</i>	Singkong	Euphorbiaceae	The tubers can be consumed by boiling	Cultivated

Table 3. The Use of Plants for Fruit

No	Latin Name	Vernacular Name	Family	Uses	Categories
1.	<i>Ananas comosus</i>	Nanas	Bromeliaceae	Ripe fruits can be directly consumed	Cultivated
2.	<i>Annona muricata</i>	Sirsak	Annonaceae	Ripe fruits can be directly consumed	Cultivated
3.	<i>Blighia sapida</i>	Mahkota dewa cina	Sapindaceae	Seeds can be directly consumed and function as medicinal plants	Cultivated
4.	<i>Carica papaya</i>	Pepaya	Caricaceae	Young fruits can be used as vegetables that are cooked and ripe fruits can be directly consumed	Cultivated
5.	<i>Chrysophyllum cainito</i>	Buah susu	Sapotaceae	Fresh fruits can be directly consumed	Cultivated
6.	<i>Cucumis sativus</i>	Timun	Cucurbitaceae	The ripe fruits can be directly consumed (fresh vegetables)	Cultivated
7.	<i>Diospyros discolor</i>	Buah merah	Ebenaceae	Ripe fruits can be directly consumed	Wild
8.	<i>Durio zibethinus</i>	Duren	Malvaceae	Ripe fruits can be directly consumed	Cultivated
9.	<i>Limonia acidissima</i>	Kawista	Rutaceae	Fruits can be directly consumed or for fruit punch.	Wild
10.	<i>Mangifera indica</i>	Mangga	Anacardiaceae	Ripe fruits can be directly consumed	Cultivated
11.	<i>Manilkara zapota</i>	Sawo	Sapotaceae	Ripe fruits can be directly consumed	Cultivated
12.	<i>Musa acuminata</i>	Pisang molen	Musaceae	Ripe fruits can be directly consumed	Cultivated
13.	<i>Psidium guajava</i>	Jambu merah	Myrtaceae	Ripe fruits can be directly consumed	Cultivated
14.	<i>Salacca zalacca</i>	Salak	Arecaceae	Ripe fruits can be directly consumed	Cultivated
15.	<i>Muntingia calabura</i>	Kerten	Muntingiaceae	Ripe fruits can be directly consumed	Cultivated
16.	<i>Theobroma cacao</i>	Cokelat	Malvaceae	The seeds are used as the source of the main components of chocolates	Cultivated

Table 4. The Use of Plants for Vegetables

No	Latin Name	Vernacular Name	Family	Uses	Categories
1.	<i>Abelmoschus manihot</i>	Kacang lendir	Malvaceae	Young fruits are cooked with soup	Cultivated
2.	<i>Apium graveolens</i>	Celeries	Apiaceae	Leaves as flavors in dishes	Cultivated
3.	<i>Averrhoa bilimbi</i>	Blimbing wuluh	Oxalidaceae	The fruits can be added into vegetable sour soup	Cultivated
4.	<i>Boesenbergia rotunda</i>	Temu kunci	Zingiberaceae	The tubers can be used for cooking ingridients	Wild and Cultivated
5.	<i>Capsicum annuum</i>	Cabe	Solanaceae	The fruits are used as cooking ingridients	Cultivated
6.	<i>Cocos nucifera</i>	Kelapa	Arecaceae	Ripe coconut fruits for coconut milk and the young ones for fresh drinks.	Cultivated
7.	<i>Plectranthus amboinicus</i>	Jinten	Lamiaceae	Used for spices	Cultivated
8.	<i>Colocasia esculenta</i>	Jangkar	Araceae	The stolon can be used as vegetables and can be cooked. The tubers can be directly consumed by boiling.	Cultivated
9.	<i>Cymbopogon nardus</i>	Serai	Poaceae	Old leaves for cooking ingridients	Cultivated
10.	<i>Ipomoea aquatica</i>	Kangkung	Convolvulaceae	The leaf tips / young leaves as the vegetables sources that can be cooked	Cultivated
11.	<i>Luffa acutangula</i>	Gambas	Cucurbitaceae	fruits are cooked with soup	Cultivated
12.	<i>Momordica angustisepala</i>	Pare welut	Cucurbitaceae	Young fruit peels can be used for cooked vegetables	Cultivated
13.	<i>Psophocarpus palustris</i>	Kecipir	Leguminosae	Young fruits can be used for vegetables sources that can be mildly fried or for soup	Cultivated
14.	<i>Sesbania sesban</i>	Taroe	Leguminosae	Flowers for vegetables	Cultivated
15.	<i>Solanum lycopersicum</i>	Tomat	Solanaceae	Ripe fruits for consumption or for cooking ingridients	Cultivated
16.	<i>Vigna unguiculata</i>	Otok	Leguminosae	Young fruits are used as cooked vegetables	Cultivated

Bawean people have a modern life style, therefore, doctors and hospitals are the first destination to go when they are sick. However, some Bawean people also use some plant species as herbal medicines to maintain their fitness or when they are sick. Those plants are planted in their home yard, such as *Benincasa hispida* usually used to prevent from a sore throat (*pharyngitis*), *Rhinacanthus nasutus* for external application for itchy skin and used for stomachache, *Sauropus androgynus* used for fevers. *Citrus aurantiifolia* and *Piper crocatum* were used to treat cough and wounds, respectively (Table 5).

The structure of house of most Bawean people, except, people living near forests and beaches, has been modern. The structure of house in the town is from concrete materials,

while houses of people living near forests and beaches were built from woods and timbers. The diversity of plants by Bawean people living near forests is used for housings and furnitures (Table 6). A variety of woody plants (trees) is often used for the parts of houses such as house pillars and roofs. Some plant species used for buildings and furnitures are directly collected from forests. *Irvingia malayana* is mostly chosen by Bawean people as the local timbers for the structure of house pillars and roofs. *Irvingia malayana* was a dominant plant in the forest. it is favourite feed of endemic deer *Axis kuhlii* [20]. Many people also grew other woody plants such as *Swietenia mahagoni* (mahoni), *Tectona grandis* (teak) and *Gmelina arborea* (white teak). The abundance of leaves of *Nypa fruticans* near the beach was used for the roofs of huts in the rice fields and farms.

Table 5. The Use of Plants for Herbal Medicines

No	Latin Name	Vernacular Name	Family	Use	Categories
1	<i>Benincasa hispida</i>	Koaden	Cucurbitaceae	Young fruits for vegetables, candies, fruit jams, and juices to cure a sore throat (<i>pharyngitis</i>)	Cultivated
2	<i>Citrus aurantiifolia</i>	Jeruk pecel	Rutaceae	The slices of fruits are poured in the hot water to cure cough	Cultivated
3	<i>Graptophyllum criptum</i>	Daun ungu	Acanthaceae	The leaf extracts for decoction and drink as antianemia (increase red blood cells and Hb)	Cultivated
4	<i>Oroxylum indicum</i>	Kayu lanang	Bignoniaceae	The roots are used as hair tonic	Cultivated
5	<i>Piper crocatum</i>	Sirih	Piperaceae	The leaves are used to cure wounds, by chewing the leaves and apply the chewed leaves to the wounds.	Cultivated
6	<i>Punica granatum</i>	Delima putih	Lythraceae	The fruits are blended with curcuma and drink to cure a sore throat (<i>pharyngitis</i>)	Cultivated
7	<i>Rhinacanthus nasutus</i>	Cucuk manuk	Acanthaceae	The flowers are boiled and the extract water was drunk for stomachache	Cultivated
8	<i>Sauropus androgynus</i>	Katu	Phyllanthaceae	The leaves are used for vegetables for lactation and antipyretic	Cultivated

Table 6. The Use of Plants for Housings / Buildings

No	Latin Name	Vernacular Name	Family	Uses	Categories
1	<i>Bambusa vulgaris</i>	Bambu	Poaceae	The stems for timber for housing	Wild
2	<i>Canarium oleosum</i>	Kenari	Burseraceae	The stems for timber for housing	Wild
3	<i>Ficus variegata</i>	Gondang	Moraceae	The stems for timber for housing	Wild
4	<i>Gmelina arborea</i>	Jati putih	Lamiaceae	The stems for timber for housing, and the leaves for the feed of Bawean deers	Cultivated
5	<i>Irvingia malayana</i>	Kayu buluh	Irvingiaceae	The stems for timber for housing, the fruits for snacks by putting the fruits on hot pans in a short time, and the leaves for the feed of Bawean deers	Wild
6	<i>Leea angulata</i>	Kayu besi	Vitaceae	The stems for timber for housing	Wild
7	<i>Nypa fruticans</i>	Nipah	Arecaceae	The leaves are used for the house roofs	Wild
8	<i>Swietenia mahagoni</i>	Mahoni	Meliaceae	The stems for timbers for housing	Cultivated
9	<i>Tectona grandis</i>	Jati	Lamiaceae	The old stems for timbers for housing	Cultivated

The use of plants by Bawean people to decorate their house was unique. The people loved to make their home more beautiful and artistic, therefore, many plant species were used for house decoration, such as orchids. The orchids were collected from the forests, such as *Phalaenopsis amabilis* and *Dendrobium anosmum*. Plant species that have colourful flowers are the choice of Bawean people to make their home cosy and beautiful, such as *Euphorbia milii*, *Mirabilis jalapa*, and *Ixora coccinea*. Crotons such as *Codiaeum variegatum* are also chosen as they have glossy multicolored foliage and it is easy to plant them. The needs of ornamental plants (Table 7) are also important for Bawean people. However, there was no cultivation or propagation of ornamental plants in Bawean island.

The use of plants by Bawean people for natural dyes was for colouring foods, such as cakes or dishes (Table 8). *Curcuma longa* with its natural yellow is usually used for cooking karee. This plant species is sometimes used for herbal medicines. For green colour for the cakes and

and pastries, people use the extracts of leaves of *Pandanus amaryllifolius* and *Dracaena angustifolia*. *Lawsonia inermis* is used for nail dyes. The plants used for dyes are usually grown in the home yards. Wild plants in the forests are useful for important animals in Bawean island, such as *Tacca palmata* being the feed source for birds. Groundcover plants such as grasses, ferns, and herbs, also ripe fruits falling from forest trees being the feed source of the Bawean endemic deers. Some plant species were also cultivated for the feed source of the deers in the sanctuary. Other uses of plants are for handicrafts, such as *Pandanus* for mats, handicrafts (Table 9).

The sustainable use of plants by Bawean people through daily use and propagation or cultivation in a large number for daily uses (Fig. 8) in long terms is one act of conservation as this can increase the chance of plants to survive. The known functions of the plant species for people daily lives can increase the awareness of people for the availability of plants all the times. Thus, it can reduce the risk of plants to become extinct.

Table 7. The Use of Plants for Ornamental Plants

No	Latin Name	Vernacular Name	Family	Uses	Categories
1	<i>Adenium obesum</i>	Kamboja	Apocynaceae	Ornamental plants with beautiful flowers	Cultivated
2	<i>Canna hybrida</i>		Cannaceae	Ornamental plants	Cultivated
3	<i>Codiaeum variegatum</i>	Puring	Euphorbiaceae	Ornamental plants with colourful leaves	Cultivated
4	<i>Cordyline fruticosa</i>	Andong	Asparagaceae	Ornamental plants with its colourful beautiful leaves	Cultivated
5	<i>Crescentia cujete</i>	Buah Mojo	Bignoniaceae	The plants for house border fences	Cultivated
6	<i>Dendrobium anosmum</i>	Anggrek	Orchidaceae	The flowers for home interior decoration	Wild
7	<i>Dyopsis lutescens</i>	Palem kuning	Arecaceae	The plants for fences in front of houses	Cultivated
8	<i>Euphorbia milii</i>		Euphorbiaceae	Ornamental plants as they flower whole the year	Cultivated
9	<i>Ficus elastica</i>		Moraceae	Ornamental plants	Cultivated
10	<i>Helianthus annuus</i>	Bunga matahari	Compositae	Ornamental plants with its beautiful flowers	Cultivated
11	<i>Ixora coccinea</i>	Soka	Rubiaceae	The plants for home interior decoration	Cultivated
12	<i>Livistona chinensis</i>	Palem hias	Arecaceae	Ornamental plants that are planted in front of houses	Cultivated
13	<i>Mirabilis jalapa</i>	Conderet	Nyctaginaceae	Ornamental plants with beautiful yellow flowers	Cultivated
14	<i>Nerium oleander</i>	Bunga mentega	Apocynaceae	Ornamental plants	Cultivated
15	<i>Phalaenopsis amabilis</i>	Anggrek bulan	Orchidaceae	The flowers for home interior decoration	Wild

Table 8. The Use of Plants for Natural Dyes

No	Latin Name	Vernacular Name	Family	Uses	Categories
1	<i>Curcuma longa</i>	Kunyit	Zingiberaceae	The stolons are extracted used as dyes	Cultivated
2	<i>Lawsonia inermis</i>	Pacar kuku	Lythraceae	The leaves for fingernails dyes	Cultivated
3	<i>Pandanus amaryllifolius</i>	Pandan wangi	Pandanaceae	The old leaves are extracted as food coloring for cakes or breads	Wild
4	<i>Dracaena angustifolia</i>	Pandan betawi	Asparagaceae	The old leaves are extracted and added with water as food coloring	Cultivated

Table 9. Other Uses of Plants

No	Latin Name	Vernacular Name	Family	Uses	Categories
1	<i>Arachis hypogaea</i>	Kacang tanah	Leguminosae	The leaves for feeds of Bawean deers	Cultivated
2	<i>Imperata cylindrica</i>	Alang-alang	Poaceae	The leaves for feeds of Bawean deers	Cultivated
3	<i>Saccharum officinarum</i>	Tebu hijau	Poaceae	The stems are pressed for sweet punch drink	Cultivated
4	<i>Pandanus tectorius</i>	Pandan pantai	Pandanaceae	The old leaves are dried under sunshine and used for handicrafts (carpets)	Wild
5	<i>Tacca palmata</i>	Grudukan	Dioscoreaceae	The fruits for feeds of wild birds	Wild



Figure 8. Daily Used Plants in Bawean Island; a) *Canna indica*, b) *Dioscorea hispida*, c) *Xanthosoma sagittifolium*, d) *Abelmoschus manihot*, e) *Limonia acidissima*, f) *Blighia sapida*, g) *Manilkara zapota*, h) *Diospyros discolor*, i) *Gmelina arborea*, j) *Irvingia malayana*, k) *Nypa fruticans*, l) *Ficus variegata*, m) *Phalaenopsis amabilis*, n) *Dendrobium anosmum*, o) *Pandanus tectorius*, p) *Tacca palmata*

We can learn from Bawean people, that in some parts, they consider conservation aspects in using plants in their daily lives through the use of cultivated plants, for the food source and herbal medicines. However, in the use of plants for housings or buildings, some Bawean people, especially people living near the forests, directly collected the woody plants from the forests and conducted logging in forest areas. These can threat the survival of woody plants and lead to the forest damages. Conservation of woody plants and forests needs to be considered to be

as the main priority. Conservation through cultivation or plantation of woody plants needs to be created (i) to meet the needs and demands for timbers for housings and (ii) for forest rehabilitation purposes. This conservation program needs to be socialized to Bawean people.

The present study on the local knowledge of Bawean provides information of the various uses of plant diversity. This confirms the essential role and the importance of plants for human beings as the plants are the source of foods, herbal

medicines, building materials, ornamental plants, and other vital uses.

The Potential of Plants for the Commodity Supporting Ecotourism Development in Bawean

There are some plants that are potential to be developed as commodities to support ecotourism in Bawean, such as traditional food and souvenirs (Table 10). Bawean island has traditional food, *kacang lendir*, which is made from *Abelmoschus manihot*. This is potential to be developed as commodities as Bawean traditional food that can be sold to support ecotourism in Bawean. Some fresh local fruits are also potential commodities for ecotourism, such as *Diospyros discolor*, *Manilkara zapota*, *Musa acuminata*, and *Limonia acidissima*. *Limonia acidissima* can also be processed for syrups as commodities. Local handicrafts as the characteristic of Bawean, such as local mats and hats made from *Nypa fruticans* and *Pandanus tectorius*, are also potential to be developed as commodities for ecotourism in Bawean (Table 10). *Musa acuminata* and *Dioscorea hispida* can be processed for crackers that can be sold to support ecotourism development. *Dioscorea* is used by locally people in east java especially in Nganjuk and it is easy to be cultivated [21]. *Phalaenopsis amabilis* and *Dypsis lutescens* are potential to be developed as commodities of ornamental plants.

Table 10. Some Plant Species Potential to be Developed as Commodities Supporting Ecotourism in Bawean

No	Plant species	Commodities potential
1	<i>Abelmoschus manihot</i>	Traditional food (kacang lendir)
2	<i>Diospyros discolor</i> (buah merah)	Fresh local fruit
3	<i>Manilkara zapota</i>	Fresh local fruit
4	<i>Musa acuminata</i>	Fresh fruits, crackers, traditional food (getuk)
5	<i>Dioscorea hispida</i>	Crackers
6	<i>Limonia acidissima</i>	Syrup
7	<i>Nypa fruticans</i>	Local handicrafts,
8	<i>Pandanus tectorius</i>	Local handicrafts, traditional rugs/mats,
9	<i>Phalaenopsis amabilis</i>	Ornamental plants or cutting flowers
10	<i>Dypsis lutescens</i>	Ornamental plants
11	<i>Irvingia malayana</i>	Tour service in Bawean deer sanctuaries by feeding the deers with leaves of <i>I. malayana</i>

Bawean island has a distinctive sanctuary with its endemic deer. The feed of the deers is leaves of *Irvingia malayana*. This species can be

developed as the feed source for the deers and can be a part of tour service of feeding the deers with its leaves in the sanctuary to support the ecotourism development (Table 10).

The involvement of local community in Bawean is important to support the production of those commodities for the development of ecotourism in Bawean. It can benefits the local community by increasing their income and to support the socio-economic progress in Bawean.

The production of those commodities that are sourced from plants needs to consider conservation of the plant species. The plant materials used in the production should not be harvested from forests as it can decrease the population of plant species in their natural habitat and threaten the existence of the plants. The plants that are used for the production of those commodities should come from propagation that can regenerate a large number of plants.

CONCLUSION

Bawean island with its attractive natural environments is potential for ecotourism. The local knowledge of the Bawean people on plant diversity and uses is important to increase understanding of the potential uses of plants and the potential for the development of plants for commodities that can support ecotourism in Bawean.

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Developing Marine and Coastal-based Sport Tourism on the Waterfront: The Case of Manado Waterfront, Indonesia

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Abstract

There are many marine-based sports that have become universally popular as tourist attraction on waterfronts. This study aimed to examine the existence of marine and coastal-based sport tourism on the waterfront. They are dependent on certain types of coastal environment or condition including surfing, windsurfing, fishing, scuba diving, snorkeling, water-skiing and sailing and parasailing. Each of these activities has millions of regular participants. Tourism communities realize the value of marine sports attached to waterfront and marine sport events continue to grow in size and number. This study uses on-site observation and interviews to the people at and around Manado waterfront. The results show that a number of benefits can be realized by communities of all sizes that have developed a strategic marine sports tourism plan such as 1) economic development for the city with increased benefits to host community and to the city in general; 2) marine sports system development by hosting events that are strategically planned leading to increased capacity within the city's marine sport system; 3) social and community development with trained volunteers increases community pride and the opportunity to enrich facility infrastructure. The community needs to be well equipped with a high standard of knowledge, skills and attitude to be employed in marine sports tourism sectors.

Keywords: marine and coastal-based sport tourism, waterfront.

INTRODUCTION

Tourism plays a role in the use of waterfront areas with new uses such as marine sport tourism. It refers to marine and coastal-based sports presented as tourist attractions around the waterfront. It can be defined as the attractions providing tourists with marine and coastal-based activities as their principal focus. Such attractions can occur in a diversity of settings. The nature and significance of both marine sports and waterfronts are integrated for commercial activities. The globalization of markets and industries has fundamentally changed the competitive conditions in the sport tourism events. Marine sport tourism is a growing industry that continues to develop [1]. Sport tourism event globalization has influenced product diversification strategies of marine and coastal-based sport tourism issues to overlook in both the strategic management and international sport tourism industries. This paper develops a theoretical framework to understand how waterfront related to marine and coastal-based sport tourism that may influence the globalization and its degree of development and scope of its international promotional market.

Marine and coastal-based sport tourism refers to marine and coastal-based sports presented as tourist attractions. This paper highlights a product diversification of marine and coastal-based sport tourism especially in the waterfront. Development and the future trends of such kinds of sport tourism have been growing rapidly in Indonesia for few last years. It can be seen through the annual event of International Festival of Youth and Marine Sport sponsored by the Youth and Sport Ministry of Indonesia where marine sport tourism will always be the main event.

This study enhances knowledge and understanding on how marine and coastal-based sport tourism in the waterfront as sports industry gives economic benefits to the regional development. This opens a wide opportunity to expand the roles of tourism for marine and coastal-based sports in the waterfront. This paper will provide communities with an awareness of the diversity of marine and water-based sport tourism as a leisure activity and at the same time introduce a wide range of marine sports tourism development within a marine sporting context and within a tourism context in the waterfront. It will develop an understanding of the opportunities and demands for both marine sports tourism and the responses of both marine sport and tourism providers. The purpose of this study are to: 1) introduce community to the nature and signifi-

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cance of both sport science and tourism that can be integrated to become a variety of marine and coastal-based sport tourism both for leisure and commercial purposes; 2) identify potentials and opportunities of product diversification of marine and coastal-based sport tourism in the waterfront; 3) increase the contribution of marine and coastal-based sport tourism events to local community and economy; 4) enhance and strengthen the roles of marine and coastal-based tourism in the sport industry development; 5) enhance the integration of two theoretical backgrounds on the concept of tourism and sport on the waterfront urban setting and tourist destination.

WATERFRONT

In spite of debates concerning waterfront development in the city planning literature, few clear definitions of waterfront exist. Few scholars have defined waterfronts precisely. Waterfront is defined as the bay, canal, lake, pond and river including man-made. It is in the area of a city, such as a harbor or dockyard, alongside a body of water. It is also a developed area that is densely populated and is being used for, or has been used for urban residential, recreational, commercial, shipping or industrial purposes [1,2].

The multiple uses of waterfront have affected numbers of people who are beginning to aware that their waterfronts can bring positive impacts to their communities. The waterfront development has multiple uses by encouraging local people to innovate a new economic way in attaining profits, refurbishing areas, restoring and protecting natural resources and improving waterfront recreation including sport tourism. A study of Singapore waterfront developments is undertaken. It is for attracting tourists and positioning the city as a global hub, while providing leisure sites for locals [4]. Core waterfront development objectives have been traced in the literature. There are various motivations for waterfront development, such as to: 1) achieve public access to the waterfront; 2) improve the image of neglected waterfront areas; 3) achieve economic regeneration to such areas; 4) open the city to the sea for people and leisure uses; 5) preserve historic buildings; 6) create a waterfront residential community; 7) increase city visitors and attendant facilities and accommodations; 8) strengthen the city's economic base, attract private investment, increase employment and increase municipal revenues [5,6]. For example, a study of waterfront in Philadelphia is situated at

the edge of the central city and adjacent to a refurbished historic district and serves as a centre of commerce, tourism and recreation [7].

Waterfronts have unique characteristics and, therefore, provide special opportunities for urban development. Specific element of the waterfront is its nature which encourages the vision for it provides unique characteristics for urban development [8]. Waterfront development has been explained as an investment in a time that gives the expansion of finance capital and global economy [9]. Waterfront as an important part for marine and coastal-based sport tourism requires an acknowledgement that the sport and tourism development program should be prepared in accordance with ongoing physical, social and economic changes.

SPORT TOURISM

Sport tourism has been defined as all participations in sport activity both casual and organised ways for both commercial and noncommercial reasons that performed during travel away from work and locality [10]. Sport tourism all around the world has become a need and drawn a great attention for a few past years due to increased need of physical health and to attract sport tourists through sport events. Sport tourist consisting of individuals who attend sport events during holiday which categorized into 3 groups as follows: 1) Event participants who are travelling and get involved in organized sport events; 2) Event spectators who are travelling for watching a sport event; and 3) Sport lovers who are travelling on their own and taking self-arrangement sports [11]. The Travel Industry Association of America estimated that in a year's time, over 50 million adults in the United States traveled 50 miles or more to attend organized sport events, competitions, or tournaments as either spectators or participants [12]. Such approach enhances mindset in increasing the marine sports to be a tourist attraction.

Good management and development of marine and coastal-based sport tourism could made a significant contribution to both tourism and sport development for the region. The study of marine and coastal-based sport tourism in this study focuses on the product development and diversification of wide ranges of marine and coastal-based sport tourism issues on the waterfront. It also targets the local community acceptance which refers to the ideas and opinions to develop and designed marine and

coastal-based sport as both recreational and commercial activities in the waterfront.

As tourist attractions, marine and coastal-based sport tourism can be included in the calendar of events in which they may attract tourists visiting the regions as it offers multiple opportunities for increasing marketing strategies including product diversification in the city as tourist destination. To implement such concept, a good plan and collaborative approach implemented by stakeholders is urgently required to meet the need for high standards facilities and services available for tourists. The supply of opportunities for marine and coastal-based sport in the waterfront is designed as tourist attractions that can be categorized as marine and coastal-based activities referring to natural, cultural and social attractions and special events.

MARINE AND COASTAL-BASED SPORT TOURISM IN THE WATERFRONT

At the beginning of 21st century, a variety of tourism experiences such as sport and leisure, and recreation activities offer tourists a range of choices and good opportunities on how to spend their holiday [13]. Marine and coastal-based sport tourism activities offer several choices. To add the diversity of such sport recreational tourism, it can be undertaken in various environments including waterfront environments. Diversity of such activities refers to various roles for engaging these activities. The people ranges from participants, spectators, referees, coaches, service providers, organization and association officials or volunteers. The reasons to participate in tourism, leisure and sport and recreation is affected by the aspects of family lifestyle, finances, time, the perception on skill, novelty, risk, challenge and adventure [13].

Marine and coastal-based sport tourism has become universally popular for tourist attractions. They are dependent on certain types of waterfront environment and condition and each of these activities has millions of regular participants. It has both competitive and recreational aspects in the waterfront setting where a professional sporting competition is developed. In addition, each of these sports has developed an image or series of images and could be termed a city waterfront culture.

The city's waterfront as tourist destination, as a tourism product and as recreational space has significantly contributed to the development of marine and coastal-based sport tourism. It can be seen from the marketing potential value of

water-based sport tourism through the notion of the spirit of environmental setting. Such sport tourism is dedicated to the geographical factors; the waterfront setting and its potential as a tourist attraction combined with its importance as a leisure and recreational functions. This also portrays the crucial role of marine and coastal-based sport tourism on the waterfront on the socio-economic development of the region. Examples include surfing, windsurfing, fishing, scuba diving, snorkeling, water-skiing and sailing, cruising, motorized, fishing and big-game fishing, whitewater rafting, kayaking, and one-day boating adventures. Each of these activities has millions of regular participants.

Water-based sports reflect the lifestyle that has being developed around the activity of marine and coastal-based sport tourism. Thus, such recreational sports or activities as tourist attraction have an influence that extends far beyond an enthusiasm for the activity itself. For many participants, and even for non-participants, the image and lifestyle associated with the marine and coastal-based sport activities in the waterfront are attractive for tourism development. Recognition of the community development potential of sport tourism has resulted in heightened interest in demonstrating the economic impact of sport events [14]. Different form of marine and coastal-based sports for tourism attraction that can be developed in terms sport leisure or recreational activities such as follows [13]:

Scuba Diving, Snorkeling and Free Diving

Scuba diving, snorkeling, and free diving are three water-based experiences that access the marine environment using different approaches, equipment, and techniques. Snorkeling and free diving use less equipment, as they only require the assistance of a mask to see clearly underwater, a snorkel to breathe on the water surface, and fins to enable propulsion. Free divers might use a small amount of weight to assist descent. Snorkelers primarily swim on the water surface facedown, searching and discovering the marine world below.

Free diving is sometimes described as "breath-hold diving" and was traditionally called "skin diving" [13]. It involves taking a breath before plunging below to swim immersed for a short time in the underwater realm. With practice, free divers develop the ability to remain submerged for some minutes before needing to surface for air [13].

Diving is a famous and commercial marine and coastal based sport tourism in North Sulawesi that has growing rapidly for the last few years. Diving offers a wide range opportunity to explore magnificent coral gardens of Bunaken Marine Park and Bangka Strait to the walls of fishes and underwater volcanoes of the Sangihe Islands to the unusual and rarely seen critters of Lembeh Strait. The coral reefs which ring the islands of Bunaken are among the most spectacular in Indonesia and have been rated by internationally experienced divers with some of the great reefs of the world.

Snorkeling is one interesting sport to experience beautiful corals and abundance of small, colorful reef fish. The islands in North Sulawesi are both beautiful and dramatic due to the combination of its exotic beaches. With an abundance of colorful marine life, warm waters and easy access, the islands are ideal for snorkeling.

Sailing and boating

One of the traditional forms of water-based experiences is boating. Historically, the use of boats for transportation, exploration, trade, and warfare predates boating as a recognized tourism, sport, leisure, and recreation experience. Over time, however, societal, cultural, political, and economic changes as well as technological developments have provided both the opportunity and encouragement for the development of a wide range of water-based activities related with boats. These experiences range from sailboating to motorboating in all their various forms. In addition, there has been growth in a number of boating-related experiences [13]. This emphasizes the multiplicity of sailing related leisure and sport tourism activities in which tourists, sports persons, and people at leisure, and recreationists may engage.

Sailing and Cruising

Sailing as an activity may be undertaken in a variety of physical locations; over varying time periods; for different reasons; with differing participant skill levels; by various numbers of participants; via formal or informal organizational structures; and using differing vessel designs or constructions, and materials drawn from a wide array of technology and corresponding levels of expenditure [13]. This multiplicity of options offer sailing as sport, recreation, and leisure including serious leisure, touristic experience or lifestyle pursuit that tend to exist in the

waterfront. These activities incorporate elements of sailing as a sport, recreation, leisure, touristic experience, and lifestyle.

Motorboating

Motorboating is boating that uses a motor as the key or only means of propulsion. Motors may be outboard or inboard. Despite the passage of time, boating continues to maintain its popularity as a sport, leisure, and recreational experience across a number of countries such as the United Kingdom, France, the Netherlands, Germany, the United States, Australia, New Zealand, and Canada. In Asia, recreational boat ownership is a more recent phenomenon. For instance, boating in Japan only became an emerging market during the late twentieth century. In addition to sport, leisure, and recreation, boating has also become a key part of the varied suite of touristic experiences offered at destinations associated with water resources [13]. In fact, rejuvenation of some ports, harbors, and waterfronts has been associated with a refocusing on recreational boating and related business enterprises, such as marina developments.

Kayaking

There are a number of trends that can be identified within kayaking as sport, recreation, and tourism. The first is an exploratory or journeying dimension across a range of water environments based on lightness and maneuverability and linked to a kayaking history in the developed world. As kayaking became established, further trends became evident. An important second trend concerns kayak design and manufacture. This began to evolve, and innovative technologies were applied to the production of kayaks and ancillary kits such as paddles, spray decks, and buoyancy aids. Each stage in this process emphasized the kayak's lightness and maneuverability while adding strength and robustness to the craft [13].

Surfing and Windsurfing

The beaches on the waterfront and islands offer windsurfing opportunities. Windsurfing in the coastal areas and in the waterfront become potential tourist attraction in a city destination both for windsurfing enthusiasts and for tourists. By comparison, windsurfing is a comparatively young sport in a history for four decades [13].

Sport Fishing and Big Game Fishing

Fishing in its various guises has long been a favored form of water-based recreation and, for some, a necessary means of subsistence. As with many survival activities, fishing has become a popular sport motivated by the challenges of competition [13].

One-day Boating Adventures

A broad definition of one-day boating adventures includes both commercial one-day boating tours as well as recreational activities undertaken on one-day boat trips. This latter category consists of many of the specific activities, such as fishing, sailing, diving, and motorboating. One-day boat tours run as commercial tour operations. Although the focus is on one type of one-day boating adventure, many of the issues identified also apply to other forms [13].

METHODS

The research questions were explored through a case study of Manado, North Sulawesi, Indonesia. Case studies are a qualitative strategy through which the researcher explores in-depth a program, event, activity, process, or one or more individuals. The advantage of a case study approach is that it permits a particular case to be explored in depth.

This research focuses on the case of waterfront in Manado, Indonesia. The case was bounded by time and activity and the researcher collects detailed information using a variety of on-site observation data collection procedures at and around Manado waterfront. The study examines that opportunity for sport tourism development on the waterfront is high. It is relevant with the program of city governments of Manado who have introduced waterfront development to the public over a period of almost two decades.

RESULT AND DISCUSSION

Since 1992, a vision has existed to establish Manado as a waterfront city to attract tourists and visitors to the area. As a part of that program, the city government declared the vision for Manado to become a world-class tourism city in 2010. The city development program was reinforced by the achievement of the green and clean city award in 2002 and 2007 from the central government. It is an attempt to put together a study on marine and coastal-based sport and tourism which selects waterfront as

important based on their given geographical settings and special characteristics. The results are generally emphasizing the urgent need to study marine and coastal-based sports in a tourism context since the demand for marine and coastal based sport is growing on Manado waterfront.

How Marine and Coastal-Based Sport Relates to Tourism on Manado Waterfront

On-site observation identified marine and coastal-based sports tourism on Manado waterfront as a growing industry that continue to develop in the city (Fig. 1 and 2). Communities are realizing the value of interacting with both the marine and coastal-based sport and tourism industries as multisport events and tourism conferences that continue to grow. The benefits of well-developed strategic marine and coastal-based sport tourism include: 1) Economic development for the city with increased benefits to host community and to the city in general as tourist destination; 2) Marine and coastal-based sport system development by hosting events that are strategically planned leading to increased capacity within the city's marine sport system; 3) Social and community development with trained volunteers increases community pride and the opportunity to enrich facility infrastructure; 4) Economic development in increasing economic development to the host community and to region as tourist destination.



Figure 1. Jet sky on Manado waterfront
(Personal documentation, 2015)

Next to the mall area there is a floating restaurant called 'Wisata Bahari' which serves sea food for tourists and other visitors. This is one of the favourite restaurants for city visitors.

Culinary tourism combined with sport tourism within the area offers multiple opportunities for enhancing the marketing of North Sulawesi's tourism. Collaboration with a well planned program implemented by tourism stakeholders is urgently required to meet the need for a high standard of facilities and services for tourists.



Figure 2. Parasailing competition on Manado Waterfront
(Personal documentation, 2015)

Sport Tourism on Manado Waterfront

Data collection from the interview with people at and around Manado waterfront shown that Manado has the potential to attract tourists to the urban area (Fig. 3). The future plan for Manado Waterfront introduces a justification used in the establishment of Marine Protected Areas (MPA) for local uses and tourist attraction. There is an evidence to suggest that marine tourism experiences by local fishermen before the reclamation can be recaptured to prompt people involved in the Manado tourism development become more environmentally responsible and to become active in marine conservation along the Manado bay.



Figure 3. Plan for Snorkeling Areas at Coral Reefs
(Development concept, 2015)

This has led to an increase in its tourism profile through product development based on tourists' demands. Tourism is considered by local

government as a significant sector to generate economic growth. This has led to an increase in planning for tourism in the city based on existing resources and the creation of new products. Tourism in Manado is in an expansion phase and tourism is being used as a development catalyst. At the same time, there is a need to invest in other tourism resources, such as heritage and/or historical attractions, and also in infrastructure, in order to enhance the tourism image leading to competitive advantages for the city. However, urban tourism development provides many challenges for Manado City if urban tourism is to be planned and developed in a sustainable manner. Urban tourism in Manado has emerged as a result of intensive development of tourism infrastructure and product development that has required a process of tourism planning. However, further studies are needed in order to understand the phenomenon and the complexity of urban functions which will influence tourism development in the area.

This research suggests that the Manado waterfront should be designated for pedestrians. This introduction of the pedestrian paths relatively facilitates comfortable access for tourists, city visitors and city residents. The introduction of the variety recreation activities surrounding Manado waterfront are suggested. The increasing accessibility to Manado waterfront will offer another opportunity to cyclists to enjoy nature while doing sports within the area (Fig. 4).



Figure 4. Cycling areas at Manado Waterfront
(Development concept, 2015)

Waterfront development, as a part of urban tourism, has been adopted to support the growth of the city. Heavy investment by the local authority in infrastructure for tourism, including the development and redevelopment of the waterfront, requires integrated planning for the overall urban tourism development in the area and integration with broader urban development concerns [15].

CONCLUSION

Manado Waterfront Development (MWD) has greatly influenced the coastal areas and environmental modification was unavoidable in such a project. Tourism has been taken seriously by the Manado City authorities and this can be seen in the initiative to promote Manado as a waterfront city. This effort has provided significant momentum for further development of the waterfront as a part of urban tourism.

Marine and coastal-based sport tourism in the Manado waterfront has increased the reputation of the city as a major tourist destination. Product diversification of marine and coastal-based sport tourism brings benefits to community developers, sport event planners and tourism professionals through economic impacts that reveal the impact of tourist spending on host residents' income where the events are taking place.

An integrated approach between sport science and tourism create the economic value of marine and coastal-based sport tourism in the waterfront as one of extreme importance. This is due to their physical requirements as they are predominantly concentrated on marine and along the coasts of an urban waterfront setting. Therefore, the nature of participation in sport and tourism is affected by several issues for example time, finances, family life style and participants' perceptions of skill, risk, adventure and challenge. This opens a wide range of opportunities for marine and coastal-based sport tourism to diversify its products in terms of types of activities and services.

Sustainability and future directions of marine and coastal-based sport tourism need to become an important issue both for sport science and tourism industry. Therefore, sustainability in product diversification of marine and coastal-based sport for tourism attraction in the waterfront should call the attention of numerous researchers, practitioners, community members, stakeholder groups, authorities at local and regional levels, state, national, and international levels. While such kinds of sport tourism utilized the waterfront as its physical environmental setting, sustainable development should be taken into consideration that is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. In addition, there is a need for further study and research on the marine and coastal-based sport tourism for the sake of sport science and tourism industry developments especially in the less developed

countries where the resources are abundantly available but lack of capacity both human and capital resources. Therefore, ability to secure funds for high management practices for product diversification of marine and coastal-based sport tourism from several sources of funding, including central government subventions and donor funding and through sponsorship and partnership are strongly encouraged. This will become truly successful and economically sustainable when such sport tourism events reach a self-financing status.

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The Potential of Butterflies in Tourism Diversification Product: Case Study at Coban Rais Waterfall, Batu, East Java

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Abstract

The diversity of Butterfly in Coban Rais is one of the potential resources for tourism product diversification and development. The aims of this paper are to determine the magnitude of the butterfly potential as a form of tourism products diversification and development in a sustainable tourism industry. There are 107 species of butterfly that come from six families was found in Coban Rais waterfall. Some species have a very large population in a specified activity, such as mud-puddling and mating. *Udara akasa* has the highest potential to make colony and *Cyrestis lutea* is a species that have the potential as a major attraction in the mud-puddling activity. Sector 3, the location of riparian with sand and gravel, is the site of the largest butterfly visits. The dry season is the highlight of a butterfly visit in Coban Rais. Development of human resources is important for the tourism products diversification in Coban Rais, i.e. the butterflies observer and visitors services. We recommend establishing a breeding center for butterfly population recovery and educational goals for visitors.

Keywords: butterflies, Coban Rais, product diversification.

INTRODUCTION

Tourism product has evolved rapidly followed by the rise of profits until early of this decade [1]. The high demand of tourism site reflects the economic development which transform rural areas into cities and urban settlements [2]. However, this development is not well-matched by adequate recreation facilities and people has large of interest on varying destination. This is an opportunity for tourism organizer who immediately undertake massive investments to build and develop attractions, both natural and artificial. Thus many managers, agents, and absorption of labor in the tourism industry lead to a tighter competition [3].

However, in the end, innovation and product diversification will determine the sustainability of a tourism destination. Novelty is mostly sought after by tourists, and many of them would not go again to a place that has been visited [4]. This condition is due to the form of management and development which are not considered by stakeholders. Instead of doing development, many tourism destinations were closed due to no longer visited by tourists, and left the natural

attraction decay, unemployment, and other eco-social impacts [5].

Ecotourism is nature-based tourism concept which has three main pillars: profits, culture, and recreation [6]. All three became one to build a sustainable tourism and benefit to nature and society. However, ecotourism also have the same challenges and must be faced. Innovation and development is the key to maintain the tourism destination existence through diversification tourism products [7].

Coban Rais is a tourism destination with 70 m in height waterfall as a main object. It is located in the southwest of Batu: Oro-oro Ombo village, Batu City (Fig. 1), East Java, Indonesia, with an altitude of 1002 meters asl [8]. This location is in the management of PT Perhutani (Persero). Coban Rais is well known by student community and visitors with their fascination in waterfalls. In fact, visitors get to know Coban Rais as a secondary objective on their visit in Batu City [8]. Most of the people do not know any other Coban Rais potential as many species of butterfly habitat. The purpose of this paper is to determine the magnitude of the butterfly potential as a form of diversification on tourism products and plans the future development in sustainable tourism industry.

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MATERIAL AND METHODS

This research was conducted in three period of observations: dry season (July), monsoons (August-early September), and rainy season (October) 2015. However, every season does not trigger a change in the community structure and their migration. Observations were made only on the type of butterfly that flew during the day (diurnal). Identification used field observation approach. The line between the gatehouses to the waterfall is divided into five main sectors; each sector is 500 m long (Fig. 2). First sector was cover a parking lots, camp ground, and ticket window, and the last sector was cover waterfall position. Each sector was observed specifically and butterflies as the object identified and documented to support the identification. Several species which requires detail

identification on the upper side were caught and their pattern carefully documented. The results of three time observations will be compiled in the form of observation list.

Each location visited by more than 20 individual butterflies was recorded as *attractive location* [9]. This location indicates that there is temporal abundance (butterfly in colonies) due to mud-puddling or mating behavior. Each location visisted by rare species and rarely were marked as *significant locations*.

This location could be predicted as habitat of food plant for rare butterflies and require special analysis and attention. Attractive and significant locations were marked in GPS (Global Positioning System) to establish a geographic analysis of data as a support of tourism maps.

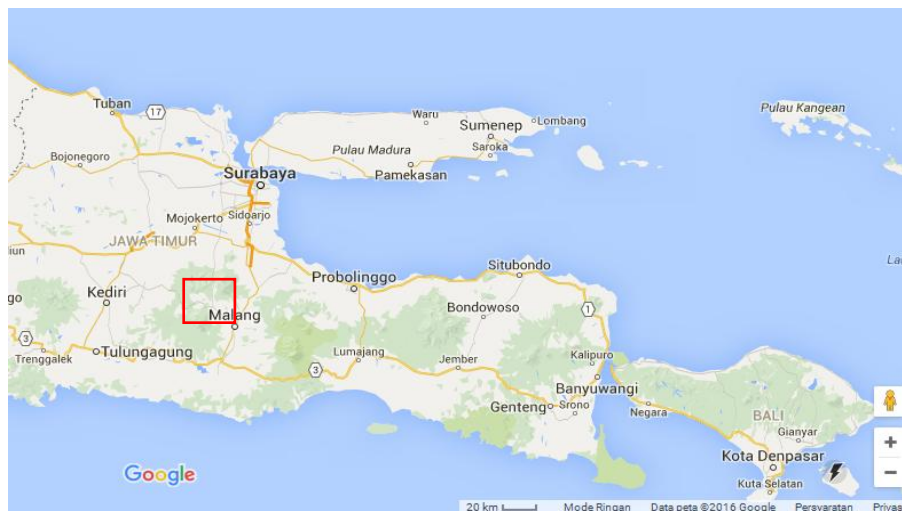


Figure 1. The Location of Coban Rais Waterfall. **Description:** □ Study Site



Figure 2. The Waterfall Route that Divided Into 5 Sectors (Source: Google Earth)

The equipments that used for documenting is 1100 D Canon DSLR camera with kit and a 75-300 mm USM lens. An insect net with 50 cm diameter is used to catch butterflies. The results of the observations are recorded as a table form in the field note. Study of literature-based data is done by compiling butterfly-watchers record, either species or families completeness and location.

RESULT AND DISCUSSION

We discovered 107 species (Appendix 1) that come from six families. Some species have a very large population in a specified activity, such as mud-puddling and mating. We recorded several species that are always found in colonies and solitary. However, some species have the ability to form a large colony than others (Fig. 3), such as *Udara akasa* Horsfield (Fig.4).

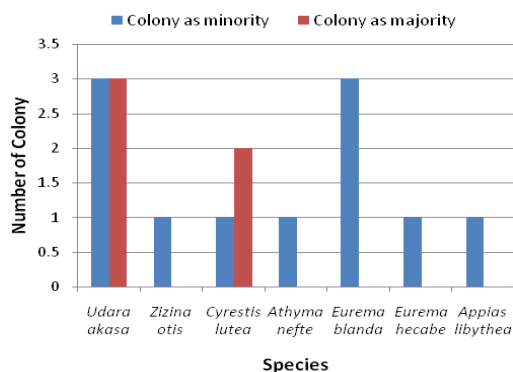


Figure 3. Species Known to Have Ability to Form Colonies

Colony forming process carried out when butterflies do the absorption of minerals together [10]. This activity is more known as mud-puddling. Butterflies absorb minerals such as potassium and sodium which derived from animals and humans sweats, feces, organic waste, or urine [10]. Some minerals dissolved by water and deposited on the wet sand and evaporated, thus attracting butterflies to come and do a mud-puddling activity.



Figure 4. *Udara akasa* Colony
(Sources : Personal documentation)

We also found a rare species *Troides cuneifera* Oberthür (Fig. 5) that protected by Indonesian republic government through the UU no.5/1990 [11]. This rare species was found in sector 3, when its fly through the tourist track.



Figure 5. *Troides cuneifera*
(Sources : Personal documentation)

The observation shows that sector 3 is the most preferred route of butterflies visit, with an average value of 1.75 on three observations time, then followed by sector 1 and sector 4 (Fig. 6). The highest average visit of butterfly in Coban Rais is during the dry season, when many butterflies observed around water flow. During the rainy season which is in the second position, a lot of butterflies seen among the flowers which available along the sector (Fig. 7).

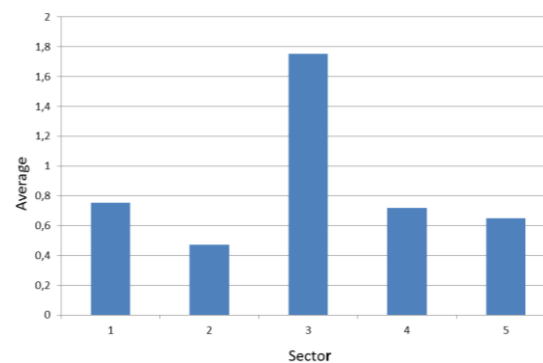


Figure 6. The Average Value of a Butterfly Visit

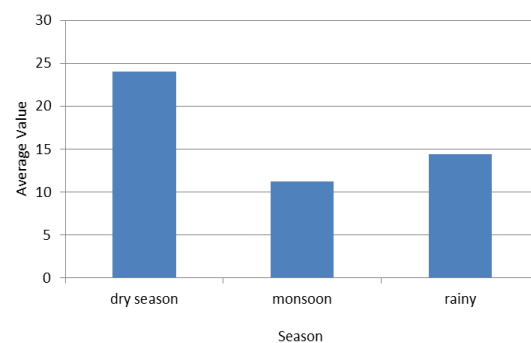


Figure 7. Average Value of Butterfly Visit based on Season

Coban Rais equipped with water flows which are always there every year. The altitude of 1002 meters makes it into a potential diversity of highlands species that may not exist in other locations. This altitude makes surrounding area of Coban Rais is cool. Besides of the waterfall, the scenery along the route is very interesting (Fig. 8). Visitors can enjoy Batu city scenery from Panderman mountain foothills. Today, many tourist utilize the available facilities, such as camping grounds and jungle trekking route.



Figure 8. Natural Scenery of the Route to the waterfall
(Sources: personal documentation)

Butterflies that found in sector 3 is much higher than in others, even compared to sectors 5 which includes the location of the waterfall. The waterfall is very humid and windy due to the heavy movement of water (Fig. 9), so the less favored by butterflies when they still requires sunlight. Sector 3 is a route that through the stream banks of Coban Rais River. Riparian is often contains of water-borne minerals from organic matter, such as humus, feces, or urine of animals. These deposits evaporate and invite many butterflies to come and do mud-puddling [10]. This activity is supported by conditions in sector 3 that has a small plateau and composed by fine sand, gravel and surrounded by a lot of shrubs are available for butterflies as well as a sunbath perch.

Mud-puddling is dominated by *Udara akasa* (family Lycaenidae). *Udara akasa* is potential as an interesting object of attraction, because it can be minority part of a colony or dominance in a colony. However, because of the size is very small (1 cm in length), a deep identification is required by arrest or documentation. *Udara akasa* is not sensitive in human traffic and will soon return to mud-puddling location when disturbed, so make it as interesting side of their attraction. This will make the visitors looks like walk among hundreds of butterflies in that route.



Figure 9. Coban Rais waterfall
(Sources : Personal documentation)

Cyrestis lutea is a butterfly of the Nymphalidae family and became the interesting objects of observations on the mud-puddling activity. In addition to the high ability to form colonies of mud-puddling, this species has a yellow-gold glittered as the sun reflected off. That size is also quite large, so it is very representative when used as an observation object. This is different to *Eurema blanda* (Pieridae family). This butterfly is in yellow colour that looks very monotonous. It is presence in each colony as minority in a small number.

Sectors 1 and 4 being the location which is pretty much visited by butterflies, supported by large flowering plants found in these locations. Butterflies much need nectar for food. Some butterflies are known to absorb organic material on this site is derived from the sap, rotting fruit, and the fluid that comes out of the shoot. These products contain a lot of sugars that needed by butterflies, especially females [11].

Sector 2 is the route of the least visited by butterflies. Vegetation that seen in sector 2 is short grasses between the pines. The possible reason of the least visit of the butterflies due to plants that are not diverse, thus reducing the potential for the existence of the food chain cycle [12], where the butterfly is included. Observations show that the butterflies were seen in sector 2 just flew through without a perch or any other activities.

Comparison of butterflies in the seasons showed a high butterfly visit during the dry

season. The scorching sun will make water in soil surfaces and plants evaporated. These conditions favor the evaporation of mineral which contained at top soil, thus supporting the many activities of mud-puddling [13]. In addition, the condition of Coban Rais which always have water is support the activity of mud-puddling, such as mineral dissolution and survival of flower plants.

The lack of rain in time of drought also increases the success of metamorphosis in Lepidoptera, including butterflies [13]. Rainwater will break the cocoon as a part of the metamorphosis.

Rainy season is quite exciting visit a butterfly on a location. Very high rainfall can trigger the growth of flowers and attract butterflies as nectar eaters [14]. Transitional season did not attract butterflies; possibly due to seasonal changes occur often quite extreme. This condition occurs where the rain and heat come in often erratic [15], so that the process of metamorphosis and reproduction of butterflies are often disrupted.

Coban Rais which has the potential of beautiful natural scenery, gifted by a diversity of butterflies that have the potential as a tourism attraction. The emergence of butterflies' colonies on routes strongly supports the ease of visitors to enjoy the butterfly as an object. Visitors can photograph the butterflies on the location and the right time. Butterflies in Coban Rais generally can be enjoyed throughout the year, but the knowledge of the right season can help visitors in assessing the condition of the butterflies diversity and time of their visit.

The tourism products such as butterfly or any other wildlife component is a great potential for destination development. In contrast to tourism, major attractions such as scenery or artificial activity, observation of wildlife is not boring and always growing up. Some types of wildlife also have a certain visitors with a selection of tourism concept. This concept applies to the selection and the prices were very strict quotas. Nonetheless, it is still has a visitors enthusiasts [1].

However, in addition to the benefits, the wildlife based tourism has challenges in its development as sustainable industry. The main challenge is to continue the research which provides information that will be used as attractions for visitors. This is related to the appropriate time and location of visits. The strength of wildlife information that intended as an attraction is the main factor in attractions

competition or even tourism with the same object.

Research is also crucial to the development of attractions and discovers the limits of carrying capacity [16], in this case is to support the protection of wildlife which became the main object. The condition of the object in the living form is very important to conserved and managed properly, especially developed in: population, the intensity of visits, and the condition of wildlife [1].

Coban Rais in the development of the butterfly as a tourism product requires a few things, especially adequate human resources [17]. The existence of the officer who is specifically understood all wildlife behavior that is used as an object of attraction is very important, especially in the field of behavioral and ecological things. The existence of the officer who is specifically observing the behavior and ecology of the location is very important and contribute any useful information for visitors, after being processed by manager or leader of tourism destination.

Officers within the tourism site needs to develop their ability to serve visitors. Coban Rais is in need officers who served the ticket seller and guiding services in walking through the routes to the waterfall.

Resources in the facilities and infrastructure forms are need to be developed, especially routes that intended specifically as a tourism. Coban Rais has a main route that must be maintained of the carrying capacity for the sustainable butterfly attraction. The cutting of the grass beside of the route should only be done in the rainy season and not done on sector 3 that have a lot of butterflies, to prevent of damaging the food plant or kill the butterfly larvae. It is not recommended to control weeds or wild plants by using chemicals because it will kill all insects, including butterflies.

The attraction infrastucture that support tourism activity has generally been available in Coban Rais, such as parking lots, a ticket window, information boards, directions, bathroom, musholla, camping ground, etc. However, in the development of butterfly as a tourism product, it is advisable to establish a semi-natural breeding center of butterfly. The butterfly observer can breed some species, either rare or not, with the purpose of recovery of butterfly population. In addition, breeding butterflies can be useful to support the benefits of education for visitors such knowledge on the butterflies conservation,

life cycle, taxonomy, as well as other educational programs [17].

Coban Rais as a nature tourism is very vulnerable to the destruction, such as landslides (Fig. 10), flood, or the collapse of the trees that cover the route. The indispensable treatment of area that will minimize obstruction of route conditions due to damage. The emergency conditions also require immediate repairs and is possible only when managers have officers that ready in restoring routes or other tourist facilities in general.



Figure 10. Road damage caused by landslide

CONCLUSION

The butterflies in Coban Rais was diverse and potentially able to developed as natural attraction. The butterfly development as a tourist attraction in Coban Rais must be supported by human resources, especially knowledge of the field and the ecologicalof butterflies, as well as improve services to visitors. Additional facilities are advised to be built is breeding center as supporting education for visitors and population recovery.

Acknowledgement

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Appendix 1. Table of Species Record

No	Species	Family/Subfamily
1	<i>Ampittia dioscorides</i>	Hesperiidae
2	<i>Bibasis sena</i>	Hesperiidae
3	<i>Bibasis oedipodea</i>	Hesperiidae
4	<i>Borbo cinnara</i>	Hesperiidae
5	<i>Halpe sikkima</i>	Hesperiidae
6	<i>Notocrypta paralyos</i>	Hesperiidae
7	<i>Oriens gola</i>	Hesperiidae
8	<i>Parnara apostata</i>	Hesperiidae
9	<i>Pelopidas conjuncta</i>	Hesperiidae
10	<i>Polytremis lubricans</i>	Hesperiidae
11	<i>Potanthus omaha</i>	Hesperiidae
12	<i>Potanthus trachala</i>	Hesperiidae
13	<i>Potanthus ganda</i>	Hesperiidae
14	<i>Pseudocoladenia dan</i>	Hesperiidae
15	<i>Tagiades japedus</i>	Hesperiidae
16	<i>Tagiades gana</i>	Hesperiidae
17	<i>Taractrocera archias</i>	Hesperiidae
18	<i>Telicota colon</i>	Hesperiidae
19	<i>Telicota ohara</i>	Hesperiidae
20	<i>Udaspes folus</i>	Hesperiidae
21	<i>Arhopala sp.</i>	Lycaenidae
22	<i>Arhopala sp.</i>	Lycaenidae
23	<i>Arhopala eumophus</i>	Lycaenidae
24	<i>Catochrysops strabo</i>	Lycaenidae
25	<i>Heliophorus epicles</i>	Lycaenidae
26	<i>Jamides alecto</i>	Lycaenidae
27	<i>Lampides boeticus</i>	Lycaenidae
28	<i>Leptotes plinius</i>	Lycaenidae
29	<i>Miletus boisduvalli</i>	Lycaenidae
30	<i>Miletus symethus</i>	Lycaenidae
31	<i>Nacaduba berenice</i>	Lycaenidae
32	<i>Poritia erycinoides</i>	Lycaenidae
33	<i>Prosotas dubiosa</i>	Lycaenidae
34	<i>Prosotas nora</i>	Lycaenidae
35	<i>Udara akasa</i>	Lycaenidae
36	<i>Zameros flegyas</i>	Lycaenidae
37	<i>Zizina otis</i>	Lycaenidae
38	<i>Euripus nyctelius</i>	Nymphalidae - Apaturinae
39	<i>Hestina mimetica</i>	Nymphalidae - Apaturinae
40	<i>Acraea issoria</i>	Nymphalidae - Apaturinae
41	<i>Ariadne ariadne</i>	Nymphalidae - Biblidinae
42	<i>Cyrestis lutea lutea</i>	Nymphalidae - Cyrestinae
43	<i>Euploea eyndhovii</i>	Nymphalidae - Danainae
44	<i>Argynnis hyperbius</i>	Nymphalidae - Heliconiinae
45	<i>Vagrans egista</i>	Nymphalidae - Heliconiinae
46	<i>Athyma nefte</i>	Nymphalidae - Limenitidinae
47	<i>Discophora sondaica</i>	Nymphalidae - Limenitidinae
48	<i>Euthalia aconthea</i>	Nymphalidae - Limenitidinae
49	<i>Euthalia monina salia</i>	Nymphalidae - Limenitidinae
50	<i>Euthalia whiteheadi</i>	Nymphalidae - Limenitidinae
51	<i>Neptis hylas</i>	Nymphalidae - Limenitidinae
52	<i>Phaedyma columella</i>	Nymphalidae - Limenitidinae

No	Species	Family/Subfamily
53	<i>Hypolimnias anomala</i>	Nymphalidae - Nymphalinae
54	<i>Hypolimnias bolina</i> (Female record)	Nymphalidae - Nymphalinae
55	<i>Ideopsis gaura</i>	Nymphalidae - Nymphalinae
56	<i>Junonia iphita</i>	Nymphalidae - Nymphalinae
57	<i>Symbrenthia anna</i>	Nymphalidae - Nymphalinae
58	<i>Symbrenthia hypselis redonsilla</i>	Nymphalidae - Nymphalinae
59	<i>Symbrenthia lilaea</i>	Nymphalidae - Nymphalinae
60	<i>Elymnias casiphona</i>	Nymphalidae - Satyrinae
61	<i>Elymnias hypermnestra</i>	Nymphalidae - Satyrinae
62	<i>Elymnias nesaea</i>	Nymphalidae - Satyrinae
63	<i>Lethe confusa</i>	Nymphalidae - Satyrinae
64	<i>Lethe minerva</i>	Nymphalidae - Satyrinae
65	<i>Melanitis leda</i>	Nymphalidae - Satyrinae
66	<i>Mycalesis fuscum</i>	Nymphalidae - Satyrinae
67	<i>Mycalesis horsfieldi</i>	Nymphalidae - Satyrinae
68	<i>Mycalesis perseus</i>	Nymphalidae - Satyrinae
69	<i>Mycalesis sudra</i>	Nymphalidae - Satyrinae
70	<i>Neptis hylas</i>	Nymphalidae - Satyrinae
71	<i>Neptis vikasi</i>	Nymphalidae - Satyrinae
72	<i>Orsotriaena medus</i>	Nymphalidae - Satyrinae
73	<i>Parantica albata</i>	Nymphalidae - Satyrinae
74	<i>Tanaecia palguna</i>	Nymphalidae - Satyrinae
75	<i>Ypthima pandocus</i>	Nymphalidae - Satyrinae
76	<i>Ypthima philomela</i>	Nymphalidae - Satyrinae
77	<i>Ypthima baldus</i>	Nymphalidae - Satyrinae
78	<i>Ypthima nigricans</i>	Nymphalidae - Satyrinae
79	<i>Ypthima pandocus</i>	Nymphalidae - Satyrinae
80	<i>Ypthima philomela</i>	Nymphalidae - Satyrinae
81	<i>Papilio helenus</i>	Papilionidae - Papilioninae
82	<i>Papilio memnon memnon</i> (Female record)	Papilionidae - Papilioninae
83	<i>Troides cuneifera cuneifera</i> (Female record)	Papilionidae - Papilioninae
84	<i>Papilio paris</i>	Papilionidae - Papilioninae
85	<i>Papilio polytes</i>	Papilionidae - Papilioninae
86	<i>Troides helena</i>	Papilionidae - Papilioninae
87	<i>Catopsilia pomona</i>	Pieridae - Coliadinae
88	<i>Catopsilia scylla</i>	Pieridae - Coliadinae
89	<i>Eurema andersonii</i>	Pieridae - Coliadinae
90	<i>Eurema beatrix</i>	Pieridae - Coliadinae
91	<i>Eurema blanda</i>	Pieridae - Coliadinae
92	<i>Eurema brigitta</i>	Pieridae - Coliadinae
93	<i>Eurema hecabe</i>	Pieridae - Coliadinae
94	<i>Eurema lacteola</i>	Pieridae - Coliadinae
95	<i>Eurema tilaha</i>	Pieridae - Coliadinae
96	<i>Appias libythea</i>	Pieridae - Pierinae
97	<i>Appias pandione</i>	Pieridae - Pierinae
98	<i>Cepora iudith</i>	Pieridae - Pierinae
99	<i>Delias belisama</i> (Female record)	Pieridae - Pierinae
100	<i>Delias pasithoe</i>	Pieridae - Pierinae
101	<i>Delias aurantia</i>	Pieridae - Pierinae
102	<i>Gandaca harina</i>	Pieridae - Pierinae
103	<i>Hebomoia glaucippe</i>	Pieridae - Pierinae
104	<i>Leptosia nina</i>	Pieridae - Pierinae
105	<i>Prioneris autothisbe</i>	Pieridae - Pierinae
106	<i>Prioneris autothisbe</i>	Pieridae - Pierinae
107	<i>Zemeros flegyas</i>	Riodinidae

Recent Status of Coral Reef Ecosystem in Penuktukan Bali, Indonesia: the Implication for Sustainable Marine Tourism Implementation

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Abstract

Recent development of marine tourism in Penuktukan Village, Sub district Tejakula of the Buleleng Regency in Bali has been contributed to the coral reef ecosystem. The aim of the research was to determine the coral reefs coverage, coral reef and fishes diversity in Penuktukan Villages, Sub district Tejakula of the Buleleng Regency. Result of the research confirms that coral reef coverage in Penuktukan was varied from 53 to 56%, indicates human impact to coral reefs ecosystems. The coverage level can be influenced by tourist activities. Based on the observation it is clear that Coral Foliose types were dominant. Diversity index (H') of coral reefs ranging from 1.754 to 1.814; while the evenness index (E) was ranging from 0.8435 to 0.9468. The coral reefs diversity is able to support underwater marine tourist program, but tourism behavior should be managed to protect coral reef biodiversity. The observed fish was less than 25 individual. These fishes taxonomically belong to *Serranidae*, *Lutjanidae*, *Lethrinidae*, *Caesionidae*, *Scaridae*, *Haemulidae* and *Chaetodonidae*. It was lower compared to the standard for population in healthy water. The implementation of marine based tourism in Penuktukan Village should be controlled through visitor management and coral reef ecosystem conservation.

Keywords: Bali, coral reefs, marine tourism, sustainable tourism.

INTRODUCTION

Recently, marine tourism is growing significantly in the world. Marine tourism focuses on the use of marine resources and its environment as tourism attractions. Marine is home of numerous creatures which is considered interesting among tourist. Tropical regions are one of the rich regions in term of marine creature. The development of marine tourism in tropical region has been viewed as one of the machine for local development. It is especially important because many tropical countries are developing countries, in which technology, infrastructure and human resources was limited [1,2,3].

Marine creature has been reported fragile to human disturbance, and tourism potentially contributes to the marine biodiversity disturbance. There are numerous report shows that impact of human activity in marine which is contributes significantly in marine ecosystem. Coral disturbance, decline of fish population, and water pollution often reported as crucial issues in marine tourism. Sustainable tourism should be able to minimize tourist impact to environment. In such a case, the proper management of

marine resources was important. Scholars point out that the proper planning and management of marine resources for tourism will contribute to the sustainability of marine resources. It is especially crucial to enhance the sustainable use of resources [4,5].

For a long time, Bali has been recognized as tourism destination. Cultural and landscape of Bali has been explored by tourism industry [6,7]. Recent growth of marine tourism has been identified as an important strategy for rural coastal development due to numerous economic benefit derived from tourism activity. Marine tourism in Bali has been grown as an important variant of tourism product. Demand for leisure in marine environment increase significantly. In Bali, snorkeling and diving has been recognized as main marine tourism activity. The interaction between tourist and coral reefs as for few studied. Therefore, it is especially important to study the coral reef status for future sustainable management practices of marine tourism. The aims of the research was to determine the coral reefs coverage, coral reef and fishes diversity in Penuktukan Village, Sub district Tejakula of the Buleleng Regency. It is especially important for sustainable marine tourism planning and management.

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MATERIAL AND METHODS

Study area

Research was done in Penuktukan Village, Sub district Tejakula of the Buleleng Regency, Bali (Fig.1). This village has wide coastal and marine area which are used as tourism destination sites. Administratively, Penuktukan Village covers an area about 625 Ha. The majority of area was dominated by forest 250 Ha and orchards 275.66 Ha. The southern part of the villages was Bali Sea, in which biologically water ecosystems rich in term of marine creature (Fig. 1). The marine is rich in term of coral reefs and fish reefs. The development of tourism in southern part of Bali Island has been considered important because this area was lowest developed compared to the southern area. The development of tourism in Penuktukan was addressed to improve local community prosperity, in which local people involve and receive benefits from tourism industry. Following the potential sites of marine environment in Penuktukan villages as dive sites, local authority and community proposed such area as new dives sites in Bali called Taman Segara. Recently, these area is one of the favorites diving sites in northern Bali Island.

Methods

Field survey was done in coastal area of Taman Segara, Penuktukan village. Three area which used for diving activities was observed, including Angel Canyon (zone A), Coral Reef (zone B) and Coral Starway (zone C). The selection of such place was based on the assumption of the place become habitat for coral reefs and fish, and diving activity was done in the area. Coral reef covering has been identified through transect line at three zone. Observation was done at 50 m transect length, started from zero point (0 m from initial point in beach) to 50 m in the sea. Design for transect was given in Figure 2. Reef coverage at the observation plot was observed systematically. Coral reefs species was identified and the coral reefs coverage was measured.

Reef fish observation was done through Underwater Fish Visual Census (UVC) methods. Fishes which are found at 2.5 m in left and right sides of transect line were listed and the number was counted. The total area for observation was about $5 \times 50 \text{ m}$ or equal to 250 m^2 .

Coral fish density was calculated in individual/transect. Observation was done three times as shown in Figure 3.

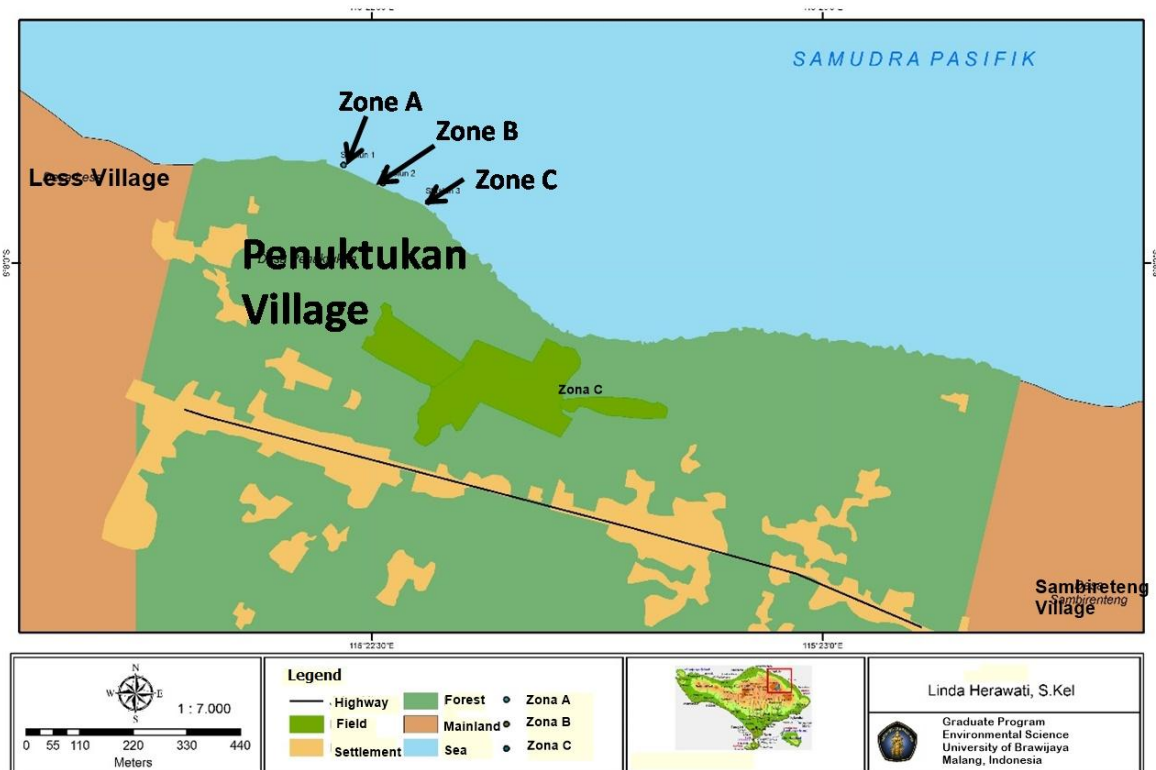


Figure 1. Map of Study Area

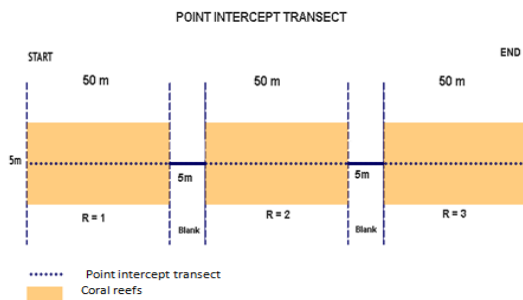


Figure 2. Observation Design by Point Intercept Transect

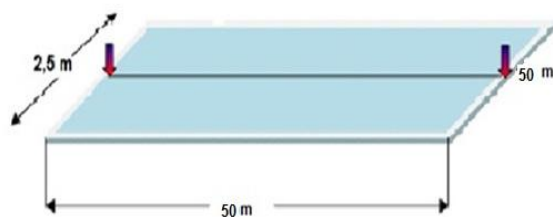


Figure 3. Fish Belt Transect Design for Reef Fish Observations

Data Analysis

The coral reefs coverage was calculated using formula:

$$N = \frac{\sum n_i}{A} \times 100 \%$$

The interpretation of data was following CRITC – COREMAP from Indonesian Institute of Sciences as follow :

- Disturbed (reef coverage 0-24.9%)
- Medium (reef coverage 25-49.9%)
- Good (reef coverage 50-74.9%)
- Very good (reef coverage 75-100%)

Criteria of fish density was classified as:

- Less, when number of individual along transect was < 25 individual
- Many, number of individual along transect was 25-50 individual, and
- Abundance when number of individual along transect was > 50 individual

The density index was calculated following formula:

$$(D_i) = \frac{n_i}{A}$$

Description:

D_i = density of species_{*i*}

N_i = number of individual species_{*i*}

A = plot area size

Relative density was calculated using formula:

$$(R) = \frac{n_i}{\sum n} \times 100 \%$$

Description:

R = Relative density

n_i = Number of individual of species

N = Total number of individual

RESULT AND DISCUSSION

Coral Reef Coverage

The coral reef coverage in Penuktukan Villagewas 56% in Zone A, 53% in Zone B and 56% in Zone C, indicates human impact to coral reefs ecosystems. The coverage level can be influenced by tourist activities. Among the observed sites, there are diversity of coral reef composition (Fig. 4). Seven forms of coral namely *Acropora* branching (ACB), *Acropora* tabulate (ACT), *Acropora* submassive (ACS), Coral massive (CM), Coral submassive (CS), Coral foliose (CF) and Coral mashroom (CMR) were found in Zone A. Similar form of coral reefs found in zone B, except CMR. Zone C has more coral reefs, including *Acropora* branching (ACB), *Acropora* tabulate (ACT), *Acropora* submassive (ACS), Coral massive (CM), Coral submassive (CS), Coral foliose (CF) Coral mushroom (CMR), Rubble (RB), Sand (S) and Rock (RCK).

The percentage of Coral foliose (CF) was high in Zone A and B, while Rubble was high in zone C. In marine ecosystem, the existence of Coral foliose was important because these corals provide shelter for numerous invertebrates and fish species. These corals often found grows and abundance in areas with high levels of sunlight. The ecological role of such form of coral was important.

The species of *Acropora* was found as coral with plates, slender and broad branches (Fig. 5). There are three types of *Acropora*, namely *Acropora* branching, *Acropora* tabulate, *Acropora* sub massive. These *Acropora* is important habitat for marine living creature. In Taman segara, *Acropora* commonly found in shallow reef environments [8].

The percentage of coral reefs in Penuktutan marine ecosystem indicates past human impact to reef ecosystem, including tourism (Fig. 6). Scholar point out that underwater tourism potentially contributes to the coral disturbance [9,10]. Through field survey, it was recorded that tourism activities was numerous, including swimming, diving and snorkeling.

Effort to increase coral reef in Taman Segara was crucial. Increase of coral reef coverage and its biodiversity will provides spectacular underwater landscape for diving and snorkeling. Ecologically, it is also important to enhance the

diversity of marine creature, including coral fish. Recently community-based coral reefs conservation programs involved local community.

Penuktukan villagers has been contributes to the recent coral reefs conservation.

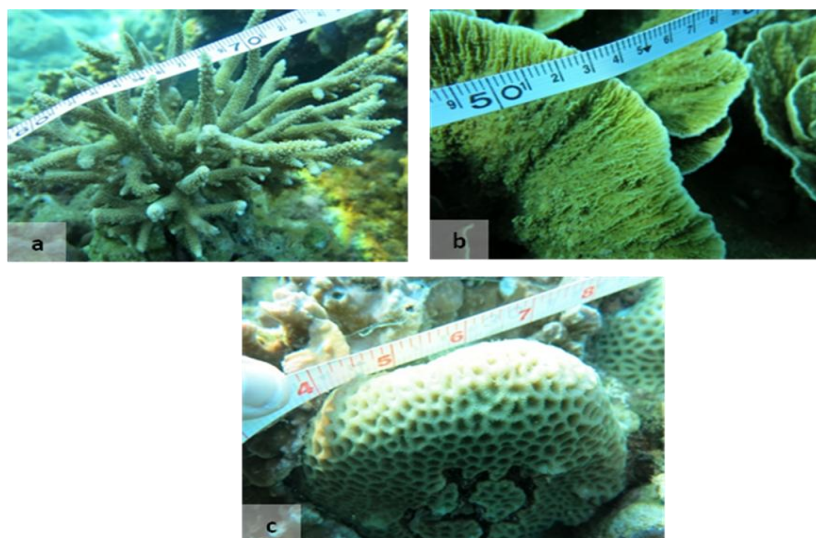
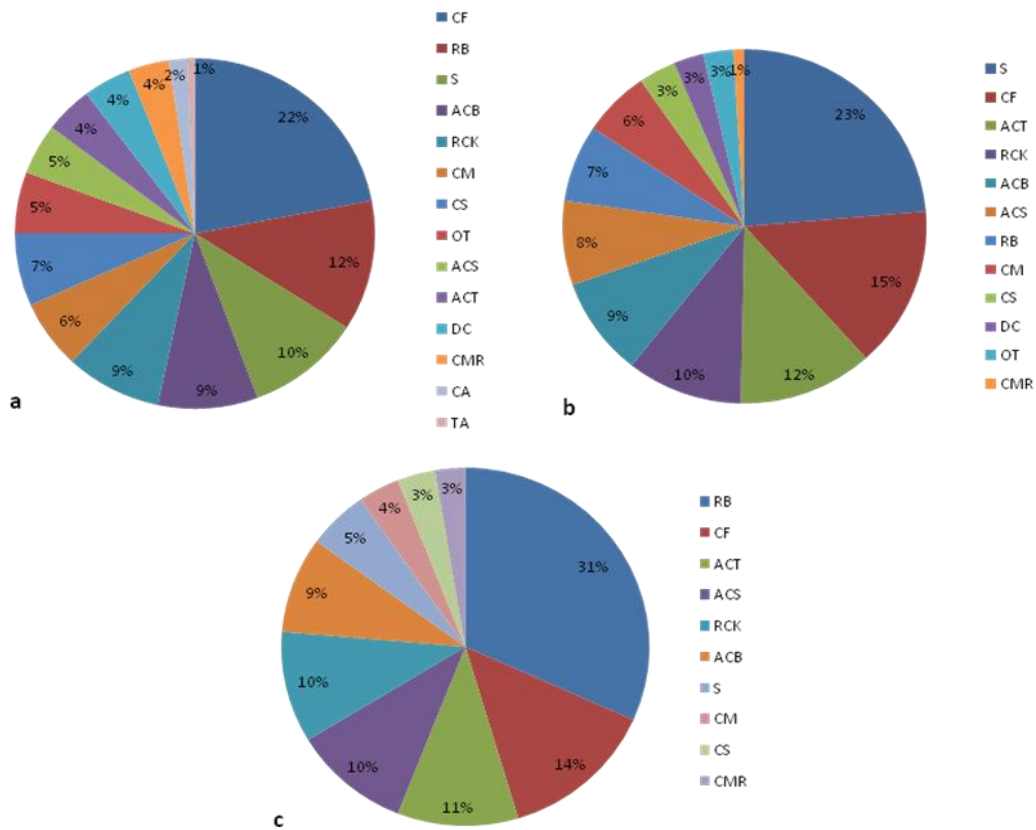




Figure 6. Coral Reefs Disturbance in Penuktukan village

Diversity of Coral Reefs

Based on the observation it is clear that Coral Foliose types was dominant. Visually, these coral types can be observed through the coral with skeletal form approximates broad flattened plate. The dominant of Coral Foliose can affect the water quality, especially in turbidity aspects. The high turbidity of sea water lead to the reefs species produce lime which lead the development of Coral Foliose.

Diversity index (H') of coral reefs ranging from 1.754 to 1.814; while the evenness index (E) was ranging from 0.8435 to 0.9468 (Table 1). The diversity of coral reef was medium. Compared to the other diving sites, the diversity level of coral reef in Penuktukan should be increase through numerous conservation programs, including reef transplantation [11].

Table 1. Diversity and Evenness Indices of Coral Reefs Ecosystems in Three Zones

Zone	Indv	Total	E	Class	H'	Class
A	8	64	0.87	High	1.81	Med
B	8	36	0.95	High	1.97	Med
C	8	43	0.84	High	1.75	Med

The highest number of species and complexity provides spectacular seascapes which are become main target of tourist. The evenness index shows that the underwater environment of Penuktukan was similar, and there are no single sites with unique characters. In the perspective of tourist's satisfaction, the diversity of coral reef provide the physical complexity that important to increase under-water destination competitiveness. The diversity level is important and contribute significantly in divers satisfaction It is especially

relevant with the motives of divers to joint marine tourism program, in which divers explore the diversity and uniqueness of coral reefs [12].

Population Structure

The structure of population significantly shows the health of ecosystem. This indicators often used to evaluate the ecosystem integrity in destinations. The evaluation of fish population will contribute to the marine management, especially in sustainable tourism development issues. Fish observation was done in similar observation sites to assess coral reef. The structure and composition of fishes was given in Table 2. From these data, it is clear that the number of observed fish was lower compared to the standard indicator. The observed fish was less than 25 individual. These fishes taxonomically belong to *Serranidae*, *Lutjanidae*, *Letherinidae*, *Caesionidae*, *Scaridae*, *Haemulidae* and *Chaetodonidae*. This data indicated that the potential of fish in Taman Segara was less. *Serranidae*, *Lutjanidae* and *Chaetodonidae* consistently found in three observed station with significant amount of density, indicate that the fishes easily able to observed by divers.

Less number of fishes seems to be related with the fisherman activity. In the field, it is observed that the exploitation of fish without considering the stock and sustainability of fish lead to the limited number of fish in observation area. Poor of fisherman understanding about coral reef conservation and sustainable fishing becomes the limitation of coral reef conservation. It is also has positive relationship with the competitiveness of dive sites.

We consider that the carrying capacity of Penuktukan underwater ecosystem use for tourism is important [13]. As far, the carrying capacity of marine tourism has been few discussed. There are few attention to the abundance number of visitor in marine environment which area potentially affect the degree of sustainability.

Table 2. Fish Family in Penuktukan Marine Area

No	Family	Rdi (%) Abundance (%)				D ind.m ⁻²			
		Zones				Zones			
		A	B	C	Σ	A	B	C	Σ
1	<i>Serranidae</i>	15.8	12.0	23.6	17.4	0.013	0.0040	0.0120	0.012
2	<i>Lutjanidae</i>	17.4	20.0	7.8	15.0	0.014	0.0066	0.0040	0.004
3	<i>Letherinidae</i>	4.7	4.0	2.6	3.9	0.004	0.0013	0.0013	0.001
4	<i>Caesionidae</i>	9.5	0.0	15.7	9.5	0.008	0.0000	0.0080	0.008
5	<i>Scaridae</i>	9.5	16.0	28.9	16.6	0.008	0.0053	0.0146	0.014
6	<i>Haemulidae</i>	3.2	4.0	0.0	2.3	0.002	0.0013	0.0000	0.000
7	<i>Chaetodonidae</i>	39.6	44.0	21.0	34.9	0.033	0.0146	0.0106	0.010
Total		100.0	100.0	100.0	100.0	0.084	0.0333	0.0506	0.500

The success of marine tourism in Penuktukan Bali is especially related with the quality of coral reefs ecosystem. Issue to maintain and conserve coral reef should become the priority program for marine tourism development. Recently, there is emerging consensus that marine tourism should be following sustainable marine tourism principles. It is especially relevant to conserve marine creature in Penuktukan, while in the same time program to increase local economic development can be implemented [14].

CONCLUSION

Marine environment in Penuktukan has its potentiality to developed as marine based tourism destination. Coral reefs and fish is the crucial resources for marine tourism development in Penuktukan. The foliose coral was dominant in Penuktukan water. The coverage's of coral reef in zone A (Angel canyon) was about 64% (good), in zone B (Coral starway) was about 40% (fair) and in zone C was about 43% (fair). Tourism contribute to the coral reef disturbance and recent coral reefs and fish diversity. Carrying capacity should be performed to minimize tourism impact to marine ecosystem, including coral reefs and coral fish. Marine tourism in Bali need the comprehensive planning and management. It is especially crucial because tourism activity potentially contribute to the coral reef degradation.

Recommendation

The management of Taman Segara in Penuktukan should increase the effort of conservation. Program should be paid to countermeasure the illegal harvesting and other human activity which area contributes to the coral reef degradation. The community in Taman Segara, Penuktukan village should be involved in coral reef conservation. Community-based tourism can be an effective strategy to involve community in coral reef conservation programs.

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The Economy of Tourism and Its Impact to Other Sectors in Lampung Province

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Abstract

Tourism sector has been identified contribute to the economy of Lampung Province. The study aims to assess the direct and indirect linkage towards economic sectors, analyze the sensitivity of tourism sector distribution, to assess the multiplier effect of dispersion in the tourism sector, and calculate the final demand of tourism sector in the economy of Lampung Province. The results revealed that the score of the forward linkages from the tourism sector in Lampung is relatively small compared to the backward linkage. Both directly and indirectly, the tourism sector is a 'down stream' sector of Lampung economy, which the output is directly consumed by final consumers. Therefore if tourism sector is developed, it can pull output that is in the upstream sector.

Keywords: development, forward and backward linkages, local economy, multiplier effect, tourism economy.

INTRODUCTION

Tourism is an important sector for many countries, and the rapid grows of tourism has been viewed as one of the challenges for new business. United Nations World Tourism Organization (UNWTO) recorded total international tourist arrivals grew faster during the year 2013 in the amount of 5 percent or 1.8 billion tourist arrivals than in 2012 [1]. In Indonesia, tourism grows significantly. Recent data shows the number of foreign tourist arrivals to Indonesia increased by 8.6 million tourists in 2012, up to 13.6% compared to 2011 [2].

Increasing amount of tourists visit to Indonesia make the tourism sector in Indonesia can play a role in economy through revenues derived from the large tourism consumption during their visit to the area of tourism destination [3]. This can be seen by tourist expenditures during the period which amounted 1,133.81 million US dollars, where the tourists expenditure/spending contributed approximately 9.1 billion US dollars, an increase of 5.8% compared to the year 2011 [4]. Meanwhile, based on Indonesia Central Bureau of Statistics in 2012, the contribution of tourism to the national economy amounted to 13.9% of the total Gross Domestic Product, and it will continues to grow in the next year [5].

The linkage of national tourism to economic activities can create some interests to calculate

contribution of tourism in the economy and dependence on social activities, especially in the visited places. It is because tourism sector is a combination of various industries such as transport, accommodation, food and drink and etc. Therefore it is necessary to make a range of methods to measure the direct economic contribution of tourism consumption to the national economy [5].

The national tourism development is also associated with the development of tourism in the province of Lampung which during the past few years continues to develop. Lampung Province has much diverse kind of attractions. Nature, culture, and artificial tourism are distributed in Lampung Province, with typical local uniqueness that strengthens the competitiveness of tourism [6]. The nature and culture tourism as their uniqueness has become tourism which differ Lampung from other provinces in Indonesia which has a specific travel themes, for example Yogyakarta with cultural tourism, or West Java with its diversity natural attractions to strengthen the competitiveness of tourism products [7].

The tourism sector is able to provide a multiplier effect for other business sectors [8]. Because of various tourism activities, all activities demand and consumption to a tour (goods/services, attractions, and more). It generate revenue for a tourism destination as well as a variety of activities providing tour services (goods/services, infrastructure, facilities, etc) which is an expense for tourism areas. Most of them result from the activities which carried out by other sectors outside the tourism sector [9].

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Same with other sectors, tourism is one sector that is able to contribute to the growth/development of a region/country. In other words, the size of the contribution that given by this sector will determine the size of the economic growth of an area/region/country.

The average contribution of tourism to GDP Lampung province was only 1.3% during 2010-2014, compare to agricultural sector 32% and processing industry 17% [7]. However, this certainly does not mean that these sectors do not need to be considered by the local government. Precisely, the increasing contribution of the tourism sector in Lampung directly or indirectly will push the growth and development in other sectors (considering the sector has significant multiplier effect to the economy [9,10].

The development of tourism in Lampung province illustrated by the development of the number of tourist visits (Table 1). In 2010 the number of tourists by the occupancy rate of hotels and accommodations amounted to 395,961 tourist arrivals and an increase of 39.27% in 2011 which became 551,476. As well as in 2012 rose to 577,893 visits; increase of 4.79% over the previous year. Furthermore, a significant increase occurred in 2013 where the number of visits amounted to 971,400 visits, an increase of 68.1% over 2012, despite a decline of 5.6% in 2014 [7].

Table 1. Number of Tourist Arrivals based on Occupancy Rate Hotels and Accommodation in Lampung Province

Year	Tourist arrivals
2010	395,961
2011	551,476
2012	577,893
2013	971,400
2014	917,230
2015	1,192,399

The development of tourism in Lampung shows that the tourism sector has linkages with other economic sectors as well as the services sector such as entertainment, hotels, restaurants, transport, agriculture, trade and processing sectors. The increasing of numbers of tourist who traveled and spend their money in Lampung are indicators that can be measured from the development of the tourism sector as well as supporting sector.

Input-Output Analysis developed by Leontief in 1930. The tables has grown to become one of the most widely accepted method, not only to describe the industrial structure of the economy but also includes a way to predict the changes of

the structure. The model of Input-Output is based on a general equilibrium model [11].

According to BPS RI [12], the Input-Output (I-O) table presents information about goods and services among the economic sectors with the form of a matrix. Fields along the column of I-O Table shows the structure of the inputs used by each sector in the production process, either in the form of intermediate inputs and primary input. Fields along the lines of Table I-O shows the allocation of the output generated by the sector to meet the demand for inter-mediate and final demand. In addition, value-added contents in row shows the composition of sectoral value added creation. This table provides an overview of: 1) The economic structure of a region that includes the output and value added in each sector, 2) The structure of intermediate inputs, namely the use of goods and services transactions between sectors of production, 3) Structure of the supply of goods and services, either domestically produced or imported goods or originating from outside the region, and 4) The structure of demand for goods and services both in the form of requests by various sectors of production and demand for consumption, investment, and exports.

There are some uses of the I-O analysis [11]: 1) to estimate the impact of final demand on output, value added, imports, tax revenues, and labor absorption in various production sectors, 2) to view the composition of the supply and use of goods and services, especially in the analysis of the needs and possibilities of import substitution, 3) for the analysis of price changes by looking at the effect directly and indirectly from input to output price changes, 4) to determine the sectors most dominant influence on economic growth and sectors that are most sensitive to economic growth, and 5) to describe the economy of a region and identify the structural characteristics of the economy region.

This model uses Input-Output (I-O) in the form of a matrix that presents information about the transactions of goods and services as well as interconnections between units of economic activity in a region and a particular period. The basic framework of Table I-O describe the transactions of goods and services that can be viewed from two sides. The first side (column) shows the input structure of economic sectors, the composition of the produced value added and the structure of final demand for goods and services. The second side (line) shows the distribution (allocation) of output of goods and

services for the production process, final demand and imports. The final demand in this regard include household consumption, government consumption, investment and exports of goods and services.

In the analysis on the role of the tourism sector on economic performance in Lampung province, final demand becomes exogenous factors that encourage the creation of value of production of goods and services. In relation to the contribution of tourism, factors (exogenous variable) are in the form of tourist consumption on goods and services.

Tourism is an activity field that supplies most of the production to final consumption [13]. Tourism functions as an intermediary supplier of goods and services to other sectors that should not be overlooked. Role of tourism as a result of supplying supply mainly to attract the output of hotel sector, restaurants, and sub-sector tourism itself; machinery industry; drugs; detergent; cosmetics and other chemical products; and transportation services for companies. electrical and electronic products. The tourism sector is not only supplying activity travel services but also goods and intermediary services. But in fact the tourism sector is also supplying goods and brokerage services to other branches in size is relatively low and is not a determining factor for triggering economic growth. The tourism sector with its function as a supplier of goods and services, especially in the final consumption of the sectors, is mostly deploy multiple direct and indirect effects throughout the economy, both in real and nominal side.

The factors that influence the number of tourist arrivals in Indonesia indicates that the amount of accommodation and the number of travel agencies is a factor that positively affects the number of tourist arrivals [14]. While a non conducive security situation is a factor that will reduce the number of tourists, instead when a conducive security in Indonesia will increase the number of tourists visiting Indonesia.

Similar study show that the tourism sector has a significant role to the economy in Bandung seen from contributions that are in the top three among the other sectors [15]. The tourism sector in the city of Bandung gives a positive multiplier effect on the economy of Bandung City.

Input-Output Analysis is a quantitative method that systematically measure the inter-relationships among several sectors contained in a complex economic system. The model also considered for general equilibrium theory as

important development model. Input-Output Model is quantitative model that can provide a comprehensive picture of [16]: (1) The structure of the national or regional economy, which includes the structure of output and value added in each sector; (2) The structure of intermediate input, i.e. the use of a variety of goods and services by the production sectors; (3) Structure of the supply of goods and services, either domestic production and imported goods that scale; (4) The structure of demand for goods and services, both between the requests of the sectors of production and consumption of final demand for investment and exports.

This study uses Input-Output analysis and the analysis has several assumptions. Transactions that are used in the preparation of Table I-O is based on following assumptions [17]: (1) Each industry produces only one homogeneous commodity (2); Each industry uses fixed input ratio in producing the output; (3) Production in each the industry is Constant Return to Scale (changes in input will impact change in output).

Based on the explanations above, therefore the objectives of this research are to: 1) calculate how much of direct and indirect linkages, coefficient distribution, power distribution, and labor multiplier; 2) analyses the impact of changes in the tourism sector final demand for the output of the tourism sector and other sectors in Lampung province.

MATERIAL AND METHODS

Data Collection

This study is explanatory research using a quantitative approach. Quantitative data is data that is obtained in the form of numbers and can be measured such as data of Input-Output Lampung Province 2015 [6], the number of tourist visits to Lampung, and tourist spending while in Lampung. This data was obtained from the Central Statistics Agency of Lampung Province and the Provincial Tourism Office of Lampung. Data Input-Output Lampung Tourism 2016 [6] will be used to discuss the problem of linkages between sectors and the multiplier impact of income and output. While tourist expenditure data used for the simulation discuss the impact of tourism on the development of economic output Lampung.

This research conducted in the province of Lampung is based on the consideration that the province of Lampung is one of the provinces in Indonesia as one of mostly visited tourism destination. Therefore, the development of

tourism in the province of Lampung is expected to attract the development of many other sectors beyond tourism sector. From this research, it can be seen how much the relationship of tourism sector to attract other sectors and what sectors are well aligned and have less relevance to the tourism sector, thus, the results of this study can be used as a reference to create a policy for the government local.

The type of data by source in this research is secondary data (Table 3). The data obtained from several references relevant to the problem under study as Input-Output Lampung province in 2015 [6] that had been prepared earlier by the Central Bureau of Statistics Lampung. More specifically, the data is a table of Input-Output 23 x 23 sectors which were taken from the Book of business sector Indonesia [12], while other supporting data are expenditure data rating, the number of tourists and others taken from the Tourism Office of Lampung Province.

Table 3. Code Sector of Business

No	Sector Production	Code
1	Agriculture	TPGN
2	Crops	TKBN
3	Livestock	PTK
4	Forestry	KHTN
5	Fishing	FISH
6	Mining and Quarrying	TBNG
7	Industrial fruit and Vegetables	IBS
8	Food Processing Industry	IKUD
9	Other Food Industry	IMLN
10	Beverage Industry	IMN
11	Other Industries	ILNY
12	Transport	TR
13	Communications	KM
14	Electricity, Gas, and Water	LGA
15	Building/Construction	PHR
16	Trade	PR
17	Hotel	HT
18	Restaurants	RST
19	Entertainment, Recreation, and Culture	HBRK
20	Financial Institutions	LK
21	Rental	PRW
22	General Government	PTUM
23	Other Services	JJLN

Data Analysis

I-O table analysis tool used to study the role of tourism services sector and other support to the economy of the province of Lampung is Input-Output Table. It is used to determine the role of the tourism sector on the economy of Lampung as input providers as well as consumers input. The impact of this sector can be analyzed based on the analysis of multipliers (output, income and employment) and linkages between

sectors [18]. For the analysis of linkages between sectors and the multiplier, the tool used is the Microsoft Excel software. Analysis of linkage (forward and backward linkages) is used to determine the degree of relatedness of a sector or sub-sector to the other sectors in an economy [19,20].

Direct Forward Linkage

Direct forward linkages is an additional increase in the production output of a sector that is caused by an increase in the final demand sector itself.

Direct Backward Linkage

Direct backward linkages is the increased use of production inputs as a sector that is caused by an increase in the final demand sector itself.

Indirect Forward Linkage

The indirect forward linkage show the effects of a certain sector that use the output of the sector indirectly per unit that increase the final demand.

Indirect Backward Linkages

Indirect backward linkage shows the linkage of the upstream sectors that indirectly provide inputs for the sector per unit that can increase the final demand.

Dispersion Index

Analysis on the impact of the development is the development of an direct and indirect linkages index [11]. Thus the existing inter-sectoral indicators can be compared. Pull power is a measure of the spread to look backward and forward linkages of the economic sectors in the region. Analysis on the impact of the spread or dispersion is divided into two types, namely the power of dispersion index and Sensitivity of Dispersion Index.

Power of Dispersion Index (Pull Power)

Power of Dispersion Index or attractive power coefficient is used to determine the benefits distribution of the a sector development to the development of other sectors through the market mechanism input. This means, the sector has the ability to increase production growth to the upstream sector. A sector would be said to have a higher dispersion if the spread coefficient greater than one. Conversely, a sector which is said to have a low dispersion when the spread coefficient is smaller than one.

Sensitivity of Dispersion Index (Push Power)

With the concept of dispersion sensitivity or pushing power, it indicates the ability of a sector to encourage growth in the production of other sectors which use the output of this sector as input. In other words, the dispersion sensitivity is helpful to determine the sensitivity of a sector towards other sectors through market mechanisms output. It means the ability of the sector to boost production growth of downstream sectors. A sector would be said to have higher backward linkages when the value of the dispersion sensitivity is greater than one. Conversely, a sector which is said to have a low sensitivity dispersion if the value is smaller than one.

Labor Multiplier

The employment multiplier rates shows the change in manpower caused by the initial change in the final demand. Labor multiplier is not obtained from the elements in Table I-O, as the multiplier output and income, as in Table I-O does not contain elements that relate to labor.

RESULT

Forward Linkage

The forward linkage is divided into two, namely direct and indirect forward linkages [13]. Value of direct forward linkage shows if there is an increase in final demand, produced output of a sector that will increase directly. On the direct forward linkage, the impact of changes in final demand will directly impact to the concerned sector. Therefore, the output generated in the production process is obtained from the input sector itself. Value of direct forward linkages obtained from the coefficient matrix that shows the number of output units from a sector that is required to produce one unit of output of other sectors [11].

Table 4. Direct Forward Linkage to the Economy Sector in Lampung, 2015

Sub Sector	Direct Forward Linkages
Leisure, recreation and culture	0.1347
Restaurant	0.1192
Transportation	0.0582
Hotel	0.0142

Based on the results of the analysis, a direct forward linkage of the tourism sector in Lampung consists of sub-sectors Leisure, Recreation and culture as a major sub-sectors of tourism, and

followed by restaurants, transportation and hospitality (Table 4). Of the four sub-sectors of tourism, Sub-sector leisure, recreation and culture has the highest direct forward linkage at 0.1347. It means that if there is an increase in the final demand of the sector amounted to 1 million Rupiah, then the output produced by this sub-sector which generated from the sector will increase the input directly by Rp 134.700.

Meanwhile, indirect forward linkage of tourism sectors presented in Table 5. The sub-sectors that have the highest indirect forward linkage is a sub-sector of hotel that is equal to the value 11.422. It means that if there is increased final demand of Rp. 1 million then the output of sub-sectors Hotel allocated indirectly to another sector or downstream sector will increase by Rp 1,142,000.

Table 5. Indirect Forward Linkage of Economy Sector in Lampung, 2015

Sector	Indirect Forward Linkages
Tourism	
Leisure, recreation and culture	10.033
Transportation	11.207
Hotel	11.422
Other	
Financial Institutions	19.625
Beverages Industry	14.155
Agriculture	12.899
Other Food Industries	15.824
Trade	11.561
Rent	11.735
Horticulture	13.102
Other Services	13.078
Electricity, gas, and water	13.025
Livestock	15.468
Construction/building	12.121
Communication	11.468

Backward Linkages

Backward linkages is divided into two types, namely the direct backward linkage and indirect backward linkage [11,20]. The value of direct backward linkage shows that if there is an increase in the final demand, the inputs of the needed sector will increase directly. In direct backward linkages, the impact of changes in final demand will directly affected the concerned sector. Therefore, the inputs needed in the production process is obtained from the output of the sector itself. The direct backward linkages value obtained from the coefficient matrix [11].

Table 6 show that the restaurant is the highest value of direct backward linkage in sub-

sectors of tourism which has amount 0.4558. This can be interpreted in case of increase in the final demand of the sector amounted to Rp 1,000,000, then the sub-sector is increase the demand for the input to the output of its own sector of Rp 455,800.

Meanwhile Table 7 show that the restaurant is the most value of indirect backward linkages of tourism, i.e. 1.4872. It implies that in the case of increase in the final demand of the sector amounted to Rp 1.000.000, then the sub-sector will increase of the input demand to other sectors indirectly Rp 1,487,200.

Table 6. Direct Backward Linkages of Lampung Economy Sectors, 2016

Sub Sector	Direct Backward Linkages
Hotel	0.4558
Leisure, recreation and culture	0.4192
Restaurant	0.3150
Transportation	0.2853

Tabel 7. Indirect Backward Linkages of Lampung Economy Sector, 2015

Sectors	Indirect Backward Linkage
Tourism	
Restaurant	1.4872
Hotel	1.4788
Leisure, recreation, and culture	1.1828
Transportation	1.2795
Other	
Electricity, gas, and water	2.0225
Building/construction	1.9022
Rent	1.7458
Food Processing Industry	1.6650
Other Services	1.5002
Trade	1.4494
Financial Institutions	1.3975
Agriculture	1.9022
Communication	1.2725

Impact of Change in Final Demand to the Direct and Indirect Total Output

The results point out that when the final demand increased, an additional final demand should be produced, and automatically produced an additional output [20]. If the tourism sector (restaurant, recreation and culture, hotel, and transportation) increase 10% then it can affect to the increasing of direct output sector about Rp 74,328 billion or increase of 1.66% from the previous total output. It is because those sectors are the main sectors in tourism (Table 8).

Table 8 also shows that 10% additional final demand in sub sector of tourism (Leisure,

recreation, and culture) will increase the total output on those sectors about Rp 2.87 billion or increase 6.51% from the previous output. If the final demand increase 10%, the tourism sub-sectors such as restaurant, hotel, and transportation are also continues to increase. The table states that the four sectors) has remain growth (as the most developed) which percentage of growth around 8.27% (Rp. 14.90 billion) from the previous total output.

DISCUSSION

Based on the analysis of data, Lampung tourism sector has a greater value of backward linkages compared to the forward linkage. The analysis of dispersion coefficients found that three sub-sectors of tourism (Hotel, restaurant and Leisure, recreation and culture) has a dispersion coefficient > 1. It means that the sector is able to increase the growth of the upstream sector.

Otherwise, the sensitivity dispersion index of the tourism sector (sub-sector of restaurant, hotel, leisure, recreation and culture, and transport) < 1. In other words the tourism sector are less able to encourage the growth of the downstream sector.

We conclude that the Lampung tourism sector is a sector in a downstream position. The sector generates output for direct consumption by the final consumer (tertiary sector). If the Government can develop this sector well and optimally, it can act as magnets on the outputs of the upstream sectors. But to develop the tourism sector in Lampung, there are still such problems in each kind of attraction in Indonesia, e.g. the lack of expansion and promotion of tourism within and outside the country on the attraction of natural and artificial tourism; the lack of safety factor, lack of maintenance, and less adequate infrastructure especially in tourist locations.

Competitive strategy on industry concept can be applied in Lampung Tourism, where the actors - the tourism business and the government, must have competitive strategy to be able to compete with local or other countries tourism such as Bali, Yogyakarta, and West Java. These tourism locations have uniqueness and characteristics for the sustainability of long term tourism development, and competition with other countries such as Singapore, Malaysia, and Thailand [21]. With abundant and diverse potential of nature and culture, Lampung tourism business agent and the government are expected to implement following competitive strategies.

Table 8. Impact of Tourism Final Demand Changes to Direct and Indirect Total Output

Sector	Total Output *	Total Output **	Change in Total Output	Change (%)
Direct				
Restaurant	15,352,125.44	15,287,453.48	64,671.96	0.42
Hotel	3,007,628.74	2,998,165.25	9,463.49	0.32
Leisure, recreation, and culture	5,797,612.86	5,729,708.77	67,904.09	1.19
Transportation	4,545,182.28	4,470,853.63	74,328.65	1.66
Total	28,702,549.32	28,486,181.13	216,368.19	3.59
Indirect				
Restaurant	15,352,125.44	15,287,453.48	64,671.90	0.42
Hotel	3,007,628.74	2,998,165.25	9,403.49	0.32
Leisure, recreation, and culture	5,797,612.80	5,729,709.77	67,904.09	1.19
Transportation	4,545,182.28	4,470,853.03	74,328.05	1.66
Total	28,702,549.32	28,480,181.13	210,368.19	3.59

Note:

* After Tourism sector Final Demand increased in 10%

** Before tourism sector Final Demand increased in 10%

Promote the Unique Characteristic of Lampung tourism

It is useful to minimize the tourism product substitution in Lampung, so travelers will only see the uniqueness in Lampung alone. The concept of competitive strategy in Lampung tourism is expected to be more advanced and survive in the long term development.

Protection and Security

On the cultural and natural attractions, the protection is essential in order to maintain the sustainability and the authenticity of the tourist attraction. The great care costs for the treatment of the attraction became an obstacle for the government. In addition, the safety factor issues should also be considered so that the convenience of both local and foreign tourists remain guaranteed [22].

Vertical Integration

The vertical integration that can be associated with tourism is the cooperation between tourism businesses. It raised their security of supply and reduces transaction costs and uneconomical costs.

Infrastructure

In supporting the growth of the tourism development in Lampung, especially the number of tourists, the government should start thinking about the provision and procurement of adequate infrastructure, particularly for infrastructure related to access to local or tourism area. As for the individual infrastructure that exist, we recommend to do not spoil and changing the original as well as the hallmark of the tourism areas (especially natural tourism

area), because it is the sign of tourism and the sale value of Lampung during this time.

IMPLICATIONS

By the consideration on the contribution of tourism sector to attract input - output of the upstream sectors to Lampung under the terms of the linkages and employment, the development of the tourism sector for the future should be a priority. It is necessary to be creative towards the resources to create attraction and tourism marketing in Lampung. One way is to use creative media such as movies and music which are published to the internet and regularly updated, travel fairs (national and international), festivals, and etc.

The nature is the most popular tourist attraction in Lampung. Aside from the natural attractions, Indonesia has a diverse tourism attractions, such as artificial attractions and cultural attractions. The government is expected to make a policy to develop the Indonesian tourism objects corresponding to each kind of tourist attraction without changing the unique and the characteristics of the tourism area. This is in order to create a tourist attraction in an appropriate manner and in accordance with the type of tourism objects.

The government should start thinking of policies related to the protection and safety, especially with regard to the tourism area. It is to ensure the safety and convenience of tourists when visiting tourism sites in Lampung, due to relatively high crime numbers.

CONCLUSION

Forward linkage of the tourism sector in Lampung is relatively smaller than backward

linkages, either directly or indirectly. This proves that the tourism sector Lampung is located in the downstream sector or the tertiary sector which its direct output is consumed by the final consumer. The results also show that the tourism sector is a sector that is in a position downstream in the economy of Lampung, which if this sector is developed, it can make interesting output in the upstream sector.

Meanwhile, the results of the sensitivity analysis shows that the dispersion of Lampung tourism sector is able to increase the growth of the upstream sector. While tourism sub-sectors (restaurants, leisure, recreation and culture, transportation, and hotel) are less able to drive the growth of the downstream sector. The results of the analysis of the tourism sub-sector have also found their multiplier effects on employment of 32.21% on the employment in 2015 than the previous year.

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FOCUS AND SCOPE

Competitiveness of destinations, products and Indonesian tourism business; Diversification of tourism products; Incentive system of business and investment in tourism; Information, promotion and communication in tourism; Tourism supporting infrastructure; Security and convenience in tourism; Tourism policy; Unique tourism community life (living culture); Local knowledge, traditions, and cultural diversity; Diversity and attractions in ecotourism; Diversity of natural attractions in ecotourism; Pluralistic diversity of ecotourism society; Diversity of ecotourism activities; Hospitality of the local resident; The quality of tourism services; Quality of HR in tourism (Standard, accreditation and competence certification); The market share of tourism and integrated marketing system; Package of tourism attraction; Development of tourism regions; Community based Eco-Tourism.

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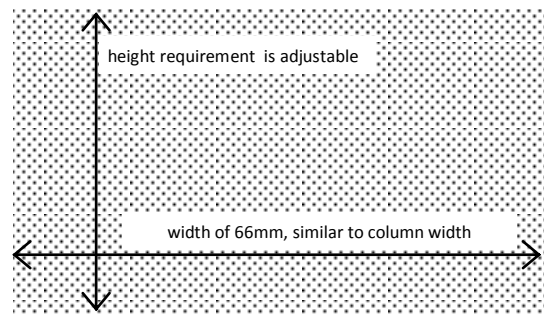


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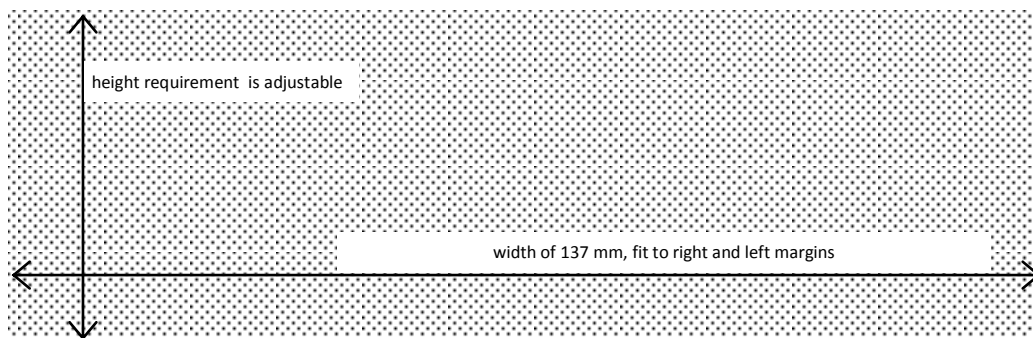


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