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Plants as Natural Dyes for *Jonegoroan Batik* Processing in Jono Cultural Tourism Village, Bojonegoro, East Java

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Abstract

Batik Jonegoroan is one of the potential tourism product in Jono Village, Bojonegoro. Batik was processed by traditional procedure using natural dyes from plants. In order to preserve the traditional batik which was colored by natural dyes from plant, the preservation of such plant were important. As far, there are no scientific data related to the species usage in Batik production. The aims of the research were identifying plant which were used as natural dyes in Batik processing. Data were collected through observation, and semi-structured interviews to batik craftsmen. Results of interviews were analyzed descriptively. The importance of plant was analyzed using Relative Frequency of Citation (RFC) index. Based on the results, there are 12 plant species used as batik dye. It is consisted of Teak, Mahogany, Ketapang, Tamarind, Mangosteen, Mango, Suji, Pandan, Indigofera, Guava, Banana and Onion. Teak (*Tectonagrandis* L.) and Mahogany (*Swietenia mahogany* L.) have the highest value of RFC, 1.00. Both species were the most frequently cited species as sources of natural dyes. Extraction of Teak leaves produce red hearts and extraction of mahogany tree bark produces red-brown dye. Both of the color is the most important color in batik motifs.

Keywords: batik *Jonegoroan*, Jono Cultural Tourism Village, perception, quality, RFC

INTRODUCTION

The uses of plants as natural dyes have been widely reported. In Indonesia, it has been reported commonly among Batik traditional home industry in Java. Batik is traditional textile originally from Java Island. Batik is one of the cultural heritages of Indonesia. Batik is a traditional dyeing technique using wax to create special patterns on textile. Batik is common among Javanese society and become the social and cultural identity [1]. Batik motifs and pattern are very diverse. Every region in Indonesia has a certain batik style in accordance with the characteristics and potential of the local area. Flora-fauna-base motifs were common in batik. These diverse motifs represent the Javanese perception about flora-fauna diversity. *Jonegoroan* is a typical batik from Bojonegoro, East Java with numerous motifs. Recently, new motif has been introduced to the local home industry. These new motifs gets big enthusiast from Bojonegoro society.

Increase of batik needs in Indonesia led to numerous factory and home industry produce batik intensively. These phenomena lead to the use of technology and chemical dyes to produce Batik [2]. One of recent technological involvement in Batik industry is synthetic dye. Batik

Industrial reports confirm that most of the batik craftsmen in Java prefer to use synthetic dyes to produce batik. The craftsmen prefer to use synthetic dyes in order to produce batik due to its economical benefits. Using synthetics dyes will allowing large quantities, short time, and low cost of Batiks processing. The cost of production of batik cloth with synthetic dyes is relatively low. Craftsmen have perception that the low price of batik with synthetic dye will be able to increase purchasing of the batik cloth.

There are few attention and research in the uses of natural dyes from plant as natural dyes. However, some community member in Jono Villages use plants as natural dyes in batik processing. These allow more sustainable practices which are important in green and eco-product, including Batik. Based on these descriptions, it is necessary to investigate what types of plants are used as natural dye in batik production.

MATERIALS AND METHODS

Data collection in this study included interviews, observation, documentation, and full participation in Jono Cultural Tourism Village, Temayang, Bojonegoro. Semi-structured interviews were implemented to identify the diversity of plants species which were used as natural dyes and its processing. Informants were selected by purposive sampling. Interview material includes several points, including name of species, plant's parts used, processing, and the resulting color.

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The data of plants usage were analyzed using Relative Frequency of Citation (RFC) as one of the significant ethnobotanical indices. The value was obtained by dividing the number of respondents who mentioned a plant species which is beneficial (FC) with the number of informants who participated in the survey (N) [3].

$$RFC = \frac{FC}{N}$$

RESULTS AND DISCUSSION

The craftsmen get the natural dyes material from home garden and sometimes were bought from nearest market. Some plants were very easy to collect, such as Teak, Mango, pandan leaf, guava and mahagoni. Mango, pandan and guava grow in home garden or area adjacent to the house. Teak was often cultivated in home-garden, or the leaf was collected from teak plantation. In Jono Village, the important species which were used as natural dyeing were Teak, Mahogany, Ketapang, Tamarind, Mangosteen, Mango, Suji, Pandan, Indigofera, Guava, Banana, and Onion (Table 1). In traditional batik processing, leaves and bark commonly used as the sources of natural dye. These materials provide numerous colors which are needed in batik drawing.

Teak and mahogany has the highest RFC value (1.00). Both species mentioned by the entire respondent as an important plant which intensively used as natural dye. These materials can be collected easily from home garden, forest, and plantation. Extraction of teak leaves produce red

hearts colour in textile. Meanwhile, Mahogany tree bark extraction produce yield red-brown color.

The fresh leaves were collected from home garden and plantation as natural dye. The preparation of natural dye were reported simple. First, the leaves are cut in size of ± 8 cm, washed, and extracted. The extraction of teak leaves produce red hearts color (Figure 1a). Young teak leaf contains several compounds, especially anthocyanin pigments. This anthocyanin compound gives red, purple, dark red [4]. The results of teak leaf extract is also used as a dye for yarn wolle by the community of West Bengal, India [5].



Figure 1. Jati (*Tectona grandis*): (a) the result of leaf extraction; (b) tree

The bark of Mahogany was used natural dye. The extraction of mahogany bark produce brownish red-brown color (Figure 2a). The extract of Mahogany tree bark can be used to color the wood [6]. The extract is also used as a dye in the leather tanning process.

Table 1. Natural dye plants in batik production

No	Name of the species	Local name	Family	Plants part(s) which used as dyeing	The resulting color	RFC
1	<i>Tectona grandis</i> L.f.	Teak	Verbenaceae	Leaves	Red hearts	1.00
2	<i>Swietenia mahagoni</i> (L.) Jacq.	Mahogany	Meliaceae	Bark	Red-Brown	1.00
3	<i>Terminalia catappa</i> L.	Ketapang	Combretaceae	Leaves	Yellow-gray	0.89
4	<i>Tamarindus indica</i> L.	Tamarind	Fabaceae	Leaves	Greenish yellow	0.78
5	<i>Garcinia mangostana</i> L.	Mangosteen	Clusiaceae	Rind	Magenta	0.72
6	<i>Mangifera indica</i> L.	Mango	Anacardaceae	Leaves	Yellow	0.56
7	<i>Pleomele angustifolia</i> N.E.Brown	Suji	Ruscaceae	Leaves	Light green	0.50
8	<i>Pandanus amaryllifolius</i> Roxb.	Pandan	Pandanaceae	Leaves	Light green	0.50
9	<i>Indigofera sumatrana</i> Gaertn	Indigofera	Fabaceae	Leaves	Blue	0.50
10	<i>Psidium guajava</i> L.	Guava	Myrtaceae	Leaves	Yellowish-brown	0.50
11	<i>Musa paradisiaca</i> L.	Banana	Musaceae	leaf sheath	Brown	0.50
12	<i>Allium cepa</i> L.	Onion	Liliaceae	Bulbs	Red-brown	0.39

The uses of mahogany as natural dye were common among society in developing countries. Bangladeshi society accustomed to using the extraction of mahogany tree bark as a natural dye for textiles [7]. In Bojonegoro, the craftsmen get part of the plant from garden and forest.

Onion (shallot or red onion) has the lowest RFC values (0.39) indicated that the species is less used by society in Jono Villages as natural dye. Few respondent know about the natural dye which was produced from onion. However, onion is one of the important materials for food processing. Onion has economic value, and in particular season the prices was very high. Craftsmen who use extraction from onion bulbs get the bulbs from traditional market.



Figure 3. Onion (*Allium cepa*): (a) the result of onion bulbs ekstraktion; (b) onion bulbs

Natural dye from plant species need to be introduced to the public. It is especially important in order to introduce the value of plants in society, especially in Batik processing. The uses of natural dye will support the ecoindustrial development in rural area. In such case, efforts to introduce natural dye from Batik can be done in several ways such as:

1. *Learn the benefits of natural plant dye.*

Knowledge about the benefits of the plant is expected to raise public awareness on the importance of efforts to maintain and preserve it. This knowledge can be obtained through direct explanation to the public and environmental education in the formal and non-formal school.

2. *Using the natural plant dye – batik.*

Utilizing the natural dyed batik would make people get the utilizing of natural dye plants directly. If people have felt the direct usefulness, then the existence of a natural plant dye batik will always be needed. Utilization of these plants should be done wisely and sustainably thus the

benefit of the plant can be felt continuously by the community.

3. *Cultivating the natural dye plants.*

Protecting batik natural dye plant can be done by planting, and cultivating plants which were producing natural dye. People can cultivate these plants in the yard of their home. The more people who grow and cultivate the plants, the easier they get these plants.

Natural dye plant conservation efforts not only the duty of the public but also the government. Bojonegoro government has a role in conservation of natural plants which were important in natural dye product. The development of Batik which was processed using natural dye will support Jono as a Cultural Tourism Village Jono, which become creative industries in Bojonegoro.

There are opportunities for natural plant conservation to enhance the sustainability of natural dyes resources. Home gardens in Jono Village can be potential spot to cultivate numerous plant species which area important as natural dyes. Worldwide, home garden has been considered important to support human life in rural environment. Home garden contributes significantly to support community's health, food security program and tourism. There are also opportunities for home garden to support sustainability of natural dyes for home industry of Batik.

CONCLUSION

There are 12 plant species used as dye for batik, i.e. Teak, Mahogany, Ketapang, Tamarind, Mangosteen, Mango, Suji, Pandan, Indigofera, Guava, Banana and Onion. Teak (*Tectona grandis* L.) and mahogany (*Swietenia mahogany* L.) have the highest value of 1.00 RFC. These species is the most frequently cited by respondents. Craftsmen in Jono village already know and use both of these plants for batik dyeing. Natural dye plant species need to be introduced to the public so that they know the additional benefits of the plants.

Recognition efforts can be done in several ways, such as studying the benefits of batik natural dye plant. We could also using natural dyed batik wisely and sustainably so that the benefits of the plants can be perceived by the public. Last, we could protect batik natural dye plant by planting, tending, and cultivating them. The use of natural dyes is also an attempt to reduce the use of synthetic dyes.

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The Natural and Cultural Resources for Ecotourism Development in Trenggalek Regency, East Java

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Abstract

Ecotourism is all of the activities that is responsible for maintaining the conservation and environmental education. This activities also involves the local communities to get some benefit. This research's aim are to determine some potentials objects and attractions for supporting ecotourism development program in Trenggalek Regency, East java. Field survey was conducted at Trenggalek Regency following several steps including preliminary study, field surveys, and interviews to several informants. Data obtained from interviews with several informants as well as from direct observations were analyzed by using descriptive analysis techniques. The results show that Trenggalek Regency have some potential resources for supporting ecotourism i.e. Geghog rice, Ayam Lodho, Alen-alen, Kripik Tempe, Tiban ceremony, Lowo Cave, Prigi Beach, Bamboo Handy Craft, Larung Sembonyo ceremony, Nyadran Ceremony, Clove plantation, and Cengkong Beach. Each of those mentioned potential resources have different characteristics that can become supporting unit for ecotourism development.

Keywords: community development, conservation, natural resources, sustainable tourism

INTRODUCTION

Tourism sector is one of the economic development machines for developing countries. It is especially important in Indonesia. In 2020 Indonesia was predicted to be visited by more tourists [1]. In the last few years, Indonesian government started to introduce and promotes ecotourism, which is expected as an effort to protect nature and its resources from environmental damage [2].

Ecotourism is tourist activity that is responsible for maintaining environment, promoting environmental education and promoting local communities to obtain benefits [3]. As continuous activities for ecotourism development, each tourism sector in Indonesian regions must be directed to ecotourism.

Trenggalek is a district located in the southern part of Province in East Java. The geologies condition was surrounded by mountains and abutted on southern coast causing Trenggalek rich in biodiversity and landscapes that could potentially become a tourist attraction. Potential tourism of Trenggalek divided into four aspects, namely the landscape, typical food, attraction and ceremonies. Overall potential tourism in Trenggalek may be appointed as a tourist attraction that is became the object of ecotourism. Therefore, the aim of this study is

identifying the potential tourism of Trenggalek which can be used as the object of ecotourism.

MATERIALS AND METHODS

Study Site

This study was conducted from October 2014 until January 2015 in several districts, i.e District of Trenggalek, District of Watulimo, District of Panggul, District of Pogalan, and District of Gandusari. Trenggalek Regency was coterminous with Tulungagung regency and Ponorogo regency in the north, in the east was with Tulungagung, in the south was with Indonesian Ocean, and in the west was with Ponorogo and Pacitan (Fig.1).



Figure 1. Trenggalek map [4]

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Data Collection

Data was collected through several steps, namely preliminary study, field observation,

interview and documentation. Preliminary study was conducted to get comprehensive picture of the study area and to get permission for related insititution. Field observation was done by visiting interested object for tourism developmet. Determination of informan was done by using certain criteria for appropriate competence. Semi-structure interviews was conducted to identify the meaning of attraction and informant perspection about the natural and cultural resources for attraction development. Data obtained from interviews with several informan as well as from direct observations were documented and analyzed using descriptive analysis techniques [5].

RESULTS AND DISCUSSION

Principally, Trenggalek regency is rich in term of cultural and natural attraction for ecotourism development. The interesting and important resources were described bellow.

1. Geghog Rice

Geghog Rice is one of the specialities foods from Trenggalek (Fig. 2). Geghog rice was available in the District of Bendungan. In the last years, Geghog rice was often carried by farmers as a provision in the fields. At last, Geghog rice was created icon from District of Bendungan. Geghog rice is very simple which is consists of rice and anchovy sauce. The sauce was added to make rice tasted very spicy. The materials of the sauce used chili, anchovies, garlic, onions, and tomatoes. Pepper and anchovies were the most important basic ingredient in this culinary. *Capsicum frutescens* L is the main chili which was used in the sauce. The communities were planted *Capsicum frutescens* L. in around their yard or field for supplied this plant. So, if the price of chili increased, the communities had stock of chili from their yard or field.



Figure 2. Geghog rice

Most villagers in the District of Bendungan had realized the importance of chili plants in their lives. Beside as materials for food Geghog

Rice, chili was also used for other cooking spices and ingredients in traditional medicines. *Capsicum frutescens* L. was contained nutrients includes fats, proteins, carbohydrates, and calcium, phosphorus, iron, vitamin A, and B1, B2, C, and alkaloid compounds [6]. *Capsicum frutescens* L. was one of the ground cover plants that can be represented a wide variety of insects and stabilized the food chain so that it can also be recommended as refugia plants [7].

Anchovy was different compare to *Capsicum frutescens* L. because anchovy can not supplied directly from the District of Bendungan. The topology areas of Bendungan were mountainous area. Thus, the fish was supplied from other district. This can be described as an act of conservation, because it provided opportunities for communities in other areas to increased production of the anchovy and automatically the communities will conduct the conservation of the anchovy habitat.

2. Tiban Ceremony

Tiban was known as tradition to invite rain. For some people of Trenggalek Tiban tradition were believed to make the rain in the dry season. This tradition began when children fighting a pitch for water as a stock during the dry season. The childrens was played hardball by used the whip and unexpectedly in the middle of fight rain drops. Tiban performer consists of two people doing whip between each other (Fig. 3). Tiban attraction was headed by "Landang". He was responsible for the operations of the Tiban attraction. Whip in Tiban attraction was made from palm sticks and tied with a rope. The rope was used from the slice of bamboo. The palm stick (*Arenga pinnata*) was widely available in the District of Pogalan.

However, the presences of palm plants were decreased in Pogalan and very difficult to find it. Nowadays the existence of palm plants were greatly influenced by the people activities that used for sale. In terms benefits of economic, palm plants ranging from physical parts (roots, stems, leaves, fibers, etc.) and their products (juice, starch and fruit) can be used for daily needs [8]. Beside that palm were given economic benefits, palm useful as a protective soil from erosion, especially in the cliffs of the river as well as the elements of production [9]. Tiban attractions can be used as a supporting ecotourism, if the requirements of all support materials for Tiban attractions can be conserved, especially palm (*Arenga pinnata* Merr.). Thus,

there needs to be an effort from both the government and people for doing conservation of the palm plant. Palm plant conservation can be doing by choosing the selection logging of old plants and replanting again.



Figure 3. Tiban and sectional palm trees; a) Tiban attraction, b) whip from the stick of palm, c) the section of palm tree, d) the section of palm tree leaf.

3. Bamboo Craft

Bamboo craft is one of the commodities from Trenggalek. Bamboo craft was widely available in the District of Pogalan. Most of the people were worked as bamboo crafts. Bamboo crafts made by people in the district of Pogalan include braids, steamer, and baskets (Fig. 4). The type of bamboo for some handicraft must an old bamboo rod.



Figure 4. Many kinds of bamboo craft

The people of Pogalan not only got the benefit from bamboo plants into crafts, but also bamboo can make atmosphere becomes shady or dim. Beside that, people mostly used of young bamboo for vegetable. Bamboo plant has a root rhizomes (rhizon) are segmented that allow rain water can absorb up to 90% compared to other crops. If more increased population of bamboo plants, then water volume in under ground will be increase too. Automatically, the water supplies also increase in the region. Besides that bamboo plant also served to conserve land, as

well as the improvement of the environment [10].

4. Kripik Tempe

Kripik Tempe is one of the specialty foods from Trenggalek. Kripik Tempe is very famous for the delicacy and the crunchy (Fig. 5). Kripik Tempe was made from Tempe with flour, garlic, coriander, and lime leaves. Kripik Tempe had only two flavors include original flavor and lime leaves flavor. Kripik Tempe from Trenggalek was made from specifically of Tempe for kripik Tempe. Soya Tempe for kripik Tempe was thinner.



Figure 5. Kripik Tempe

Kripik Tempe can be used as a supporting ecotourism when it was processing through organic processing. Soybeans organic can be cultivated by means of organic farming. Organic farming will be providing benefits including the cost are not too much, the price for organic agricultural products is much higher than conventional farming, as well as improving soil fertility in the long term [11]. Thus, agricultural land in the region of Trenggalek can be maintained sustainably when agricultural system was transferred into the organic farming system.

5. Ayam Lodho

Ayam lodho was made from chicken with coconut milk and spicy flavor. Ayam lodho usually served with savory rice and vegetables (Fig. 6). The chickens must be used Javanese chicken. Javanese chickens are chickens that were allowed to eat and live freely in the yard or the field.



Figure 6. Ayam lodho with urap-urap

The Javanese Chicken in maintenance that will be fed in the morning. The Javanese chicken will be released into the yard or moor at noon, in order to the Javanese chicken to feed themselves. Liberation diets that applied in Javanese chicken get the nutrients naturally. In the yard or moor, chicken can take all kinds of plants and animals for example, chicken can eat the flowers on the grass, young leaves of grass and small animals ranging from worms to various types of insects.

Ayam lodho can be used as a supporting of ecotourism if the chicken must be used Javanese chicken. If Ayam lodho was appointed as an icon of Trenggalek, then the need for the Javanese chicken will be increased. The yard or fields will be a lot left to over grow ground cover plants. Automatically the land will be protected from erosion caused by water. Ground cover plants from grasses can serve to slow runoff, as protector of the land surface caused by the destruction of the power of rainwater, enriched organic materials, encourage the development of soil biota that can improve soil physical and chemical properties, and increase soil porosity [12].

6. Alen-Alen

Alen-alen is other of the typical food from Trenggalek. Alen-alen used as a snacks food because has a small shape, like ring, fried and savory taste (Fig. 7). Characteristic of alen-alen have a yellow color. Alen-alen was made from cassava (*Manihot esculenta* Crantz). Varian sense of alen-alen include onion flavor, cheese, chocolate, sweet and spicy flavor.



Figure 7. Alen-alen

The process of making starch cassava (*Manihot esculenta* Crantz) was started from milling. Results of milling are starch that has been mixed with water. Waste milling results called gamblong and was separated for fodder duck. Then strach was dried in order to evaporate the water content and remaining flour. Cassavas were supplied from outside the area Trenggalek because the area Trenggalek not able to supplied

cassava in large quantity. In fact, Trenggalek basically able to supplied cassava. It is evident that in 2012 Trenggalek had become one of the largest producers of the commodity cassava in East Java.

Alen-alen can be used as a support ecotourism when the farmers of cassava got knowledge to grow crops (*M. esculenta* Crantz) following traditional practices. This will have a positive impact for farmers that can increase revenue. Besides that, the other benefits can utilize the land continuously without timeless. Planting of cassava (*M. esculenta* Crantz) can be done by Multiple cropping, intercropping, and (Sequential cropping) [13].

7. Lowo Cave

Lowo Cave is a natural tourist destination located in the Watulimo Trenggalek (Fig. 8). Lowo Cave is the largest cave, the longest and most beautiful in Asia. The length of Lowo Cave reaches 859 m and consists of 9 rooms. Lowo cave was discovered in 1931 by Mbah Lomedjo. He was curious about the animal prey may disappear. In his search, Mbah Lomedjo found a cave and not accidentally mentioned Goa Lowo, so the name of the cave is used until now [14].



Figure 8. Lowo Cave area; a) The entrance Lowo Cave, b) Stalactite and stalagmite, c) inlet sunlight, d) Bats in the ceiling of the cave.

Lowo Cave; *Lowo* means bat; thus many bats found in the cave. Species of bats found in the Lowo cave had a small size and black color. Reviewed from the small size, bats lived in Lowo cave are insectivorous bats (Microchiroptera).

The existence of bats is very beneficial for the community and the environment. For people, the bats are produce manure that can be used as fertilizer. The manure was called *guano* fertilizer. In addition to produce manure, which serves as a fertilizer, Microchiroptera is the type of insectivorous bats that can serve as natural enemies and effectively to control pests of

agricultural crops [15]. In order to sustain Low cave, the bat population conservation was needed.

8. Prigi Beach

Prigi beach is one of the natural tourist areas on the south coast. Prigi beach was located in the Tasikmadu village, District of Watulimo. Prigi Beach location was approximately 48 km from the centre of Trenggalek. Prigi beach had an area approximately 5 ha with a length approximately 2 km. Prigi beach was located on the Prigi bay. Waves of Prigi beach relative smaller than south area. It is because the waves on the Prigi beach had been blocked by hills which are on either side of the beach.

Prigi beach is well known as the largest producer of fishery, in which more than 90% of fisheries productions were exported outside Trenggalek [16]. This makes Prigi Beach as a place of landing the largest fish on the south coast after Cilacap. Species of fish had economically valuable include tuna, sword fish, lemuru and cakalang (Fig. 9).



Figure 9. Prigi Beach area; a) Prigi Beach, b) Type of fish catches

Fish resources are renewable resources (resources that can be recovered). However, its must be balanced with good management, because if not managed carefully it will have an impact on fisheries resources and the environment. Management of fisheries resources must be accordance with the principles of sustainable development. Therefore, it must be balanced with attention to the integrity of the marine ecosystem as a whole marine life. Marine ecosystem must be maintained including coral reefs and mangroves, in order to the fishery resources can be continued [17].

9. Traditional ceremony Larung Sembonyo

Prigi beach is not only famous for the fisheries sector, but is known for a place to perform traditional ceremonies *Larung Sembonyo* (Fig. 10). Larung Sembonyo was implemented with sweeping away offerings and agricultural products into the sea as agratitude to God in hope got blessed, safety, and obtained abundant

sea and land. Larung Sembonyo was held in the Selo month (Java calendar), Sunday kliwon. Larung Sembonyo Ceremony was performed by farmers and fishermen.



Figure 10. Larung Sembonyo ceremony

The culmination of the Larung Sembonyo ceremony was swept away the couple small doll with a sitting position on the boat. A small doll was made of banana stems and pinned three colors flowers include of ylang flower, jasmine flower and lecarri flower. Other offering was used "Cuk badek bakal tetes" which means everything that was consumed by humans. Among them are crops, Banana, chicken eggs, sugar, tobacco, coconut, and medicinal plants.

Larung Sembonyo ceremony can be used to support ecotourism. This is associated with all equipment must be presented if the ceremony was done. The crops plant must be presented in Larung Sembonyo ceremony. In order to always able to meet the needs of crops, the community needs to pay attention to the arrangement of land. Land arrangement can be done with the cropping systems, overlapping shifts, and hall way system. The advantages of the land arrangement can reduce the risk of crop failure, because the plants one to the other can be complementary [18].

10. Cengkrong Beach

Sub district of Watulimo is a region with many charming beaches, e.g. *Cengkrong Beach* which rarely visited by people. Cengkrong beach is an area of beautiful mangrove forests (Fig. 11). Mangrove forests in Cengkrong Beach had approximately 10 species of mangrove, i.e. *R. apiculata*, *Sonnaretia alba*, *Bruguiera gymnorhiza*, *Ceriops tagal* CRob., *Xylocarpus granatum*, *Avicennia* sp., *Aegiceras corniculatum*, *Lumnitzera* sp., *Derris* sp., and *R. mucronata*.

Mangrove forests in the Cengkrong region not only was presented a fresh green expanse of forest, but tourists were who visited can enjoy various types of shore birds and wild animal, i.e. monkeys, small crocodiles, as well as the

cultivation of certain biota aquatic. Mangrove forests in area of Cengkong Beach had provided many benefits to the community around the Cengkong coast region, especially economic field. The public economy will be increased because the people were used by several types of mangrove plants as food, beverages, building materials or anything that can be sold. One of them is "bogem"; the fruit of mangrove plant were used by communities for raw materials syrups, jams and soaps. Some other types can be used as raw material for textiles and pharmaceuticals.



Figure 11. Cengkong Beach area

In terms of function, mangrove forests have three functions, i.e physical function, biological function, and economical function. Physical functions that maintain the condition of the beach in order to stable remain, protecting coastal cliffs, and as a green belt to prevent coastal erosion caused by the sea water. Mangrove biological function, include as a nursery habitats of fish seed, shrimp, and crabs, as a diverse source and non biota aquatic, and the source of plasma cum. Mangrove economic function is as a source of fuel, building materials, medicines, food and beverage, and textile raw materials [19]. To sustain mangrove forest in Cengkong beach, we must take care environmental around Cengkong beach and used the land for aquaculture is permitted only about 20% of the total mangrove forest area.

11. Nyadran

Nyadran ceremony is one tradition that was carried by the people in Ngantru Village, Trenggalek. Nyadran from the word *Sadra* meaning grave pilgrimage. Nyadran ceremony in Ngantru was tradition to visited grave of *Minak Sopal*, the first Regent of Trenggalek who contributed in building *Bagong Dam*. Nyadran tradition was held on Friday Pon, Selo month (Javanese calendar), housed in Bagong Dam.

Nyadran Ceremony procession include tadarusan, bathing buffaloes, Wayang Kulit, slaughtering buffalo, tahlil, ruwatan, Jaranan,

throwing buffalo head in Bagong Dam, and salvation event. The event was conducted over several days before Friday Pon. Top part of Nyadran ceremony was swept away buffalo head in Bagong Dam (Fig. 12).



Figure 12. Nyadran ceremony [20]

In implementation of Nyadran, buffalo is an important of an element. Type of buffalo that use in traditional ceremonies of Nyadran is albino buffalo (*Bubalus bubalis*). Albino buffalo was denoted as a substitute for the white elephant that used by Minak Sopal used as escape goat when establishing Bagong Dam. But with the development of the times, a white elephant is very difficult to find thus it was replaced with a buffalo.

As an important element in the Tradition of Nyadran, the buffalo Caucasians should always provided in the moment Nyadran ceremonies. But the existence of albino buffalo gradually decreased because the number of cut is very high without an increase in population and the lack of feed and natural grazing fields. With the existence of this demand, there has to be an effort to make the population of buffalo does not become extinct. Some things that can be done is the maintenance of traditional buffalo grazing. In this case they need to maintain the existence of puddles or swamp that will automatically protect the soil from erosion. Pools or swamps area provide wide variety of ground cover plants as buffalo's food. It also increases the enthusiasm of local communities to preserve traditional Nyadran ceremony, so it becomes an incentive to preserve the population of buffalo [20].

12. Clove Plantation

Clove (*Syzygium aromaticum* L) is a major commodity in Trenggalek. Clove plantation crops are very well known and widely exported out of the city. In 2004, Trenggalek is the largest clove production in East Java. However, the productivity was decreased by 2008. According to the Social Macro Economic Data in 2004-2008, the decrease was caused by higher cost of care

than the offered price. Clove farmers are also has difficulties in selling, because not all of the cloves can be accepted by the middlemen. Therefore, clove farmers in Trenggalek choose to switch the cultivation of other crops.



Figure 13. Clove estate in Munjungan sub-district

Most of the districts in Trenggalek are very suitable to plant the clove. Terms were intended planting cloves that 300-600dpal. The communities who are farmers not only planted clove, but the distance between one plant clove with other crops planted with production plants. Some types of plants are planted at a distance of cloves, e.g. fruit plants (banana, guava, mango, pineapple and coffee) and sometimes planted with grass. These plants can grow well in the shade of cloves as the main crop. Beside to use the results of cloves, clove farmers may use the results of crops under clove trees because it can be harvested within a short time.

It is in the implementation, the community has been using Agroforestry to the pattern to plant the cloves. Advantages of Agroforestry systems, especially in the field of ecology, among others, cause plants can create a breeding place for birds and mammals. Beside that, Agroforestry can conserve the genetic diversity with different functions in stabilizing an ecosystem [21].

CONCLUSION

Trenggalek has several tourist destinations that can be used as a support for ecotourism, i.e Geghog Rice, Ayam Lodho, Alen-Alen, Kripik Tempe, Tiban, Lowo Cave, Prigi Beach, Bamboo Craft, Nyadran Ceremony, cloves estate, and Cengkronk Beach. Each potential of tourism has different characteristics that can be used as a support for ecotourism, thus create a component that well conserved in the district of Trenggalek.

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Consequences of Cultural and Behavioral Difference of Tourist: Study of Australian and Indonesian Tourist Who Visit Lombok Island, West Nusa Tenggara

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Abstract

This study aims at identifying behavior differences of Australian tourists and domestic tourists who visit Lombok island, and determining as well as analyzing the Hofstede cultural variables (power distance, individualistic-collectivist, uncertainty avoidance, masculine-feminine, long-term orientation) that may explain the differences in behavioral intention (to have activities, to interact, and to transact) of Australian and domestic tourists. This study was conducted on 160 Australian and domestic tourists who were visiting the island. Sampling was done by convenience sampling. Methods of data analysis were conducted by using t-test and discriminant analysis. The results of this study showed that there are differences in behavioral intentions of Australian travelers and the domestic ones in having activities, interacting, and transacting, and these differences can be explained by the cultural background of the tourists that are based on cultural orientation at the individual level. This study extends the use of CVSCALE and may be considered as an addition to the use of secondary data in determining the value of culture, as well as providing clearer framework on the limits of the relationship of cultural values and the various tourist behaviors.

Keywords: Individualist-Collectivists, Longterm orientation, Masculine-feminine, Power distance, Tourist behavior, Uncertainty avoidance

INTRODUCTION

The diversity in cultural background is becoming one factor that had been believed to be a differentiating factor between the behaviors of the tourists. The differences in language, dressing, culinary, cultural point of view, lifestyle, and various activities which are undertaken commonly found among travelers [1-4]. As an individual who visits a new country or place, a tourist still has certain needs and desires that should be fulfilled. To meet various needs, they perform actions or activities that demonstrate their behavior to meet the needs for in the tourism places until they arrived back in their homeland. Behavioral differences that occur cannot be avoided and will be found by the tourism actors in any tourism sectors [1,5]. In short, understanding what and how the desire and willingness of the tourists as well as their behavior is an important factor for the success of tourism marketing activities [6].

In terms of tourism sector, culture has a significant influence on the consumer or traveler's behavior [7] and the fundamental determinant of a person's desires and behavior [8]. Cultural values is an umbrella concept which

includes various elements such as shared values, beliefs and norms that collectively distinguish a particular group of people from others [1] are resistant to change [9], and remain unclear when at home or when traveling abroad [10]. Such cultural differences among the tourists may result in different attitudes, opinions, emotions, as well as the tendency to make a purchase during their traveling [11]. People from different cultures will have different cultural values and rules of social behavior, perception, and social interaction, which in turn will affect their lifestyle, work patterns, the way how to relax, and the patterns of their consumption behavior [12].

The studies related to national cultural differences and tourist behavior has been widely based on the Hofstede's cultural dimensions [13-16]. According to Hofstede [7], many Asian countries have a culture that is both collectivist and degree of a version to high uncertainty. Tourist behavior, for example, from Japan, Korea, China, and Indonesia tend to travel in groups [2,3,17]. Different with Eastern culture, Western culture is often associated with individualistic cultures and have a low level of uncertainty avoidance. In tourism activities, travelers who have a high individualistic cultural background are usually motivated by hedonism, the comfort, the pursuit of pleasure and fun, sensation,

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stimulation of pleasure, and also self-satisfaction [18].

Researches which have been carried so far has been more emphasis on tourists' behavior differences due to the differences in national culture background based on the Hofstede's score of dimensions. It does not explain the relevance of each dimension of culture on behavior. These dimensions often do not always give effect in the form of behavior that is expected to occur in accordance with Hofstede's scores of cultural dimensions [19].

Hofstede's cultural scores indicate the level of culture from various countries, which is a metrical measurement value of certain dominant culture from certain countries [20]. The use of Hofstede's cultural scores is metrics for measuring the cultural orientation of individuals, resulting in some of the methodological difficulties, and it is often contradictory with the existing Hofstede's scores. Therefore we need a measurement of cultural values on the individual level [12]. Some researchers argued that, marketers are more likely to succeed if they focus directly on consumers' characteristics and instead focus on country's characteristics [21-24].

This study tried to identify the behavioral characteristics of Australian and domestic tourists during their stay in Lombok Island, and further analyzed the relationship between Hofstede's cultural dimensions to tourist behaviors; thus, this was to clarify the relationship between each of Hofstede's cultural dimensions with tourist behavior. Therefore, the purposes of this study are:

1. Identifying differences in the behavior of activities, interactions, and transactions of Australian and domestic tourists who visit Lombok Island;
2. Knowing and analyzing Hofstede's cultural variables (power distance, individual-collective, uncertainty avoidance, masculine-feminine, and long-term orientation) which explain the difference in intention to behave (activities, interactions, and transactions) of Australian and domestic tourists and who visit Lombok Island.

MATERIALS AND METHODS

This study employed explanatory survey method, which was to describe and test the proposed hypotheses. The subjects in this study were Australian and domestic tourists who visit Lombok Island. There were 80 tourists both

Australian and domestic each group selected as the samples of the survey. According to Roscoe in Sekaran [25] that size of the sample in the multivariate study is at least 10 times of the number of variables studied. Based on consideration of the characteristics of the tourists who had just settled in a certain period of time and been relatively short, sampling in this study was conducted with the convenience sampling.

Data collection was accommodated through questionnaire, which was given directly to the Australian and domestic tourists. Researchers visited tourism sites, which are representing the four most famous tourism sites in Lombok Island, namely; Senggigi Beach, Gili Trawangan, Kuta Beach, and Gulf of An. The questionnaire contained statements of indicators to express the variables being analyzed in this study, which were measured with a 5-point Likert scale (1, 2, 3, 4, and 5), from strongly disagree (1) to strongly agree (5). To identify the differences in tourist behavior between the two countries (Australia and Indonesia), the analysis was conducted through two independent sample t-test and to test whether a variable distance power (X_1), individualist-collectivist (X_2), uncertainty avoidance (X_3), masculine-feminine (X_4), long-term orientation (X_5), explaining the difference in behavior activities (Y_1), the behavior of interactions (Y_2), and the behavior of transactions (Y_3) of the tourists. The testing was conducted through discriminant analysis.

RESULTS AND DISCUSSION

To give a general overview of the relevance of the respondents in this study, the following description of the respondents in terms of sex, age, and education level.

Based on the presentation of Table 1, it shows that the number or percentage of the respondents between men and women did not differ significantly; that was assumed that both men and women have equal opportunities to have tourism activities. In terms of the age aspect, it is showed that the dominant age group was productive age travelers, between 26-45 years old. This might be due to the possibility of the tourists in that age they have higher productivity or spared income for travel or leisure. Based on the education level, the majority of respondents in both groups had a higher education (above high school).

Table 1. Description of Australian and Indonesian Tourists Based on Sex, Age, and Education Level

Characteristics of the respondents	Category	Australia (%)	Indonesia (%)
Sex	Male	46.3	56.3
	Female	53.8	43.8
Age	18-25 years old	20.0	15.0
	26-35 years old	27.5	36.3
	36-45 years old	18.8	37.5
	46-55 years old	13.8	11.2
	56- 65 years old	17.5	-
	66-75 years old	2.5	-
Education	High schools	38.7	33.7
	Diploma	16.3	10.0
	Bachelor (S1)	36.3	45.0
	Graduates (S2/3)	8.7	11.3

For the descriptions from the respondents of the two groups of tourists towards the Hofstede's cultural variables is presented in Table 2 as follows. The score for the variable PD, IC, UA, MF, and LTO in both groups showed the domestic tourists was higher level for the fifth variables of culture than Australian tourists. This

means that domestic tourists acceptance of inequality in the distribution of power, collectivity, risk-avoidance, feminine, and tend to have values of prudence, fortitude, perseverance, thrift, respect for tradition, and fulfilling social responsibility.

Table 2. Description from the respondents towards the cultural variables

Variables		Average Score for Tourists' Culture	
		Australian	Indonesian
Power distance (PD)	Discussing with the subordinates	1.83	2.15
	Asking for opinion from the subordinates	1.85	2.06
	Interactions with the subordinates	1.56	1.63
	Agreeing with the opinions from the subordinates	2.09	2.53
	Not delegating tasks	2.23	2.79
	Mean	1.91	2.23
Individualist-collectivist (IC)	Prioritizing group	3.06	4.16
	Loyalty to the group	2.99	3.91
	Rewarding the group	3.15	3.83
	The success of the group	2.95	3.85
	The goals of the group	3.29	3.84
	The support from the group	2.43	3.61
	Mean	2.98	3.87
Uncertainty avoidance (UA)	Instructions as the guidance	2.88	3.58
	Obeying the rules	3.08	3.84
	Rules as the guidance	2.90	3.69
	Standard procedures as standard of operational	2.53	3.78
	Important guidance	3.21	3.73
	Mean	2.92	3.72
Masculine-feminine (MF)	Equal career for men-women	1.93	2.0
	Different way to solve the problems	2.33	3.41
	Difficult problems can only be handled by men	2.23	3.09
	Special jobs for men	3.18	3.76
	Mean	2.42	3.24
Long-term orientation (LTO)	Cost savings	3.93	4.39
	Diligence	4.01	4.45
	Stable personality	4.08	4.36
	Future planning	3.54	4.40
	Sacrifice	2.90	4.06
	Hard work	4.04	4.50
	Mean	3.75	4.36

Various activities undertaken by the Australian and domestic tourists indicated their preferences upon variety of alternative activities to do during the vacation. The following is the inquiries from the respondents towards a variety of activities that they could do during the vacation which are referred by Pizam & Sussman [10]. Table 3 shows the responses of the Australian tourists and domestic tourists on various preferences of activities performed during their vacation.

Table 3. Description of Respondents' Inquiries

Behaviors Variables		Average Score for Tourists' Behaviors	
		Australian	Indonesian
Activities	Adventures	3.90	3.06
	Active	3.74	3.25
	Up-to-date	3.66	2.76
	Mean	3.77	3.02
Interactions	Local attractions	2.91	2.95
	Local culinary	4.24	3.56
	Length of visit	3.40	3.20
	Gathering with other travelers	4.03	3.43
	Mean	3.66	3.29
Transactions	Buying souvenir	3.09	3.86
	Buying handicrafts	3.08	4.03
	Shopping	2.24	3.81
	Group traveling	2.13	3.78
	Sending postcards	2.55	2.98
	Mean	2.62	3.69

Based on Table 3, Australian tourists tend to have higher intentions to conduct the activities or mobility and interactions as it was compared to the domestic tourists. In terms of transactions behaviors, domestic tourists tend to have higher intense transactions than Australian tourists. Based on the results of two independent samples *t-test* showed that the existence of significant differences between the two groups related to the behavior of the activities, interactions, and transactions, as shown in the following Table 4:

Table 4. Behavioral Differences of Australian and Indonesian Tourists

Tourists' behaviors	Results of t-test		
	t-count	t-table	p-value
Activities	6.791	1.97	0.000
Interactions	4.048		0.000
Commercials	10.305		0.000

Table 4 showed *t-count* > *t-table* and the *p-value* (0.000) < alpha 0.05 level, it shows significant difference in tourists' behaviors from Australia and Indonesia. Based on the analysis results of testing for the difference which has been concluded that: *there are differences in the behavior of the activities, interactions, and transactions between Australia and Indonesian tourists in having tourism activities in Lombok Island.*

Results of discriminant analysis to prove whether Hofstede's five cultural variables can explain the differences in behavior intention between Australian and domestic tourists in having activities, interactions, and transactions done by establishing discriminant function. The results of discriminant function through stepwise method for the behaviors of activities, interactions, and transactions are as follows:

$$D_{Y1} = -6.415 + 0.602X_2 + 1.313 X_3 ;$$

$$CR^2 = 23.6\%$$

$$D_{Y2} = -7.820 + 0.552X_1 + 1.098 X_3 + 0.748X_5 ; CR^2 = 29.4\%$$

$$D_{Y3} = -7.023 + 1.709X_2 + 0.354 X_3 ; CR^2 = 45.8\%$$

Discriminant function activity behavior consists of two cultural variables (IC, UA) that may explain the differences in the high-low behavioral intention for the activities of the tourists, with squared canonical correlation of 23.6 percent. This means that 23.6 percent of the diversity of the behaviors which occur between the activities of the tourists can be explained through the discriminant function. The diversity of the established interactions behaviors intention of the discriminant function consists of three cultural variables (PD, UA, LTO), 29.4 percent of the variability can be explained through the discriminant function. In the discriminant function formed to diverse transactions behaviors indicates that there are two cultures (IC, UA) that became the explanatory variables of the tourists transaction behavior, 45.8 percent of the variability can be explained through the discriminant function.

Tourists from a culture that has a low level of uncertainty avoidance is likely to have higher threshold tolerance to risks and uncertainties, which will perform risk reduction behavior in the lower level. Instead, tourists who have a high level of cultural aversion is likely to have a low threshold of tolerance towards risks and uncertainty; therefore the tourists will conduct behavioral risk reduction in high-level [26].

Australian tourists tend to be more willing to take risk, be tolerant and open of new things, like innovation and ideas as well as interests in any different matters, more facing something new in the form of goods, new environments as well as new people they met during the vacation. As the active outdoor tourists have been found to be outdoor enthusiasts who enjoy activities such as hiking, backpacking, camping, sailing, fishing, golf, and visiting areas of natural or wilderness [27,28] and spend less time and money on shopping. Instead domestic tourists had higher score for uncertainty avoidance cultures. Uncertainty avoidance is likely to be high on the domestic tourist would encourage them to keep themselves and stay shy away from new things that are not familiar to them, so that they have less interactions with tourists from other countries and engage in activities around the tourist sites.

In a collective society, identity and value of the individual is rooted in the social system over the individual accomplishment or achievement, refers to "societies" in which individuals are integrated into a strong, cohesive in-groups [8]. Therefore, people from individualistic cultures tend to see themselves more independent than the collective society and concerned with the fulfillment of their own individual goals, whereas people from collectivist cultures tend to see themselves as someone who connects with others and put concern with value of the communal goal above their own interests.

The freedom to perform a variety of activities, independence, and to behave towards achieving a personal goal may encourage the tourists to be a more individualistic individual whose values to actualize themselves; they would perform various activities freely without having to think about other people's views or assessment towards them. In their view, individuals are free to do anything, free to express their wants and needs, especially when they are dealing with tourism activities. Therefore, in the context of individualistic community, Australian tourists tend to have a high intention to doing activities in tourism areas or during their vacation.

For the domestic tourists, on the other hand, they tend to have a collectivist culture, the behavior exhibited highly dependent on the views, opinions or values that exist within the group. Their behavior in the activities is largely determined by the behavior of the group; for the main interest belongs to the group. This may

limit the freedom of the individual in a collectivist culture in expressing different behaviors out of the behavior of groups or behaviors that is tailed with the community. According to Riter in Pizam and Sussman [10], Japanese tourists (collectively) are not such pioneers or adventurers. Research by Kim and Lee in Manrai [26] indicated that the individualist tourists are more likely to look for new things, while collectivist tourists tend to be motivated to be with family. Veerapong [29], Vespestad and Mehmetoglu [30] found that individuals with individualist orientation values are more challenged to participate in the activities of nature and hiking. Similarly, other research showed that consumers from individualistic cultures showed a higher tendency to explore a variety of places and visit places that are completely different from the commonly encountered [31].

Individualism shows a more loose relationship between individuals with the societies, and each individual is expected only to keep himself and his immediate family. Collectivism, on the other hand, refers to a society or community in which the individuals are integrated into a strong, cohesive in-group, throughout the life of the community which will continue to protect them and not question loyalty within the group members [8]. The consequences of these values in consumers' behavior in tourism activities may relate to the behavior of the people in groups, their relationships with others and their perceptions of themselves in relation to others [32].

In collectivist culture, the orientation of the collectivity and identity are derived from the social system [33]. Therefore the people in this culture tend to be influenced by the behavior as referred to the group and see themselves as part of an integrated parts or members of the community. The empirical research so far has shown that individuals from such high collectivist culture tend to be family-oriented compared to those from high individualism culture. The study by Sun *et al.* [31] and Kosompong *et al.* [22] showed that consumers with collectivist value are more oriented to their families. Individuals' behavior exhibited by high collectivist value may indicates responsibilities as a member of the family, loyalty, and uphold the unity and happiness together in the family.

The strong bond that exists within the individuals and the group has consequences for the individual impulse to behave that can please the other group members, so that such behavior

may improve the relationship within the individuals in the group. This study demonstrated that the behavior of domestic tourists who tend to like to buy souvenirs or handicrafts at tourist sites, buying the presents for family, friends or other individuals in the group, shopping, traveling in groups, and have a higher preference for sending message to the other people (through letter or postcard) to family members or other groups.

Long-term orientation/*Confucian dynamism* is the degree to which a culture which focus on the future. Individuals, who have a high orientation to get the memories of the past when they think about the past, are more prone to nostalgia and memories and tend to like to bring perceived in doing something including during the vacation. They feel comfortable in their memories and organize their behaviors in ways accordance with the past because they believe that the past experience would provide comfort, so individuals tend to hesitate to try new things in current life [34,35]. Consistent with this argument, Holbrook [34], Cotte *et al.* [36], Baumeister and Baumeister *et al.* in Karande and Merchant [35], found that individuals with a past orientation would have a strong preference for products and services that remind them of the past, avoiding the new or foreign recreational activities; they are more likely to remain on the existing routines and more less likely to act spontaneously.

The domestic tourists prefer the current behaviors that may be helpful for their future and better appreciate the past. The future-oriented perspective of the domestic tourists may cause their tendency to take into account the duration for their travel (most likely to travel in a relatively short time) because they have burden to be required to back to work in the origin place, setting the effort to prepare for the future. This view may also cause the domestic tourists will consider every dime they spent during the vacation, tend to work continuously even though at the time of traveling, so that in the end they are hesitant to interact with the surrounding environments during the vacations. The Australian tourists, on the other hand, who have a long-term orientation culture, have higher score in terms of duration of traveling, so they tend to be happy to get together, to spend money for pleasure; they travel with relatively longer duration. For those trips are something that should be filled with fun activities, recreations, add friends / acquaintances, trying new things, regardless their routines during this

encounter. What obtained currently would be for life today.

Variable power distance culture is one of the explanatory variables on the tourists' interactions behaviors. Individuals with a view of the low power distance tend to take relationships with others in a way more consultative or democratic, respect the independence and their perspectives on other members of society tend to be the same on a formal position [8,37]. The domestic tourists have higher score of power distance scores compared to the Australian tourists. This means that more domestic tourists to have a sense of honor, respect of individuals who are in a higher position and tend to still pay attention to the social level (hierarchy) in view of other individuals, including during the vacation. This view tends to reduce domestic tourists' intention to interact with the surrounding environment including the new people whose status is unknown or even higher. Domestic tourists tend to shy away from activities which may not suit with their social status, such as eating in simple stalls, communicate with other individuals in which their view have a different social status. In addition, their social position or status for domestic tourists requires them to always be present in order to strengthen their status in the group. According to Woodside and Ahn [16] shorter duration visits are more likely to be conducted by the tourists from countries with high power distance. This is because if a person gets a high status in the hierarchical power structures then that individual must be physically present to strengthen its position continuously, whereas in countries with low power distance, weak social ties so that they can travel longer as they like.

CONCLUSION

The tourism behaviors of Australian and Indonesian tourists in doing activities, interactions, and transactions during the vacation in Lombok Island indicated some differences. The differences in behavioral intention that occurred between the groups of Australian and Indonesian tourists in activities can be explained based on the cultural background they have. Individuals with low uncertainty avoidance and individualistic values performed high behavioral intention activities. Similarly, individuals with low uncertainty avoidance value and low long-term orientation, and low power distance values had high intention to interactions. Individuals with collectivist orientation values and high

uncertainty avoidance, on the other hand, had high behavioral intension to transaction.

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Obstacles Facing Promoting Tourism for Islamic Landmarks from the Perspective of Tour Operators in Egypt

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Abstract

The UNESCO launched a campaign #unite4heritage in Egypt to defeat extremism and intolerance. The message of such campaign is peace, dialogue and unity embedded in cultural heritage. As culture and tourism are linked together, such message could be delivered through improving culture heritage tourism in Egypt. Islamic landmarks are considered as a part of human heritage. Therefore, the purpose of this study is to identify how much tour operators in Egypt include Islamic landmarks in their programs to determine the obstacles facing promoting cultural tourism in Islamic landmarks' areas. Additionally, the study would identify positive results in the case of developing heritage tourism in Egypt. To achieve a high result, a survey approach was employed to collect data from 100 tour operators, using a completed questionnaire technique as well as a Likert Scale and statistical models in order to test and interpret the research outcomes. The research findings indicated that although tour operators in Egypt are convinced of the significance of the Islamic landmarks, there is no contradiction between creating global understanding and at the same time achieving benefit to the local community. However, there is a range of obstacles facing promoting such type of tourism in Egypt.

Keywords: Culture heritage tourism, community, Egypt, Islamic civilization.

INTRODUCTION

The travel and tourism sector has become an important driver of growth and prosperity for many countries. It is estimated that this sector accounts for about 9 percent of GDP and employment worldwide (Insight report, 2012). Nowadays the requirements and expectations of tourists as well as the concept of tourism have changed. As an alternative to the concept of tourism based on entertainment and resting, the cultural tourism has developed helping tourists and hosts communities to contact with each other and foster understanding and experiences between them [1].

According to the UNWTO 37% of all tourism trips contain a cultural element; in its forecast 2020 UNWTO predicts that cultural tourism will be one of the 5 key market segments of the future. ATLAS survey also indicates a further growth in the proportion of tourists taking cultural holidays, up from 17% in 1997 to 31% in 2007 which means that cultural tourism is growing in importance worldwide [2].

As a matter of fact, the Egyptian economy relies heavily on tourism sector. Egypt receives mostly mid and low spending tourists as well as a small number of high spending tourists. With the increasing demand for unique experiences,

boards of tourism and DMOs will be forced to present on different markets [3] by diversifying the tourist attractions in order to achieve a balanced growth of the tourism industry and maximum benefit. This means that the type of tourism products developed and the facilities that support them must be able to attract visitors that are prepared to pay a premium price as heritage/culture tourists. The success of such an approach depends heavily on the quality of the overall visitor's experience since the time of arrival to the time of departure.

Additionally, Egypt is predominantly perceived of as the land of the Pharaohs. However, the Pharaonic era is only one component of Egypt's rich and diverse history. Egypt bears witness to the histories of civilizations, such as the Greeks and Romans, and also the expansion of ideologies, such as the Christian and Islamic. Many heritage regions in Egypt are still waiting for serious planning treatment. For example, the whole area of Islamic Cairo needs to be planned and included in tourists' programmes as a part of the tourism product [4]. This study aims to identify how much tour operators in Egypt include Islamic landmarks in their programs in order to determine the obstacles facing promoting culture tourism in these areas from their point of view, and to identify the positive results in the case of its development.

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TOURISM IN EGYPT

Culture Heritage Tourism

Tourism is not just an aggregate of merely commercial activities; it is also an ideological framing of history, nature and tradition; a framing that has the power to reshape culture and nature to its own needs [5]. Many destinations developed their tangible and intangible cultural assets as monuments, museums, theme parks, architectural and artistic works or sculptures or events as cultural – historical events, music and dance, theater, language and literature, festivals and artistic events and put them on show for tourists stepping beyond the sun, sea and sand tradition for a ‘real’ taste of their host destination through cultural heritage tourism [1,6].

Culture heritage tourism helps destinations in developing comparative advantages in an increasingly competitive tourism marketplace. It also helps creating local distinctiveness in the face of globalisation. Although there is no single agreed definition for culture tourism and heritage tourism. However Stebbins [7] defines culture tourism as a genre of special interest tourism based on the search for and participation in new and deep cultural experiences, whether aesthetic, intellectual, emotional, or psychological. Cultural tourism also regarded as a form of special interest tourism where culture forms the basis of either attracting tourists or motivating people to travel [8-11].

Similarly, heritage tourism is regarded as a subclass of cultural tourism, which is defined by the World Tourism Organization [12] as "movements of persons for essentially cultural motivations such as study tours; performing arts and cultural tours". Heritage tourism is based on nostalgia for the past and the desire to experience diverse cultural landscapes and forms [13]. In addition, cultural heritage tourism defined as "traveling to experience the places and activities that authentically represent the stories and people of the past and present. It includes historic, cultural and natural resources [14]. Heritage tourism employs historic-assets, cultural and natural resources that already exist rather than creating and building attractions, and destinations look to the past for a sustainable future. Indeed these assets need preservation and often restoration or interpretation, but the foundation for creating a dynamic travel experience lives on in the stories and structures of the past [15]. The term "cultural heritage tourism" is useful to help bring together all of the

partners that need to be working together on this type of an effort including organizations [16]. In this study, both heritage and cultural tourism are used in combination and/or interchangeably.

Culture Heritage Tourism for Dialogue between Civilization

The relationships and interaction between cultures and civilizations through dialogue considered as a major force of development and progress. Culture Heritage tourism is a major vehicle of the ongoing dialogue between different civilizations. It helps promoting true knowledge of the divine religions and reemerging ignorance in order to understand and learn from and about others and their experiences without any prejudices or preconceived ideas. This dialogue is a necessity in the contemporary world and should be rooted in the hearts and mind of people in order to overcome obstacles. Such dialogue must focus on the significance of shared values which give meaning to life and provide form and substance to identities. Tolerance and respect for the other are core values that transcend civilization differences [17].

Consequently, cultural heritage proves its significance within the context of peace. It is often the denial of cultural identities that fuels the countless conflicts afflicting the globe, and that prepares and foment the conflicts of the future. The central element of the culture-of-peace idea is an understanding of the identities of others [18] to break down political and ideological barriers [19] through ensuring the accessibility of culture heritage to all visitors [4]. Culture heritage tourism is a necessity to empower people with a deep awareness of areas such as their own history and heritage.

Islamic Landmarks in Egypt

The Islamic Civilization is in reality resembles an amalgam of a wide variety of cultures from North Africa to the western periphery of the Pacific Ocean, and from Central Asia to sub-Saharan Africa. Interesting archaeological sites for the Islamic civilization include Qandahar (Afghanistan), Samarra (Iraq), Qusayr' Amra (Jordan), Aqaba (Jordan), Shanga (Kenya), al Rafiq (Syria) and Hamdallahi (Mali), al-Fustat (Egypt), Siraf Mosque (Iran), Baghdad, Husn al-Qadisiyah, Jundi Shapur, Kufa, Ukhaidir (Iraq), Aqaba (Jordan) [20], all witness the Islamic civilization.

It is obvious that the spirit of Islam and the culture of the Arabs swept over all the old part of

Egypt. The influence of the Islamic and Arab culture and architecture was so pervasive that the Egyptian cities and towns became pioneers, leading Muslims and countries in many ages [21]. More than two hundred Islamic monuments covering less than two square hectares, still stand today in Cairo. Cairo's architectural monuments rank among humanities great achievements recognizing that their preservation is a matter of importance to the whole world. The UNESCO has listed the Egyptian capital Cairo as one of the cities of human heritage. Such recognition is well justified for few cities on the earth display and a dense concentration of historic architectural treasure as does Cairo. This concentration reflects the political situation of Islamic Egypt which never had another capital outside the space occupied by the city that is called Cairo. However, historians describe a series of capital cities, including Al Fostat, Al Askar and Al Qataia

and Al Qahira, but all of these were within sight of one another and eventually became a single city. Cairo has been the center of power in Egypt since the year 641. Continuously, centralized power in one area distinguishes Egypt from other Islamic nations, such as Syria, Iraq, Anatolia, Andalusia and Persia. The area between the mosque of Amr in the south and Bab al-Nasr and Bab al Futuh to the north outside this area where there is a few medieval buildings of interest have survived, on one hand. On the other hand, there is a large number of Egypt's medieval and post-medieval monuments still stand within it just to witness more than eleven centuries of history [22].

The Muslim landmarks in Egypt are divided into eight periods. Each period was distinguished by its architectural perspective and left a rare collection of antiquities, architecture and graphics as follows.

Table 1. Islamic landmarks period in Egypt

Period	Landmarks	Year
The Orthodox Khalifs period	The Mosque of Amr Ibn Elas	21 H (642).
The Tulunid period 254 - 292 H. (868-905 AD)	The Mosque of Ahmed Ibn Tulun	263- 65 H (876/877- 879)
The Fatimid period 358 - 567 H. (969-1171 AD)	Al- Azhar Mosque Mosque of Al- Hakim Mosque of Al- Guyushi Al- Aqmar Mosque Mashhad (Mausoleum) of As-Saiyida Ruqaiya Mosque of Sayidina Al-Husayn Mosque of As-Salih Talat	359- 61H.(970-72) 380- 403H.(990- 1013) 478H.(1085) 519H.(1125) 527H. (1133) 549H.(1154/55) 555H.(1160)
The Ayyubid period 567 - 648 H. (1171-1250 AD)	Mausoleum & Mosque of Imam Ash-Shafit Mosque of Sultan As-Salih Negm Ad -Din The Salhiya Madrasa Mausoleum of Sultan Sultan As-Salih Negm Ad-Din	608H.(1211) 647/48H. (1249/50) 641H(1243/44) 647/48H. (1249/50)s
The Mamluk period 648 - 923 H. (1250-1517 AD)	Mosque of Sultan Az-Zahir Baybars Mosque-Madrasa-mausoleum of Sultan Qalaun Mosque & Madrasa of An-Nasir Muhammad Ibn Qalaun Mosque of Salar and angar Al-Gawli Khanqa of Sultan BayBars al-Gashankir Mausoleum of Hasan Sadaqa	665-67H(1267-69) 683- 684H.(1284-85) 695- 703H (1295- 1304) 703H(1303/1304) 709H(1310) 715H.(1315)
The Ottoman period 923 - 1220 H. (1517-1805 A.D.)	Mosque of Sulayman Pasha Mosque of Al Hamudiya Mosque of Sinan Pasha Mosque of Al-Malika Safiya Mosque of Al-Burdaini Mosque of Muhammad Bey Abu Adh-Dhahaba	935H.(1528) 975H(1567) 979H(1571) 1019H.(1610) 1025-1038H(1616- 1629) 1188H(1774).
Muhammad Ali period, 1220 - 1265 H. (1805- 1848 AD)	Mosque of Hasan Pasha Tahir Mosque of Muhammad Ali Al-Kabir Mosque of Sulayman Agha As-Silihdar	1224H. (1809) 1246-1265H.(1830- 1848) 1253- 1255H (1837- 1839).
The Modern period	Mosque of As-saiyida Zaynab Mosque of As-Saiyida Nafisa Mosque of Ar-Rifaii Mosque of Al-Fath Mosque of Dumaqsis Mosque of Al -Fuli	1302H.(1884/85) 1314H(1897) 1329H(1911) 1338H (1920) 1116H (1704)

There is a number of other Islamic buildings, such as the citadel of Salah Al-Din, the Walls of Cairo, Beit al—Kreitleya, Beit Gamal al Din al Zahabi, Beit al-Sehiemi, Wikalet al-Ghouri, Khan Khalili Bazar, the Islamic arts Museum, the Manial palace Museum, the Nilometer at Roda, Sabil-Kuttab of Abd El-Rahman Katkhuda, the Fort of Qait Bay, and the Fortress of Salah al-Din on Pharaoh's Island.

MATERIALS AND METHODS

Tour operators play a vital role in the tourism industry. As intermediaries between tourists and tourism service providers, tour operators can influence the choices of consumers, the practices of suppliers and the development patterns of destinations [23]. The purposes of this study are to investigate whether or not tour operators in Egypt well include Islamic sites in their tourism programs as well as identify the obstacles facing the development of the heritage tourism in these sites. Additionally, the study would determine the benefits in the case of developing it. To achieve the objectives and hypotheses of this study, the study methodology depends on questionnaires with 24 questions that were distributed among 100 tour operators in Cairo and Giza governorates.

The response rate reached 70%. Most of the non-respondent organizations mentioned many reason such, they are not ready to deal with questionnaire; they are too busy, these data are confidential, etc. Literature, site visits, and interviews used to formulate conclusions and recommendations to define obstacles facing developing Islamic landmarks in Egypt. The Likert scale was used to analyze officials responsible and experts towards the objectives of the study by answering a number of questions using five-point scale '5-1 (strongly agree - strongly disagree'. Statistical models were used to analyze the data.

RESULTS AND DISCUSSION

All of the respondents asserted that heritage tourism is available in Islamic landmarks. Total 58% of the respondents asserted that Islamic sites are included in tourism programs as half day tours while 42% of them see that it is not included (Fig.1).

Although visitor's services encompass the basic elements, most travelers need to make traveling more enjoyable such as shopping,

touring, lodging, restaurants, and infrastructure [24] and that consumer are increasingly considering environ-mental quality as well as the quality of services as factors in their selection of tourist destinations.

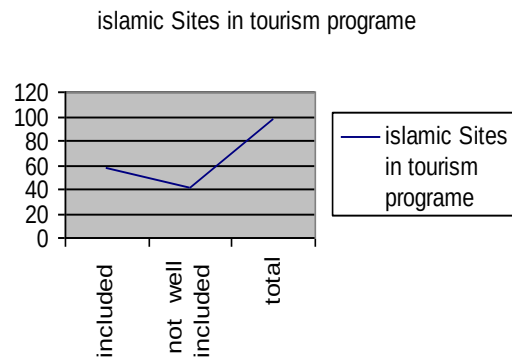


Figure 1. Islamic Sites in tourism Programe

Additionally, they want a high standard of environmental conservation coupled with simple, efficient and pleasant service [25] but, the results in Table 1 indicate the agreement of most respondents on the lack of services and tourism facilities in selected areas.

In addition, about 74% of the respondents disagreed to the availability of good transportation services, Mean-1.99. Total 91% of the respondents disagreed to the availability of information on things to do and not to do, Mean-1.43. As much as 77% of the respondents disagreed to the Cleanliness of the local environment and 77% of the respondents disagreed to the availability of cleaning bathing areas, Mean-1.97. It is clear from results that most of Islamic landmarks areas are suffering from the lack of services. The respondents also mentioned that most of these areas existe in a slum areas and there is a lack of role of the Ministry of Culture in raising public awareness.

Results in Table 2 shows the agreement of most respondents about the lack of effective marketing Strategies to promote tourism in Islamic landmarks areas and they does not believe that there is neither a marketing plan to promote tourism, nor an adequate development plan. Other obstacles mentioned by respondents were lack of using modern tecnology in publicity, lack of such information about these places and neglecting domestic tourism.

Table 2. Tourism services in Islamic landmarks' areas

	Strongly disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly agree (%)	Mean	Std. Error	Std. Dev	Chi - Square	Sig.
transport services in the destination	39	35	12	12	-	1.99	.121	1.007	16.159a	.001
places to eat and drink	32	36	12	12	6	2.23	.143	1.190	24.406b	.000
information on things to do in the destination	68	23	3	3	--	1.43	.089	.737	75.058a	.000
availability of health services	35	39	13	13	4	2.13	.140	1.162	34.696b	.000
cleanliness of the local environment	47	30	10	10	4	1.96	.141	1.169	43.971b	.000
clean bathing areas	42	35	7	7	4	1.97	.134	1.111	40.783b	.000
directional Signs	25	29	28	28	6	2.61	.155	1.286	14.116b	.007
shopping	18	25	20	20	4	2.70	.134	1.115	15.565b	.004
awareness among the local community	17	39	7	7	3	2.39	.115	.958	34.696b	.000

Additionally, 54% of the respondents do not believe that there is neither a marketing plan to enhance tourism in Islamic landmarks areas, nor an adequate publicity about these areas, on one hand. On the other hand, 33% are neutral as they do not have any information about any strategies to develop these areas, Mean -2.48. Total 45% of the respondents (13% strangely disagree, 32% disagree) about the existing of a plan to manage and develop Islamic landmarks'areas for tourism and 36% was neutral, Mean-2.65. This outcome does not match the standered of developing heritage tourism in religious areas as tourism at religious or sacred sites is a special type of cultural heritage tourism [26]. Developing cultural heritage at religious sites requires a plan in which all stakeholders participate taking intoconsideration allowing the local community to continue using the site; and prpreservation of it.

The results in Table 3 show that the majority of the respondents agreed to the positive results in case of developing heritage tourism as follows:

About 90% of the respondents asserted that there would be economic benefits to local community, mean -1.49. Total 85% of the respondents see that tourism in these areas will be Competitive value Mean -1.55, on one hand. On the other hand, 85% of the respondents agreed on the importance of tourism development in these areas to create a dialogue among civilizations, mean-1.81. In addition, 86% of the respondents asserted that developing tourism in these areas will be a tool for

Preserving local traditions and culture, mean -1.65. It is also worht mentioned that 84% of the respondents asserted that tourism in these areas would increase awareness of the site or area's significance, mean -1.93.

Consequently, cultural resources generate economic vitality by leveraging human capital and culture to generate economic vitality through tourism, crafts, and cultural attractions. Programs based on such resources can improve urban quality of life, and expand business and tax revenue base and positive regional and community image [27]. Heritage tourism protects historic, cultural, and natural resources in towns and cities by involving people in their community. When they can relate to their personal, local, regional, or national heritage, people are more often motivated to safeguard their historic resources. Culture heritage tourism can be employed as a tool for raising awareness as it educates residents and visitors about local and regional history and shared traditions. Through involvement and exposure to local historic sites, residents become better informed about their history and traditions. Understanding the significance of one's heritage provides continuity and context for a community's residents, and it strengthens citizenship values, builds community pride, and improves quality of life [28]. On the other hand Culture heritage tourism – can result in a variety of benefits for local community such as job creation and small enterprise development [3,27].

Table 2. Marketing strategies to promote tourism in Islamic landmarks

	Strongly disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly agree (%)	Mean	Std. Error	Std. Dev	Chi - Square	Sig.
Accessibility of Information	15	39	33	10	3	2.48	.116	.964	33.246b	.000
Existing of marketing plan	15	39	33	10	3	2.48	.116	.964	33.246b	.000
Existing of a development plan	13	32	36	15	4	2.65	.124	1.027	25.130b	.000

Table 3. Positive aspects of the development of heritage tourism

	Strongly agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly disagree (%)	Mean	Std. Error	Std. Dev	Chi - Square	Sig.
Economic Benefits to local community	65	25	6	4	0	1.49	.096	.797	66.594a	.000
Competitive value	65	20	10	3	2	1.55	.108	.900	95.855b	.000
Dialogue between civilization	41	44	11	3	1	1.81	.104	.862	95.855b	.000
Preserves local traditions and culture	54	32	10	4	-	1.65	.101	.837	41.783a	.000
Helps support community amenities	36	44	12	6	2	1.96	.119	.992	47.594b	.000
Increases awareness of the site or area's significance	39	41	12	6	2	1.93	.121	1.005	46.725b	.000
Enhances the community's image and pride	30	54	7	6	3	1.97	.113	.939	65.420b	.000

CONCLUSION

There is an increasing world wide recognition of the importance of culture and heritage tourism. Hence, heritage tourism has become a major "new" area of tourism demand that almost all policy-makers are now aware of and anxious to develop [29]. Tourists often visit such historic religious sites as opportunities for gaining cultural and educational experiences [30]. They are seeking authentic experiences that are tied to a specific historic place, rather than just leisure in a resort that could be anywhere [31]. Planning should be used to help provide these experiences, while reducing some of the negative impacts of tourism. Planning can help tourists better appreciate what they are seeing; reduce congestion and crowding by making tourists aware of alternative sites to visit; and explain appropriate tourist behaviors that minimize impacts on the site and its religious use. This study showed clearly that in spite of the fact that the Islamic landmarks is an important part of Egypt's tourism product, but much remains to be done through creative local and regional product

development. Developing heritage tourism in Egypt should begin with caring for our authentic historic buildings and sites, and taking the initiative to work with local, regional, conservation and other non-governmental organizations in order to develop a tourism strategy.

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Geophysical Characteristic and Water Resources Availability in Rote Ndao, East Nusa Tenggara as a Basic for Coastal Tourism Development

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Abstract

East Nusa Tenggara has been known as an arid region in Indonesia. Water scarcity is among the crucial problems in East Nusa Tenggara. Recently, however, some area in East Nusa Tenggara has been developed as tourism area which is important for local economic development. Lands and water conservation therefore becomes the crucial issues in East Nusa Tenggara. The aims of the study are to identify and describes the recent geophysical characteristics of land in Rote Ndao as a basic factor for water conservation and sustainable tourism development in arid environments. Field work and secondary data collection were done in Rote Ndao Regency, East Nusa Tenggara. Result of the study confirm that climates and rainfall was limited, but in some month there are heavy rain. Absent of land conservation strategy lead to the rapid runoff. The topography was undulating and if it is properly managed such structure can be used to support water conservation. Vegetation covers and quality was limited and it becomes the barrier for water infiltration to soils. Therefore, the re-vegetation programs should be promoted widely in the island. It is especially important to enhance the sustainable coastal tourism destination in Rote Ndao.

Keywords: arid environment, soil conservation, tourism, water management

INTRODUCTION

Tourism in Rote Ndao Regency, East Nusa Tenggara, recently is growing significantly. The rapid international tourist arrivals in Rote Ndao led the area has declared as important tourism zone in East Nusa Tenggara Province. Throughout the world, tourism has been identified contributes to the local economic development. Tourism provides opportunities to open new economic activity and local business. In the same time, tourism contributes to the local culture promotion and empowerment. In East Nusa Tenggara, there are about 35 tourism object. Mostly it is consisted of natural object and attractions. One of the most famous tourism destinations is Nemberala coast for surfing. There are also potential object and attractions such as wide sand sea, lakes, cave and historical monuments [1].

Tourism development in coastal ecosystem widely studied by numerous authors due to its potentiality to contributes negative impact to environment. Among the crucial phenomena in coastal tourism development is human migration to coastal area. These were followed by increasing tourism facility and land degradation which are decrease soil capability to absorb

waters [2]. Study by Desrainy [3] found that uncontrolled urban development in Jakarta-Bogor-Tangerang-Bekasi regions has changes rural and sub-urban area becomes densely populated regions. Such situation contributes to the rapid land uses changes, decrease of biodiversity, poor of food security, and urbanization [4]. The prospect of economic grows lead investor to establish numerous economic infrastructures in coastal regions.

Tourism development in Rote Ndao should consider environmental aspect, especially land management. It is particularly important because water as a crucial source was limited. Rote Ndao located in semi-arid environment in Indonesia with low rainfall intensity. The number of rainfall month was only 3-4 months yearly. The dry climates and lack of the management strategy of water resources lead water scarcity in Rote Ndao. Water is important not only for tourism development, but also for numerous human activities. Water is crucial resources to support human being. Therefore, it is government responsibility to draws the proper strategy for water conservations. Tourism development should be able to enhance and support water conservation. Therefore, tourism destination planning and implementation should be put water as key issues in development. Beckerson and Walton in Harp [5] found that tourism development in England contributes to the water resources problems, especially to meet spa

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industry. Cristina argues that there are two important aspect related to water in rural environment. Firstly, in dry period, numerous of water spring and water resources were limited and people has difficulties to access water. Secondly, in rainy season when water abundance, there are difficulties to managed water to meet basic need of local community in villages.

In order to minimize negative impact of tourism on water resources, the comprehensive water resources management is important. It is especially important to provide sufficient water for community and tourism needs in water catchment area [2]. Wisnawa and Sutapa [6] point out that water resources conservation is important for environmental sustainability, and enhance the sustainability of water for the future. It is especially relevant in the case of tourism area such as Kuta and Sanur in Bali. The environmental conservation is especially important in order to mitigate negative impact which is related to the soil, land and water such as land slide.

In order to establish the proper management plant of natural resources, it is important to identify the basic characters of geophysical character of land in Rote Ndao Regency. Geophysical characters are one of the key indicators and important measurement aspect in development activity.

Methods

Field work and secondary data collection were done in Rote Ndao Regency, East Nusa Tenggara. Secondary data was collected from related office, i.e. Tourism office, Metereological office, Regional Planning Agency. Field survey was conducted at Rote Island. Focus of the observation is verification of the factual condition of Rote Ndao, especially for its lands physical characteristics, hidrologica characteristics and vegetation characteristics. Data was analysed descriptively.

General characters of Rote Ndao Regency

Rote Ndao Regency with capital city called Baa, located at the southern part of Indonesian archipelago. Administratively, it was established by Undang-Undang No. 9 of 2002. The regency has an area about 1280,10 km² which are consist of 107 islands. About eight island was inhabited by local people, namely Rote Island, Usu Island, Ndana Island, Nuse Island, Ndao Island, Landu Island and Do'o island. About 99 island was not

inhabited. Rote Island is the the biggest island (97.854 Ha) and become the tourism destination island in East Nusa Tenggara. All of the island has similar characteristics. The number of rainy season was about 3-4 month, and dry season were about 8-9 month. Most of the rains with high storm.

Basically, the climates of Rote Ndao regency similar with other islands and area in east Nusa Tenggara. Rainy season was relatively short, from December to April yearly with air humidity about 85%. Wind speed was recorded about 14 knot/hours, the average of air pressure about 966,7 millibars and the average of rainfall were about 800-1200 mm and air temperature ranging from 23.6° - 27 °C. During few years ago, air temperature was increase significantly. The minimum temperature was recorded about 17.0°C and the maximum temperature was about 33.7°C with wind speed was about 0.9 knot/hours. Number of rainy days in 2013 was about 126 days. It is increased compared to the last years (about 104 days). The highest rainfall was recorded at January (363,1 mm), February (359,8 mm) and March (328,8 mm). Based on the rain fall map which was produced by Bakosurtanal and BMG 2004, the average of rainfall in West Rote sub-district was about 500 - 1000 mm. Based on the BMG data of Rote Ndao regency [1], it was recorded that during 10 years the monthly rainfall less than 100 mm was recorded at 8 month. Therefore, it was concludes that Rote Ndao Regency was dry.

The population of Rote Ndao regency in 2013 was recorded about 127.911 people. People density was about 100 people/Km² with population growth rate about 1.6%/year. The number of population with age more than 15 years about 65,928 individual [1].

Lands physical characteristics

The topography of Rote ndao area was undulating. About 32,625 Ha was hilly mountains and 45,250 Ha was flat area. The average of slope was about 45 %. The contour of Rote island was varies. The coastal area was about 0 - 10 m asl., while in the centre of island was about 200 - 1500 m asl with land slope about 40 - 60%. The land uses of Rote Ndao was dominated by forest, paddy field, plantation, settlement with home gardens and orchards.

Based on the Geology Map of East Nusa Tenggara in Figure 1 (sheet number 2205: Kupang Atambua) which area produced by Geology Research and Development Centre

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Bandung [7], most of the area has type Q1 Pleistosen or coralline limestone which were appears in soil periphery less than 60 %, while type Tmb is Bobonaro complex approximately about 30%. The remaining area consist of type QTn or Noele formation with some little part of the coastal area was type Qa or Alluvium (Holocene). The age of the stones was classified into Quaternary.

Hydrological characteristics

According to hydro geological aspect, Rote Ndao has classified as tropical regions where

watershed contain water in rainy season but water scare in dry season. Dry season has been identified long, about 7-9 month yearly. In Rote Nado Regency, Most of the area can be classified into Q types (quaternary) and T type (tertiary), with rainfall average about 500 - 1000 mm. About 10 % of area have akuifer land with moderates productivity, water surface depth, and water flow > 5 lt/s. Less than 60 % of lands have akuifer produktif with limited ground water flow and there are many cracking, water flow potential < 5 lt/s. About 30 % is considered rare ground water zone with low productivity.

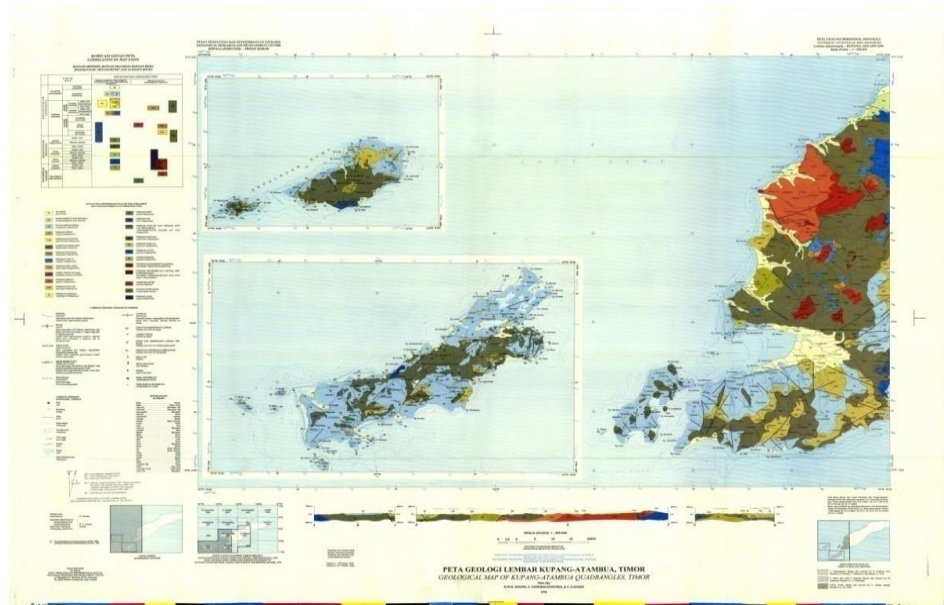


Figure 1. Geological map of Rote Ndao, East Nusa Tenggara

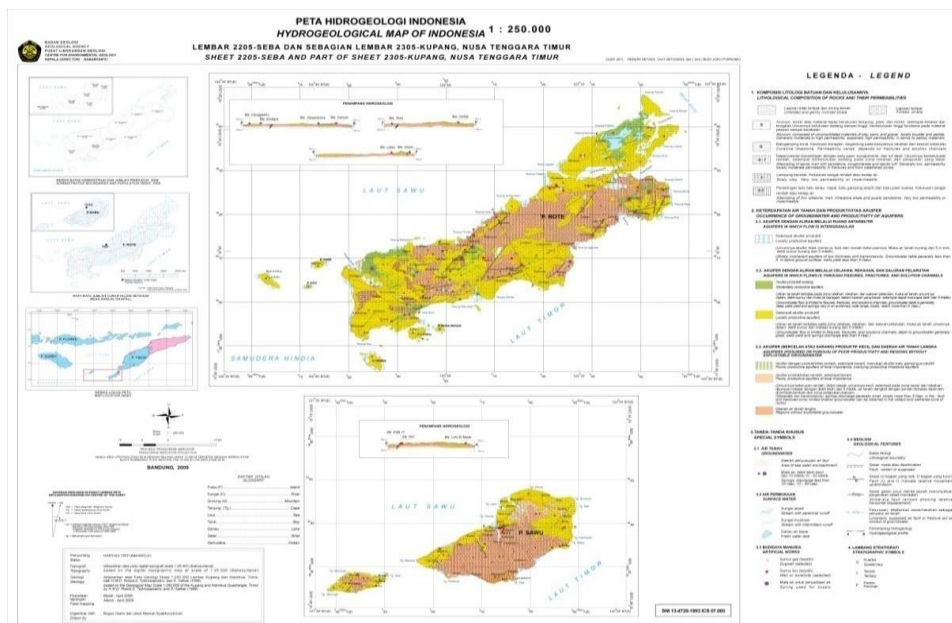


Figure 2. Hydrology map of Rote Ndao Regency NTT [8]

Vegetation characteristics

Based on the statistics document and official document from Regional Planning Agency (Bappeda) Rote Ndao Regency in 2013, the land covers in West Rote sub district was drawn below (Table 1).

Table 1. Land uses allocation in Rote Ndao Regency, 2013

No	Types of land uses	Size (Ha)
1	Open space and settlements	43,865
2	Dry orchards/home gardens	3,945
3	Orchards (huma)	4,247
4	Grazing area/ grasland	24,546
5	Swamp area	-
6	Aquaculture	-
7	Water pool	-
8	Barren lands	1,309
9	Plantation	5,021
10	State forest	-
11	Community forest	7,855
12	Dry lands	10,591
13	Paddy field	18,754
14	Others	7,878
Total		128,010

Sources : BPS dan Bappeda Rote Ndao [1]

DISCUSSIONS

Local population and tourism in Rote Ndao

Based on the demographic data, the rate of population growth was recorded 1.6% yearly. The population density was estimated about 100 individual/km². About 75% of the community activity is farming in dry land. Some people works in forestry and fisheries sectors. Agricultural sector is one of the important sector in Rote Ndao, but as far its productivity was low. Dry environment, lack of water and poor technology and human resources seems to be the limited factor for agricultural productivity. Increasing agricultural productivity requires sufficient water for agricultural irrigation. Problems related water availability is water scarcity which are becomes the crucial limiting factor for productivity.

Regional planning to integrate numerous sector of development has been drawn. In such a case, however, the capacity of provincial and local government to establish the proper regional planning by involving water issues was important. It is especially important when tourism was consider as a new economic activity in Rote Ndao. Tourism can be separated from water resources. The challenges for water resources management in newly tourism

destination is related to the water allocation for domestic needs, agriculture and tourism needs [8].

Tourism recently become intereting phenomena in Rore Ndao. Tourism grows significantly in West Rote, Lobalain and Central Rote sub district (Table 2). Both domestic and international tourism grows significantly. In the perspectives of water resources, however, such situation should be responded by water resources management. Growth of tourist followed by increse of tourism accomodation (i.e. hotel, lodge, home stay) and other tourist facility which can be separated by water resources [2].

Table 2. Tourist growth in Rote Ndao

Subdistrict	International tourist		Domestic tourist	
	2010	2012	2010	2012
West Rote	736	1,050	97	331
Lobalain	13	4	949	1,596
Central Rote	15	25	300	257

Land geophysical conditions

Based on the topography data, the landscapes of Rote Ndao Regency can be classified as steepest lands. Based on the Asdak classification [9], the land topography can be classified into several category, namely Class 1 : 0 – 8% (flat), Class 2 : 8 – 15% (flat), class 3 : 15 – 25% (moderate), class 4 : 25 – 45% (steep) and class 5 : > 45% (steepest). There flat area found in coastal zone of the island where some part is undulating and form basins. These situation provides opportunities for water accumulation which are to penetrates to soils. These is similar with Arsyad [10] and Dewi *et al.* [11] arguments. The infiltration capacity and ground water storage was influenced by number of water which was flow in the surface of lands, especially in its amount and rain intensity. The highest degrees of slopes increases the water surface flows, and therefore increase the soil erosion hazards.

In case of Rote Ndao Regency with Q1 soil types-coral limestone-, the infiltration potential was low, but such stone formation provides opportunities for rain water infiltration due to the structure have numerous pores. In the case of Tnb types in Bobonaro complex, there area potentially for highest infiltration. In such structure, however, there are some land conservation techniques was needed to countermeasure landslides. A number of remains sand in such structure lead to the ability of water

to transfer water into soil. Soils texture basically has relationship with soil pore. In case soil pores abundance, the infiltration capacity was high. Sartohadi [12] found that soil pores volume affect the rate of infiltration. Soil with number of soil pores has low weight. Conversely, soil with low pores has high weight, thus has high ability to absorb water [13]. In case of natural resources management, there are needs of research and studies related to the infrastructure and technology options to conserve water. Unsustainable uses of lands lead the increase and rapid land degradation [14]. In such a case there are positive relationships with water catchment area management as a crucial source to generate plant energy, irrigation, water spring management and other domestics needs.

Hydrogeology

The hidrogeological profiles of land in Rote Ndao provides opportunities for water infiltration to soils. It is especially related to the soil litology composition and karsts with highest levels of soils porosity. These process produces ground water which was found beneath the earth's surface [15]. Ground water quality was affected by climates, litology, times and human activity [16]. Similarly, Alwi and Marwah [17] point out that unsustainable uses of land and the absence of land conservation technology contributes to the negative impact water catchment area hydrology and water rivers quality of the area.

Having the important of infiltration process, there are important infiltration capacity research through hydrometereologic data and physical characteristics of water catchment area. It is similar with the case of sub-watershed Kreo which has highest rain fall in Garang water catchment area [18]. The water conservation therefore is important, especially in sustainable tourism lanning and development in Rote Ndao. In such a case, however, the detail and proper techniques was needed with special attention to the hydrogeological characteristics of location.

Vegetations

Based on the vegetation cover data of Rote Ndao Regency, it can be said that vegetation distribution and density was scare. It was calculated that community forest only 6% of the total area. About 34% of the total land was dominated by settlement and home garden, and about 19% was feeding ground. The dry and barren lands was calculated about 8%. This figure shows that the number of vegetated area were

low and needs to be improved in order to enhance water conservation.

Vegetation was the important factor for water conservation because its ability to absorb and stored water in hydro geological process [19,20]. The roots of vegetation also contributes significantly in soil protections and water infiltration. The roots of vegetation has important role in increasing soil permeability and therefore increase water infiltration.

Tourism facility and infrastructure development has been widely recognized contributes to the decreasing vegetation covers, especially in coastal area. Homegarden as a important spot in settlement area for water catchment area widely converted into numerous building and tourism facility to provides tourism basic needs. It is important for local government to drawn Regional Land Use Planning. Land uses changes has significant consequence for biodiversity and water conservation [2,21]. Forest and wildlife area conversation into settlement and tourism infrastructure affect negative impact of environment and biodiversity. Such changes contribute significantly to reduce natural water absorption zone and minimizersoil ability to absorb water.

According to governmental law number PP No. 43 Tahun 2008, water conservation should be implemented in integrated manners. These can be includes several key aspect namely, 1) soils protection and conservation; 2) ground water preservation; and 3) water quality management and protection of ground water from pollution. Moerwanto [22] argues that integrated water resources management is the process to enhance the integrity of development and water conservation, soil and other natural resources to increase the economical and society welfare by involving the issues of ecosystem sustainability. Tourism development cannot be separetd from environmental issues, including water resources management. Agriculture and soil management and technology should be promoted in order to meets the ecosystem sustainability issues, namely strip cropping and alley cropping. The physical techniques such as building terrace in steepest land was important. The proper management of land allow highest farmland productivity and therefore contribute to the local economic and farmer welfare. Moreover, the sustainable agriculture practices in dry land ecosystem has its potentiality to developed as one of the significant tourism attraction.

CONCLUSION

Recent tourism development in Rote Ndao has close relationship with water issues. It is especially important because Rote Ndao physically located at dry environment where water scarcity become one of the crucial issues. Potential conflict between tourism and water can be minimized through proper water resources management. There are several important strategy to support water conservation in Rote Ndao. It includes water infrastructure and catchment reservoirs (*embung*) constructions, bio-pore holes, re-vegetation of lands, especially in protected forest, production forest, home gardens and other potential locations as catchment reservoirs.

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Model of Ecotourism Management in Small Islands of Bunaken National Park, North Sulawesi

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Abstract

The Bunaken National Park is one of the famous national park for tourism in North Sulawesi, Indonesia. The abundance natural resources is one of the crucial natural attraction for tourism in Bunaken. Tourism in Bunaken contributes significantly in local economic development. In the same situation, however, tourism contributes negatively to environment. Tourist activities contributes significantly in coral reef covers. Utilization of natural resources as an object and attraction needs to be done carefully, taking into account the balance of ecological, socio-economic and socio-cultural. The concept of ecotourism with three aspects of development were important in aspect in Bunaken National Park tourism development. The management of the park tour needs to be done based on the concept and principles of ecotourism. The Bunaken National Park tourist management model simulated by the dynamic system with the Powersim Constructor software show the number of tourist 2035 reached 27,152.98, extensive coral cover 447.87ha, the local community incomes Rp 15,834,861,419.63 and government revenues Rp 1,751,770,691.04.

Keywords: conservation area, ecotourism, powersim model, sustainable management.

INTRODUCTION

Bunaken National Park (BNP) is a conservation area with beauty and attractiveness of the underwater resources. The total area of $\pm 89,065$ ha area in accordance with the Decree of the Minister of Forestry No. 730 / Kpts-II / 1991 with slightly wavy morphological conditions, and is one of the most beautiful marine parks in the world. Most areas of coastline consist of mangrove forests and white sand. Prior to 1986, the area has been designated by the Government of Bunaken in North Sulawesi as a regional tourist attraction. This area is surrounded by 22 villages with a total population of around 30,000 inhabitants. Its existence is to support the tourism industry and is a source of income large enough area in North Sulawesi [1].

Bunaken National Park has 28 dive sites rich in tropical fish and coral reefs. More than 3,000 species of fish found in the area "Golden Triangle" of Papua New Guinea, the Philippines, and Indonesia. Bunaken is biologically and strategically located in the "triangle" which there are sharks, turtles, Mandarin Fish, sea horses, stingrays, and the famous Sea Kings ancient fish (the Coelacanth). There are also coral reefs both

soft and hard by forming a steep wall, with various kinds and colors of coral [1].

Problems that occur when this is happening in the park are environmental degradation. It is identified from less land coral cover. Currently tourism activities are generally only focused on Bunaken Island alone, so that the pressure exerted on the environment to be increasing. According DeVantier and Turak [2] visitor in Bunaken National Park more and more are turning to recreational diving activities, and this led to the degradation of coral cover more apparent.

A decrease in the percentage of live coral cover drastically occurred at a depth of 3 m. When compared to coral cover in the survey by the BNP and Natural Resort Management (NRM) in 1998 with the results of the monitoring activities BNP in 2010, the coral covered area in 1998 changed from 72.1% to 33.24% in 2010. Dutton *et al.* in Supit [3] states that the increase in human activity in the utilization of coral reef ecosystems can cause damage to the coral reef ecosystem itself. For that in efforts to use natural resources as objects and tourist attraction, need a management plan carefully because it may have an impact on the environment. Tourism as an industry must really have good planning, implementation and evaluation, so that the negative impacts of tourism can be tolerated [4].

Based on the above mentioned problems, the management of Bunaken National Parks should

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be done with reference to the concept of ecotourism, so that tourism can be realized in a sustainable manner. Development of sustainable tourism policies can be a useful way to encourage new forms of business, increase employment and promote conservation [5]. Sustainable tourism development should be based on actual analysis of the potential environmental, social, cultural and economic social utilized to improve the welfare of local communities [1,6].

Ecotourism is a concept that has to accommodate tourism demand and tourism supply, where it is seen in the six elements that follow the concept of ecotourism: conservation, education, ethics, sustainable development, local impact and benefits [7]. The concept of ecotourism is a concept that is capable of bridging the interests of environmentalists with

the tourism industry. Based on these problems, the goal of this research is to create a model of sustainable tourism management BNP. BNP travel management model simulated in dynamic systems, with the help of software Powersim Constructor to provide an overview of system behavior both present and future.

MATERIALS AND METHODS

The research was conducted in Bunaken National Park in North Sulawesi province, which began in August of 2011 (Figure 1). Data used in the form of primary data, ie expert opinions, interviews with residents, employers and workers in tourism. Secondary data include extensive coral cover, the number of tourists, admission to Bunaken National Park, literature and previous studies associated with this research.

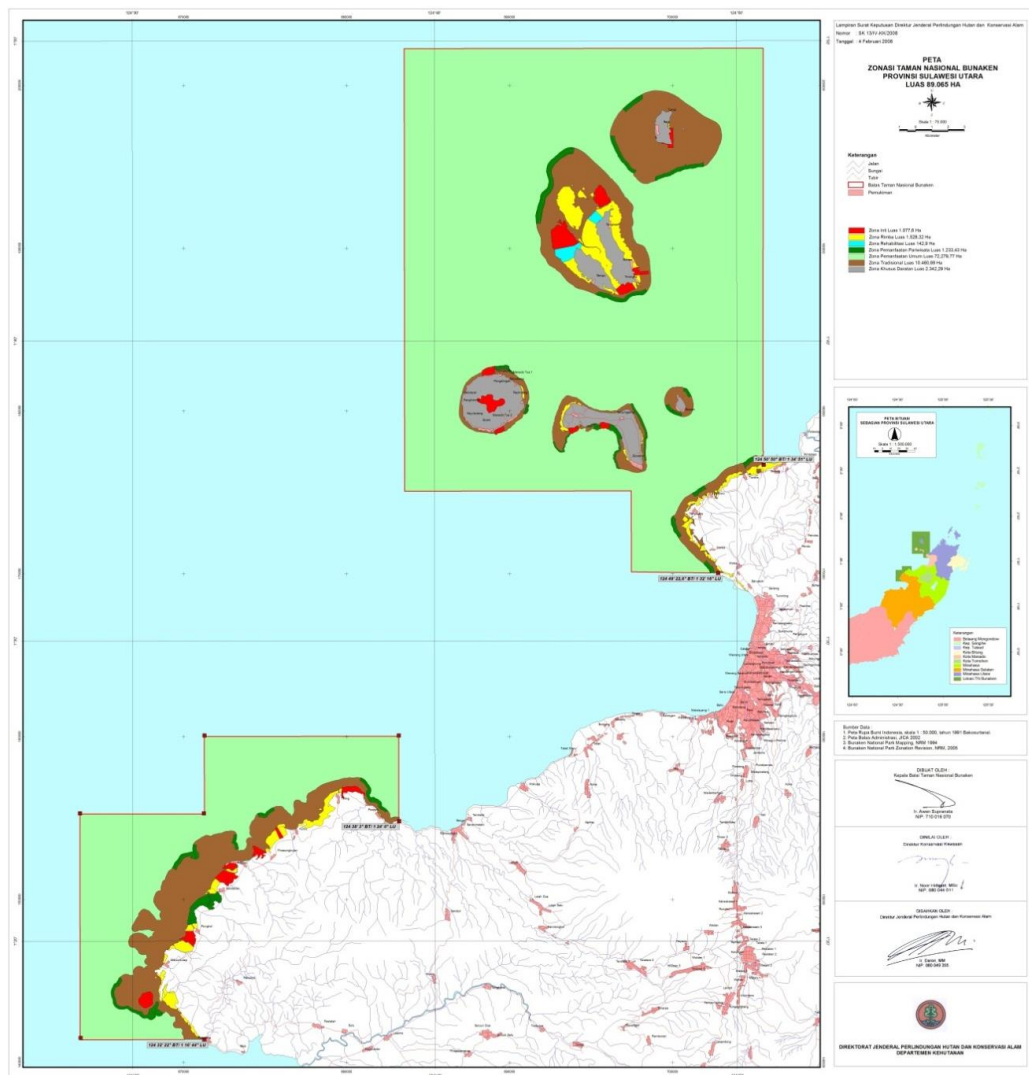


Figure 1. Map of Research Location [8]

Data Collection

At this stage of the assessment sub-model of ecotourism data is required in the form of extensive coral coverage, quality of service and promotion, while public revenue is income from the rental of the boat. Diving equipment rental, restaurants, lodging, guides, and selling souvenirs. Further for the government revenues, the data needed were derived from the sale of admission tickets tourists, and levy of ship. These data were obtained through questionnaires and interviews with local people.

Data Analysis

Furthermore, the data were processed using Microsoft Excel, and the built model was simulated in dynamic systems with the help of software Powersim Constructor, to provide an overview of system behavior both present and future. The next stage is to test the model validation is the validation test structure and performance validation test. AME (means absolute error) is the deviation between the average value of the actual simulation. AVE (absolute error variation) is the deviation of the actual value of the variation simulation. Limit of acceptable deviation is 5-10% [9]. The formula for calculating the AME and AVE are:

$$\text{AME (absolute means error)} = (S_i - A_i) / N$$

$$S_i = S_i / N \text{ and } A_i = A_i / N$$

Description: S = Value simulation

A = Actual value

N = Interval time of observation

$$\text{AVE (absolute variation error)} = (S_s - S_a) / A_i$$

$$\text{Description: } S_s = ((S_i - S_i)^2 / N)$$

$$S_a = ((A_i - A_i)^2 / N)$$

N = Interval time of observation

RESULTS AND DISCUSSION

Ecotourism management model in BNP is built on a set of relationships between the statement of needs and the statement of the problem to be solved in order to meet those needs. The concept modeling is based on the situation and the problems that occur today in BNP. The identification of models that are built can be seen in Fig. 2, where the number of tourist arrivals will affect the vast coral cover, and vice versa extensive coral cover will affect the number of tourists. Furthermore, the number of tourist visits and extensive coral cover will also affect people's incomes and government revenues, and household incomes and government revenues will affect the promotion and quality of service. It is apparent that each element in the model built will have interrelated relationships and mutually influence each other.

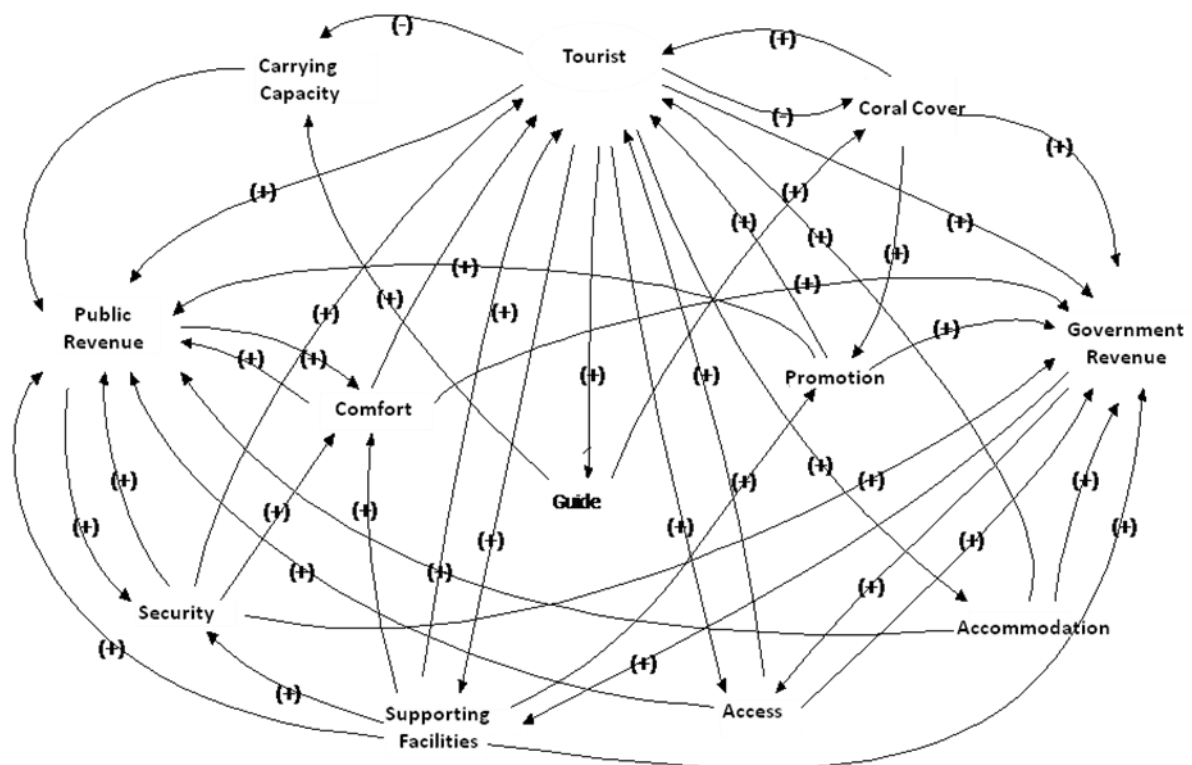


Figure 2. Diagram of circumference causal (causal loop) management of Bunaken National Park

Simulation of Model Management of Bunaken National Park Ecotourism

Making the management model of Bunaken National Park aims to determine the concept of ecotourism management of BNP in order to run a sustainability, both from the ecological and socio-economic aspects. The concept of model built (Fig. 3) is the application on the influence of tourism visits to the existence of coral reefs, public revenue and government income.

Some of the key variables in the sub ecotourism models are: 1) rating, 2) promotion, 3) the print media, 4) electronic media, 5) exhibit, 6) quality of service, 7) access, 8) accommodation, 9) guide, 10) security, 11) comfort, 12) supporting facilities, 13) coral cover, and 14) carrying capacity. The key variables of sub public revenue models are: 1) guide, 2) resort and diving center, 3) speed boat, 4) souvenirs, 5) snorkeling equipment rental, 6) restaurant, 7) long boat, 8) sub-sea vessels, 9) catamaran, 10) boats, and 11) cottages. Further sub key variables government revenue model consists of: 1) admission of domestic, 2) admission of foreign tourists, 3) levie of 40 hp motor boats, 4) levy of 80 hp motor boats, and 5) levy of motor boats above 80 hp.

Scenario Simulation Model Management of Ecotourism Bunaken National Park.

Simulation models are built based on current conditions (*existing condition*) of each of the key variables, and as time goes by key variables can be changed. Based on this further prepared various scenarios strategies that can be carried out for management of BNP in order to run in a sustainable manner.

The model scenario in the sub model of ecotourism made of the number of visitors, extensive coral cover, people's income, and government revenues. Based on the model that was built where the promotion and quality of service will affect the increase in the number of tourist arrivals and the number of tourists will also affect people's incomes, government revenues, and extensive coral cover. Vice versa extensive coral cover will affect the number of tourists, people's income, and government revenues. The people's incomes and government revenues will affect the promotion and quality of service. The equations used in tourist number are as follows:

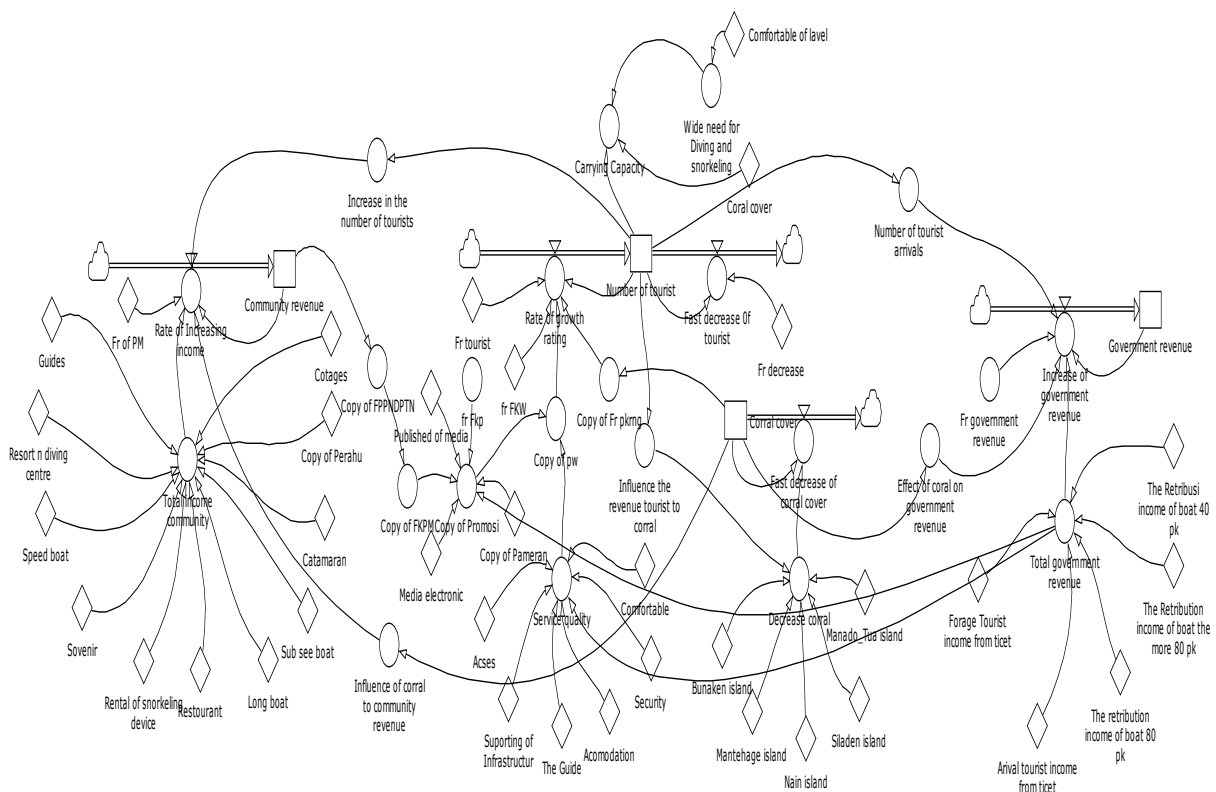


Figure 3. Structure of the dynamic model of ecotourism management in Bunaken National Park

JKW = LPW - LTW

Description: JKW = number of tourist arrivals
LPW = rate of growth rating
PTW = The rate of decline in tourists

While

$$LPW = JW \times FK \times PW \times FKW \times FW$$

$$LTW = JW \times FPW$$

Further

$$PW = (P + K) / 2$$

Description: JW = Number of tourists
FK = Fraction of coral
PW = Effect of promotion and service quality of the number of tourists
FKW = correction factor rating
FW = Fraction of travelers
P = Promotion
K = Quality of service

While the equations used for coral cover are:

$$TK = PK \times LK$$

Description: TK = Coral cover
LK = Area of coral cover
PK = The decline of coral

While

$$PK = TKP / 5 \times PWK$$

Description: TKP = Decrease in five coral islands
PWK = Effect of the number of tourists on the reef

The equation used for public revenue is:

$$JPM = PM \times FPM \times PKM \times TPM \times PWM$$

Description: JPM = Total public revenue
PM = Community revenue
FPM = fraction public revenue
TPM = Total income communities
PKM = Effect of coral on public Revenue
PWM = Effect of the number of tourists to the income of the people

The equation for government revenue is:

$$JPP = PP \times TPP \times FPP \times PKP \times PWP$$

Description: JPP = Total government revenue
PP = Government revenue
FPP = Fraction of government revenue
TPP = Total government revenue
PKP = Effect of coral on government Revenue
PWP = Traveler Effect on government revenue

Furthermore ecotourism scenario of Bunaken National Park can be seen in Fig. 4 which clearly visible causal relationship between the number of tourist visits, extensive coral cover, people's income, and government revenues. The increasing number of tourists visiting the extensive coral cover has declined, but unlike the case with household incomes and government revenues that will increase if the number of tourists increased. This is consistent with previous studies conducted by Supit [3] which

states that tourist arrivals has significant effect on coral cover percentage.

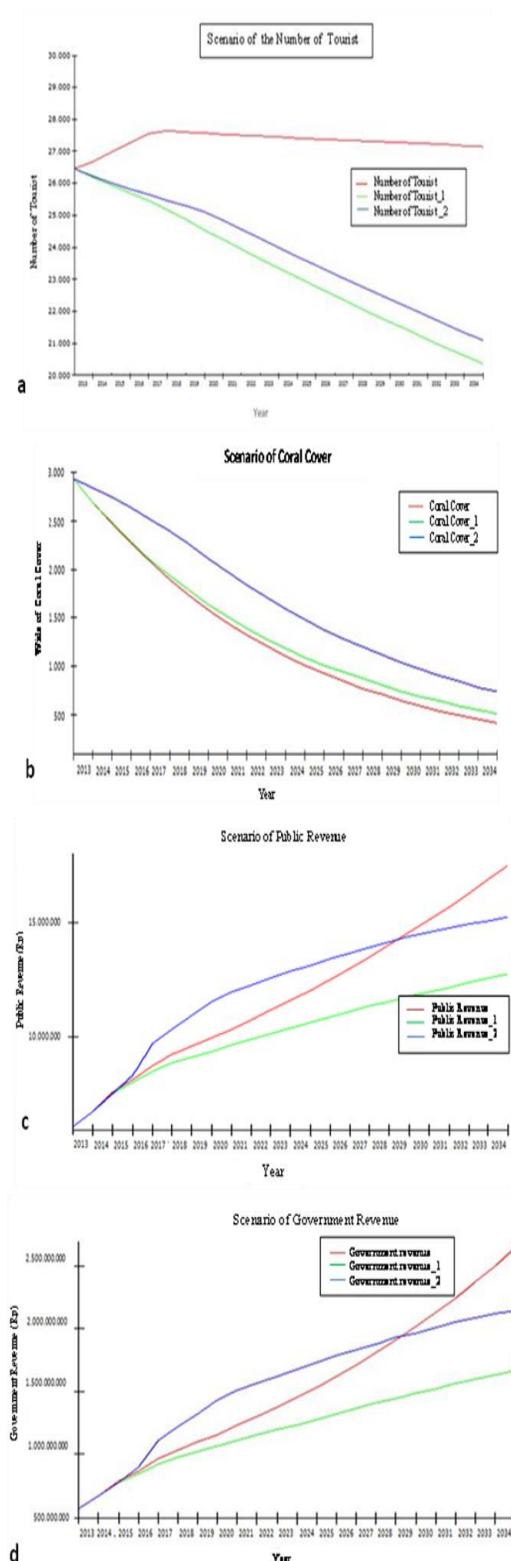


Figure 4. Simulation Scenario in BNP; a) tourism number, b) coral cover, c) public revenue, d) Government Revenue

Number of Tourist

Based on the scenario of simulations conducted where the number of tourist arrivals increased until 2019, while the year after decreased. In 2013 the number of tourists is 26,454, and in 2019 the number of tourists reaches 27,600, while years later it appears that every year there is an average decline of nearly 10% up on 2035 (Table 1). This occurs along with the reduced extensive coral cover, then the number of tourist arrivals will also decrease if the object and appeal offered beauty of BNP decreased.

Based on the number of tourist arrivals the number of tourists visiting BNP has exceeded the carrying capacity, which limits the carrying capacity of 4000-6000 dives/site/year [2]. Meanwhile, according to Hawkin and Roberts in Supit [3] recommends 5000-6000/dives/site/year can be used to estimate an overall capacity of protected areas to support recreational diving, depending on the number of dive sites available. This is an issue for national parks, where the national park is a conservation area which is used as an object and tourist attraction which should prioritize conservation than utilization.

In terms of tourism, the more tourists are visiting, the more successful tourism is considered because it can attract tourists to visit the area. Economically, tourism also considered successful, because it can boost the economy and welfare of the community, which ranks tourism foreign exchange against 10 largest goods export which was ranked fifth with a contribution amounting to 8,554.40 million USD [10]. However, if viewed in terms of environmental sustainability, tourism is considered as one causes of environmental damage.

Based on these problems, the management should pay attention to the balance between ecological, socio-economic and socio-cultural [1]. According to Dutton *et al.* in Supit [3], increase of human activities in the utilization of coral reef ecosystems can cause damage to the coral reef ecosystem itself. Management should consider the balance between the environmental, socio-economic and socio-cultural, but in fact the environment has always been far behind the economy [11]. Stakeholders should pay attention to the sustainability of the important dimensions of governance of protected areas [1,12].

Furthermore, Table 1 showed differences in the number of tourist arrivals figures in column 1, 2 and 3, where the number of tourists_1 (column 2) and the number of tourists_2 (column 3), has received the intervention while the number of

tourists in column 1 without intervention. The interventions were carried out on tourist numbers_1, which only restrict the number of visits, while the number of tourists_2 in addition for limiting the number of visits made also revamping the entrance, as well as optimal utilization of the overall tourist objects that exist. As for the attractions in the form of natural attractions, tourist artificial, culinary tourism, as well as arts and culture both within and around the area of Bunaken National Park. The national park is a repository of unique natural scenery, cultural assets and historic resources are good as a tourist site [13,14]. The aim is for tourist activities not only to be focused on Bunaken National Park alone, so that the environment can be maintained.

Table 1. Results of the simulation the number of tourists.

Year	Number of tourist	Number of tourist_1	Number of tourist_2
2013	26,454	26,454	26,454
2014	26,678	26,188	26,220
2015	26,973	25,942	26,010
2016	27,251	25,684	25,824
2017	27,554	25,454	25,650
2018	27,641	25,172	25,417
2019	27,600	24,857	25,283
2020	27,563	24,547	25,095
2021	27,530	24,241	24,854
2022	27,498	23,940	24,863
2023	27,468	23,642	24,277
2024	27,440	23,349	23,994
2025	27,412	23,060	23,714
2026	27,386	22,774	23,439
2027	27,360	22,492	23,166
2028	27,334	22,213	22,897
2029	27,308	21,938	22,631
2030	27,282	21,666	22,368
2031	27,256	21,398	22,108
2032	27,230	21,133	21,851
2033	27,204	20,871	21,597
2034	27,178	20,612	21,345
2035	27,152	20,357	21,097

Coral Cover

Coral cover shows the extensive decreases each year (Table 2). In 2013, extensive coral cover in the five islands of Bunaken National Park is 2,935.32 ha, whereas in 2035 decreases to 447.87 ha. This certainly must get the government's attention to maintain the sustainability of coral ecosystems that exist in Bunaken National Park, because the travel management must pay attention to the carrying capacity of the environment especially marine tourism offered is a fragile ecosystems [15]. Coral reef ecosystems than can be used as an object

and attraction also serves as a source of food supply for human needs, protection to tropical islands, and as a source of foreign exchange [16,17].

Travel management requires government support through policies related to the use of nature as an object and tourist attraction, regard to the carrying capacity of the environment so that sustainable tourism can be achieved [1]. Management by promoting economic terms alone, in the end will not commensurate with the expenditure to overcome the effects of environmental damage caused. Appropriate policy interventions have the power and positive influence on sustainable tourism [18,19].

Table 2 also shows the vast differences in coral cover in which to extensive coral cover 1 and vast coral cover 2 got such interventions carried out on the number of tourist arrivals, while extensive coral cover in the first column is without any intervention. The rate of decline in coral cover 2 with interventions optimize the full potential of existing attractions, both in BNP and surrounding area. Subsequent interventions such as the promotion of negative impacts on the environment due to exceeded number of visitors over the carrying capacity, to raise awareness and affection of the people and tourists to the environment [20].

Table 2. Results of extensive simulation on coral cover

Year	Corral Cover (Ha)	Corral Cover_1 (Ha)	Corral Cover_2 (Ha)
2013	2,925.32	2,295.32	2,925.32
2014	2,693.55	2,693.55	2,841.88
2015	2,478.35	2,482.28	2,745.92
2016	2,278.14	2,289.41	2,638.96
2017	2,092.20	2,113.23	2,520.58
2018	1,919.54	1,952.13	2,392.77
2019	1,760.63	1,804.95	2,260.43
2020	1,615.09	1,670.57	2,125.21
2021	1,481.76	1,547.75	1,991.83
2022	1,259.58	1,435.38	1,861.36
2023	1,257.61	1,332.46	1,738.12
2024	1,144.97	1,238.11	1,621.85
2025	1,050.87	1,151.53	1,513.46
2026	964.59	1,072.00	1,412.41
2027	885.57	998.88	1,318.22
2028	812.91	931.59	1,230.41
2029	746.36	869.61	1,148.98
2030	685.32	812.47	1,073.44
2031	629.32	759.75	1,003.33
2032	577.95	711.06	938.22
2033	530.81	666.05	878.05
2034	487.56	624.42	822.39
2035	477.87	585.87	770.87

Based on the differences intervention in extensive coral cover 1 and vast coral cover 2, it

is clear that there are vast differences in coral cover. Extensive coral cover 2 is larger than the vast coral cover 1 which just received the intervention in the form of restrictions on the number of tourist visits. Tourist behavior has now changed where the majority of today's travelers desire recreational tourism, plus which in addition to enjoying the uniqueness of the local environment, they also makr an active interaction with the local community to know more about the culture, customs, traditions and social values of society [21].

Community Revenue

Public or community revenue (income) increased to Rp. 15,834,861,420 in 2035 (Table 3). Total revenue were obtained from the amount of revenue that has not been reduced by the cost/operational expenditures. Public revenue (column 1) increase each year, while the amount of public revenue_1 (column 2) decreased compared to the amount of public revenue (column 1). Public income 1 (column 2) intervened by restrictions on the number of tourist visits, thereby affecting the amount of public revenue.

Table 3. Simulation of community revenue

Year	Community Revenue	Community Revenue_1	Community Revenue_2
2013	6,064,277,578	6,064,277,578	6,064,277,578
2014	6,759,812,080	6,759,812,080	6,759,812,080
2015	7,558,717,848	7,500,354,706	7,507,072,217
2016	8,403,591,630	7,910,390,237	8,301,273,149
2017	8,571,393,694	8,319,067,415	9,594,411,879
2018	8,968,037,833	8,614,959,109	10,121,146,798
2019	9,283,234,448	8,819,937,743	10,630,565,869
2020	9,607,744,721	9,017,004,142	11,136,732,130
2021	9,941,996,033	9,205,608,915	11,519,548,412
2022	10,286,333,578	9,385,212,223	11,776,735,697
2023	10,641,121,196	9,555,308,685	12,023,940,505
2024	11,006,681,616	9,715,417,800	12,260,585,771
2025	11,383,350,345	9,865,097,574	12,485,731,276
2026	11,771,476,297	10,003,946,449	12,699,076,558
2027	12,171,422,444	10,131,604,942	12,899,963,552
2028	12,583,479,162	10,247,744,992	13,087,860,068
2029	13,088,015,110	10,352,082,930	13,262,280,309
2030	13,445,297,307	10,444,380,384	13,422,786,847
2031	13,895,671,197	10,524,444,884	13,568,992,272
2032	14,359,470,722	10,592,130,173	13,700,560,548
2033	14,837,036,391	10,647,336,224	13,817,208,014
2034	15,328,751,344	10,690,008,979	13,918,704,099
2035	15,834,861,420	10,720,139,811	14,004,871,688

Total income of community 2 increased compared to the amount of income of the people first started in 2016. This occurs due to the interventions at the community revenue 2 that optimize the full potential of objects and tourist

attraction. In addition, Manado has interesting art and culture that can be used as objects and tourist attraction. *Mapalus* culture (mutual assistance), thanks giving celebration, and artistic attractions (*Maengket*, *Cakalele*, *Masamper*, *Kabasaran* dance), and historical heritage need to be packaged attractively, thus the pressure on the environment as a result of tourism activities can be minimized [20].

Government Revenue

The number of government revenue in 2013 increase in 2035. Government revenues₁ in 2035 decreases, while the number of government revenues₂ increased (Table 4).

Table 4. Simulation results of government revenue

Year	Government Revenue	Government Revenue ₁	Government Revenue ₂
2013	570,979,000	570,979,000	570,979,000
2014	647,825,588	647,825,588	647,825,588
2015	737,668,470	731,105,139	731,860,570
2016	793,195,823	778,006,384	822,716,443
2017	854,271,225	825,172,539	973,105,222
2018	900,659,712	859,612,903	1,035,795,240
2019	937,805,510	883,613,561	1,096,971,648
2020	976,274,143	906,780,800	1,158,262,735
2021	1,016,129,646	929,037,335	1,204,982,920
2022	1,057,427,240	950,306,960	1,236,551,843
2023	1,100,225,212	970,517,594	1,267,101,388
2024	1,144,577,723	989,600,283	1,296,259,485
2025	1,190,541,244	1,007,490,940	1,324,204,577
2026	1,138,174,675	1,024,130,697	1,350,756,052
2027	1,287,539,471	1,039,466,219	1,375,829,927
2028	1,338,691,165	1,053,448,531	1,399,345,731
2029	1,391,686,781	1,066,034,658	1,421,229,298
2030	1,446,584,854	1,077,187,823	1,441,413,125
2031	1,503,445,469	1,086,877,696	1,459,836,708
2032	1,562,330,281	1,095,079,989	1,476,446,826
2033	1,623,302,550	1,101,777,510	1,491,197,763
2034	1,686,427,168	1,106,959,164	1,504,051,490
2035	1,751,770,691	1,110,620,415	1,514,977,779

The difference in the number of government revenue is happening because of the amount of revenue of the government first received intervention in the form of restrictions on the number of tourist arrivals, thus automatically affect the amount of government revenue₁.

Total government revenues₂ increases, because the received interventions that optimize the full potential of objects and tourist attraction there. The intervention has a positive impact where the number increased government revenue and environmental sustainability of Bunaken National Park can be maintained.

Model and Performance Validation

The next stage is to test the model validation, with structure validation test and performance validation test. AME (means absolute error) is the deviation between the average value of the actual simulations, while the AVE (absolute error variation) is the deviation of the actual value of the variation simulation, with an acceptable deviation limit which is a maximum of 10% [9]. AME validation test results (absolute means error) shows the number of tourist arrivals to 0.03, 0.02 people's income, government revenue 0.03, and extensive coral cover was 0.04 or wholly on average below 5% so the results of this model structure can be said to be accurate and acceptable (Table 5). Furthermore, Table 6 the results of the validation test AVE (absolute variation of error) shows the number of tourist arrivals of 0.03, 0.02 people's income, government revenue 0.03, and extensive coral cover 0.04. These results indicate that the performance validation tests of this model is acceptable because the average is under 5%.

Table 5. Results of the validation test AME

Year	AME The Number of Tourist	AME Income Communities	AME Government Revenue	AME Extensive Coral Cover
2013	?	?	?	?
2014	0.00	0.00	0.00	0.00
2015	0.03	0.02	0.03	0.04

Table 6. Results of the validation test AVE

Year	AVE The Number of Tourist	AVE Income Communities	AVE Government Revenue	AVE Extensive Coral Cover
2013	?	?	?	?
2014	0.00	0.00	0.00	0.00
2015	0.03	0.02	0.03	0.04

CONCLUSION

Based on the results of analysis, the number of tourists visiting has a real connection with extensive coral cover. Increase on the number of tourist arrivals will affect the broad decline in coral cover, and vice versa. Otherwise, decline in coral cover will cause the number of tourists to decrease. Increase of the number of tourist arrivals occur until 2019, and the next year there will be a decrease in the number of tourists due to the decline of extensive coral cover. The number of tourist arrivals in 2035 became 27,152 and extensive coral cover was reduced to 447, 87 ha. Furthermore, household incomes and government revenues in 2035 respectively to Rp 15,834,861,420 and Rp 1,751,770,691.

The first intervention is done on the number of tourist visits, extensive coral cover, communities incomes and government revenues in the form of restrictions on the number of tourist visits. Results indicate that on each element of a decline compared to the first results without intervention, while the second intervention has increased when compared to the intervention 1. The number of tourists in 2035 the first intervention to decrease until it reaches 20 357 tourists, and the second intervention increased compared to 1, reaching intervention 21.097 tourists.

Extensive coral cover in 2035 on one intervention increased compared with the one without intervention, that is from 447.87 to 585.87 ha, while the second intervention increases to 770.87 ha. Income communities in the intervention 1 total revenues decreases to Rp.10,720,139,811, and the second intervention has increased to Rp. 14,004,871,688. Further for government revenues in 2035 with the first intervention decreases from Rp. 1,751,770,691 to Rp 1,110,620,415 and the second intervention increases to Rp. 1,514,977,779. Based on the results of the validation structure test and performance validation test (AME and AVE) showed each below 5%, thus this model can be said to be accurate and acceptable.

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MANUSCRIPT SUBMISSION

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.

PEER REVIEW PROCESS

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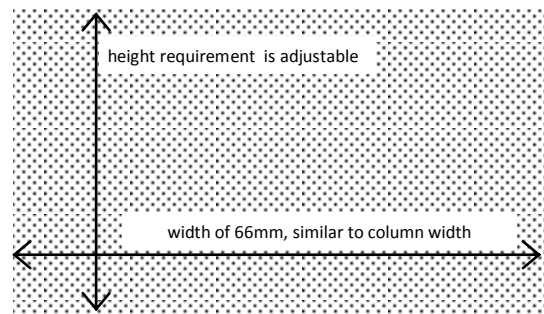


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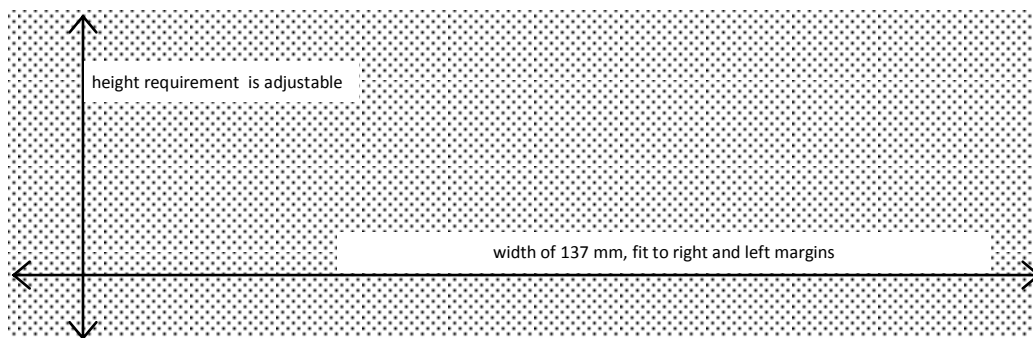


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- [4].Syafi'i, M., Hakim, L., dan Yanuwiyadi, B. 2010. Potential Analysis of Indigenous Knowledge (IK) in Ngadas Village as Tourism Attraction. pp. 217-234. In: Widodo, Y. Noviantari (eds.) *Proceed-ing Basic Science National Seminar 7* Vol.4. Universitas Brawijaya, Malang. (Article within conference proceeding)
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CONCLUSION (Calibri 10 Bold, Left, Capslock)

Conclusion of the study's findings are written in brief, concise and solid, without more additional new interpretation. This section can also be written on research novelty, advantages and disadvantages of the research, as well as recommendations for future research. (Calibri 10 Justify)

ACKNOWLEDGEMENT (Calibri 10 Bold, Left, Capslock)

This section describes gratitude to those who have helped in substance as well as financially. (Calibri 10 Justify)

REFERENCES (Calibri 10 Bold, Left, Capslock)

- [1].(Calibri 10 Justify, citation labelling by references numbering)
- [2].Vander, A., J. Sherman., D. Luciano. 2001. *Human Physiology: The Mecanisms of Body Function*. McGraw-Hill Higher Education. New York. (Book)
- [3].Shi, Z., M. Rifa'i, Y. Lee, K. Isobe, H. Suzuki. 2007. Importance of CD80/CD86-CD28 interaction in the recognition of target cells by CD8⁺CD122⁺ regulatory T cells. *Journal Immunology*. 124. 1:121-128. (Article in Journal)

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