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The Role of Social Capital in the Development of Mauhalek Waterfall Ecotourism in Belu District, East Nusa Tenggara Province

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Abstract

The purpose of this research is to know the relationship and the role of social capital in supporting product and service of Mauhalek waterfall ecotourism. Phenomenology approach was chosen because it allow the researcher to identify a particular phenomenon, and requires the researcher to examine the subject by being directly involved in developing meaningful patterns and relationships. In the context of the research to be studied, the main focus of this research is the norms, beliefs, networks, products, and services of Mauhalek waterfall. From the research results, it can be concluded that there are various custom rules in maintaining Mauhalek waterfall which still exists until now, one of them is *ukum Badu* (prohibition of cutting the tree and taking fruit that existing around the Mauhalek forest). The high belief in myths and rules makes the sustainability of Mauhalek waterfall is still maintained until now. The beauty and authenticity of natural resources and culture of Mauhalek waterfall make it as a good tourist product to be offered to the visitor.

Keywords: Mauhalek waterfall, social capital, sustainable tourism.

INTRODUCTION

In Nusa Tenggara Timur region, tourism destination is growing rapidly in line with the development of technology and communication in the region. Tourism is one of the important industrial sectors and has great potential and opportunity to be developed [1]. Some of the existing tourism offers are very diverse, ranging from marine tourism, mountain, agro, animal etc. [2]. Precisely in Belu Regency, in the city which directly adjacent to the Democratic Republic of Timor Leste (RDTL), there is a very interesting diversity of tourism such as Mauhalek waterfall tourism located in Lasiolat Sub-district, Raiulun Village. The concept of tourism development offered at Mauhalek waterfall is the existing tourism development harmonized with environmental conservation issues and the empowerment of local community related to the culture and customs of the local community [3].

The interesting charm in a tourism destination is an attraction, either in the form of art shows, recreation, or presentation of a typical packed and preserved local culture [4]. The aspects in the development of ecotourism model consisted of social, natural, human, physical, and economic aspect. The implementation of

ecotourism is basically done with simplicity, maintaining the integrity of nature and the environment, maintaining the authenticity of customs, living habits or the way of life [1].

The social capital is a feature of social organization such as network, norms and social trust that can facilitate the coordination and cooperation for mutual benefit. Thus, the main attribute of social capital consists of the norm, trust, and networking [5]. The term ecotourism can be interpreted as a trip by a tourist to a remote area with the aim of enjoying and learning about nature, history, and culture in an area where the tourism pattern helps the economy of the local community and supports nature conservation [6].

This research about the community's social capital in improving tourism development which is conducted at Mepar Village, Lingga Subdistrict, Lingga Regency. In this research, the writer finds the value of Mepar people that is still developing until now. This informal value is an effort to encourage the formation of tourist event such as *Safar bath*, *haul jama'* and *malam tujuh liko* at the village. The value that encourages the tourist events as mentioned above is known to the community by *tolak bale* which means it refuses from ill-fated or dangerous and also invites lucky fate or known to the local community with the word *Mojo* [7]. The social capital is then developed until now because of the success of society in conserving it.

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Social Capital that owned by the head of the family to develop the marine ecotourism itself, is considered quite well. This is related to their income and education level. However, when correlated with the social capital, it is more influential on the level of understanding of norms and the number of people who are known on the social network they had. However, there's insufficient or fading belief of the community; especially in the ecotourism development [8].

Social capital in tourism development can be seen in the research conducted in Basring Village. The social capital contained in the Group of *Nelayan Ikan Hias Samudera Bakti* has the positive influence in the success of the empowerment program conducted to fishermen of Basring Village. They are changing the fishing pattern from the environment unfriendly to be environmentally friendly and able to invite the fishermen to maintain and preserve the existing marine environment. The existing social capital in the Group of *Nelayan Ikan Hias Samudera Bakti* is social capital that tends to be inward-looking, usually the type of bonding social capital tends to be conservative and prioritizes group solidarity rather than more tangible things to build itself and the group in accordance with the guidance of values and norms of more open society [2].

Ecotourism cannot be separated from social capital [9]. One of the indicators of social capital is local wisdom, where the local wisdom of people around the Mauhalek waterfall has relevance to the development of Mauhalek waterfall. The purpose of this research is to study the role of social capital in supporting product and service of Mauhalek waterfall ecotourism.

RESEARCH METHODS

Phenomenology Approach

This study used a phenomenology approach. Phenomenology was chosen because the researcher able to identify a particular phenomenon, and it requires the researcher to examine the subject by being directly involved in developing meaningful patterns and relationships [10]. In the context of the research to be studied, the main focus of this research is the norms, beliefs, networks, products, and services of Mauhalek waterfall.

Data Collection

Qualitative data obtained from the selected people by purposive sampling, namely the technique of determining the sample with a certain consideration. In Raiulun Village, four

respondents were chosen because they were considered to understand the existing development and the existing potentials in the research area. The research population is the Village Head of Raiulun, Mauhalek waterfall management, the customary stakeholder of Raiulun Village, and community. The respondents was determined by snowball sampling approach, namely the technique of determining sample initially small in number, then increasing because the information obtained is not complete yet.

The collected data are (1) social, economic and environmental conditions in the research area, (2) factors in social capital (norm, trust, and network) that exist in the research area, and (3) product and services available at the research area. Judging from the type of data, there are two types of data collected in this study, namely primary data and secondary data. The main data used to compile the model in this study are primary data collected through questionnaires to the respondents who are interested people in the research location. While the secondary data from village's document and Mauhalek waterfall management. The data collected is about (1) social, economic and environmental conditions at the research location, (2) the state of social capital of the Raiulun Village community based on norms, beliefs and networks, and (3) products and services from Mauhalek waterfall.

RESULT AND DISCUSSION

Regional Overview

This research conducted in Dualasi Raiulun Village, Lasiolat Sub-district, Belu District, East Nusa Tenggara Province. Raiulun Village has 9 km² of Village area which is surrounded by hills, with altitude of 924 m asl (above sea level). Climatologically, Raiulun Village is at an average temperature of 24-34°C tropical climate, the geographical position closer to Australia than Asia, making Raiulun Village has low rainfall between 1000-1500 mm.year⁻¹. The topography of Raiulun village varies between altitude 0 and +1500 m asl.

Raiulun Village has 875 people with 440 men (50.5%) and 445 women (49.5%) and 223 households [11]. The social life of customs society of Raiulun Village is divided into several tribes. It can be seen in table 1 that there are 11 tribes at this Raiulun Village. These tribes have the tribal chief who will regulate and run the customary rules of their lives.

Table 1. Community Tribes of Raiulun Village

No	Tribe Name	No	Tribe Name
1	Dua besi	7	Mone sogo
2	Reuba	8	Mone hitu
3	Bere gatal	9	Mone walu
4	Lakus	10	Hakpor
5	Tuli gatal	11	Leoes
6	Sirigatal		

Source: Custom Stakeholder of Raiulun village (2017)

Community work at Raiulun Village is quite diverse. Starting from the farmer, civil servant, the vegetable seller, maker of woven cloth (typical of Belu Regency), taxi bike driver, and cattleman, but most of them are farmers. This is supported by the fertile condition of agricultural land. The types of farms grown are rice paddy, maize, tubers, and vegetables. Within a year, agricultural production can produce 3,399 - 7,585 tons per year.

Raiulun villagers also have livestock in each house. The large livestock population is 799 animals, the small livestock population is 453 animals, and the poultry livestock population are 2,131. Other than that, the community around Mauhalek waterfall has the small industry, i.e. weaving industry; with 60 weaving industries has been registered [11]. Raiulun Village is one of the villages in Lasiolat Sub-district with low economic level and the average income level of the community is IDR 250,000 and for the highest income is IDR 4,000,000. This revenue is derived from the sale of agricultural products, plantation, livestock, woven fabric, and salary that works as the civil servant or contract worker.

Social Capital of Community around Mauhalek Waterfall

There are three social capital indicators that will be described in the management of waterfall Mauhalek, namely norm, belief, and network. Generally, the various rules and local wisdom in preserving nature is a factor that relates to norms, trust between Raiulun people and trust of Raiulun people to the government or other party; which is one of the indicators of social capital, namely trust. Furthermore, the meeting intensity between Raiulun people and acceptance of information and relation between people or from outside the community is the network. Here is an explanation of the social capital variable through each indicator of the variable.

Norm

The behavior of social capital of the community is directly described by the norms, values, and rules prevailing in that society [12].

Here are the rules for the management of Mauhalek waterfall based on the local wisdom of Raiulun Village. Table 2 explained the rules or norms that exist at Mauhalek waterfall.

Table 2. Norms that exist at Mauhalek waterfall

Finding	Meaning	Description	Sanction
<i>Ukum Badu</i>	Not damage the waterfall and forest that exist around the waterfall	Already destroying the natural surrounding that guarded by their ancestor	Animal, <i>sopi</i> , sirih pinang (<i>paan</i>), cloth
<i>Halikutar hasa oan</i>	Traditional ritual mentioning the Lord and the Land and the ancestor and landlord who find the waterfall	Getting grace from the water called the supreme	-
<i>Mata merek</i>	People who see or find a person or group of people who damage the waterfall	Witness in the process of customary law as a person who sees and finds the incident	Getting part in sanctioning of the perpetrator
<i>Foho</i>	<i>Mesba</i> or compound stone	Used as a place of offerings to the ancestor in the traditional ritual	-
<i>Tarahorak</i>	Apologizing to the ancestor	Apologizing to the ancestor for damaging Mauhalek waterfall	Bringing sanctions that determined by the tribal chief

Source: Custom stakeholder of Raiulun Village (2017)

The customs people at Raiulun Village has a rule where people are not allowed to deforest the existing forest at Mauhalek waterfall area. The forest around the waterfall should be preserved because custom people of Raiulun Village believe that the waterfall and its surroundings are the inheritance of their ancestors who have been used or utilized from the past until now for their survival. Furthermore, the waterfall and its surrounding such as forest around the waterfall should not be cut because they believe that every tree has a guard. According to the residents, if they are found to be cut, it will be given a custom sanction in the form of fines such as animal (pig), *sirih pinang* (*paan*), and *sopi* (traditional drink).

The animal used as fines is in accordance with the size or the number of trees cut which is determined by the custom stakeholder of

Raiulun Village in the custom language called *ukum Badu*. Raiulun Village community cooperate in adhering to the customary law at Mauhalek waterfall, this is evidenced by the presence of *matan merek* which means People who see or find a person or a group of people who damage Mauhalek waterfall then the person will report to the head of the tribe or commonly called *tua adat*. After that, it will be followed by *tua adat* will give sanction to someone or group of people who damage this Mauhalek waterfall. The excellence of this *matan merek* is he/she will get a special part from the result of sanction given to a person who damages this waterfall.

At Mauhalek waterfall, there is a levelled stone used as *mesba* or place in doing custom procession called *foho*. This place is usually used by tribes belonging to *Bunak* tribe that is one of the four major tribes. There are 11 tribes in Belu Regency -the small tribe of *Bunak* tribe which uses the levelled stone as *mesba* which is believed to be a means of bringing them closer to their ancestors and as a source of harmony for the people around the waterfall, the tribes believe it as *halikutar hasa oan*. In addition, it is also used in the apology ceremony to the ancestors resulting from the destruction of Mauhalek waterfall by bringing sanction determined by *tua adat* called *tarahorak*.

Trust

The relationship between Raiulun villagers in accordance with the results of the interviews that they have excellent relations between people. It can be seen from the form of high trust in fellow villagers in Raiulun also manifested in the implementation of traditional activities. Customary activities that are held always involve all parties and do not distinguish the Raiulun Village community based on their class or social stratification. The existence of mutual trust between communities encourages the sustainability of social relations that support in a community order. A form of high trust to Raiulun villagers is also realized in the implementation of ceremonial activity such as ceremony of *halikutar hasa oan* (ceremony performed as thanksgiving to the God and to the ancestors). The ceremonial activity is usually done once in a year during the harvest season in September. The ceremonial activity always involves all parties and does not distinguish Raiulun villagers based on social group or stratification.

Raiulun villagers also believe that violating the rules that have been created and mutually

agreed upon will cause disaster for the tribe or community group such as crop failure and drought as well as danger to the individual or someone's life such as the person will get ill and also get the misfortune such as accident etc.

Network

The relation of Raiulun villagers with the government is very good. The government of Raiulun Village is very supportive of the activity undertaken by Raiulun villagers, i.e. tourism management activity of Mauhalek waterfall. In addition, this activity is supported by opening the road for the tourist attraction of Mauhalek waterfall by using village funds and assistance from relevant departments such as department of public works and department of tourism as promotion media of tourist attraction for Mauhalek waterfall.

The trust of Raiulun villagers towards the government is shown in the form of appreciation of every monitoring from the related agency, serving and reporting every result of Mauhalek waterfall management. This activity is often done at the village office or invited to the activities made by the related agency. These activities are conducted with the intention of monitoring and evaluation and determining tourism destination management strategy that exists in Belu Regency including Mauhalek waterfall.

The establishment of BUMDes Raiulun (Village-owned Business Agency) is based on the potential of Raiulun Village which has Mauhalek waterfall and this formation is intended for economic improvement of Raiulun villagers. Early formation of this BUMDes in 2016 formed by the Village Head of Raiulun. Membership in BUMDes is taken from people who have willingness in accordance with the purpose of BUMDes establishment, i.e. the management of Mauhalek waterfall [3].

Ecotourism of Mauhalek Waterfall

Mauhalek waterfall area has a high diversity of flora and fauna because Mauhalek waterfall tourism is initially the customary forest that preserved various existing ecosystems. Mauhalek waterfall forest has 14 species of trees namely Pinang (areca nut), mahogany, avocado, tamarind, jackfruit, mango, *lamtoro*, teak, candlenut, palm, white teak, sandalwood, Guava (*Syzygium*), and *Eucalyptus*. Fauna in waterfall Mauhalek are monitor lizards, monkey, eagle, sparrow, wild pig etc. This condition is huge potential as an ecotourism attraction (Table 3). Landscape at Mauhalek waterfall is the

combination of various physical components of the ecosystem with surrounding vegetation creating a very beautiful panorama as part and object and tourist attraction, the landscape has significant role and position in a tourism destination. In Figure 1 can be seen the beauty of Mauhalek waterfall.

Table 3. Product and Service of Mauhalek Waterfall
Source: Field Observation (2017)

No	Product And Service	Explanation
1	Landscape and environmental and cultural attraction	Flora and fauna, springs, waterfall, bunak culture, typical food of local community
2	Landscape benefit	Tracking to waterfall, waterfall bath, photography, shopping the result of local community garden
3	Accommodation and facility of support services	Stall, cottage, bathroom, toilet and dressing room, traditional market
4	Equipment and supply	Tour guide, motorcycle taxi
5	Education and skills	Research of local wisdom and woven fabric
6	Awards, conservation accomplishment or service	Not formally



Figure 1. Mauhalek Waterfall (**Source:** Personal Documentation, 2017)

Cultural tourism that can be seen is the existence of traditional worshipping ceremony, namely worshipping the ancestors which are often held in this waterfall by 11 tribes. It is believed that the stones are composed of this waterfall is *mesba* or place of worship to the ancestors. Observation in the field shows that this area can be used as a tourist attraction because it is one of the first waterfall attractions and it can be used to rest and relax with the cool air. There are many trees and a beautiful waterfall that make the visitor very comfortable to be in this Mauhalek waterfall area.

The advantage of the Raiulun villagers is that they trust their customary leader (head of tribe). In addition, the Raiulun villagers religiously obey the regulations issued by their customary leader. The reason is that Mauhalek waterfall is a protected water source from ancient by their ancestors before it is designated as a tourism area. They assume that the waterfall and the two sources of water are life source, so they keep this Mauhalek waterfall for the preservation of nature and the source of its water are still maintained until now. They keep this waterfall with a variety of custom rules, one of them is *badu ukum* (prohibition of cutting down trees and taking fruit around the Mauhalek forest). High belief in myths and rules passed by the customary leader (head of tribe) that makes the community of Raiulun village still preserve this Mauhalek waterfall.

The role of community social capital of Raiulun Village in developing products and services of Mauhalek waterfall tourism is very good. It can be seen from several norms that have existed since antiquity which makes this waterfall tourism maintain the authenticity and beauty of Mauhalek waterfall. It also supported by the compliance of the community of Raiulun Village in complying with existing rules, and also the level of trust among people is also very high due to the familial relations of the tribes at Raiulun Village, the village community is very obedient to the tribal chief (*tua adat*), village head and other village officers. The relation of mutual trust which makes Raiulun villagers can establish cooperation in the management of this waterfall goes well.

With the existence of Mauhalek waterfall tourism, the Raiulun villagers have more awareness to preserve the environment with written rules made in *PERDES* (Village Rules). The assistance of planting tree seeds to enrich existing resources, with the help and socialization of the community, make they understand more about the importance of maintaining the environment theoretically.

From the results of this study in accordance with the theory of Putnam [4], stated that social capital is a feature of social organizations such as networks, social norms and beliefs that can facilitate coordination and cooperation for mutual benefits. These three aspects have their respective roles and facilitate each other to get mutual benefits. In the aspect of norms having a role in preserving the natural resources of the waterfall of Mauhalek with customary rules and

sanctions that apply in the Raiulun Village community. The norm can also serve as a reminder of the type or tourism activities that can be done and cannot be done. This certainty is considered absolute because it has been decided jointly and contains strong traditional elements.

CONCLUSION

Norm or rule that exists at Raiulun Village is very strong because all of the villagers highly uphold the local wisdom they have. They strongly believe by continuing to preserve the local wisdom, then their life will be safe and serene. They keep this waterfall with various custom rules, one of them is *badu ukum* (prohibition of cutting trees and taking fruit that exists around the Mauhalek forest). Customary community trust of Raiulun Village has been planted since their ancestors and also the Raiulun villagers believe what is said by the customary leader (head of tribe). It is seen from obedience to the orders and rules issued by their customary leader (head of tribe), Raiulun Villagers network has been formed through the organization of BUMDes established by village head of Raiulun in 2016 with the intention as a place for the surrounding community to manage the Mauhalek waterfall.

The role of community social capital of Raiulun Village in developing product and service of Mauhalek waterfall tourism are very good seen from some norms that have existed. Antiquity makes this waterfall tourism is maintained the authenticity and beauty, which also supported by the obedience of Raiulun villagers in compliance with *ukum Badu* (traditional rules) that has been there, and with the willingness to develop the Mauhalek waterfall, Raiulun villagers who joined in the group of BUMDes develop and add the Mauhalek waterfall facility with the income they get and support from the government of Belu District as an intention to increase the comfort of tourists.

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The Role of Local Government for Local Product Processing: the Implication for Tourism Sustainability in Lok Baintan Floating Market

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Abstract

Lok Baintan floating market is the destination tourism in South Kalimantan Province. The trader activity in the floating market becomes the attractiveness of tourism activity. The diversity of good sold in the floating market becomes one of the determinants for tourism sustainability. The tourism sustainability in Lok Baintan Floating Market is the responsibility of both community and government. The objective of this research was to analyze the role of government for local product processing in Lok Baintan Floating Market to improve the tourism activity. This research is focused on local government who has the responsibility for local product processing in Lok Baintan Floating market, i.e. Tourism Agency of South Kalimantan Province, Tourism Agency of Banjar Regency, Fishery Agency of Banjar Regency, Agriculture and Farm Agency of Banjar Regency, and Head of Lok Baintan Village. The research used qualitative method, which used observation, depth interview, and document as the data collection technique. The results of the study showed that tourism activities in Lok Baintan became one of the priorities of tourism development in South Kalimantan, but not managed maximally yet. First, the Products sold in the floating market were still raw goods. Then the processing of products sold in the floating market had not been a priority of activities undertaken by local the government. Moreover, limitations of costs were the main cause of the absence of training in agricultural product processing, fishery product processing and handicraft production in the tourist area of Lok Baintan. Processing and diversity of goods sold in the floating market become a determinant of the sustainability of tourism activities in Lok Baintan Floating Market.

Keywords: Government, Local product, Lok Baintan Floating Market, tourism.

INTRODUCTION

Trader activities in Lok Baintan become the attractiveness of tourism. Traders on Lok Baintan is dominated by women. The women using the *jukung* or small boat sell the local product from their villages such as fruits, vegetables, fish, traditional cake, and craft [1,2].

The socio-economic of traders are still low grade. Tourism activities in Lok Baintan do not have a positive impact on the socio-economic life of traders [3]. Many tourists do not buy traders merchandise because agricultural are sold in large quantities. The foreign tourists are difficult to bring fruits and vegetables in large quantities. The foreign tourists also cannot buy live fish. The local product needs to be processed into a finished product with the good packaging, hence foreign tourists will easily bring souvenirs from Lok Baintan. The role of government is to provide the training for product processing into finished products.

The government has an important role in tourism industry development [4-7]. Developing of tourism industry depends on the quality of the product as the basis of product, and the price for the same product. The most important thing in the tourism industry is who pays for the product and who benefits from it [8].

The government has the role of motivator, facilitator, and dynamist. Government as the motivator means government ensures the sustainability of the tourism industry. Government as the facilitator means that the government provides all the facilities to support tourism activity. The dynamist means that good relationship between government, the private sector, and the public to support the development of the tourism sector [9].

Local government has an important role in driving the sustainability of the tourism agenda. Sustainability the tourism requires the ability and capability to integrate the natural resources, cultural, and human capital [8,10]. Governments also provide a good environment for the private sector, local community, tourists and other stakeholders for tourism sustainability [10].

Tourism sustainability in Lok Baintan is determined from the trading activity. The

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limitation time and merchandise on the floating market make the limitation of tourism activity. The local government has the responsibility to improve the quality and quantity of the merchandise on the floating market. Based on the background, the objective of the research was to analyze the role of government for local product processing in Lok Baintan Floating Market to improve the tourism activity.

RESEARCH METHODS

Study Area

Astronomically location of Lok Baintan floating market (Figure 1) is 3°17'21.1" S and 114°40'11.1" E. Lok Baintan is located in Banjar Regency, South Kalimantan [2,11]. The study used fieldwork and qualitative approach. The target population was the local government who has the responsibility for local product processing in Lok Baintan Floating market, i.e. Tourism Agency of South Kalimantan Province, Tourism Agency of Banjar Regency, Fishery Agency of Banjar Regency, Agriculture and Farm Agency of Banjar Regency, and Head of Lok Baintan Village.

Data Collection

Data collection was obtained through observation, depth interview and document.

Observation was used to get the general condition of tourism activity on the floating market. Depth interview was used to get the information the role of local government for local product processing to improve the tourism activity in the floating market. This document was used to analyze the local government program in Lok Baintan Floating Market which used Triangulation method for testing the validity of data. Data analysis consisted of data grouping, data reduction, data display, and conclusion drawing [12].

RESULT AND DISCUSSION

The Processing of Agriculture Product

Processing of agricultural product program in Lok Baintan has never been implemented by Agriculture and Farm Agency of Banjar Regency, due to the limitation of cost. In addition, this program has also never been implemented in Lok Baintan, because local government in this region has never applied to assist the management of plantation products to Agricultural and Farm Agency of Banjar Regency. Lok Baintan Village is not a priority program of plantation cultivation. The opinion of resources and counseling of Agriculture and Farm Agency follows:

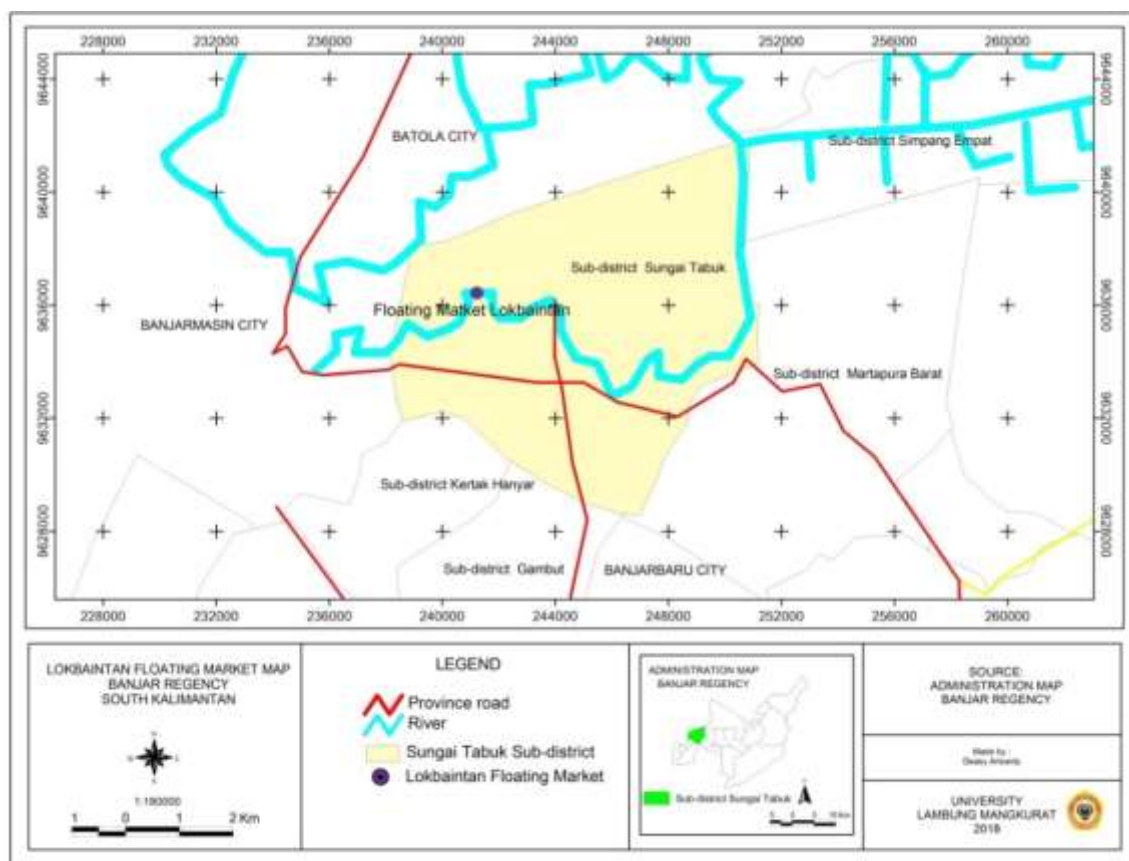


Figure 3. Lok Baintan Floating Market Location

"Regarding the activities of the plantation and livestock service in Lok Baintan, there has been no activity to get there. Our plantation is still focusing to the development of rubber. We still focus only in some villages, not including Lok Baintan Village. Extension activities can actually be done if there are villages that need good counseling or training, we are ready to guide, but the local people who have to request procurement to us then we will be able to follow up".

The Processing of Fishery Product

Processing of fishery product program in Lok Baintan to support the tourism activity has never been implemented by Fishery Agency of Banjar Regency also considers that Lok Baintan Village is not yet a program priority. The community from Lok Baintan also never submits proposals to carry out training activities in their villages. Lack of information from both the agency and the community causes the cooperation activities between the government and the community is not going well. The opinion of the head of business and investment of Fishery Agency in Banjar Regency follows:

"Training activities from the fisheries agency is limited, due to budget constraints, our budget in one year only two or three times the training. For special training in Lok Baintan village, we have never been there; we usually conduct community training from some villages that we are here to attend training. Fishery product is *abon* and crackers, for our marketing also provide links to the trainees. Until now, there is no program that we specialize in Lok Baintan Village, but it is possible if people ask for special training, we may be able to leverage the program there".

The community on Lok Baitan Floating Market producing the fishery (Fig. 2) into salted fish. The salted fish product has simple packaging. They have their own creativity because there is no training from the local government for fishery product packaging (Fig. 3).

The Creative Economic in Tourism Area

The Creative Economy Agency is a part of the Tourism Agency in Banjar Regency. The Creative Economy Agency was built in 2017. The creative economic agency is not yet developing the community activities in tourism area due to the limitation of funding. The opinion of the head of creative economic of Banjar Tourism Agency follows:

"We still focus on marketing tourist attractions. The creative economic will begin to be implemented in 2019, because it is our target budget in 2019 for training. Lok Baintan floating market is dominated only by fruits and food, there has been no innovation for processing raw products into a superior product that characterizes its own".



Figure 2. Live fish on Lok Baintan Floating Market



Figure 3. The Packaging of Salted Fish

Training for local product processing in Lok Baintan will be implemented in the year 2019. Type of training is cakes cooking, crafting, and empowerment of women. Training programs will be expected to improve the types and quality of products available in Lok Baintan Market. Handicraft training will use water hyacinth as the material of crafting.

Based on the results of interviews with artisans in local villages, there is no role of government in advancing the existing craft in the village. Craftsman in this village is only one person (Fig. 4). She makes crafts based on his own creativity. Handicrafts are taken by merchants for resale in a floating market. The craft is a basket and a place for rice. The craft is made by using a small bamboo called *bamban* (Fig. 5). Limitations of raw material and the number of craftsmen cause the limitations of handicrafts sold in the floating market.



Figure 4. The craftsmen and the handicraft



Figure 5. *Bamban* as the material of handicraft

The role of tourism agency of Banjar Regency in the development of Lok Baintan Floating market tourism is the development of destination and promotion. Related destinations not only from the tourist agency but also involve other agencies and local communities. The floating market program constructs the facilities to support the activities of tourists. Related to the actual promotion of the tourism agency, there is a program was regularly done once a week or once a month. In 2019, routine activities once a week or once a month will be done again.

One of the big events are prepared by the Tourism Agency of Banjar Regency is 1000 *jukung* (small boats). This event will be held in November 2018. The target of the program is not only from domestic but also international tourist.

The creative economy of the tourism agency of Banjar Regency prepares small and medium business related to the tourism, unfortunately, this program could not be implemented properly in Lok Baintan in 2018. The Tourism Agency of Banjar Regency will prepare the handicraft training to women on Lok Baintan in 2019. The result of handicraft can be marketed as a souvenir on tourism area.

The head of Lok Baintan Villages said that the people have been getting the screen printing training from local government. The training is only held about 2 days. No other training has been implemented in this village in 2018. The head of Lok Baintan said that the community of Lok Baintan is only waiting for the training program from local government, due to they are confused where they have to submit the training proposal.

The Tourism agency of Banjar Regency is focused on *POKDARWIS* (the tourism awareness group). The purpose of *POKDARWIS* program is to make the local community be aware of tourism activity. *POKDARWIS* members are about 20-30 people.

The concept of self-conscious tourism implanted into the community is based on 7 of fascination [13]. The tour can get a good impression. The tour also can help for promoting the resort to other people through the story or photo from social media.

Tourism agency of Banjar Regency is not involved in the development of agriculture and fishery product because the tourism agency is focused on the tourist object. The tourism agency considers the promotion of agriculture product and fishery product is responsibility from Agriculture and Farm Agency and Fishery Agency. The tourist agency of Banjar Regency considers the local product processing to be a souvenir or another product such as creeps, cracker, and orange syrup is the responsibility of Agriculture and Farm Agency and Fishery Agency. There should be a synergy between the relevant agencies to promote the agriculture and fishery product in Lok Baintan due to the sustainability of tourism attractiveness related to the local product in Lok Baintan Floating Market.

The Tourism Agency of Kalimantan Province in 2019 will develop a trading arrangement such as traditional traders' clothing, merchandise packaging and assemble their merchandise. The majority product sold in the floating market is fruits. It will be a development target. The traders will be given the training to process raw goods into a product. The product will be characteristic of the floating market.

The Tourism Agency of Kalimantan Province in the year 2019 will develop a floating shop as the place of tourist to enjoy the floating market and to sell the local product of the floating market. The floating shop becomes a gathering point between traders and tourist. The short of trading times makes the short of tourism activity.

The tourists also arrive in the floating market in the early morning, so that the tourists have limited time to enjoy the floating market.

Tourism Agency of Kalimantan Province also has the program to form the 100 community groups. The community group is aware of tourism attraction in Lok Baintan. The community group will manage the activities of tourists. The government's expectation is the community's independence in processing tourism activities in their region. The donation funding to support this activity is IDR 15,000,000 per group. The donation funding is used for financing the tourism activity. Some of the problems that occur in the Lok Baintan floating market are as follows.

- a. Limitation coordination among the agencies involved in tourism activities,
- b. The tourism in Lok Baintan is not yet managed well,
- c. Processing of agricultural products, fishery products and handicraft in Lok Baintan is not a priority in tourism activity,
- d. Lack of information between local government and community about the training,
- e. The government is still focused on preparing the human resources and facility involved in tourism activities,
- f. Limitations of funds for processing the local product in Lok Baintan are considered to be a major issue.

The sustainability of tourism activities in the floating market is determined by the trading activity occurring in the area. Limitations of goods sold and limited time in tourism activities will be an obstacle to the sustainability of tourism activities. Processing of agricultural, fishery and handicraft products in this region becomes very important. The tourism agency of South Kalimantan Province has the program to process the local product in 2019.

The role of local government provides training on the processing of natural products that exist in this region. Limitations of funds need to find a solution. The government also promotes the products from the region, so that tourists already know the goods in the floating market.

The local government sector has an important role in supporting tourism development. Local government promotes the network between agencies, community groups and the private sector to invest in the area [14]. Investment is one effort to overcome the lack of funds in the management of tourist areas in Lok

Baintan. The role of local government is to be a liaison between investors and the community in the tourist area. The investment in Lok Baintan has the benefit to promote the local product and promote the socio-economic community.

Development of tourism product involves stakeholders and activities. The government has the required social and political capacity and legitimacy to coordinate the activities of diverse and different interest groups [15]. Various interests and programs in the development of Lok Baintan can be coordinated by local governments. Local governments can choose the main priorities that will be developed in this region. Trading activities as a major attraction in this tourism activity can be a top priority.

CONCLUSION

Trade activity is a major activity in tourism in the Lok Baintan Floating Market. Limitations of the types of goods become a problem in the sustainability of tourism activities in this region. Processing of raw goods into finished goods in tourism activities becomes very important in tourism activities in this region. Local governments still have not made the training for processing of raw materials of agriculture and fishery, and handicraft items as a top priority in tourism activities. Local governments are still focused on human resource development and tourism facilities procurement. Budget constraints become the main problem in the development of local product processing in this region.

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The Empirical Analysis of the Quality Level of Tourism Industry Services in Toraja: Ke'te Kesu

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Abstract

Indonesia has a number of tourism potentials to be built and developed sustainably. The destinations of local and overseas tourists have experienced an excellent growth trend in recent years, especially in North Toraja District, South Sulawesi. Therefore, the tourism industry is the government's main concern in recent years to increase its index because of its potential to boost the economic growth, especially for the local people and GDP. This study focused on the empirical analysis of the tourism industry service level that is viewed from the readiness and the support from available infrastructures. The method of this study was a survey distributed to respondents visiting the tourism industry using questionnaire based on SERVQUAL and IPA Diagram. By using SERVQUAL and Important Performance Analysis (IPA) method, we found eight service attributes which were divided into five SERVQUAL dimensions indicating that the service quality at Ke'te Kesu, North Toraja Regency, South Sulawesi needs to improve the aspects on Important Performance Analysis (IPA) diagram, including the service attribute: T5 (the availability of restaurants around the tourist location), T6 (the availability of street signs to tourist objects), R2 (the ease of finding tourist locations), R3 (the availability of public transportation to tourist location), RE4 (the immediate response from the officer/local citizen on the request or complain), RE5 (tourist Information Centre, contact person) is clear), A1 (Staffs are expert in serving tourists), and E5 (the concerns of tour operators and officers/residents to the needs of visitors). Sale in the floating market become a determinant of the sustainability of tourism activities in Lok Baintan Floating Market.

Keywords: Customer Satisfaction, IPA Diagram, Service Quality, Toraja, Tourism.

INTRODUCTION

Indonesia is a country with a million fascinating tourism along the equator, from Sabang to Merauke. This is a great potential to get more foreign exchange. In recent years, the government has seriously worked on this potential. It can be seen from their effort to develop existing tourist areas and make them as the priority tourism development programs by investing the development to create 10 *New Bali* which was estimated to spend \$20 billion [1]. The acceleration program for tourism development is an effort to reach the 2019 targets including the expectation to contribute to the GDP of 5.5% by collecting IDR 280 trillion of foreign exchange, creating 13 million jobs, and to bring the tourism competitiveness index to the top 30 by targeting 20 million foreign tourists and 275 million local tourists [2].

North Toraja is one of the favorite tourist destinations that become a priority visit for foreign and national tourists. The tourism office of Tana Toraja noted that the number of visits by both local and foreign tourist is 93,037 people (Table 1). This is the highest increase ever. This

increase becomes both challenge and opportunities for the region as well as the surrounding communities. One benefit for local and local communities is that it can certainly accelerate the economic growth. It is a way to introduce the widely-sustainable local culture and to contribute to the achievement of national foreign exchange earnings and GDP targets.

In addition to the opportunities described in the paragraph above, there are several challenges that need to be anticipated related to the increasing opportunities for this visit. The first is related to the level of service quality that supports tourism. This is important because it relates directly to tourists when accessing and interacting with these attractions. This has an effect on their expenditure level because the cost of several elements such as traveling, transportation, hotel, and other services is one of the main considerations in deciding tourist destinations [4]. The direct interaction to the good quality of facilities and services will build a positive impression and perception in consumers so that, indirectly, consumers will serve as a media campaign for other potential consumers.

The level of service quality has been proved to have a significant direct impact on the customer satisfaction level. Therefore, measurement and improvement of service quality is an important aspect of the

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management of rural tourism destinations [5]. This encourages the need for analysis in measuring the level of customer satisfaction to meet consumer needs, improve service quality, and create better service innovation [6].

Table 1. Number of Tourists at the Object of North Toraja Tour (April 2016 - March 2017)

No.	Tourism Object	Number of visitors
1	Ke'te Kesu	93,037
2	Limbong	2,376
3	Bori Kalimbuang	4,494
4	Londa	33,285
5	Galugu Dua	167
6	To Barana'	715
7	Palawa'	1,218
8	Lo'ko Ma'ta	279
9	Museum Lendorundun	275
10	Pala' Tokke	114
11	Marante	269
12	Tambolang	954
13	Maruang	3
14	Sarambu Sikore	275
15	Lombok Parinding	155
16	Ne' Gandeng	1,700
17	Buntu Pune	22
18	Pana'	20
19	Pasar Bolu	30
20	Singki'	1,400
21	Lempe	48
22	Tombi	0
23	Tirotikua	0

Source: North Sulawesi Culture and Tourism Agency [3]

The method used in mapping the level of customer satisfaction and service quality level is SERVQUAL. Assessments using SERVQUAL factors were initiated by Parasuraman and others, which SERVQUAL scales were developed and used in the wider field of study [7,8,9]. SERVQUAL has been widely applied in service studies in various fields. It was designed to measure the quality of services based on the consumers' perspective. SERVQUAL consists of five dimensions of service quality including reliability, assurance, tangible, empathy, and responsiveness. SERVQUAL method is useful in identifying and analyzing the gap between what consumers expect and what they experience related to the quality of the service.

To map the output of SERVQUAL and to make it more specific, gap analysis is used to identify the gap between visitor expectations and their perceptions. Furthermore, to determine the service priority, the level of the performance and importance of a service using Importance-Performance Analysis (IPA) diagram mapping. IPA

which was introduced in 1977 by Martilla and James, is to identify which service or product attributes the company which is focusing on improving the customers' satisfaction [10].

The results of this analysis provide a portrait of what attributes are important and require a quality improvement based on consumer perceptions. This helps service providers in determining priority attributes that require immediate quality improvement. Then, the next step in the methodological development was the adoption of the IPA (Importance-Performance Analysis) approach as one of the methods used in determining the priority if there are alternative attributes that require quality improvement. The main purpose of this study was focused to provide a conceptual framework of service level for tourism industry through mapping the quality of services by empirical analysis.

RESEARCH METHODS

This study was conducted on one of the leading tourist attraction in South Sulawesi which is called Ke'te Kesu, a village in North Toraja. Ke'te Kesu is a cultural tourism object which got the highest number of visitor among the 23 tourist objects in Tana Toraja.

This study was conducted for four months which was from June to September 2017. Data collection was conducted through a survey by distributing questionnaires to 200 respondents who visited Ke'te Kesu Toraja. The survey used questionnaires that have been prepared in a structured and systematic way based on five dimensions of SERVQUAL.

Questionnaires were prepared based on the service attributes which were developed from five SERVQUAL dimensions. Those attributes are as follows in Table 2. The assessment of respondents was based on Likert scale 1 - 5 to measure their expectations and perceptions. Qualitative data from the questionnaires were transformed into quantitative data which were processed using statistical analysis techniques namely the test validity and reliability.

The Validity Test

The measurement of research attribute validity is done by using the Pearson Product Moment correlation coefficient formula. The criterion is if r calculate is greater than r table, it means the data is valid. Conversely, if r calculation is smaller than r table, then data is invalid. Based on the 95% confidence level and alpha/margin error = 5 percent with the number of preliminary survey samples of 20 respondents,

r table = 0.444 with $n = 20$. This means $df = 18$ ($df = n-2$) with a significance level of 0.05 (95%).

Table 2. The Service Quality Dimension

Code	Services
T1	The scenery is very interesting
T2	The tourist location is clean
T3	Gift shop/ Souvenir Sale in tourism destination is available
T4	There is a festival or cultural event that is very interesting to watch (Entertainment Facility: Natural and Cultural Attraction)
T5	There are restaurants or cafeteria available around the tourist sites
T6	Directions to the attractions are available
T7	The public facilities around the tourist sites as per the needs of tourists are available
R1	The community around the tourist attraction is very friendly
R2	The tourist location is easy to find (Accessibility)
R3	Officers/locals are able to answer your questions well and clearly
R4	Clear tourist location information (available website, tourist Information Centre, contact person) are available
R5	The price of admission offered at tourist sites is in the accordance with the facilities offered (Affordability)
R6	Costs that should be spent during the tourists are in the destination are affordable
R7	The clerk is friendly and polite in serving
RE1	The communities around the tourist attraction are very friendly
RE2	The tourist location is easy to find
RE3	Public transport to tourist sites is available
RE4	Officers/locals are able to answer your questions well and clearly
RE5	Clear tourist location information (website, tourist Information Centre, contact person) is available
A1	Officers cater to tourists proficiently
A2	Officers/locals are able to provide information about your questions reliably
A3	The safety and security of visitors are guaranteed while in the attraction
A4	Visitors feel comfortable, calm, and happy during their stay at the tourist sites
A5	The officer passes the information to the visitor politely
E1	Officers/residents easily build good communication to visitors
E2	Officers/locals give good attention to the visitors
E3	The concierge/locals are friendly to visitors
E4	Tourists and officers/residents are very concerned about the needs of visitors
E5	Officers/locals always greet and smile to the visitors

To find out the correlation coefficient of validity, on each attribute of the research

questionnaire, the calculation was processed by using SPSS Following is test results of the validity of the instrument (Table 3).

Table 3. Results of the Validity of the Instrument

Code	r calc.	r table	Result
T1	0.472	0.444	Valid
T2	0.707	0.444	Valid
T3	0.524	0.444	Valid
T4	0.447	0.444	Valid
T5	0.584	0.444	Valid
T6	0.737	0.444	Valid
T7	0.564	0.444	Valid
R1	0.562	0.444	Valid
R2	0.660	0.444	Valid
R3	0.853	0.444	Valid
R4	0.449	0.444	Valid
R5	0.663	0.444	Valid
R6	0.481	0.444	Valid
R7	0.550	0.444	Valid
RE1	0.573	0.444	Valid
RE2	0.549	0.444	Valid
RE3	0.537	0.444	Valid
RE4	0.632	0.444	Valid
RE5	0.453	0.444	Valid
A1	0.966	0.444	Valid
A2	0.669	0.444	Valid
A3	0.988	0.444	Valid
A4	0.914	0.444	Valid
E1	0.762	0.444	Valid
E2	0.796	0.444	Valid
E3	0.625	0.444	Valid
E4	0.698	0.444	Valid
E5	0.612	0.444	Valid
E6	0.521	0.444	Valid

The Reliability Test

The reliability of the measuring instrument was tested to determine whether the value of the instrument used to collect primary data from the research sample was reliable or unreliable. The reliable notion is that the measuring instruments which were used are reliable so that when they are used in different situations, the research questionnaire does not lead to very different perceptions. Testing that shows r calculate $< r$ table means the data is not reliable, whereas if r calculate $> r$ table, means the data is reliable.

Based on the selected level of confidence 95 percent and α /margin error = 5 percent, with the number of preliminary survey sample was 20 respondents, r table was 0.444 with $n = 20$, which means that $df = 18$ ($df = n-2$) with a significance level of 0.5 (95%). The correlation coefficient of reliability obtained from the results of statistical calculations was compared with the table critical value product moment. The reliability testing using Cronbach's Alpha technique was assisted

by the SPSS software for each SERVQUAL dimension. SPSS test results can be seen in table 4 below:

Table 4. The Result of Reliability Test

Dimension	r calc.	r table	Result
Satisfaction/Perception			
Tangible	0.731	0.444	Reliable
Reliability	0.727	0.444	Reliable
Responsiveness	0.689	0.444	Reliable
Assurance	0.840	0.444	Reliable
Empathy	0.765	0.444	Reliable
Expectation/Importance			
Tangible	0.767	0.444	Reliable
Reliability	0.742	0.444	Reliable
Responsiveness	0.744	0.444	Reliable
Assurance	0.772	0.444	Reliable
Empathy	0.778	0.444	Reliable

Based on the results of the instrument validity and reliability tests, data that obtained from the respondents who became the research sample was valid and reliable. Furthermore, the data was used as a reference for measuring the customer satisfaction.

Furthermore, the questionnaires were distributed to respondents (Ke'te Kesu visitors). The number of respondents was 200 including foreign tourists (who could speak any foreign languages that were understood by the researcher). Respondents were determined by using a random sampling technique and the number of respondents was decided based on population number of visitors to the hall. Of all respondents studied, the data obtained can be divided into some characteristics, i.e. gender, age, last education, occupation, tourist category, tourist related information, and the number of visits in the last 1 year.

RESULT AND DISCUSSION

Respondents

This section of the study shows some of the results obtained from the survey in Ke'te Kesu, North Toraja (Fig. 1). A brief description of the characteristics of respondents can be seen in Table 5. The characteristics consist of gender, age, last education, occupation, and types of tourists.

Based on the five characteristics, there are three specific categories that dominate why visitors decide to Ke'te Kesu. The three dominant characteristics were: people who were categorized as students from 15-30 years old and were in the local tourist group. This provided opportunities for service providers to explore these characteristics in order to improve the quality of tourist visits.



Figure 1. One of the Tourist Objects at Ke'te Kesu North Toraja (Personal Documentation, 2017)

Table 5. Characteristics of Respondents

Social Attributes and Demography	Sub Attributes	Percentage (%)
Gender	Male	46
	Female	54
Age	< 20 years	13
	21 – 30 years	62
	31 – 40 years	20
	41 – 50 years	5
	>50 years	0
Education	Elementary School	1
	Junior High School	8
	Senior High School	18
	Higher Education	61
	Other	12
Occupation	Student	58
	Civil Servants/Army/Police	9
	Entrepreneurship	15
	Private Sector	17
	Other	1
Tourist Category	Local	96
	International	4

Gap Analysis

In improving service quality, the following are the results of service level identification from the gap analysis for each attribute developed from the five SERVQUAL dimensions. The gap score for each item attribute was calculated by subtracting the expectation score from the perception score. The results in Table 2 show that the differences between perceptions and expectations for all 29 attributes and five dimensions are generally ranged in negative mean (Tangible: -0.48, Reliability: -0.49, Responsiveness: -0.68, Assurance: -0.52, Empathy: -0.49). Indicating that there are a lot of service improvements efforts need to be fulfilled to enhance the service quality.

Table 6. Gap Analysis SERVQUAL

Dimension	Code	Satisfaction / Perception	Importance/ Expectation	Gap
Tangible	T1	4.35	4.48	-0.13
	T2	4.00	4.22	-0.22
	T3	4.33	3.96	0.37
	T4	4.23	3.91	0.32
	T5	2.6	4.23	-1.63
	T6	2.63	4.34	-1.71
	T7	3.89	4.28	-0.39
Reliability	R1	4.08	4.17	-0.09
	R2	2.77	4.29	-1.52
	R3	2.67	4.4	-1.73
	R4	4.15	4.09	0.06
	R5	4.04	4.21	-0.17
	R6	4.18	4.1	0.08
	R7	4.12	4.2	-0.08
Responsiveness	RE1	3.89	4.21	-0.32
	RE2	3.86	4.26	-0.4
	RE3	3.61	4.18	-0.57
	RE4	2.83	4.27	-1.44
	RE5	3.62	4.29	-0.67
Assurance	A1	2.93	4.33	-1.4
	A2	4.03	3.89	0.14
	A3	4.01	4.4	-0.39
	A4	4.07	4.51	-0.44
Empathy	E1	4.08	4.27	-0.19
	E2	3.99	4.28	-0.29
	E3	2.62	4.05	-1.43
	E4	4.14	4.29	-0.15
	E5	3.67	4.27	-0.6
	E6	4.02	4.3	-0.28

The results of gap analysis generally indicated that the level of service quality that the visitors expected were still higher than the one that they perceived during the visit. Among the 29 service attributes, 25 service attributes were perceived to be low by visitors, while 4 other service attributes were perceived positively and appealing to visitors. On the tangible dimension side, it was found that the tour was enlivened by festivals and local cultural performances and completed with a gift shop to buy unique souvenirs that characterize Ke'te Kesu.

Information on tourism on the reliability dimensions, the friendly welcome and acceptance by local residents showed a positive state. The perception of visitors associated with the costs incurred during the visit is quite affordable. This finding is slightly different from previous study, according to visitors that the cost they spent in tourism destination was quite high [11]. For that, the research recommended to tourism destination to consider reasonable prices.

Importance-Performance Analysis (IPA)

The IPA diagram is divided into four quadrants where the first and second quadrants reflect the level of attributes that are very

important. In both diagrams it is found that there are 17 attributes that are considered important by service users. These 17 attributes are distributed in two parts where the left side shows a low level of performance and the right part shows a satisfactory level of performance, eight attributes to the left side (northwest corner side) and nine attributes to the right side.

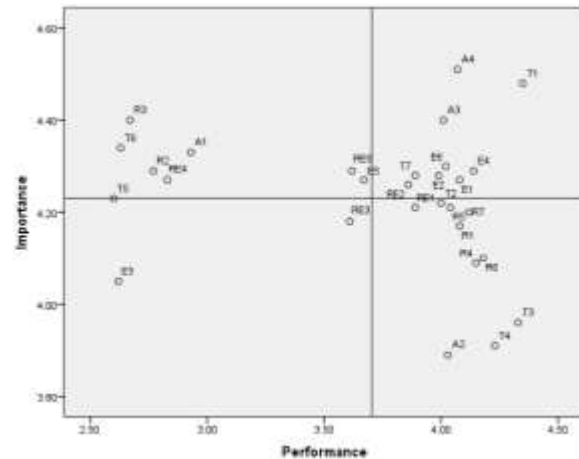


Figure 2. Diagram of Importance-Performance Analysis

Whereas third and fourth quadrants reflect the level of attributes that are not important for service users. There are 12 attributes described in these two diagrams, two attributes in left side and 10 attributes in right side. It means that these attributes dominantly in good performance even though these attributes were not as important as those in top sides.

Furthermore, from the gap analysis, priority determination to improve the quality of service was done through mapping Importance-Performance Analysis (IPA) Diagram, particularly in upper-left side. From the results of data processing through the diagram of IPA (Important Performance Analysis), there are eight service attributes that became the main priority to make service improvements (appears in upper-left). The service attributes that the service improvement would handle were the ones in quadrant A of each tangible dimension (physical proof), reliability, responsiveness, assurance, empathy. For more details, please see the Table 7.

Regarding the findings, several attributes can be connected are related to the environment of the tourism destinations, such as the availability of places for food and beverages, directions to location, public transportation, and information center. These finding differ to previous research mainly related to that tourist destination is

environmentally friendly, tourist destination offered food and beverage that are clean and hygienic [11]. In another research, several findings from the study conducted by Tendean showed that the availability of dining area and transport are some of problems that need attention to be improved [12].

Table 7. The Service Attributes that Need Improvement

No	Code	Service Attributes
1	T5	There are restaurants around the tourist sites
2	T6	Directions to the attractions are available
3	R2	The tourist location is easy to find
4	R3	Public transport to tourist sites is available
5	RE4	Officers/local residents immediately respond to requests or complaints
6	RE5	Tourist location information (website, tourist information center, contact person) is clear
7	A1	Staffs are expert in serving tourists
8	E5	Tourists and officers/residents are very concerned about the visitors' needs

The Improvement Plan of Services

To get customer loyalty, special study is needed to conduct on the participatory of all stakeholders of tourism objects and the North Toraja District Culture and Tourism Office. This loyalty will have a positive effect on the tourism industry including Ke'te Kesu and other attractions to increase visitor loyalty and number of visits. It is important to realize that the visitor's perception and expectation plays an important role in the process of assessing the overall level of service quality. At the beginning of the visit, visitors will have a certain level of expectation or confidence in a certain standard of service. The expectation is then compared to the actual service that they perceived or experienced [13]. In other case, flight services, practitioners should focus on delivering superior service quality and provide high value of service in order to improve the customer satisfaction. The study shows that service quality and perceived value contribute directly to customer satisfaction [9].

The improvement plan on the customer satisfaction in this research would be taken as the input to the manager to enhance service improvement based on improvement priority. The input included specific steps from customer/visitor satisfaction issues faced and actions that could be taken by the manager.

Some strategies can be developed based on the eight attributes that are of concern for immediate improvement in quality. The strategy

can be grouped into three parts, namely physical and transportation facility development (T5, T6, R2, R3), development of integrated information systems (R2 and RE5), and human resource development (RE4, A1, E5). By implementing these strategies, it is expected that it can help to develop the quality of services for tourists while visiting tourist spots in Tana Toraja.

Development of Physical and Transportation Facility

Development of physical facilities can be developed by upgrading modern facilities without eliminating the local characteristics of a tourist area. Provides an attractive restaurant with local characteristics which also serves local specialties and food. The provision of this restaurant also considers the character of tourists who are generally young and educated (Table 5). Access to easy locations supported by transportation facilities is the second thing that needs to be developed to improve service quality. In addition, the need to be developed is a location sign board and information board related to the history and characteristics of a tourist spot that can be presented in three languages (Local Language, Indonesian Language, and English).

Development of Integrated Information Systems

An integrated information system is a priority for development. The ease of access to information will make the Toraja tourist area more attractive to visit. Some things that need to be developed in this information system are interesting tourist spot services, cultural performance information and schedules, types and access to transportation, maps that integrate a lot of general information such as location distance, tourist spots, restaurants, places of worship, and hotels.

Development of Human Resources

To improve services, it is necessary to improve service skills for service providers. This can be improved by developing a standard of service for tour guides and others that focus on meeting customer (tourist) needs and satisfaction.

Listed below is an overview of programs that could be offered to services industries in increasing the customer or visitors' satisfaction and loyalty (Fig. 3). The management of tourist objects also needs to conduct an upgrading to deepen the ability of its officers in serving visitors

related to their needs during they are in the tourist areas.

Furthermore, as a leading tourist area, local governments must encourage this potential to be developed further. One strategy that can be applied is to benchmark the developed tourist areas. In addition, the regional government needs to maximize by optimizing local potentials that have not yet been explored.

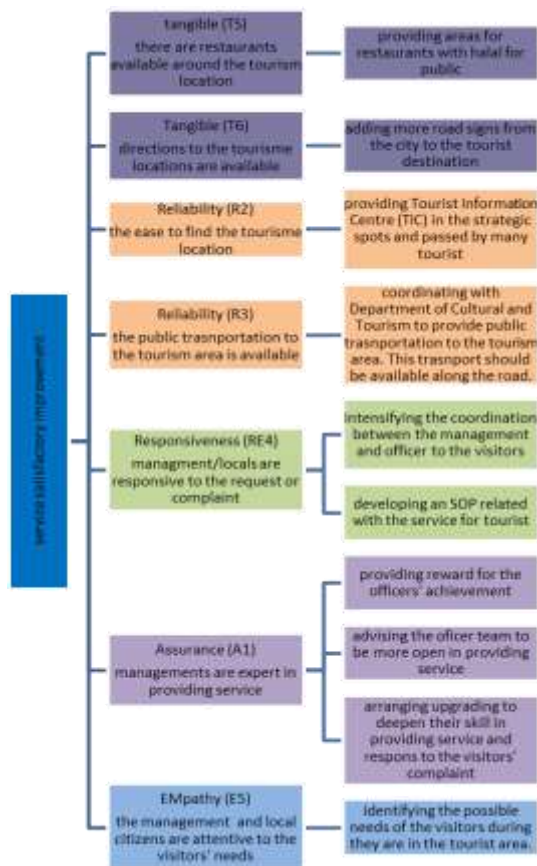


Figure 3. The List of Actions for Service Improvements

This study has limitations of the results. First; the results are based on one tourism services, so it needs to extend in other tourism services in the country in enrichment of findings. Second; most respondents from this study were local tourist, future research might include more international visitors to get more findings. Also, perceptions of service quality in the tourism sector from other stakeholders' perspectives such as staff, guide, government, etc. should be considered. Finally, a wide study needs to extend the result of investigation.

CONCLUSION

Based on the result of SERVQUAL Score data calculation on each dimension, generally the

visitor or the customer has not been satisfied with the performance of the tourism management based on the service that they provided with the tangible dimension of 88.57%, reliability dimension of 88.76%, responsiveness dimension of 83.96%, assurance dimension of 87.85%, and the empathy dimension of 88.44%. Considering 29 service attributes with five SERVQUAL dimensions, the positive gaps which were obtained including five service attributes ranging from 0.06 to 0.37 and 24 service attributes with negative gap values ranging from -0.08 to -1.73.

The result of IPA (Important Performance Analysis) analysis showed that among 29 service attributes, there were eight items that became the main priority of the improvement that were, T5 (there are restaurants around tourist location) and T6 (directions to the tourism object are available) in the tangible dimensions, R2 (the tourist sites are easy to find) and R3 (public transport to tourist sites are available) from reliability dimensions, service attributes RE4 (officers / local residents respond immediately to requests or complaints) from responsiveness dimension, A1 (officers are expert in serving tourists) from assurance dimension, and E5 (tourism object manager and officer/citizen are very attentive to visitor requirement) from empathy dimension.

There are three strategies that can be developed to enhance the quality of services. First, upgrade physical facilities and transportation. Second, build integrated information systems. Third, develop the capabilities and competencies of human resources.

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Community Participation in Festival and Digital Tourism Campaign (Case of North Halmahera District, Indonesia)

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Abstract

Galela community participation in the implementation of the Festival Tanjung Bongo (FTB) shows the existence of a partnership pattern in accordance with pentahelix elements. This research uses a qualitative method with a case study approach to describe the level of local community participation in the preparation of Festival activities and various dynamics that occur in realizing these activities. In-depth interviews, observation, and document studies were implemented in order to generate data. The triangulation techniques were implemented as data validation techniques to obtain credible information. The results of this study indicate that the local government becomes a stimulus for community participation in the planning and preparation stage of the Tanjung Bongo Festival event, although the activity was postponed due to the refusal from the National League for Democracy Executives related to the readiness of supporting infrastructure. On the other hand, the pentahelix element of government synergy, academic, association, community, and media becomes the very essential factors in organizing the festival. Meanwhile, the level of community participation can be categorized to achieve the level of citizen control in accordance with Arnstein (1969).

Keywords: Digital Campaign, North Halmahera, Participation, Pentahelix, Tanjung Bongo Festival.

INTRODUCTION

Tourism in the precarious era shows fluctuations in tourist demand. Lise and Tol [1] show that demand for tourism products is also influenced by climate change, so the prediction of tourist visits from year to year always shows different results. Sharpley [2] provides an overview of tourist demand for rural tourism in Cyprus, where agro-tourism is one of the preferred destinations to visit. Changes in orientation and interest in tourist visits from urban areas to rural areas indicate a desire to be separated from the busy routine of office work, especially tourists with employment backgrounds in urban areas.

The development of tourism in rural areas cannot be separated from the participation of local communities to encourage economic growth. Nevertheless, the previous study showed the existence of limitations on community participation in tourism development, especially in developing countries [3]. Therefore, to accelerate the growth of the rural tourism sector, optimal local community participation is needed.

In the digital age, humans have a new lifestyle that cannot be separated from electronic devices. Technology becomes a tool that can help

most of the human needs and can be used to facilitate the task and work; technology brings human civilization into the digital era [4]. Technological developments also bring about changes in tourism marketing strategies, as well as efforts to increase the quantity and quality of tourism products and services cannot be separated from the digital era [5]. The use of technology in the marketing strategy can improve the quality of products and services offered to the consumers [6]. This shows that digital advertisement becomes effective and efficient strategies in marketing the product.

In the context of tourism, marketing of tourism products through social media becomes an effective strategy to increase tourist visits [7]. A digital advertisement is also used in marketing the hotel so as to be able to face market competition [8]. Competition in the hotel industry environment drives a change of innovation in resource management in order to be able to gain a favorable position in the market, thus digital advertisement becomes an effective strategy to compete for consumers [9]. As a service provider, hospitality determines the quality of service provided by the hotel and it affects expectations of individual values, thus digital advertising is based on market segmentation results [10]. This shows that the digital advertisement has been used by the hospitality industry as an integral part of the tourism sector.

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Openness in the digital age, providing space for individuals to access information and interact in Internet-based virtual space known as netizen. Each provider of virtual space (provider) implements rules or provides different restrictions according to the typical platform and functionality. In an effort to market tourism destinations, the existence of virtual space and netizens are seen as space and market. It can be an opportunity to promote tourist attraction objects, appeal the tourist to visit and increase tourist traffic. Meanwhile, such an effort can be achieved through a digital advertisement of tourism image in accordance with the preferences of tourists. Nevertheless, in the precarious era, there are consequences that may result in rejection or negative response from the netizens to the marketed products. Thus, the dynamics need to be studied scientifically and profoundly. Based on these considerations, the purpose of this study is to describe the community participation in a festival and digital advertisement case of North Halmahera Regency.

RESEARCH METHODS

The location of this research is North Halmahera Regency. The method used in this research is qualitative with case study approach at Tanjung Bongo Festival (FTB) in 2017 in Galela Sub-District, North Halmahera District. This study focuses on the participation of multimedia entrepreneurs for the imaging of local tourism destinations through the KASBI Community in the form of digital advertisements supporting the implementation of Tanjung Bongo Festival and the utilization of social media to convey the aspiration of Tanjung Bongo Festival's delay.

Data Collection

The data collection techniques used is in-depth interviews, observation and document studies. In-depth interviews were conducted with Higaro Multimedia entrepreneurs (HS) and Manyawa Multimedia (SRK). The discussion was held with ST and MS related to the implementation of Tanjung Bongo Festival. The document study was conducted using the Regional Tourism Development Master Plan 2011 and Regional Tourism Development Plan and Strategy 2016-2021. Meanwhile, tracing information through social media and search engines are used to provide more information about the analysis in this study. In addition, the data validation technique of triangulation was used to obtain credible information.

The data collection process is done through several approaches. In the early stages, researchers conducted a discussion with multimedia entrepreneurs in Tokuwela coffee shop and Kedai Kopi *coffee shop* about business related development and tourism in North Halmahera. Through intense communication with multimedia service entrepreneurs, the researcher seeks to identify problems and challenges in developing business as well as multimedia service entrepreneur's participation in North Halmahera's tourism development. Through multimedia service entrepreneurs, researchers are associated with coffee shop entrepreneurs and KASBI community in North Halmahera. This is an opportunity for researchers to examine information in depth related to parties involved in tourism according to pentahelix elements.

Furthermore, the researcher conducted observations at research sites and discussed with local communities who work as a provider of sea transport services to tourist sites. To ensure the accuracy of the information received, researchers clarified by tracing information in social media and news online through the development of tourism in North Halmahera specifically the Tanjung Bongo Festival. The valuable opportunity researchers have gained is the opportunity to discuss with the youth of the National Student League for Democracy Executives with the arguments against the Tanjung Bongo Festival. The debate between netizens that occurred in social media, also makes it easier for researchers to obtain information related to the development of Tanjung Bongo Festival. Thus, the information obtained can support the data analysis in this scientific article.

Data Analysis

The data analysis was carried out using triangulation, namely a comparative approach to the results of observations, in-depth interviews, and document studies. In order to obtain valid data, the depth of data is required. Therefore the research process takes a long time in order to conduct the interviews, observation, and study of documents. In the context of this research, the process of data collection is done not only in a formal but also by the non-formal way, which means through family or kinship approaches. Thus, researchers try to build good relationships first so that the data obtained is not only from

the surface but from deeper and more trustworthy sources.

RESULT AND DISCUSSION

Digital Tourism Campaign in North Halmahera

The Multimedia and Multigrade Business Entrepreneurs not only make videos or take pictures for personal gain, but they also documented the potential of regional tourism and advertisement in social media for the promotion of tourism destinations in North Halmahera. This shows the existence of communication strategies in the digital age to introduce and promote the resulting product. In the social context of strategy, promotion of products on social media is an integration for the relationship between the company and the consumer can be well established [11]. Social media is an online medium in which its users can easily participate, share and create content including blogs, social networks, wikis, forums, and virtual worlds, even used as a promotional tool because it has a direct connection with its users [12]. Thus, the digital advertisement of tourism image in the precarious era becomes an effective strategy to introduce tourism products in an area to tourists.

Manyawa Multimedia Entrepreneurs has produced a number of works in the form of videos and photos about the existing condition of tourism in North Halmahera in social media promotion. The experience of producing works to promote North Halmahera tourism has started since 2011, as well as expertise in the field of visual communication design is supported by the background of entrepreneurial studies. The profession as a photographer or videographer is run professionally to raise awareness about the value of an artwork. Interpersonal influence and word-of-mouth (WOM) is ranked the most important information source when a consumer is making a purchase decision [13]. These influences are especially important in the hospitality and tourism industry, whose intangible products are difficult to evaluate prior to their consumption. This shows that digital advertisement and promotion play an important role in increasing tourist visits to tourism destinations. As for some of the works of Manyawa Multimedia can be seen in Figure 1.

Figure 1 is some work produced by Manyawa Multimedia entrepreneurs related to digital advertisement of tourism image of North Halmahera. In addition, Higaro Multimedia entrepreneurs also produced a number of works

on travel experiences to cultural portraits of local communities as an integral part of the tourism sector. As for, some of the works of Higaro Multimedia can be seen in Figure 2.



Figure 1. Manyawa Multimedia's Works in North Halmahera Tourism Imagery (Source: Manyawa Multimedia, Stive Recaldo Karimang Facebook Profile, 2018)



Figure 2. Higaro Multimedia's Works in Regional Tourism Imagery (Source: Higaro Multimedia, Enda Cafarunerz Facebook Profile, 2018)

Figure 2 is documentation of Higaro Multimedia business travel. This shows the existence of a digital campaign to promote tourism through personal experience [14]. Tourism marketing through personal experience documentation form is the most effective

imaging strategy [15]. This shows that each multimedia entrepreneur has their own way of advertising tourism in North Halmahera.

Raja Ampat Miniature: Doro Somola Beach (Tanjung Bongo)

Social media plays a significant role both on the demand and on the supply side of tourism [16]; allowing the destinations to interact directly with the pre-visitors via various internet platforms that allow them to monitor and react on visitors opinions and evaluations of advertised services. In Indonesia, especially on North Maluku Province, North Halmahera District, Doro Somola or *Tanjung Bongo* Tourism Destination began to become a trend in social media since 2016. It can be seen from the documentation of tourism brand advertised in social media.

On December 6th, 2016, *blog.reservasi.com* published a travel experience to Tanjung Bongo under the title of *Small Raja Ampat Replica from North Halmahera*. On January 8th, 2017, *jalamalur.com* participated in promoting the natural beauty of Tanjung Bongo by releasing an article titled *Doro Somola, Miniature Bair and Raja Ampat in Galela*. On the same date, *newtampanuli.com* also released a news story titled *Similar to Raja Ampat, Tourist Flood* that shows the natural beauty of Tanjung Bongo. On January 31st, 2017, *lifestyle.okezone.com* released an article titled *Miniature Raja Ampat, Apparently in North Halmahera*. On February 12th, 2017, *i-news TV* released the news entitled *Tanjung Bongo in Halmahera as Raja Ampat Miniature*.

Furthermore, Tanjung Bongo became a trend in social media; it attracts domestic and foreign tourists to visit the location. In addition, tourists visiting Tanjung Bongo also advertised Tanjung Bongo in the form of a private video. This shows the imaging of tourism destinations through technology information as a tourism promotion strategy of North Halmahera.

Partnership in Preparation of Tanjung Bongo Festival

Cross-border partnership in tourism resource management laying the groundwork for sustainable management of cross-border tourism resources [17]. Partnerships in planning for regional development can bring together stakeholders representing interest at national, regional, and local geographical scales [18]. On July 13th, 2017, the Local Government of North Halmahera Regency through the Department of Tourism conducted a digital advertisement of

festival organizing in indotimur online media. The information circulated online with news theme *North Halmahera government will organize Canga Festival and Wonderful Halmahera Festival* that include the statement of Joice Betsy Mahura as Head of Department of Tourism about the planning of the festival. On November 7th, 2017, *Beritadaerah.com* announces different information with the theme of North Halmahera Regency Preparing for Tanjung Bongo Festival (FTB). This indicates a change in the festival plan as published in July.

Festival Tanjung Bongo (FTB) is a cultural festival that will be held on December 7th-9th, 2017 has the purpose of digging and lifting back the values of the local culture. In addition, the FTB is organized as an effort to promote regional tourism (destination branding). The brand becomes a differentiating factor of products or services and has a psychological and symbolic significance for the consumer, so the festival becomes one of the efforts to overcome the crisis of tourist confidence in a region [19]. Nevertheless, the organization of the festival should pay attention to the management capacity associated with the availability of qualified human resources [20]. This indicates that the festival as an effort to promote tourism destinations become an effective strategy in instilling good regional tourism image to tourists.

Although the condition of festival management capacity in terms of human resource availability is also important to consider for the successful implementation of the festival and the achievement of targets or implementation targets festival. In preparation for the festival, the Local Government through the Department of Tourism coordinates with the community to be involved in the festival. Documentation of the coordination meeting of the Tanjung Bongo Festival can be seen in Figure 3.



Figure 3. Coordination with Local Communities (Source: Fanpage Festival Tanjung Bongo, 2018)

Figure 3 is a coordination meeting of Tanjung Bongo Festival at Galela District Office on 12 October 2017. In addition, Raisus Banau Force and the local government planned through the Department of Tourism, also provide full support

of the implementation of the Festival Tanjung Bongo. On November 5th, 2017, local communities participated in the construction of supporting tourism facilities and infrastructure by building road access and bathroom facilities for tourists. Meanwhile, the documentation of community participation in preparation for FTB implementation can be seen in Figure 4.



Figure 4. Community Participation in the Preparation of Tanjung Bongo Festival (Source: Fanpage Festival Tanjung Bongo, 2018)

Figure 4 shows the presence of community participation in the preparation of the Tanjung Bongo Festival (FTB). In addition on November 17th, 2017, students practiced *Tokuwela* dance which will be displayed in the FTB. Meanwhile, the documentation of community participation in preparation for the implementation of FTB can be seen in Figure 5.



Figure 5. Participation in the Preparation of Tanjung Bongo Festival (Source: Mikdar Ramly Pinoke Facebook Profile, 2018)

Figure 5 shows the participation of students in preparation of the FTB to perform a traditional dance called *Tokuwela*. The *Tokuwela* dance is a traditional dance that requires more than 20 dancers, while *tokuwela* songs accompany the formation of the dancers lining in two rows facing each other while holding hands, then a child will walk on their hands. This dance reflects local cultural values to live with mutual support for one another. The preparation of the festival cannot be separated from the participation of multimedia entrepreneurs to create Tanjung Bongo Festival advertisement. In addition, the preparation of the FTB cannot be separated from the participation of KASBI community and CB community. Meanwhile, one of the forms of participation can be seen from the work of FBT advertising on social media in Figure 6.



Figure 6. Tanjung Bongo Festival Advertising (Source: Fanpage Festival Tanjung Bongo, 2018)

Figure 6 is an FTB advertising video involving a number of parties (multimedia entrepreneurs, Kasbi community, observers of Halmahera North tourism). This shows the awareness of the community that encourages participation in the preparation of the festival to increase tourist arrivals to North Halmahera. In addition, academic participation in the preparation of FTB can be seen from the willingness of Prof. Thamrin Amal Tomagola as a national figure from Galela, as the presenter at the cultural seminar with the theme of Local Culture Revitalization (*Menggali Kembali serta Melestarikan Nilai-Nilai Akar Budaya Bangsa*) on November 29th, 2017. Cooperation between various stakeholders in tourism in preparation of festivals shows the existence of pentahelix government, academia, associations, media, and community), as in figure 7.

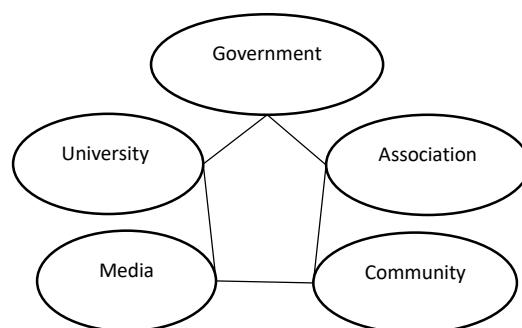


Figure 7. Elements of Pentahelix in Preparation of Tanjung Bongo Festival

Figure 7 shows the existence of partnerships in preparation for the Tanjung Bongo Festival. The Local Government, through the Department of Tourism, coordinates with the Indonesian National Army, KASBI community, CB Community, Academic Organizations and local communities to work together in the implementation of Tanjung Bongo Festival. The partnerships formed can facilitate the process of achieving the goal of festival implementation [21,22]. Partnerships are able to expand access to tourism information potential in remote areas

[23]. In addition, established partnerships can raise public awareness of the environment in tourism development [24], and enhance ownership of tourism resources [25]. Partnership becomes the most effective strategy in marketing tourism destinations [26]. Thus the benefits of partnership can be seen in the preparation of the FTB to achieve sustainable tourism and community-based.

Tourism Policy Supervision

Tourism policy plays a role as important guidance in implementation process [27]. However, destination management organizations need to encourage tourism organizations to design and implement tourism marketing plans with a view in enhancing collaboration and partnerships in a destination [28]. This shows that collaborative advantage in tourism policy implementation and supervision are important. Society as the subject in development, have freedom of expression and oversee the performance of Local Government as executor of public policy. On October 30th, 2017, Radar Halmahera print media reported LMND's rejection of FTB activities. The National Student League for Democracy (LMND) and Jarod Community in Tobelo rejected the Tanjung Bongo Festival because it was judged to be impartial to people's economy. According to LMND, the budget of IDR 627,830,000 would be more appropriate if used for infrastructure development in a number of North Halmahera tourism destinations. Meanwhile, the statement of Karlos Dodongko as Executive LMND chairman in Tobelo gave the following statement:

"Tanjung Bongo has never been touched by tourism development and development projects. But, suddenly planning to hold a festival with a budget of IDR600 million for ceremonial events. This is like the rubbish event such as Wonderful Talaga Paca some time ago. We consider this activity to arrive at a reasonable time, so it must be rejected. The local government of North Halmahera and the competent agency (Tourism Department) should evaluate the activities of the new Talaga Paca in 2016."

This statement clarifies that it has not been easy to develop tourism destinations as it demonstrates in Bali. Tourism development must be natural, however, it finds any errors that need wise response [29]. Meanwhile, one of the Jarod Tobelo Community presidents, Stevan Tindage in Radar Halmahera News said that:

"Tanjung Bongo is well known to local tourists without any promotion by the North Halmahera's Department of Tourism. So that the impetus should be done by the Local Government is to build the facility, so that it has value to attract tourists to come to tourism said objects that can sustain Micro, Small, Medium Enterprises and transportation services as well as to increase the income. If the Department of Tourism wants to make Tanjung Bongo Festival as a promotional event, it must be ensured the readiness of infrastructure facilities in Tourism Strategy Area (KSP) Galela and Loloda as already mentioned in North Halmahera Tourism Master Plan known as RIPPDA 2011. Promotion activities are not only presented to local communities and stakeholders of North Halmahera. However, it can provide the impact of national and foreign stakeholder income. Various studies have been conducted to conclude that such activities are not feasible to be implemented this year."

Internal conflicts in tourism development can occur, one of the causes is the struggle for economic opportunities as a result of tourism development [30]. Nonetheless, conflicts can occur due to lack of infrastructure as well as the existence of coercive elements of organizing festivals. On November 3rd, 2017, Radar Halmahera published the news under the title *Tanjung Bongo Festival Disturb the North Halmahera's Department of Tourism* that shows the internal debate of the Department of Tourism related to the implementation of the festival. The news content cites the views of Jhon Anwar Kabalmay as follows:

"The existing construction facilities provided only a toilet, this does not make sense. Then what will be promoted? Which is certainly very embarrassing for the organizing committee because there is no preparation and preparation from the committee itself. So far the implementation of the festival that was made seemed to scattered regional government budget. For example is Wonderful Talaga Paca Festival, after the implementation of the event, there are no tourist visits the site. Even, supporting facilities were destroyed everywhere."

Rejection of the tourism sector is not only related to local wisdom maintaining but concerning regional tourism imaging [31]. On November 5th, 2017, the refusal to organize the Tanjung Bongo Festival campaigned in the form of a demonstration in front of North Halmahera

Regent's Office. Meanwhile, the documentation of the demonstration of FTB's rejection by the Jarod Community and the National Student League for Democracy (LMND Eks) the executive of Tobelo city can be seen in Figure 8.



Figure 8. Demonstration of Tanjung Bongo Festival Rejection (Source: Stevan Tindage Facebook Profile, 2018)

Figure 8 shows the presence of public scrutiny of public policy. On November 23rd, 2017, a letter of deferment of FTB activities that have not been signed or stamped was leaked on social media. The letter was about the postponement of activities until May, considering the inadequate infrastructure. The circulation of the letter to social media raises a number of debates between the pros and cons of the FTB. This indicates a problem of internal coordination of activity organizers of tourism policy implementers. This indicates that resources, coordination, disposition of implementers and bureaucratic system in the process of implementation of tourism policy must be optimized [27]. Thus, the internal problems of the Local Government Work Units can be solved before they become public issues.

Digital Promotion: Implications of Tanjung Bongo Festival Delay on Regional Tourism Branding

The implications of digital advertisement on social media affect the regional tourism branding specifically the performance of the Department of Tourism [32]. This shows the challenges in building a competitive advantage [19]. Thus it can be seen that digital advertisement not only show the benefits in product marketing strategies or services in the field of tourism but vice versa. In the context of the FTB, on November 24th, 2017, the online media *tabloidkontras.com* releases news with the title of *Towards FTB, a number of Infrastructure Almost Completed* by mentioning the statement of Husni Amal as chairman of the local committee of Festival Tanjung Bongo, related enthusiastic attitude of citizens in preparation of FTB implementation as follows:

"Because the field tends to have rocky surroundings, the first thing to do is building access such as a road. In addition to the footpath, the local committee also made some stairs at the boat moorings to Tanjung Bongo hill that tourists often visit to take pictures. About 6 (Six) toilet facilities are provided by the local community through mutual assistance"

This shows the high spirit of the community in participating actively in organizing FTB. Subsequently, on November 25th, 2017, *Kantorberita.id* released news entitled *North Halmahera Government suddenly foiled the Festival* which showed that the reason for FTB's delay was irrational. On the same date, *Kabarmalut.com* released the news under the title *Local Community Resistance as Festival Procrastination impacts*, which is shown with various netizen comrades related to the performance of local government.

Festival is emerging worldwide as a growing and vibrant sector of the tourism and leisure industries and are seen to have significant economic, socio-cultural, and political impacts on the destination area and host groups [33]. However, the level of participation of the local community is important. On 26th November 2017, *kantorberita.id* published the news under the title *Tanjung Bongo Festival Delay, Muhtar: This Increases the Accumulation of Resistance*, by citing Muhtar Adam as an academician of Khariun University in Ternate and shows the performance of the local government that is not optimal. On November 27th, 2017, the Executive Committee of Tanjung Bongo Festival went to North Halmahera Regent's Office to request an explanation regarding the festival's postponement. On 28th November 2017, *Kabarmalut.com* reported the reasons for the cancellation of the festival based on a press conference with the Regent of North Halmahera and the Regional Secretary. Frans Manery as North Halmahera Regent explained that the delay of FTB until May 2018 due to FTB supporting facilities has not been maximal yet, FTB is also not accommodated in the Budget Work Plan (RKA) this year, so it should be allocated in regional government budget on 2018.

Meanwhile, Fredy Tjandua as the Regional Secretary explained, initially North Halmahera Regency Government will hold Canga Festival to Raja Ampat Regency. However, due to various considerations, these activities should be postponed and diverted to FTB activities with the

record that all aspects of FTB support have been maximal, especially supporting facilities and infrastructures. The final condition according to survey results in several locations shows that the supporting facilities and infrastructures are not optimal yet. Delayed FTB activities that seem impromptu, have implications for local communities. Digital media campaigns related to FTB delays lead to a netizen debate on social media. Meanwhile, the pro and contra symbol of FTB implementation can be seen in Figure 9.



Figure 9. Symbols of Pros and Cons of FTB (Source: Stevan Tindage and Stive Karimang Facebook Profile, 2018)

Figure 9 shows the pros and cons of organizing the FTB on social media. The delay in FTB implementation affects the perceptions of the people who have participated in the preparation of the FTB. Nevertheless, the community strives to keep the FTB organized according to the schedule set. Following a meeting with the local government on 27th November 2017, local committee chairman Husni Amal invited the community to a meeting on 28th November 2017 at Terminal at 20.00 WIT (Eastern Indonesian Time) to discuss the results of the meeting with the local government as well

as to discuss the preparation of the FTB implementation.

The result of the meeting culminated in an agreement to continue to hold the FTB on 7th to December 9th, 2017. On December 7th, 2017, Kabarmalut.com released the news entitled *Residents Disappointed with Local Government*, then on December 8th, suaraindonesia-news.com released the news with the title of *Tanjung Bongo Festival Success held from voluntary fund* which shows that FTB delays unilaterally make people again uphold the cultural values of *bari* and *lean* (mutual assistance). The form of digital advertisement of a number of online media can be seen in Table 1.

Table 1 represents a number of media promoting the festival management, delays in festivals up to local government up to the success of FTB implementation by local communities. This shows that digital campaigns in addition to providing positive benefits also have the opposite effect. Through the number of online media that preach the development of the implementation of FTB, internal organizational problems can be a public problem because of access to information through electronic or online media. In addition, potential conflicts are vulnerable to provocative media coverage without credible sources of data or information. Therefore, the published news content needs to be carefully reviewed by the reader so as not to lead to unsuccessful understandings that lead to conflict and worsen the image of regional tourism. Therefore, a collaborative management model [34] is required.

Tabel 1. Tanjung Bongo Festival Digital Campaign

Online News	Published Date in 2017	News Entitled	Resources
Indotimur.com	13 th July	Pemkab Halut Goes to Canga and Wonderful Halmahera Festival	Joice Betsy Mahura (Head of Tourism Office)
Kabardaerah.com	7 th November	North Halmahera Ready to Hold Festival Tanjung Bongo	
Tabloidkontras.com	24 th November	Ahead of FTB Some Infrastructure Almost Completed	Husni Amal (Chief person FTB)
Kantorberita.id	25 th November	Local Government Halut Suddenly Foiled Tanjung Bongo Festival.	Fredy Tjandua
Kabarmalut.com	28 th November	This is the reason for the Regent Halut Cancel FTB	Frans Manery and Fredi Tjandua
Antaramaluku.com	30 th November	Regency of North Halmahera Delays Tanjung Bongo Festival	Fredy Tjandua
Halmaheraraya.info	2 nd December	Tanjung Bongo Festival Stay held	Husni Amal (Chief person FTB)
Halmaheraraya.info	3 rd December	State Officials to Attend Tanjung Bongo Festival	Muhammad (Pune Villagers)
Kabarmalut.com	7 th December	Disappointed Residents of Tanjung Bongo Festival Not attended by Halut Officials	
Issuu.com/Malutpost	8 th December	Opened by the Governor, Halut Officers Are Not Invited	Husni Amal (Chief person FTB)
Suaraindonesia-news.com	8 th December	Tanjung Bongo Success Festival is held from Voluntary Fund	
Liputantoday.com	9 th December	All Bikers Celebrate Festival Tanjung Bongo Galela 2017	Head of Motor Club North Maluku

Level of Participation in Tanjung Bongo Festival

The value of local culture known as *bari* and *lelean* (mutual assistance) among the Galela community becomes the determining factor of FTB implementation. The existence of cultural values in the implementation of the FTB shows that local expertise can be a patron of tourism development [35]. On the other hand, on December 7th, 2017. The opening of the festival is marked by drum band attractions and cultural attractions *Tokuwela* (Fig 10).



Figure 10. Festival Tanjung Bongo 2017 (Source: Wie Ismail, Yesaya Banari and Jovandry Pangkey Facebook Profile, 2018)

Figure 10 shows the existence of community participation in the implementation of FTB. On December 9th, 2017, *liputantoday.com* released the news with the title *All Bikers Celebrate Festival Tanjung Bongo Galela 2017*. This shows the support and participation of the community during the implementation of FTB. The level of community participation is stratified according to the gradations of power that can be seen in the process of decision making, implementation and enjoying results until evaluation [36]. The level of participation in question consists of eight levels: influence, therapy, informing, consultation, placation, partnership, delegated power and citizen control.

In the context of community participation in Galela, it can be seen that the level of participation is in the level of citizen control involves the people to plan, implement, evaluate and supervise the activities of Tanjung Bongo Festival and do not depend on the local government. This can be seen from the information published by *Suaraindonesia-news.com* dated December 8th, 2017 with the title of news *Festival Tanjung Bongo Successful held from voluntary fund* that shows the festival held successfully without the help of local government. The sustainable tourism can be achieved by the participation of the community through mutual cooperation, thus the

community does not depend on the government in development but become independent in development [37]. Mutual assistance in the context of Galela community is the use of network, trust and cultural values of *beri* and *lelean* to achieve development goals. It shows the role of social capital in achieving the success of development [38]. Social capital becomes the center so that challenges in tourism development can be faced together [39]. In addition, the benefits of tourism development can be enjoyed by the community evenly [40,41]. Thus it can be seen that the level of community participation in the planning, implementation and evaluation of activities is also determined by social capital to face various challenges in tourism development.

CONCLUSION

The results of this study indicate that the local government becomes a stimulus for community participation in the planning and preparation stage of the Tanjung Bongo Festival event. Although in the end, the activity should be postponed due to the rejection of the festival by the National League for Democracy (LMND) executives related to the readiness of supporting infrastructure. The rejection of the Tanjung Bongo Festival and the decision of the Regional Government to delay the implementation of the activities have implications for the community's trust or the relationship between the local government and the Galela community. Nevertheless, the community partnership take advantage of local cultural values known as *beri* and *lelean* to realize the festival. In the preparation of the festival, it can be seen that there is a partnership pattern according to the pentahelix element that is government synergy, academic, association, community and media in the imaging of regional tourism through FTB activity. Communities have media support and other tourism stakeholders. However, the level of community participation can be categorized as the level of citizen control in accordance with the eight levels of Arnstein because of the community's independence in planning, implementing and evaluating the activities. Thus it can be seen that policies, partnerships and participation are essential factors in the implementation of community-based tourism development in North Halmahera.

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Community Structure of Coral Reef at Pasir Putih Beach in Situbondo East Java, Indonesia

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Abstract

Pasir Putih beach of Situbondo has coral reefs resources to support ecotourism program. The purpose of this study is to evaluate the structure of coral reef community in *Pasir Putih* beach. This study was taken place at four sites namely; *Batu Lawang*, *Teluk Pelita*, *Karang Mayit*, and *Karang pon-pon*. Method used was *Ex Post Facto* using belt transect sampling technique with size 1x1m and length 30m and 11 times repetition. The observed physic-chemistry parameters are temperature, salinity, conductivity, pH, turbidity, DO, nitrate, and orthophosphate. The results showed that the four sites almost have the same conditions. *Batu Lawang* location is dominated by *Porites mayeri* (Poritidae) which is vulnerable to severe conditions. The second location (*Teluk Pelita*) has a high index value of diversity. The third location (*Karang Mayit*) is dominated by Poritidae family. The fourth location (*Karang Pon-pon*) is dominated by the Acroporidae family which is a clear water indicator and has a fast growth rate. However, in the fourth location, the sedimentation is quite high compared to other sites. The value of abiotic factor in the *Pasir Putih* beaches of Situbondo has a relatively normal value, the pH of value from 7.55 to 7.56, temperature 29.99°C to 30.4°C, salinity 32.33 to 32.66 ‰, conductivity 37.8 to 40.2 $\mu\text{S}\cdot\text{cm}^{-1}$, DO 7.73 to 10 ppm, turbidity 0.57-1.56 NTU, nitrate from 0.32-0.1 $\text{mg}\cdot\text{L}^{-1}$ and orthophosphate 0.02 to 0.54 $\text{mg}\cdot\text{L}^{-1}$, the water in *Pasir Putih* Situbondo was still suitable for support the growth of coral reefs.

Keywords: Coral Reefs, Community Structures, *Pasir putih* Beach.

INTRODUCTION

Pasir Putih beach of Situbondo is marine tourism located in Sub-district of Bungatan, Situbondo Regency, East Java. This beach has easy accessibility because the road to the beach could use public transport or private vehicles, with easy access would invite many visitors who will come to the *Pasir Putih* beach of Situbondo.

There are some activities that visitors do when visiting *Pasir Putih*, for example traveled, swimming, boat tours, snorkeling, and diving. Some researchers argue that diving is one of the causes of the existing ecological damage in the marine waters [1]. Divers who use photography tools could cause more damage to the coral reefs [2].

Reviewing the diving and snorkeling activities in *Pasir Putih* beach of Situbondo, there is the existence of the availability of beautiful and exciting undersea natural scenery. For examples the condition of coral reefs, fish, and other marine animals. Previous research at the beach of Situbondo suggested that there were 11 species with the index value of diversity ranging from 1.17 – 2.33 [3]. The value was categorized as moderate.

Another research stated that the percentage of coral cover at the location of *Batu Lawang* 32.48%, *Teluk Pelita*, and *Karang Mayit* 23.30%, and *Karang Pon-pon* was 27.47% [4]. *Batu Lawang* and *Karang Pon-pon* are classified as moderate, whereas *Teluk Pelita* and *Karang Mayit* are classified as poor condition. Based on these facts, it is proven that coral reefs are fascinating to examine and it is urgently needed to monitor its ecological damage.

Coral reefs are marine ecosystems composed of a group of coral animals that form calcium carbonate or a kind of limestone. Coral reef ecosystems have biological, aesthetical and cultural benefits, but these ecosystems begin threatened, mainly in areas with large human populations. Excessive exploitation causes coral reefs vulnerable to climate change nowadays [5].

Coral reefs are attractive because they have unique shape, have very low mobility, as other animal habitats [6]. Coral reefs can also be an essential indicator to describe the quality of waters ecosystem in the site; whether it is good or not [7]. Therefore, this research is vital to find out the profile of coral reef community structure in relation to seawater quality at *Pasir Putih* beach of Situbondo with four location; *Batu Lawang*, *Teluk Pelita*, *Karang Mayit* and *Karang pon-pon*.

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RESEARCH METHODS

Study Site

This research was conducted on October-December 2017 at *Pasir Putih* beach of Situbondo (Fig. 1). The study conducted at four sites sampling location, the location I namely *Batu Lawang* ($7^{\circ}41'40, 99^{\circ}S$, and $113^{\circ}49'21.70^{\circ}E$). This location has many human activities, for example, hotel construction dominates this area. Several mangrove plants could be found and shipping activity only for research. Location II is *Teluk Pelita* ($7^{\circ}41'22.89^{\circ}S$ and $113^{\circ}49'42.85^{\circ}E$). This location has the most visitors. There are also hospitality, stalls selling typical souvenir of *Pasir Putih* beach. Location III is *Karang Mayit* ($7^{\circ}41'17.08^{\circ}S$ and $113^{\circ}49'48.09^{\circ}E$). At this location, there is a dock and a conservation monitoring post. Fishing activities are most dominant in this area than in the first and second locations, and there are resident settlements after the monitoring post. Location IV is *Karang Pon-pon* ($7^{\circ}41'6.58^{\circ}S$ and $113^{\circ}50'6.01^{\circ}E$). At this location, there are no activities, only the mangrove forest, and partially trees.



Figure 1. Map of Pasir putih Beach of Situbondo

Sampling Method

This research using *Ex post facto* method namely examining unmanipulated cause and effect [8]. Sampling technique in this research using belt transect. Belt transect is installed parallel to the coastline. It is aimed to know the difference of community structure or species distribution pattern between/inter-zones in the coral reef [9].

Data Collection

Waters quality parameters data retrieval (physic-chemistry) including temperature, salinity, conductivity, turbidity, nitrate, orthophosphate, pH and DO. The measurement analyzed in Ecology Laboratory at Faculty of Mathematics and Natural Sciences, University of Brawijaya.

Coral reef data retrieval used a belt transect method, using a 1x1 m plot size with a distance of 2m per plot, with the number of plots 11. In each

plot, we expanded the strings then divided into four sections for easy identification.

Coral reef data was taken using transect photographs. There was five times photo for each plot. The first photo namely the whole plot photo. The second photo is a photo of each box in the plot. One plot is divided into four section boxes. After retrieving the data using transect photographs, coral reefs were identified by the book of Indonesian Coral Reef [10].

Data Analysis

Coral reef data calculated and tabulated using Microsoft Excel to determine IVI (Importance Value Index) and Diversity Index (Shannon-Wiener Index). Analysis of seawater quality use One-way ANOVA ver 16 to determine the difference test between sampling sites. Biplot analysis was used to determine the correlation between parameter factors, then cluster analysis was used to determine the similarity in the four sampling locations using the PAST 3 program.

RESULT AND DISCUSSION

Community Structure of Coral Reefs

Coral reefs in the *Pasir Putih* beach of situbondo from the four sampling sites found as many as nine families namely Acroporidae, Agaciidae, Astrocoeniidae, Faviidae, Fungiidae, Pocilloporida, Poritidae, Caryophylliidae, and Siderastreidae with 39 number of species.

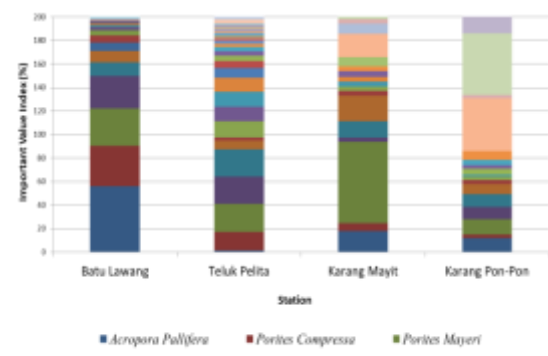


Figure 2. Importance Value Index of Coral Reef at *Pasir Putih* beach of Situbondo

The composition of coral reefs (Fig.2) at the first location namely *Batu Lawang* indicates the existence of *Acropora palifera*. Wherein this Acroporidae (Fig. 3) family was stated usually exist in clear waters, it has a fast growth rate, susceptible to sedimentation and fishing activities [11]. At this location, there are a lot of human activities, i.e. building a hotel before this location. There is also mangrove forest nearby.



Figure 3. Acroporidae Family

Teluk Pelita has a diverse composition. No dominating species was found. This second location has nice water, although this area had the most visitors and other activities (hotels, stall, boat tours, and snorkeling). *Karang Mayit* location dominated by *Porites mayeri*. The Poritidae Family (Fig. 4) is usually able to survive in poor waters, turbid water conditions, and high sedimentation. Besides that, it can live in various habitats; sandy, muddy, or broken corals [12].



Figure 4. Poritidae Family

At the third location, there are fishing activities that are often seen, the dock and boat tours. The last location *Karang Pon-pon* location dominated by *Acropora* spp and *Leptoseris scabra*, which belong to the family of Acroporidae and Agariciidae, respectively. At this location, higher sedimentation occurred compared to the other three sites. At this location, almost 95% of the site is filled with forests, only a few were established buildings, and the buildings were already unused.

Various things can cause damage or decline of coral reefs in a region, one of which is the sedimentation [13]. Sedimentation is often associated with coral reef damage, lack of light penetration, the existence of small waves, and currents influences, which may cause sediments on coral reefs uncleaned and this causes the growth of coral reefs inhibited [14].

Based on Shannon-Wiener Index value (Fig. 5), the first location indicates medium diversity with the value of 2.98. The value of *Taxa Richness* 15 is

due to the dominant species namely *Acropora palifera*, wherein this species can survive in clear waters [11]. One of the factors that make the *Acroporidae* (Fig. 3) family grow in these waters is the existence of mangrove forests which partly contribute to the state of the aquatic ecosystem around [8].

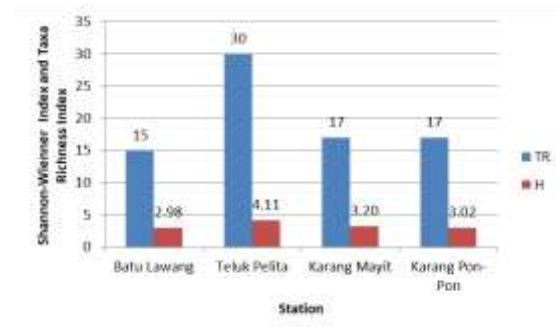


Figure 5. Index Shannon-Wiener (H') Index Value and Taxa Richness (TR)

Batu Lawang shows the value of 4.11, which is classified with high diversity. Despite its high diversity, the value of *Taxa Richness* reaches 30. However, the species found in this location does not indicate species that can survive in clear waters, but the species that survive in a tolerant state such as the species of *Porites Mayeri* and *Porites compressa* belong to Poritidae (Fig. 4) family. It is susceptible to poor environmental conditions and able to survive on all substrate types. At this location, there are various human activities, for example, boat tours, snorkeling, docks, and swimming. These various human activities that carried out can lead to the decreased growth of good corals.

Karang Mayit shows the value of 3.20 included in the category of high diversity level with the value of *Taxa Richness* 17. Meanwhile, at the last location, *Karang Pon-Pon* has a value of 3.02. This location has the same *Taxa Richness* as *Karang Mayit*, with a value of 17. Seen that there is high sedimentation along the coastline at *Karang Pon-Pon*, this shows that corals can not grow well [10]. Sedimentation occurs due to several factors in unstable natural conditions, which also lead to sedimentation, for example, erosion, reduced light penetration, and the entry of freshwater into the oceans [15].

The Dominance Value Index (Fig. 6) from *Batu Lawang*, *Teluk Pelita*, *Karang Mayit*, and *Karang Pon-Pon* are 0.16, 0.07, 0.18, and 0.18, respectively. This value shows a low partial dominance value index because it is less than 0.4.

The highest Evenness Value Index is *Teluk Pelita* for 0.75. This is in accordance with the land use map wherein *Teluk Pelita* is the least experience of sedimentation than other locations. This affects the life of surround coral reefs, considering the condition of sedimentation decline that can accelerate the growth of coral reefs [15]. *Teluk Pelita* high evenness value index (Fig. 4) comparable to the highest human activity as well. Human activities do not affect the structure of coral reef community around it, this is inversely proportional to the research of Toyosima [2] which said that the higher human activity around the coast can decrease or damage the existing coral reef ecosystems. In research at *Pasir Putih* beach of Situbondo, this possibility of human activity does not affect the coral reefs due to several causes, for example, sedimentation is declining at *Teluk Pelita*, a place that was originally good for coral growth, and other natural factors.

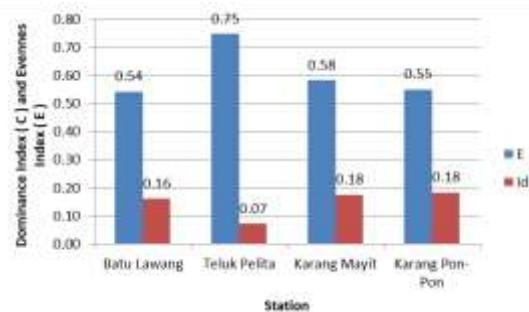


Figure6. Dominance Value Index (Id) and Evenness Value Index(E)

Water Quality

Environmental factors are the most critical limiting factor for coral growth. Changes in the physic-chemistry factors of water will have an impact on changes in the composition and relative abundance of an organism living in an aquatic ecosystem [16], so that this condition must be kept for the balance of an ecosystem.

Abiotic factors at the *Pasir Putih* beach of Situbondo shown in Table 1. The temperature at the four locations has a range between 29.99°C-30.43°C. This value indicates that there is a

temperature range which is good for the growth of coral reefs, good coral growth between a temperature of 25°C-31°C [17]. Salinity value at these four research sites is in the range 32.66-32.33 ‰. This value indicates that in this salinity, the coral reefs are still able to live well, according to Suharsono [10], coral reef will grow well at the salinity range 27-40‰, but best in the normal salinity of the sea that is 36‰.

Conductivity is the ability of water to conduct electricity; the higher the conductivity value, the more ions contained in these waters [18]. The highest conductivity value is in the *Teluk Pelita*. The high value of conductivity can be due to the many activities of the people there, such as bathing so that the number of ions contained in the water increases [14].

The acidity (pH) in water measured by the number of hydrogen ions. The more hydrogen ions then the acidic the waters become, and vice versa [19]. The pH values at the four sampling sites ranged from 7.55 - 7.56. Under such conditions, including the normal pH for the organism to survive. If the pH is in very acidic or very alkaline conditions, it will affect the metabolism and causes respiration disorders [20].

Turbidity is a measure to the extent that light can penetrate water. If a waters experience high turbidity, it will prevent the penetration of sunlight into the seawater. If this happened, the rate of photosynthesis on coral reefs will decrease this may lead to a decrease in growth rates on the coral reefs [21]. Turbidity values in the four sites ranged from 0.57-1.56 NTU. There is no provision for good turbidity values for healthy coral reefs. In normal conditions, the value of turbidity is < 1 NTU, but in storm conditions coral reefs can tolerate aquatic turbidities > 100 NTU [22].

Dissolved Oxygen (DO) is the amount of dissolved oxygen in an aquatic ecosystem. A good DO value for coral growth ranged from 6.5mg.L⁻¹, the highest DO value at *Karang Mayit* reaching 10.6 mg.L⁻¹, *Karang Pon-Pon* value for 9.26mg.L⁻¹. The higher the value of the DO, then waters became much better because many organisms require oxygen and vice versa [23].

Table 1. Water Quality physics - chemistry

Location	Temp (°C)	Salinity (‰)	Conductivity (µS.cm ⁻¹)	Parameter				
				pH	Turbidity (NTU)	DO (Ppm.‰ ⁻¹)	Nitrate (mg.L ⁻¹)	Orthophosphate (mg.L ⁻¹)
Batu Lawang	29.9	32.26	37830	7.56	1.56	7.73	0.11	0.05
Teluk Pelita	30.76	32.33	40230	7.55	0.57	7.6	0.32	0.02
Karang Mayit	30.67	31.9	36900	7.57	0.62	10.6	0.18	0.54
Karang Ponpon	30.43	32.33	20710	7.56	1.04	9.26	0.1	0.03

The nitrate level on *Karang Pon-Pon* shows range value between 0.1-0.32 mg.L⁻¹. This value is categorized that the concentration of nitrate in the waters at *Pasir Putih* beach in Situbondo is still good, because nitrate content/level in normal sea waters ranges from 0.01-0.50 mg.L⁻¹ [24].

Orthophosphate levels on *Karang Pon-Pon* are in the range 0.03-0.56mgL⁻¹ indicates that the value is still on the standard limit, the value is good enough for the growth of an organism [25]. The higher the value of phosphate, the more nutrients, both derived from the decomposition of sediments and organic compounds derived from the dead bodies of flora fauna. Low phosphate levels can also be caused by intensive phytoplankton activity [26].

Biplot analysis (Fig.7) is used to determine the correlation between factors. *Batu Lawang* and *Karang Mayit* have a high value of orthophosphate, pH and DO (dissolve oxygen). That meaning high value is range normal to the growth of coral reefs, while Taxa Richness value is low. *Teluk Pelita* has a highvalue of diversity index, Uniformity Index, Nitrate, and Conductivity while the DO (dissolve oxygen) value and the Dominance Value Index is low.

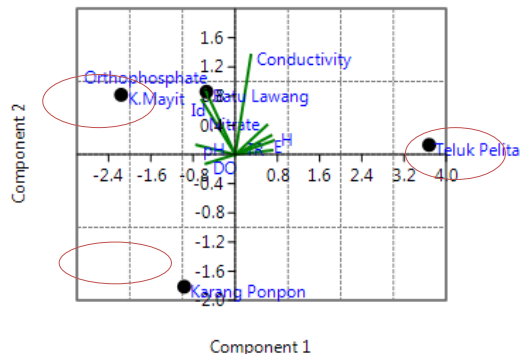


Figure7. Biplot Analysis

Karang Pon-Pon has a high value of Dominance Index and DO (dissolve oxygen) while the value of Evenness index, diversity index, nitrate, and conductivity is low. From these four areas, *Karang ponpon* is close to the area of aquaculture, settlements, and waterways, thus it is suspected that there is sedimentation in this location [27]. Although the areas are close to mangrove areas, pond cultivation can damage mangrove ecosystems which later become spawning, then fish growth will affect local productivity. Some components that can influence the existence of these activities are DO

(dissolve oxygen), brightness, and the number of phytoplankton [28].

Continuous research is important so that the coral reefs condition can be better than before. It is necessary to conduct periodic monitoring, not only to check the damage but also record specific species of coral reefs that are easily affected by the sediment and not. We can also continue to make fishing zoning distribution, conservation with the aim of adjusting the area needs/utilization. It is also urgent to conduct rehabilitation to increase coral population, reduces algae that live freely, and finally increase public awareness to be responsible for managing coral reefs.

CONCLUSION

The condition of coral reefs on the *Pasir Putih* beach of Situbondo has almost similar conditions in all research locations, meaning that there is no trend from one of these locations. Each location has special characteristics to describe the causal conditions of coral reefs. The highest Dominant of Value Index is *Karang Pon Pon*. *Teluk Pelita* value of the Diversity Index is high, *Batu Lawang* and *Karang Mayit* has a high pH, DO and conductivity value.

The structure of the coral reef community has not been affected by human activity, as indicated by the broad diversity index on *Teluk Pelita*. Whereas this location has the most human activity, meanwhile *Karang Pon-Pon* almost no human activity shows a high dominance value. However, the species that dominate is *Acropora* sp which is a species in an excellent aquatic.

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Water Quality Evaluation of Post-Tin Mining Ponds Tourism in Bangka Island Using Diatom as Bioindicator

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Abstract

Post tin mining pond in Bangka Island has been used as a tourism place, fishing, fish ponds, and agricultural areas that can reduce water. The purpose of this study is to evaluate the quality of water in the post-tin mining pond which is used as a tourist place based on physics, chemical and biotic indices of Diatoms as bioindicator. Sample water and Diatoms were taken at three post-tin mining pond (Itam, Pedindang, and Jangkang 2) and natural swamp as the reference site. Sampling in each pond and swamp was done in three stations as replications and then physics-chemical quality of water were observed (pH, water temperature, turbidity, conductivity, COD, and phosphate) and also the Trophic Diatom Index (TDI) and Pollution Tolerant Value (% PTV) from Diatom as indicator of trophic status and organic pollution. The results of the study showed that all of the ponds and natural swamp had low pH range from 4.32-6.34. The turbidity of Itam and Pedindang are higher (22-24 NTU) than Jangkang 2 and swamp (3.13-9.13 NTU). Jangkang 2 had the highest conductivity value (115.10 $\mu\text{S}\cdot\text{cm}^{-1}$) and swamp has the lowest (10.64 $\mu\text{S}\cdot\text{cm}^{-1}$). The value of COD and total phosphate in all location still meet the government standard (COD < 20 $\text{mg}\cdot\text{L}^{-1}$ and total phosphate < 0.2 $\text{mg}\cdot\text{L}^{-1}$). Water quality in post-tin mining ponds is lower than natural swamps based on Diatom as bioindicator. All of the ponds were categorized as moderately polluted based on Shannon Wiener Diversity index of Diatom ($H=1.2-1.6$), however, the swamp is lightly polluted ($H=2.6$). Trophic status of water in post-tin mining ponds based on Trophic Diatom Index (TDI) included in the eutrophic while in swamp categorized as mesotrophic. Based on percentage pollution tolerant value (%PTV), the water in Itam and Pedindang included in heavily organic pollution and water in Jangkang 2 and swamp have moderate organic pollution.

Keywords: Bangka, Diatom, post-tin mining pond, tourism, water quality.

INTRODUCTION

Bangka Belitung is one of the provinces with abundant mineral resources, namely tin and is widely distributed on the sea floor or land [1]. Tin mining in Bangka Belitung has existed for long time and more than 200 years ago [2]. The Center for Geological Resources in 2007 are 4.037.304 tons of seed and form 622.626 tons of metals.

Tin mining activities will definitely have a positive or negative impact on the environment. Tin mining has an influence on Regional Original Income (PAD) as well as improving community economics [3]. The negative impact of tin mining activities is the disruption of natural ecosystems included plant vegetation and soil. Post-tin mining pond will be filled with water to form a pond. Human activity around post-tin mining pond still continues today. The surrounding community is still using post-tin mining pond for daily needs such as bathing, washing, and as a tourist place.

Post-tin mining ponds are seen as economically potential and have benefits as raw water sources, aquaculture and recreational areas that are managed directly by tin companies or by the government. Utilization of various tin mining pond in Bangka Island is various, such as fishing grounds, ornamental fish ponds, and recreational water playgrounds.

Post-tin mining pond in Bangka Island is currently being utilized by the government and assisted by the community as a water recreation and fishing place. Around the pond was made like a bridge and colorful, and added several boats to attract visitors.

If the tourism sector can be managed properly, it can improve the economy of the community by utilizing the potential of the surrounding nature and culture. Tourism development of post-tin mining pond can be done by changing the inheritance of tin mining activities into local tourism resources [4].

Water quality is one of the important factors to determine changes and levels of environmental pollution due to human activities. One way to find out the condition of water in post tin mining pond is to be seen from the physics factors of water chemistry and biology, namely from the composition and structure of

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Diatoms as a bioindicator of changes in environmental quality [5].

Based on the above, the objective of this research was evaluating the water quality of post tin mining pond which was used as a tourist spot. Water quality is determined based on the physics chemical parameters of water and some biotic indices of Trophic Diatom Index (TDI) and Pollution Tolerant Value (%PTV) as bioindicator.

RESEARCH METHODS

Study area

The research was conducted from April-September 2018 in three post-tin mining pond (Itam, Pedindang, and Jangkang 2) in Bangka and one swamp as a reference site (Fig. 2). Water and diatom samples were taken in the morning until noon. Abiotic and Diatom factors were identified and analyzed in the Laboratory of Ecology and Animal Diversity, Department of Biology, Faculty of Mathematics and Natural Sciences, University of Brawijaya Malang.



Figure 1. Map of Bangka Island



Figure 2. Sampling Locations of in Bangka

Water Physics and Chemical Quality

The physics and chemical parameters of water were measured, i.e. the water temperature measured by a digital thermometer,

turbidity with turbidity meters, conductivity with conductivity meters, pH with pH meters, along with COD and Total Phosphate. Based on the standard method of the Official and Analytical Chemical Association all parameters are measured in triplicate [6].

Diatom Sampling

Diatom samples at each study location were determined at the same location as the physics and chemical sampling location by taking a 1 Liter water sample using a vertical water sampler at a water depth of 3-5 meters and then water filtered using plankton net. Diatom samples were preserved using 10 drops of 4% formalin and 5 drops of CuSO_4 . Water and diatom samples in each location were taken at three stations so that a total sample is 12 samples.

Data analysis

Physics and chemical quality data for each location were compiled and analyzed by different tests between research stations using ANOVA followed by Turkey HSD (if data distributions normal) and Brown-Forsythe test and continued with Games-Howell test (if data distributions are not homogenous). The results of identification and count the density of each Diatom species used for determinate Taxa Richness, Shannon-Wiener Diversity Index (H), Trophic Diatom Index (TDI), and percentage Pollution Tolerant Value (% PTV) which is indicated organic pollution in water [7,8]. Diatom was identified using morphological characters with reference [9,10,11].

RESULT AND DISCUSSION

Water Quality of Post-Tin Mining Pond at Bangka Island Based on Physical-Chemical Parameters

Parameters of physics and chemistry can be used as indicators of the water quality so that it can greatly affect the aquatic biota in these waters, one of which is Diatom. Results of analysis of measurements of water and physics meters in three post-tin mining ponds in Bangka Island and one swamp in the form of a reference site can be seen in Table 1.

The result of water monitoring indicated that the acidity (pH) of water post tin mining pond in the range of 5.49 – 6.34. The highest pH value was found in Itam, while the lowest pH value was in Jangkang 2. The results of pH measurements post-tin mining pond in Bangka Island have a range value that wasn't significant. Aquatic organisms in water can live with a pH value

ranging from 6.6 – 8.5 namely tolerance between weak acids to weak bases. Water with very acidic or very alkaline conditions can endanger the survival of an organism, such as Diatom [12]. Acidity (pH) is one of the environmental parameters that control the survival of Diatoms and the process of extracting nutrients, the balance of minerals and the balance of metals found around the pond [13,14].

The results of temperature measurements in the water of post-tin mining pond in Bangka Island show that the water temperature ranges from 29.8 – 32.6°C (Table 1). The highest water temperature was found in the Itam location and the lowest water temperature was in the swamp. This can be influenced by the intensity of sunlight, the activity of heat exchange between water and around the pond, and also the condition of vegetation around post-tin mining pond. Lower temperatures can originate from turbulence caused by movements of water that make water lose heat [15].

Turbidity can describe the optical properties of water, determined based on the amount of light absorbed and emitted by the ingredients contained in water. Turbidity can be caused by the presence of organic or inorganic materials suspended and dissolved in water [16]. Based on Table 1, the value of turbidity post-tin mining pond in Bangka Island ranges from 3.13 – 23.63

NTU. The optimum turbidity value of a water range between 5-30 NTU. The highest turbidity value was located in the location of Itam while the lowest was located in the swamp. The high value of turbidity in Itam can be caused by heavy metals inside the post-tin mining pond and inorganic or organic material suspended or dissolved in water [17].

The conductivity value post-tin mining pond in Bangka Island ranges from 10.64 – 115.10 $\mu\text{S}\cdot\text{cm}^{-1}$. Jangkang 2 has the highest conductivity value, while swamp has a low conductivity value (Table 1).

COD value (oxygen content needed to degrade chemically organic matter) of water in post-tin mining pond of Bangka Island ranges from 9.13 – 18.23 $\text{mg}\cdot\text{L}^{-1}$. Pedindang has the highest COD value while Itam has the lowest COD value. According to UNESCO/WHO/UNEP in 1992 the quality standard or COD value is less than 20 $\text{mg}\cdot\text{L}^{-1}$. It can be said that the water is not contaminated [18].

The result of measurements in Table 1, it show that the total phosphate value post-tin mining pond in Bangka Island ranges from <0.03 – 0.09 $\text{mg}\cdot\text{L}^{-1}$. The analysis total phosphate results based on the quality standard of 0.2 $\text{mg}\cdot\text{L}^{-1}$ according PP 82 of 2001 Class II Province of Bangka Belitung Islands. The highest total phosphate is located in Pedindang.

Table 1. Physical and Chemical Parameters of Water in the Post-tin Mining Pond in Bangka Island

Location	pH	Water temperature ($^{\circ}\text{C}$)	Turbidity (NTU)	Conductivity ($\mu\text{S}\cdot\text{cm}^{-1}$)	COD ($\text{mg}\cdot\text{L}^{-1}$)	Total Phosphate ($\text{mg}\cdot\text{L}^{-1}$)
Itam	6.34 ± 0.16	32.60 ± 1.40	23.63 ± 5.60	65.97 ± 3.37	9.13 ± 0.45	$<0.03 - 0.04$
Pedindang	6.22 ± 0.52	31.10 ± 0.10	22.20 ± 8.32	93.23 ± 1.22	18.23 ± 3.52	0.09 ± 0.02
Jangkang 2	4.32 ± 0.08	32.20 ± 0.10	9.13 ± 2.55	115.10 ± 2.16	8.98 ± 0.21	<0.03
Swamp (rawa)	5.49 ± 0.28	29.80 ± 1.40	3.13 ± 2.47	10.64 ± 3.22	9.42 ± 0.49	$<0.03 - 0.13$
*Government standard	6 – 9	-	5-30 NTU	25		0.2

Note: * Government Regulation No. 82, 2001

Diatom in Post-tin Mining Pond in Bangka Island

The number of diatom taxa was mostly found at the location of the swamp (Fig. 3). This show that the condition of the location has not been contaminated by heavy metals, where the location is far from the tin mining location. Swamp is a reference site. While the Pedindang is the location with the lowest number of taxa.

Pollution is a condition that has changed from the original (good) to the worse state. Changes from the original conditions under these adverse conditions can occur as inputs from pollutants originated from post-tin mining pond. These pollutants, in general, has toxic properties that are harmful to the survival of the organism [19].

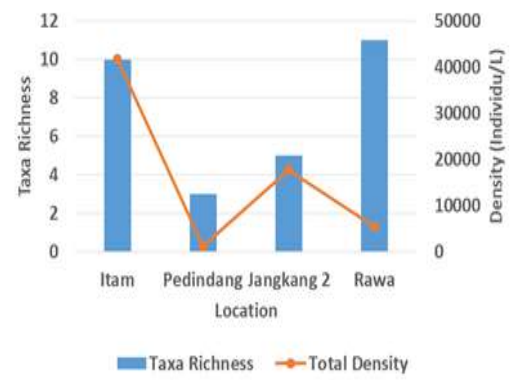


Figure 3. The Taxa Richness and Density of Diatom in Post-tin Mining Pond in Bangka Island

The calculation of the Shannon-Wiener diversity index (H') of Diatom in post-tin mining pond in Bangka Island (Fig.4), showed that swamp are categorized as very good or not polluted with a value of $H' = 2.6$. The pond of Itam, Pedindang, and Jangkang 2 have low diversity taxa (3-10.5) which are categorized as moderate pollutions. Differences in the value of diversity index can be influenced by the number of species in the community post-tin mining pond in Bangka Island, water depth, availability food in water, and human activities. A community has a high species diversity when many species with relatively even numbers of individuals. If a community consists of only a few species without the number of individuals distributed equally, the community has a low diversity [20].

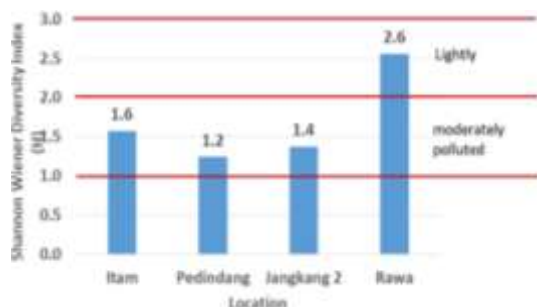


Figure 4. Shannon-Wiener Diversity Index of Diatom in Post-tin mining pond in Bangka Island

Tropical status and the level of pollution of organic matter in water can be assessed by the TDI (Fig. 5) and the Organic Pollution Level (% PTV) (Fig. 6) which was used to show the level of eutrophication, organic pollution, and toxin pollution levels [21]. Based on the results of the tropical status assessment (Fig. 5) the quality of water in post-tin mining pond Bangka Island is classified as mesotrophic to eutrophic. Jangkang 2 has the highest value of TDI and classified as eutrophic, while the lowest TDI value is swamp belonging to the mesotrophic.

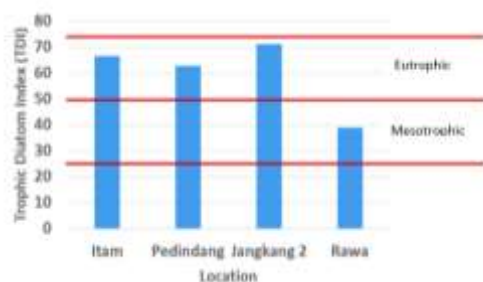


Figure 5. Trophic Status of Water in Post-tin Mining Pond in Bangka Island based on the Trophic Diatom Index (TDI)

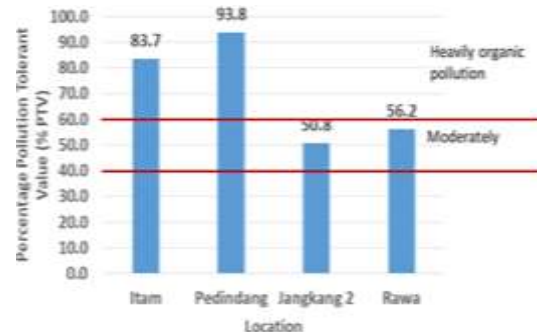


Figure 6. The level of water pollution post tin mining pond in Bangka Island based on Percent Tolerance Value (% PTV)

Based on the results obtained, the trophic status of the post-tin mining pond in Bangka Island has a significant impact on the quality of water mesotrophic to eutrophic. Diatoms are often used as bioindicators of water quality in water to indicate the condition of the waters from the level of pollution of organic matter [22].

The results of the IVI study report (Fig. 7) in four different research locations showed that each location values have a different species. *Nitzschia* sp and *Navicula* sp species are Bacillariophyceae classes that can be found in all locations. This showed that *Nitzschia* sp and *Navicula* sp have very good adaptability. The Bacillariophyceae class is phytoplankton that has a tolerance to temperature, nutrition, and sunlight [23]. The Bacillariophyceae class can grow fast even under poor nutritional conditions and low sunlight [24].

Navicula sp and *Nitzschia* were co-dominate in Pedindang, while *Synedra* sp and *Navicula* sp were co-dominate species in Jangkang 2. This type of Diatom is able to adapt to turbid aquatic environments which are tolerant of waters with high organic matter content [25].

Post-tin mining pond that being used in various activities such as tourist and fishing provide influence on water quality based on physics, chemical and Diatoms as bioindicator. It can be grouped using biplot analysis. The effect of human activities in the post-tin mining pond can be seen from the classification of water quality based on physics-chemical parameters and Diatoms using cluster and biplot analysis. The grouping water quality in post-tin mining ponds and natural swamp can be seen from biplot analysis, based on several physical-chemical parameters of water and biotic index on water quality (Fig. 8).

The quality of post-tin mining pond water in Bangka Island has different characteristics.

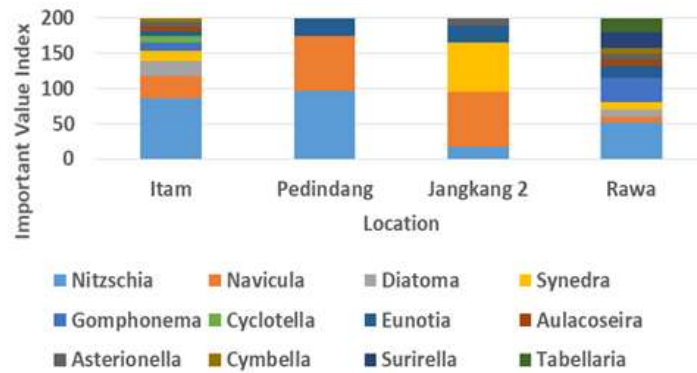


Figure 7. Important Value Index (IVI) of Diatom in post tin mining pond in Bangka Island

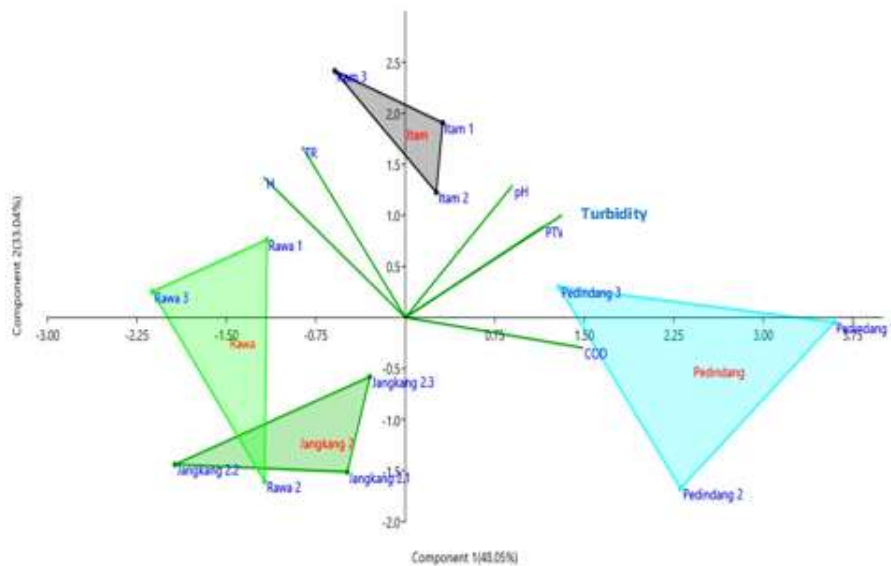


Figure 8. Effect of Tourism Activities on Post-tin Mining Pond in Bangka Island to the Characteristics of Water Quality

Jangkang has almost the same characteristics as Swamp, while Itam has almost the same characteristics as Pedindang. Water quality at Jangkang and swamp locations was characterized by high H values and taxa richness, while Itam and Pedindang are characterized by high COD, %PTV, turbidity, and low H.

Water quality in the Pedindang location is characterized by COD, % PTV and higher turbidity. It shows that the level of pollution of organic matter is high. Meanwhile, Itam is characterized by a higher pH value. Jangkang 2 has a lower value of COD and % PTV which shows better trophic status with low levels of organic matter pollution, with good water conditions. It is characterized by high H values and taxa richness. Swamp is a reference site located far from tin mining activities while Jangkang 2 is a tourist site, but it is one of the post-tin mining ponds that became a reclamation program from PT. Timah Tbk. Otherwise, Itam and Pedindang

included as contaminated by heavy organic materials. Tourism activities around the ponds have reduced mesotrophic status to eutrophic, with moderate to severe pollution.

CONCLUSION

The quality of water in the swamp and several aquatic ecosystems in Bangka Island greatly varies. Based on the calculation of Shannon-Wiener's diversity value, the natural swamp (2.6) is in a good category. The water quality of post-tin mining pond in Bangka Island based on the Diatom biotic index of Trophic Diatom Index showed categories as mesotrophic to eutrophic (39-71). The level of organic pollution in post-tin mining pond is heavy with a value of PTV (50.8-93.8%), which was moderate to heavy organic water pollution.

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Herpetofauna Diversity and Taxa Richness Ground Cover Plant as Bioindicator Environmental Quality in Boon Pring Recreation sites at Sanankerto, Turen, Malang Regency

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Abstract

Boon Pring is one of the ecotourism destinations in Malang regency with tourism attractions including motor boats, water bikes, and picnic activities. These activities can cause environmental degradation in Boon Pring area. The purpose of this research is to analyze taxa richness of ground cover plant, diversity, and community structure of herpetofauna in Boon Pring and explain the environmental quality in Boon Pring based on their relationship. The method used is selective purposive belt transect with 10 m long belt and 10x5 m² plot area. Each station is repeated four times. The data obtained were analyzed with Ms. Excel and the PAST program to search Taxa Richness for plants, abundance, frequency, Shannon – Wiener diversity index and Import Value Index (IVI) for Herpetofauna. Then they were analyzed regression, cluster, and biplot to determine the relationship between the two. The results showed decreased of ground cover plants taxa richness and herpetofauna diversity index from station one to station four. The value of IVI indicates the dominance of *Eutrophis multifasciata* species in degraded sites. Determination coefficient showed a value of 51%, which means there is a positive relationship between ground cover plant and herpetofauna diversity. The conclusions of this study, the taxa richness of ground cover and diversity of herpetofauna have decreased in areas with degraded environmental quality. There is a dominance of one type of herpetofauna in the degraded areas of *Eutrophis multifasciata*. Between the taxa richness of ground cover plants and diversity of herpetofauna showed a positive relationship, in this study 51%.

Keywords: Boon Pring, Diversity Index, Ground Cover Plant, Herpetofauna, Regression.

INTRODUCTION

Ecotourism in Malang Regency increasingly growing. One of the newly-opened ecotourism in 2016 is Boon Pring Andeman in Sanankerto Village, Turen, Malang regency. Before it becomes a tourism interest, this location was a bamboo forest with about 60 species richness kinds of bamboo. Tourist attractions in Boon Pring are emphasized on Boon Pring lake. This lake is used by tourists to play water bikes and rent a motorboat in purpose to go around the lake. In addition, Boon Pring also has picnic areas and swimming pools which are widely utilized as family vacation [1].

The human activity in Boon Pring shows an increment every day. The number of tourists who visit this place keeps increasing every day. It makes the manager improve Boon Pring's service facilities and infrastructure. The improvement of these facilities and infrastructure can reduce the naturalness of Boon Pring as a bamboo forest. The reduced levels of naturalness mean environmental degradation growth is raising in

Boon Pring. This matter should be studied in order to know how much the degradation impact on the environment. One way to learn about environmental degradation is by using bio-indicator. Bioindicators themselves means an indicator or a sign based on the existence of a living being [2].

There are so many bioindicators in nature ranging from microorganisms to vertebrates. For instance, ground cover plants and herpetofauna are organisms that are included in bioindicators. Ground cover plants have a high degree of sensitivity to environmental changes. It is because ground cover plants are pioneer organisms that will form microhabitats for animals and plants with habitus above them. Their essential role which is to raise nitrogen binding in the soil becomes the main underlying factor to decide that ground cover plants can be used as bioindicator [3].

Not only ground cover plants, herpetofauna community is also able to be applied as a bioindicator. Herpetofauna or groups of reptile and amphibian animals are a type of vertebrate that is sensitive to environmental degradation. The sensitive amphibious animal and reptile senses become the underlying factor to include herpetofauna as one of the bioindicators.

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Poikilotherm animals are also included as herpetofauna due to its environment-dependent body temperature. If the environment is not suitable for them, herpetofauna will not be able to live in the corresponding environment [4].

The Boon Pring environment is a suitable environment for herpetofauna. The existence of lakes and bamboo forests increases the humidity of the environment and makes it a suitable place for herpetofauna. Therefore, the environmental quality measurement at Boon Pring can utilize herpetofauna as bioindicator. Besides the diversity of herpetofauna, ground cover plant taxa richness was used to complete the environmental quality assessment in Boon Pring. This study aimed to analyze the ground cover plant taxa richness, herpetofauna diversity, and community structure. Moreover, this study also projected to the environment based on their relationship.

RESEARCH METHODS

Sampling Methods

This research was conducted at Boon Pring Andaman, Sanankerto Village, Turen, Malang Regency -8.155802 S and 112.761982 E. This research was conducted from November to December 2017. Sampling was conducted at four stations (Fig. 1), bamboo forest, bamboo-mahogany forest, tourist area, and mahogany garden. The applied method was selective purposive belt transect. Each location sampled four times by using selective purposive belt transect with 10 m long belt and 10x5 m² plot area (Fig. 2) to obtain the results that represent the station. In addition, in this study researcher get data from an interview with local people.



Figure 1. Four Sampling Location in Boon Pring Andaman

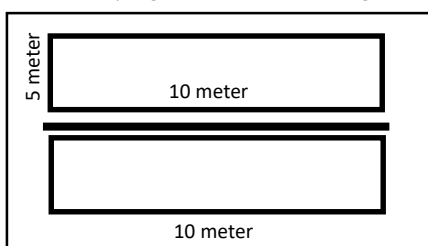


Figure 2. Selective Purposive Belt Transect Design

Data Analyze

Ground cover plant data was analyzed by Ms. Excel 2007 to found its taxa richness. Herpetofauna data was analyzed for abundance, frequency, relative abundance, relative frequency, Important Value Index (IVI) and Shanon – Wiener Diversity Index (H') which is also analyzed using Ms. Excel 2007. PAST Program was used for analyzing its regression, cluster, and biplot.

RESULT AND DISCUSSION

The results showed a positive relationship between taxa richness of ground cover plants with the Herpetofauna Shannon - Wiener diversity index (Fig. 3). The highest value for taxa richness of ground cover plants and Herpetofauna Shannon - Wiener diversity index is located in the bamboo forest location. The taxa richness value of ground cover plants in bamboo forest reaches 15 taxa while herpetofauna Shannon - Wiener diversity index is 0.6. Based on the journal [5], bamboo forest is a habitat of some herpetofauna such as snakes, frogs, and toads. This is due to the shade of bamboo headers are causing the microhabitat becomes more humid and suitable for herpetofauna habitat that likes more humid places. Besides that, bamboo forests provide many leaves litter for many small insects that become the main food of frogs and toads.

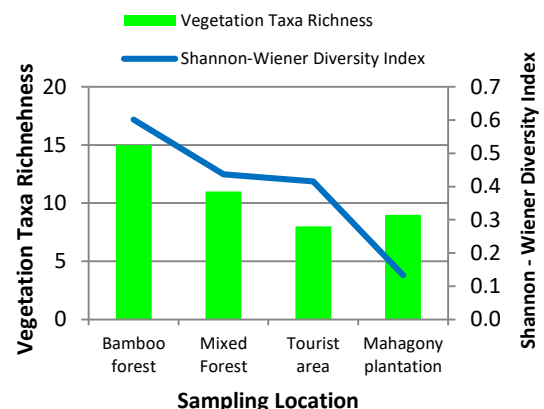


Figure 3. Correlation graph between ground cover taxa richness and herpetofauna Shannon – Wiener diversity index

From the study, it is elicited unique data. The location of the mahogany garden has a very low value of herpetofauna Shannon - Wiener diversity index (0.1) but has a slightly higher taxa richness of ground cover (9 taxa) than the tourist area (8 taxa). It is because mahogany is included as exotic species. Mahogany (*Swietenia mahogany*) is a type of tree that is widely used

for its daily needs. This exotic species is included as a species that has a huge amount of water-waste (water-waster). Water-waster means it requires a lot of water to make it grow well. So, this plant will absorb water around it to the maximum extent that this plant can absorb [6]. This condition causes the situation of microhabitat around mahogany is dry. So that herpetofauna cannot live comfortably. However, some plants can survive with little water supply. The condition of mixed bamboo - mahogany forest is not like the mahogany garden. Bamboo is a good provider of water and storage [5]. Thus, the microhabitat under the canopy can still be maintained and create a suitable microclimate for herpetofauna and ground cover plants.

Taxa richness of ground cover plants on tourist area or it can be said that degraded areas have low value. Although it has higher diversity value of herpetofauna than mahogany forest. The location of tourist area is dominated by *Eutrophis multifasciata*. This is indicated by the high value of the Importance Value Index (IVI) in the tourist area (Fig.4).

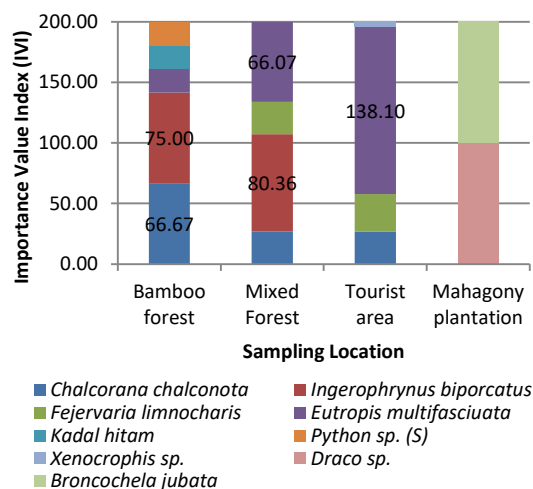


Figure 4. Importance Value Index (IVI) of each species that found in Boon Pring. (S) indicate secondary data

Eutrophis multifasciata or garden lizards or Common Sun Skink is known as the most commonly found lizard in areas that are already open or have few canopies. The existence of this lizard may indicate that the site is already degraded because it is a cosmopolitan animal and is able to survive in areas where it has no canopy protection [7]. One of the indications of the degraded environment is the reduced or the loss of plant canopy like in Boon Pring tourist area. There is no dominance of any species herpetofauna in other sampling location.

The result of regression analysis shows that there is a relationship between cover plants and herpetofauna. The coefficient of determination on the regression analysis reaches 51% (Fig. 5). The value of determination coefficient here shows how much taxa richness effect of ground cover plants on herpetofauna diversity in Boon Pring. The value of 51%, indicating the influence of taxa richness has a significant effect on the diversity of herpetofauna. Herpetofauna has a fairly narrow microhabitat in nature, the existence of herpetofauna must be supported by good environmental conditions in order to support the survival of herpetofauna. One thing that made microhabitat suitable with the environmental conditions for herpetofauna is the ground cover plants. Ground cover plants can provide protection for herpetofauna. In addition, the presence of flowers in ground cover plants will provide prey to herpetofauna [4].

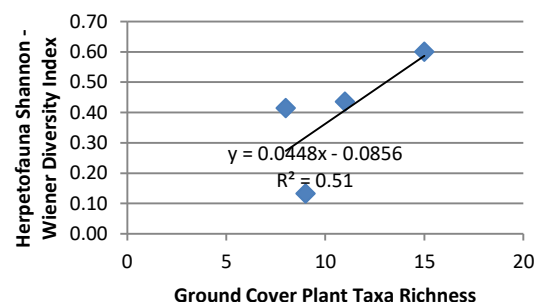


Figure 5. Regression analyze between Ground Cover Plant Taxa Richness and Herpetofauna Shannon - Wiener Diversity Index

Cluster and biplot analysis are used to classify locations based on the factors affecting the location. The result of cluster analysis with distance 50% similarity level shows three different location groups. These groups are mahogany garden, mixed forest, and tourist areas groups and bamboo forest groups (Fig. 6). Each location is characterized by a few specific things. This is demonstrated by biplot analysis (Fig. 7). The mahogany garden group is characterized by its low herpetofauna diversity and the co-dominance of *Draco sp.* and *Broncochela jubata*. Mixed forest and tourist areas groups are characterized as having low ground cover plant taxa richness and have some herpetofauna that can withstand the environmental changes. While the bamboo forest group is characterized by the diversity of herpetofauna and taxa richness of high ground cover plants and has herpetofauna which more sensitive to environmental changes.

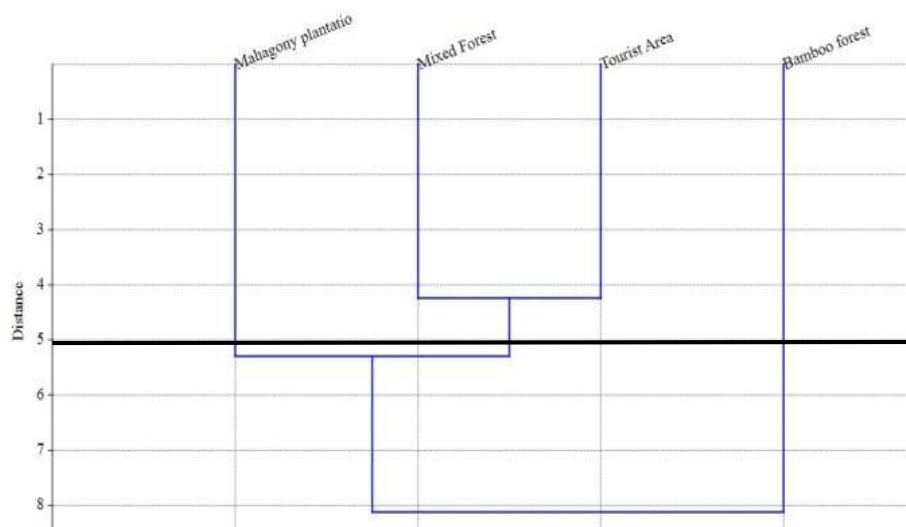


Figure 6. Cluster analysis of each location in Boon Pring

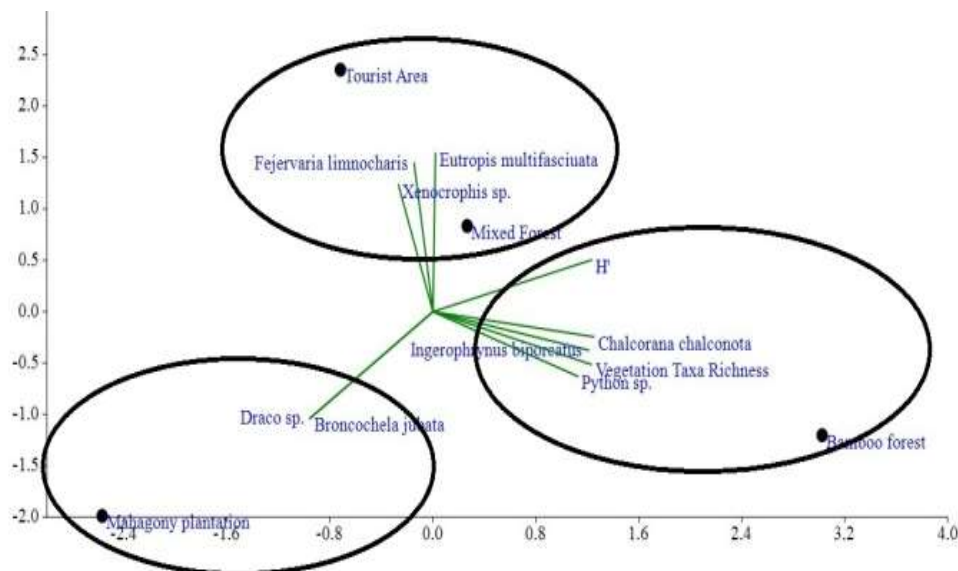


Figure 7. Biplot analysis for each location in Boon Pring

After conducting this research, researchers should advise managers not to plant many invasive plants at the Boonpring site. This suggestion is to keep the herpetofauna habitat that is not disturbed and remain stable.

CONCLUSION

This research concludes that all ground cover plant taxa richness and herpetofauna diversity was decreased from bamboo forest to the tourist area. There is a dominance of *E. multifasciata* in degraded land (tourist area). Study about *E. multifasciata* as a bioindicator can be done for the other research. There was a positive relationship between ground cover plant taxa

richness and herpetofauna diversity. The more degraded the land or the lower taxa richness ground cover plant the less herpetofauna diversity will be. So, from this study, we might know that degraded land does not increase any biological aspect.

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Ethnobotany Home garden in Puspa Jagad Tourism Ecology Area Semen Village, Gandusari District, Blitar Regency

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Abstract

Home garden is one form of sustainable agricultural land management. Home garden is important as a local identity in a society especially in rural areas. The purpose of this research is to describe the uniqueness and distinctiveness of the home garden which includes the elements of the home garden, plants species diversity and ethnobotany value of plants in Puspa jagad Ecological tourism area. Data collection is done by observation to find out the elements of the home garden and plants species diversity component. Interviews were also conducted to obtain data on the management of the home garden and ethnobotany values of plants which included ICS (indexes of cultural significance) and UVS (Use Value species). The home garden elements in Puspo Jagad ecological tourism area consist of *ngarepan* (home garden located in front of the house), *kiwo-tengen* (home garden located right and left of the house), *mburitan* (home garden located behind the house), *joglangan* (traditional bio pore well as a place for water infiltration as well as an organic waste bin), *peceren* (holes as well as waste disposal sites from activities at home), cattle sheds, wells, bathroom and toilets. Plant diversity on home garden consists of 151 species of 132 genus and 61 plant families. These plants are grown in general to beautify the environment around of the house. The stratified plant canopy vertebration on home garden in Puspo Jagad Tourism Ecology Area are dominated by stratum E,D and C Based on the results of the calculation of ICS or Cultural Interest Index shows that the needs of the community depends largely on the local natural resources around. Based on ICS and UVS values, coconut (*Cocos nucifera*) and banana (*Musa acuminata*) plants are the plants that have the highest value, this is because these plants have many parts that can be utilized and are widely used for daily needs.

Keywords: ICS, identity, plant, UVS.

INTRODUCTION

The home garden is one of the most common, important and widely cultivated land management practices in Indonesia, besides rice fields and moorings [1]. The size of the home garden in Indonesia in 2011 is about 10,300 thousand hectares or 14% of the total agricultural land area. The yard of the house is also considered a traditional home garden which in the management of the land combines various useful plant species, livestock and fishery in it [2]. The main characteristic of the home garden is the presence of residential elements, the diversity of plants whose composition depends on the needs of the owner [3,4].

The characteristics of land can be said as a home garden is located around the residence or around the house, has a variety of forms according to the geographical and cultural conditions of society, part of the agricultural land for the owner and has clear boundaries. The home

garden is considered sustainable environmental management. This is because in the management of this home garden there are elements that contain the values of conservation, economic and social-culture of the local community.

Conserving home gardens is one of the in-situ conservation strategies, especially the conservation of plants, although there are also a variety of wild animals and animals that are involved in building a living network within them [5]. In the home garden of Tenggerese, *Anaphalis* sp. was found; a rare plant typical of the mountains are. The existence of this plant, as a cultivation plant is one form of conservation of in-situ [5].

Culture home garden is important as a local identity in a society, especially in rural areas. As a result of culture, the home garden in each region in Indonesia certainly has various types or specific models that are unique and distinctive according to the geographic condition and the culture of the

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society that exists. The home garden has special characteristics with the community groups that own it or in other words the existence of a home garden has a relationship with a community group. In addition, the home garden in it also contains elements of conservation, especially plants. Types of plants that grow in the home garden are also influenced by the geographical conditions in which the home garden of the house is located [3,6].

The uniqueness and distinctiveness in the form of horizontal and vertical vegetation structure and home garden management can be used as a tourism attraction, especially along the route of the tourist area or in the villages designated as the tourist village area. Rural tourism is a tourism product that was built to introduce rural tourism attractions. Tourist village is a form of sustainable based tourism practice. Through the development of tourist village is expected to improve the standard of living of the community, conservation of natural resources and culture in the community [6].

The home garden in Eco-tourism Village of Puspa Jagad can be identified from the structure of the vegetation composition, horizontally and vertically as well as the composition of its farm animals and fisheries. It is also necessary to study its ethnobotany, thus we can know the mutual relationship between human with the plants in the yard of the house. Typical home garden model is a uniqueness of its own. This uniqueness can be part of the attractions in tourist areas such as Puspa Jagad Ecotourism for the tourist attractions. This study aimed to describe the home garden uniqueness in the ecological tourism area of Puspa Jagad, Blitar.

RESEARCH METHODS

Study Area

This research was conducted in Semen Village, one of the villages in Gandusari District, Blitar Regency. The village has an area of approximately 1,079.12 ha. The topography of the area is undulating with an average height of 497 m above sea level.

Data collection

The data was collected by observation on the types of home garden compounds. The plants that are found are directly induced by local names, scientific names, families and their benefits. Observations also made on home garden typology include information on the elements of the home garden, the area of the home garden and the

existence of domestic plants and livestock. Elements of the home garden, in general, include frontal expertise, backyard, side yards, kitchen, the existence of wells and bins. Interviews were conducted to obtain data on the management of home garden and cultural aspects in it in depth. In addition, interviews are also conducted to find out the various benefits of these crops by the community.



Figure 1. Map of Semen Village, Gandusari District, Blitar

Data analysis

Based on the benefits of plants grown in home plants, it can know the cultural value (ICS) and use value (UVS) for each plant. ICS calculations aim to determine the most important or most useful types of plants for human life [7]. ICS is done using the following formula:

$$ICS = \sum_{i=1}^n (q \times i \times e) n_i$$

Description:

n = usefulness value of a last plant species

q = value of quality on the use of a plant species

5 = for main foodstuff

4 = food additives and main ingredients

3 = other food + secondary material and ingredients of traditional medicine

2 = material for ritual, myth and recreation and value 1 = only known usefulness only.

i = intensity value on the usefulness of plant species

- 5 = very high intensity value of its use
4 = moderate intensity of use high
3 = medium intensity of use
2 = low intensity of use
1 = very low intensity of use
e = value of exclusivity
2 = most preferred and is the main choice and is second to none
1 = several types that exist likely to be an option
0.5 = secondary source or material

UVs are the use of a plant that is utilized by the community [7].

$$UVS = \frac{\sum UVis}{n_i}$$

Description:

UVs = Value Use Species

UVis = the number of mentioned uses of a species

ni = Total number of respondents interviewed

RESULT AND DISCUSSION

Plants in the home garden of Puspa Jagad

The home garden on a local language in Puspo Jagad Tourism Ecology Area is called a *pecuren*. The land is said to be a *pecuren* characterized by clear boundaries in the form of fences from certain plants (*Cordyline fruticosa* (L.) A. Chev.) or bamboo. Besides that the ground floor of the home garden is relatively clean from litter and weed plants. This is what distinguishes other land around the home garden, for example moor.

Other than a *pecuren*, also called a *tanah*, *tanah* is an abbreviation of the local language which means *tatanen sing pernah* or meaning manage the land well. This shows that the existence of the home garden in Puspo Jagad Tourism Ecology Area very closely with the management carried out by the owner.

Based on the research, it is known that in the home garden, there are 151 species of 132 genus and 61 plant families. These plants are grown in general to beautify the environment around of the house as well as to meet daily needs. The home garden are part of a small-scale plant biodiversity community. Plants that exist in the home garden system represent the choices and interests of the community [8]

In general, the stratification of plant canopy in the home garden of the Puspa Jagad Ecological Tourism Area is dominated by strata E, D and C. Whereas plants that have B and A stratification are rarely found in the yard of the house, except in a relatively large home garden. Usually plants that have A and B stratification are found some distance from the main building. This is due to the canopy trimming of plants that should have tree leaves. The existence of plants with stratification

A and B that are adjacent to the building is feared to be able to damage the building. This is different from most home gardens in the tropics including Indonesia which has complete stratification [9].

Stratification of plants on home garden in Puspa Jagad Ecological Tourism Area which are dominated by the status of E, D and C, this is possible this region is an area with contour of hilly land between the Kelud and Kawi mountains [9]. Other areas in areas with contour of hilly land such as Ngadas village, Poncokusumo District, Malang Regency and Ranu Pani Village, Senduro district Lumajang Regency, which is also located in the mountainous areas of the home garden plants, which are dominated by plants with E and D strata with horticultural plants [11].

Stratification is a vertical distribution of plants. Where each plant species in the community has different height measurements. These plant stratifications are grouped into five categories E, D, C, B and A. Strata E are plants with a high category of less than 1 m. strata D is plants with a high category between 1- 4 m. strata C is plants with a high category between 4-20 m. Strata B is plants with a high category between 20- 30 m. Strata A are plants with a high category of more than 30 m [12].

Plants grown in the home garden have many important functions, but in general, the land of the home garden is used for ornamental plants or useful plants which as an ornamental plant. So generally the plants in home garden are classified into pure ornamental plants and plants that are useful but also functioned as an ornamental plant. Non-ornamental plants are used as food crops, wood, industry, medicine, and others [13]. Based on the results of the Interview, it is known that the home garden has an important value for the people in Puspa Jagad Ecology Tourism Area.

Horizontal home garden is divided into three regions based on its layout of the house, namely front home garden or in a local language called *ngarepan*, side home garden or in a local language called *kiwo-tengen*, and back home garden or in a local language called *mburitan*. Front porch is dominated by ornamental plants because it is a reflection of homeowners, if the home garden is narrow and to add the beauty of the home, they add ornamental plants grown in pots. The front home garden is also used to dry the agricultural crops such as coffee or dried cassava. Meanwhile, the home garden which is located at the left of the house is usually used to place the clothes drying or place to dry the wood. While the backyard functioned as a place of livestock. In addition, the

rear home garden also functioned as a place of firewood and bathroom.

Plants behind the house are usually large plants or plants that require a large area. Elements on the home garden in Puspa Jagad area is fence, *joglangan*, *peceren*, livestock pens, wooden place, clothesline, bathroom and well (Fig. 2 and 3). These elements have a bond with the homeowners. Home garden is largely limited by the various plants which are arranged in such a way so that there is a boundary or fence between one home gardens with other land units. Plants used for the compilers of this fence are generally a plant that is easily planted, e.g. from cuttings.

Joglangan is a hole made with a size of about 2 x 2 m with a depth of 1.5 m. This *joglangan* is used as a garbage container for the leaves of the fallen leaves from plants of the home garden. *Peceren* is a place to accommodate household wastewater from bathroom and kitchen. *Peceren* is usually planted with *Pekiwon* plants. *Pekiwon* Plants that usually exist in home garden are pandanus (*Pandanus amaryllifolius*), *Dringo* (*Acorus calamus*), *Suji* (*Dracaena angustifolia*) and etc. These plants are phytoremediation plants that can absorb pollutants [14,15].

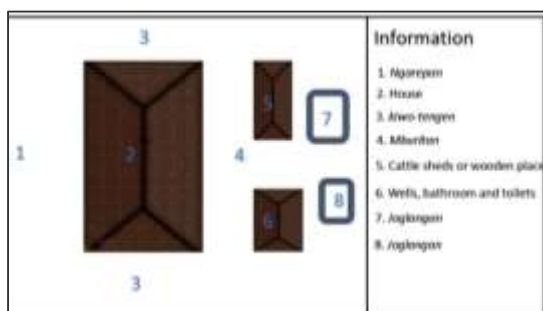


Figure 2. The elements of the house In Puspa Jagad Tourism Ecology Area



Figure 3. Home Garden Elements.

Description: A. The front of the house used to dry the harvest, B. cattle pen, C. Peceren and D. firewood warehouse

ICS and UVS Value

The results of the calculation of ICS or Cultural Interest Index show the needs of the community. Based on the value of ICS, *Cocos nucifera* or coconut is a plant that has the highest value in Puspa Jagad tourism area (Table 1). This is because the coconut plant is a multifunctional plant, e.g. for food, woody materials called *Glugu*, wood fuel, medicines and others. Another high ICS values are bananas, sugarcane and *empon-empon* or herbs plants (such as turmeric, galanga and etc).

Table 1. ICS Value

No	Species	Local Name	ICS
1	<i>Cocos nucifera</i>	Kelapa	119
2	<i>Musa paradisiaca</i>	Pisang	102
3	<i>Saccharum officinarum</i>	Tebu ireng	44
4	<i>Alpinia galangal</i>	Laos	42
5	<i>Curcuma longa</i>	Kunir	42
6	<i>Boesenbergia rotunda</i>	Kunci	42
7	<i>Ipomoea batatas</i>	Ubi jalar	41
8	<i>Manihot esculenta</i>	Singkong	41
9	<i>Pennisetum purpureum</i>	Rumput gajah	40
	<i>Artocarpus</i>		
10	<i>heterophyllum</i>	Nangka	36
11	<i>Capsicum annum</i>	Lombok	30
12	<i>Pandanus amaryllifolius</i>	Pandan	29
13	<i>Coffea canephora</i>	Kopi	28
14	<i>Syzygium polyanthum</i>	Salam	27
15	<i>Durio zibethinus</i>	Durian	26
16	<i>Zingiber officinale</i>	Jahe merah	26
17	<i>Carica papaya</i>	Pepaya	24
18	<i>Calliandra calothyrsus</i>	Kaliandra	24
19	<i>Vigna unguiculata</i>	Kacang panjang	24
20	<i>Manglietia glauca</i>	Kayu kembang	24

Coconut plants in the tropics generally in Indonesia are important plants and are known as multifunctional plants. Plant parts such as leaves, flowers, fruit and stems can be used for daily use [16], included in various customary rituals in Java. This is because in this tree has the noble philosophies. Coconut fruit called *Cengkir Gading* is an important means of custom rituals such as for *Mitoni* (baby shower), wedding ceremony and etc. This is because Javanese society seen it as a plant that represents the symbol of the hope, so that humans have *Cengkir Gading* or *Kenceng Ing* thought, which can be interpreted as a strong thought to achieve goals. It is describe the strong determination and mind in achieving the purpose of life. In the ceremony of *Siraman* as part of pre wedding ceremony in Javanese culture, two green coconuts are tied in the husk, sprinkled with water and flowers. This coconut is a symbol of hope for the eternal marriage until the end of life. Green coconut is also considered a plant that symbolizes the glory and the bearer of sustenance.

Young yellow coconut leaves called *Janur Kuning* is often used as decoration or symbols in various traditional ceremonies. Linguistically, the word *Janur Kuning* comes from the word *Jan* which is defined as *Jannah*. *Jannah* is an Arabic word meaning heaven, *Nur* means light, and *Ning* means *Wening* or holy. So, yellow coconut here is meant to remind the two brides to have the holy feelings towards each other. It also mean that humans in reaching a holy goal must be intended because of God.

In the Javanese wedding ceremony, *Janur Kuning* (yellow leaf of coconut) is also used as a symbol of hope for a beautiful household. *Janur Kuning* in the wedding ceremony is usually used as decoration and *Kembar Mayang*. In the use of this leaf, it should not be cut, but teared. This is as a symbolization and *Piwulang* to the bride so that later in marriage, if they face various problems in their life, although their heart feels like teared apart, they must remain steadfast and keep the household not to break or divorce.

Other tourism area such as Tengger, ecologically, we can not found coconut trees because it has topography above 1,800 m asl. However, Tenggerese still see coconut as an important part in everyday life, including in traditional ceremonies. This can be seen from *Ongkek* or offerings made by shamans in *Kasada*, *Unan-Unan* or *Karo* ceremony which always include the fruit of coconut (*Cengkir Gading*) and *Janur*. Tenggerese perception on the whole coconut tree is a mystical portrayal of human life [17]. The ritual component of the tengger community originating from coconut plants are 30% [18].

In Tambaksari Village of, Purwodadi District, Pasuruan Regency, East Java Province coconut plants also have the highest ICS value. This is because coconut plants have many benefits for the community [19].

In addition to the ICS, we also used UVS, an index that describes the level of value for plant species present in home garden. Based on the UVS index (Table 2), the highest value is a *Musa paradisiaca* or banana plant with a value of 4.

The parts of banana that used are stems, flowers, fruits, and leaves. Coconut and *Artocarpus heterophyllus* or jackfruit plants for the Puspa Jagad community also have high UVS values. This is because this plant has various benefits ranging from leaves, stems, fruits, and seeds. Utilization of these plants ranging from food ingredients, fruits, vegetables, handicrafts, ritual utilization, food wrapping, fodder etc.

In Tambaksari Village of, Purwodadi District, Pasuruan Regency, East Java Province banana plants also have the highest ICS value. Banana plants have a fairly fast growth period and continuously, which results is quite high. Banana fruit can be used in both raw and mature [14].

Table 2. UVS Value

No	Species	Local Name	UVS
1	<i>Musa paradisiaca</i>	Pisang	4
2	<i>Cocos nucifera</i>	Kelapa	3.87
3	<i>Artocarpus heterophyllus</i>	Nangka	3
4	<i>Manihot esculenta</i>	Singkong	2.43
5	<i>Carica papaya</i>	Pepaya	2
6	<i>Ipomoea batatas</i>	Ubi jalar	2
7	<i>Manglietia glauca</i>	Kayu kembang	2
8	<i>Lansium domesticum</i>	Duku	2
9	<i>Syzygium polyanthum</i>	Salam	2
10	<i>Syzygium aromaticum</i>	Cengkeh	2
11	<i>Syzygium aqueum</i>	Jambu air	2
12	<i>Citrus hystrix</i>	Jeruk nipis	2
13	<i>Saccharum offucinarum</i>	Tebu ireng	2
14	<i>Xanthosoma sagittifolium</i>	Gate	1.96
15	<i>Colocasia esculenta</i>	Bentul putih	1.96
16	<i>Durio zibethinus</i>	Durian	1.61
17	<i>Coffea canephora</i>	Kopi	1.48
18	<i>Cananga odorata</i>	Kenanga	1.35
19	<i>Mangifera indica</i>	Mangga	1.04
20	<i>Apium graveolens</i> L.	Seledri	1.04
21	<i>Amorphophallus paeoniifolius</i>	Suweg	1.04

CONCLUSION

The diversity of plants found in the yard of the house (Home garden) in Puspa Jagad Tourism Village Ecology is 151 species of 132 genera and 61 plant families. These plants are grown generally to beautify the atmosphere of the house, due to its shape of flowers, leaves and morphology of plants that are considered attractive. Plants in this home garden are also well utilized to meet the daily needs of the owner. Home garden as part of the growing place of domesticated plants is also the location of livestock.

The stratified plant canopy vertebration in home garden in Puspa Jagad is dominated by strata E, D, and C. While plants with stratification B and A are rarely found, except house with relatively large home garden and usually found in some distance from the main building.

Based on the results of the calculation of ICS or Cultural Interest Index shows that the needs of the community depends largely on the local natural resources around. Based on the value of ICS and UVS, coconut and banana is a plant that has the highest value, respectively.

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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.

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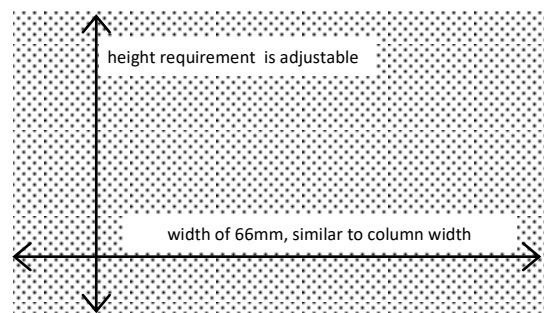


Figure 1. Illustration of Dimensional Figure of one column width. Figure dimension adjusted to the width of one column. Name the figure (diagram) written below the image. (Calibri 8.5 Justify)

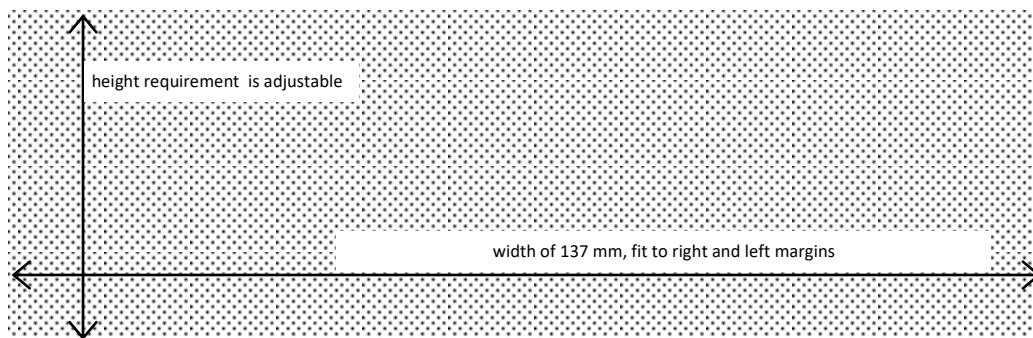


Figure 2. Illustration of Dimensional Figure of two column width. Figure dimension adjusted to the width of two columns (137 mm). Figure were align top or bottom of the page. (Calibri 8.5 Justify)

References

1. Primary references include journal, patent, dissertation, thesis, paper in proceeding and text book.
 2. Avoid self citation.
 3. Author should avoid reference in reference, popular book, and internet reference except journal and private ana state institution.
 4. Author was not allowed to use abstract as references.
 5. References should been published (book, research journal or proceeding). Unpublished references or not displayed data can not be used as references.
 6. References typed in numbering list (format number 1,2,3,...), ordered sequentially as they appear in the text (system of Vancouver or author-number style).
 7. Citation in the manuscript typed only the references number (not the author and year), example: Obesity is an accumulation of fat in large quantities which would cause excessive body weight (overweight) [1]. Obesity is a risk factor of diabetic, hypertension dan atherosclerosis [2].
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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)

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Cover:

Madakaripura Waterfall
Probolinggo, East Java, Indonesia

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