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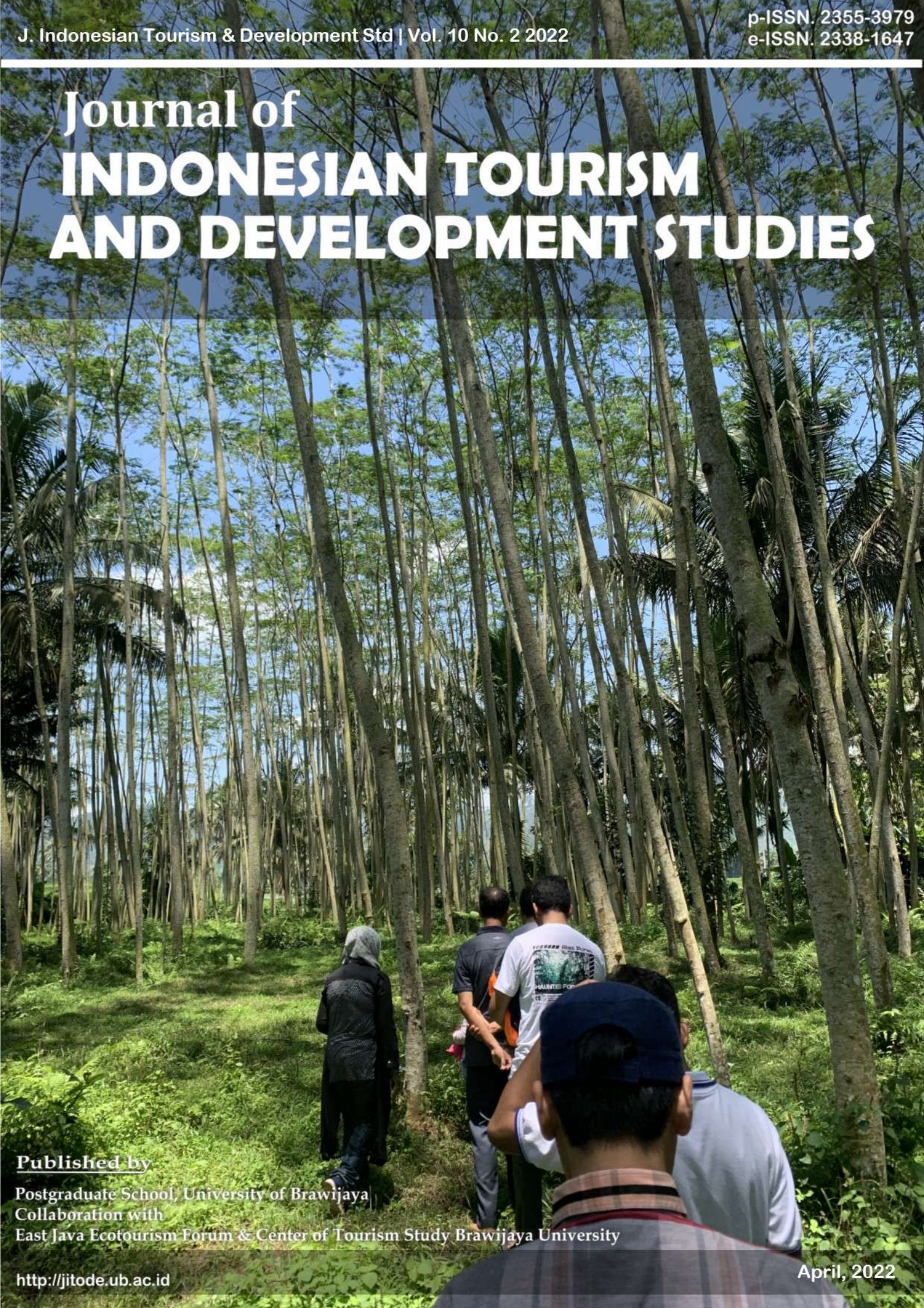

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An Ethnobotanical Study of Plants Used as Traditional Medicine and Its Processing in Gapura District, Sumenep, Madura

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Abstract

The aim of this study is to describe the variety of medicinal plants, the ingredients of medicinal plants, and its utilization in Gapura District, Madura Regency. This study was conducted on June – October 2021. This study methodology was started by collecting the data, observation, and documentation. This study consisted of 60 respondents aged over 35 years because they are more experienced in making traditional medicines. The analysis of data used UVS, FUVS, ICS, and SWOT. This study found that 37 of 30 families of medicinal plants were utilized by Gapura societies. Based on the results of FUVs (Family Use Value), the families that are often used by the people of Gapura District are Zingiberaceae with a percentage of 1.75%, and the Moringaceae family with a percentage of 0.5%. The commonly utilized plant organ is the rhizome which is processed using a grater. The strategy for conserving the diversity of medicinal plants in Gapura District is wild and cultivated. Wild plants are usually only considered pests by the local community, but some wild plants have very good potential to be used as traditional medicines. Cultivated plants are a way of processing medicinal plants with the aim of bringing maximum results with good quality. Furthermore, Gapura District made the farmers' community conserve the medicinal plants through biological conservation.

Keywords: Conservation strategy, ethnobotany, medicinal plants

INTRODUCTION

Medicinal plants are beneficial plants for paregoric, body immune booster, virus killer, and damaged organs reparation [1]. Parts of medicinal plants which are frequently used in traditional medicinal sciences are roots, barks, woods, leaves, flowers, and seeds [2]. Historically, Indonesian ancestors had already implemented traditional treatment using forest plants or the surrounding house plants to recover all kinds of illnesses, either external or internal diseases [3]. Scientifically, traditional medicine is a science, skill, and practical theory. It is also a belief, collective experiences of societies with a variety of cultures for health maintenance [4].

In traditional medical treatment, Madura ethnic use various forest and house plants. For example, weeds (*Imperata cylindrica*) used as cholesterol neutralizer, fertility, hematemesis medicine, snake potion neutralizer. Other examples of medicinal plants are star gooseberry and marsh fleabane, used as breast milk boosters, menstruation boosters, fluor albus neutralizers, also heartleaf maderavine madevine as scars infection medicine, etc. [5].

The existence of traditional natural resources emphasizes the correlation between the conservation systems and biological conservation. This fact relates to the finding of this study, which is expected to find a new and innovative medicinal plant to be observed further by some pharmacists for developing public health quality. Madura ethnic has their own manners in using the medicinal plants. Therefore, it is needed to explore more about the various medicinal plants usually utilized by Gapura District societies purposed to the medicinal plant's cultivation approach and involve the societies in natural resources preservation. The study of ethnobotany of medicinal plants aims to know the quantity and the variety of frequent medicinal plants used by Gapura District societies. This research aimed to describe the variety of medicinal plants in the Gapura district. Moreover, to describe the ingredients of medicinal plants and their utilization by societies in Gapura District.

MATERIAL AND METHOD

Research Location and Observation

This research was conducted in Gapura Sub-District, Sumenep District, Madura Regency (Fig. 1). The research was conducted from July-October 2021. The researcher started to approach Gapura District societies to get more data about the medicinal plants that existed in Gapura District, taking notes of the societies' names, ages, jobs, education, and their perceptions toward medicinal plants'

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conservation and utilization. The observations delegated several observers who collected the data by taking notes of all that they heard and saw in the research location.

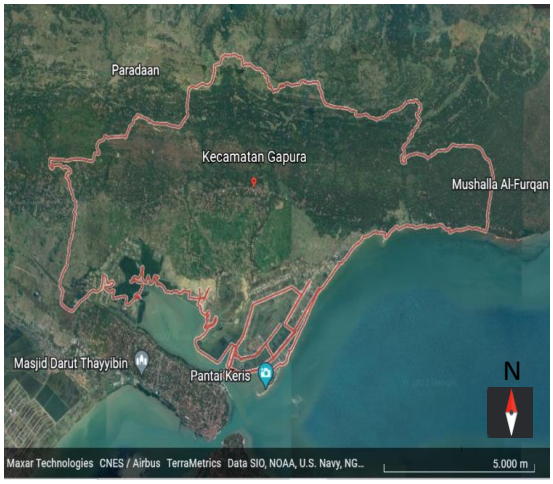

Figure 1. Gapura Distric, Sumenep, Madura (**Source:** Google Earth, 2022)

Interview and Documentation

The researcher collected the data by interviewing the respondents to get their perceptions and opinions about the study. The additional data was completed using questionnaires distributed to Gapura District societies, Gapura Head District, and other respondents related to the study. Questions posed to respondents include the types of plants used, processing methods, and parts used. The number of respondents is 60 people who are over 35 years old because they are more experienced in making traditional medicines. After the interview section and data about medicinal plants have been collected, the researcher also captured the variable location and made crucial notes to make the structural documents to strengthen the conductivity of the research observation.

Data Analysis

The data was collected by structural interview, observation, and documentation. Those data collected are analyzed using Species Uses Value (UVs), Family Use Value (FUVs), Index Cultural Significant (ICS), and SWOT analysis. UVs analysis aims to find out the utility of plants species using the following patterns [6]:

$$UVs = \frac{\Sigma UVis}{is}$$

Description

UVs : The total value of *s*
UVis : *s* value determined by respondent i
is : The total of respondents interviewed

UVs pattern can be extended to be FUVs when the data has a lot of species that can be representative of a certain family [1]. Meanwhile, ICS analysis aims to find out the form value of medicinal plants in the local culture. FUV and ICS analysis was calculated with the following patterns [1]:

$$FUV = \frac{\Sigma FUi}{n}$$

Description

FUV : Family form utility
FUi : The quantity of form utility of every family by the respondents
N : The total of species in a certain family

$$CSI = \Sigma(ixexc)x\ CF$$

Description

i : Species cultivation (a species effect toward community daily life). Score 2 assigns cultivation species, and score 1 assigns species in the uncultivated area.
e : Utilization options (a species that can replace another species' utility). Score 2 indicates unselected substitute.
C : The frequency of use (plants which are effectively used). Score 2 is assigned to the plants often used while score 1 indicates unknown plants/rarely used.
CF : The justification factor (informant consensus) is a deal intensity between informants. CF score is counted by dividing the total certain species citation and the total of most frequent species citations.

SWOT Analysis

SWOT analysis aims to know the potential recommendation in conservation support. Several factors of strategy in biodiversity conservation in Gapura District are grouped into some categories; those are *Strength (S), Weakness (w), Opportunity (O),* and *Strength (S).* This analysis can logically maximize the strengths and opportunities and also minimize weaknesses and threats.

RESULT AND DISCUSSIONS

Medicinal plants species in Gapura District

Based on the observation, there are 37 medicinal plant species, including 30 families most frequently utilized (Table 1). The interview records of Central Gapura and West Gapura societies show that they consume all the medicinal trees as traditional medicine formulated through some processes. They could easily find those medicinal plants around their house, in a garden, or even in the jungle as a wild

plant. The use of plants by local communities is influenced by various factors, including yield and availability, language, social relations [7], cultural history, understanding [8], belief, and trust [9].

Table 1. Medicinal Plants

No	Species
1.	Ginger (*Zingiber officinale*)
2.	Turmeric (*Curcuma longa*)
3.	Galangal (*Alpinia galanga*)
4.	Curcuma (*Curcuma xanthorriza*)
5.	Aromatic Ginger (*Kaempferia galanga*)
6.	Noni (*Morinda citrifolia*)
7.	Cassava (*Manihot esculenta*)
8.	Physic Nut (*Jatropha Curcas*)
9.	Star Gooseberry (*Sauropus androgynus*)
10.	Basil (*Ocimum sanctum)*
11.	Lemongrass (*Cymbopogon nardu*)
12.	Betel nut (*Areca catechu*)
13.	Coconut (*Cocos nucifera*)
14.	Date (*Phoenix dactylifera*)
15.	Palm Fruit (*Borassus flabellifer*)
16.	Betel leaf (*Piper betle*)
17.	Chili (*Piper retrofractum*)
18.	Guava (*Psidium guajava*)
19.	Water apple (*Syzigium aqueum*)
20.	Heartleaf Maderavine (*Anredera cordifolia*)
21.	Star fruit (*Averrhoa bilimbi*)
22.	Lime (*Citrus aurantifolia)*
23.	Purple leaf *(Graptophylum pictum)*
24.	Cherry *(Muntingia* calabura)
25.	Aloe Vera (*Aloe vera*)
26.	Morel Berry (*Physalis angulata*)
27.	Celery (*Apium graveolens*)
28.	Neem (*Azadirachta indica*)
29.	Papaya (*Carica papaya*)
30.	Star of Bethlehem (*Isotoma longiflora*)
31.	Jasmine (*Jasminum sambac*)
32.	Tamarind (*Tamarindus indica*)
33.	Sappan Wood (*Caesalpinia sappan*)
34.	Cinnamon (*Cinnamomum burmannii*)
35.	Lotus Thorn (*Ziziphus spina-christi*)
36.	Moringa Leaf (*Moringa oleifera*)
37.	Pine tree (*Acous calamus*)

Medicinal Plants Utilization in Gapura District

Traditional medicinal treatment with medicinal plants had been implemented by their ancestors in hereditary. With the development of modern medical treatment, Gapura District societies are still concerned to use traditional medical treatment using medicinal plants since they still believe in black magic (*santet;* witchcraft) or possessed.

The finding of the percentage of medicinal plants utilization by Gapura District is illustrated in (Fig. 2). The most consumed medicinal plant by Gapura District places ginger (its rhizome) which is crucial in daily life since ginger is not only used as a traditional medicine but also primarily needed to make food.

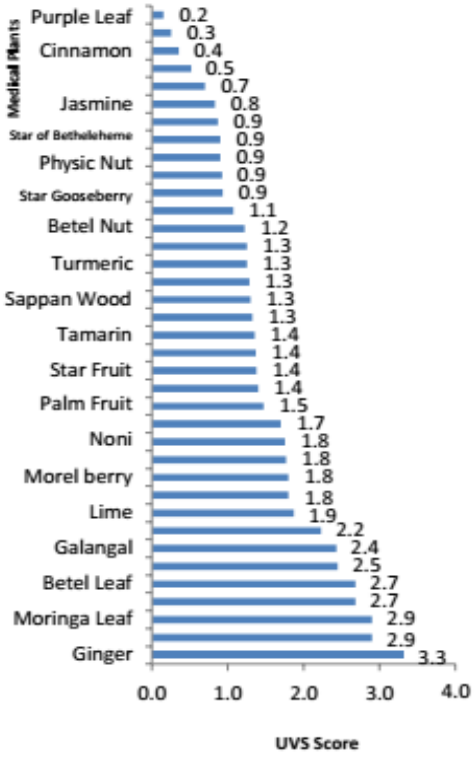

Figure 2. UVS of Medicinal Plants in Gapura District

The existence of biodiversity utilization shows Gapura District's nature and ecosystem sustainability. In this area, the wild herbs regenerate naturally without human intervention. This fact shows that Gapura District societies still conserve medicinal biodiversity. Medicinal plants are easy to get and widely available or used more often [10]. However, the main factor influencing the use of plants by local communities is the purpose of their use [11].

Medicinal plants Utilization based on its Family

The most frequently used medicinal plant for traditional medical treatment in 3 villages of Gapura District is the Zingiberaceae family. FUVs results from the three villages show 1.75% in East Gapura, 1.35% in Central Gapura, and 0.85% in West Gapura. Mostly Gapura District uses the Zingiberaceae family because this family is consumed in their daily life. This kind of family is easily got and found since Gapura District societies still conserve it around their house. Zingiberaceae family is used to increasing appetite, body warming, and injury treatment.

Zingiberaceae Family contains volatile oil, starch, tannins, and resins. Volatile oil works on stabilizing the nerve system, fun booster, curing several illnesses, and expediting blood circulation [3]. Medicinal plants are more secure since it

does not consist of chemical, it also costs cheaper, are accessible, and can be very helpful to be alternative medicine in an emergency [12], such as Corona Virus Disease 2019.

Analysis of Index Cultural Significance (ICS)

The research finding shows that the highest index culture goes to *Zingiber officinale* species with 222 scores and followed by *Moringa Oleifera* with 216 scores, while the lowest index is *Jatropha curcas* with 1 score and followed by *Graptophylum Pictum* with 2 scores. This fact is caused by the high-intensity use of ginger as the primer needs and the accessible product. Ginger is claimed as a medicinal plant for medical treatment to warm the body, relieve cough, relieve nausea, and relieve menstruation cramps. Additionally, ginger is also proven as a traditional medicine for immunity boosters. The mixture of ginger and honey is the best concoction to recover children's cough, while the bioactive substance is beneficial for other diseases [5].

Moringa leaf (*Moringa oleifera*) is also another accessible medicinal plant in Gapura District; otherwise, the societies rarely consume this medicinal plant since they just need this plant at a certain time. In contrast, Gapura District societies almost every day consume ginger since ginger has a lot of benefits for medical treatment, and it is also an ingredient. Moringa (*Moringa oleifera*) is a plant that is recognized to have many uses nationally and internationally. In Indonesia, Moringa is used for food, medicine, cosmetic ingredients, and cultural rituals [13].

Star Gooseberry (*Sauropus androgynus*) is used to boost breast milk and relieve fever, while the purple leaf is used for expediting menstruation. These two medicinal plants are rarely consumed because of low cultivation and are just consumed by certain people, for example; massager, and midwives. Currently, the management of medicinal plants needs to be considered a basic necessity of life because today's society prefers traditional treatment with basic ingredients from herbal plant parts [6].

Utilized Plants Organ by Gapura District

Several traditional herbs in Gapura Districts are from cultivated medicinal plants or wild medicinal plants. There are a lot of cultivated medicinal plants in Gapura Districts, such as turmeric, ginger, and galangal, since those medicinal plants are not only medicinal herbs for Gapura District societies but also ingredients or spices. Contradictory, wild medicinal plants will be extinct if those plants are neglected and low-cultivation; otherwise, this matter can be solved by exploration and data collection.

As has been mentioned previously, not all Gapura District societies consumed medicinal plants every day, but only certain people like massagers, midwives, or physicians to cure their patients' illnesses. It is noted that every single physician has their ritual in making the medicinal herbs, but they prefer to keep it privately because it is their own ancestor's confidential.

There are a lot of kinds of medicinal plants that can be used for medical treatment, for example, medicinal plants, ornamental plants, vegetable plants, and fruity plants. Additionally, the useful parts of trees used as traditional herbs are roots, tubers, rhizomes, twigs, stems, leaves, flowers, fruit, and seeds (Fig. 3).

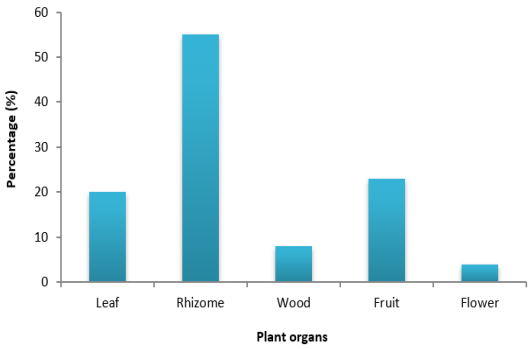

Figure 3. Plants organ frequently used

Based on the percentage graphic above, the most frequently used plant organ is rhizome, proven by mostly Gapura District societies consumed Zingiberaceae since it is considered as primer needs and easily found. Cultivation of ginger plants is in great demand by the people of Gapura because, in addition to easy maintenance, ginger can also be grown in arid lands such as in Gapura District. Ginger vegetative growth is not affected by increasing periods of drought stress [14].

The most rhizomes used are the ginger plant because apart from being made for medicinal, ginger plants are also needed by people for spices. The content contained in the ginger plant nutrients in ginger can complement the nutrients in the main menu and help launch the digestive process Active substances in essential oils, among others: shogaol, gingerol, zingerone, and other natural antioxidant substances, have properties to prevent and treat various diseases from mild to severe, such as colds, coughs, headache, aches, rheumatism, nausea, motion sickness,

impotence, Alzheimer's, cancer and heart disease.

Pharmacy Process of Medicinal Plants by Gapura District Societies

The use of medicinal plants or medical treatment has been implemented in the ancestor's era and inherited to their generation. Mostly, Gapura District societies still consume traditional medicine because they still trust in their ancestors that medicinal plants have more potential in curing any illness, such as betel leaf, which can clean dirt in eyes.

Traditional medicine in Java is widely documented by the nobility for the legacy of knowledge. Herbal medicine is used by the elite in addition for treatment. People generally use empirical knowledge about herbs that are passed down orally, putting more emphasis on information about ingredients for herbal medicinal mixtures [15].

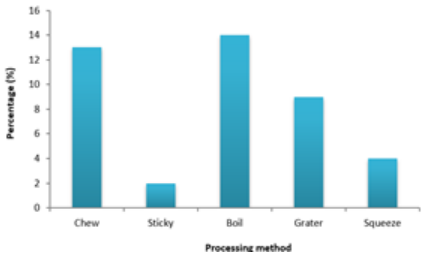

Figure 4. The process of medicinal plants

The graphic above (Fig. 4) shows that most people use the boiling manner to make medicinal herbs since they process the medicinal herbs based on their needs, and the boiling method tends to suit. Besides, they sometimes mix the medicinal herbs while boiling with other medicinal plants based on their hereditary sciences. The second manner mostly used to make the medicinal herbs is by a grater. It is usually used to process rhizomes into medicinal herbs by squeezing them to separate the water and the pulp. Then they will consume the squeezed water as medicinal herbs.

There are more methods to process the medicinal plants into medicinal herbs. Those are being dried, pounded, grated, brewed, boiled, roasted, chewed, dripped, squeezed, smeared, or directly eaten and drunk.

Traditional Chinese medicine is a treatment that has an older history than chemical drugs originating from the West. Traditional medicine has been part of Chinese culture for more than 3000 years and has spread for decades throughout the world, and one of them is Indonesia. Traditional Chinese medicine has been known as a medicine that has fast effect and potent properties. The traditional medicine is mostly in the form of powder and processed by grinding [16].

Conservation Strategy Medicinal Biodiversity in Gapura District

Strategy is planning, direction, and management united to achieve the goals by balancing strategic superiority and the environmental challenge. The strategy of medicinal plant cultivation must highlight the technical, social, cultural, and economic aspects. The technical aspects reviewed from the ecology aspects are abiotic and biotic.

Table 2. SWOT analysis

Strength	Weakness
Gapura District societies	Gapura District societies still lack in developing the agriculture of medicinal plants
Mostly, Gapura District societies still keep the medicinal plant sustainability	The low education of Gapura District societies
Gapura District societies are still consume medicinal herbs as *Jamu*, which made traditionally	The low awareness of Gapura District societies about the decrease of medicinal plants
There are still a lot of massagers, midwives, and physicians that use medicinal plants	The low knowledge of young generations toward the medicinal plants
Gapura District societies do not only use medicinal plants as a traditional medicine but also use them as primer needed in their kitchen	The low interest of Gapura District societies in medicinal plants growth
Opportunities	**Threat**
Supportive natural resources	The medicinal plant's habitat damage is caused by the low attention to the environment
Government support to make farmer community of medicinal plants	The extinction of medicinal plants
In most of the Gapura District area, the medicinal plants self-regenerate without humans interventions	The extinction of local culture about the benefit of medicinal plants
The opportunities for medicinal plants spread	

The abiotic aspect includes temperature, temperature, humidity, rainfall, pH, type of soil, soil structure, soil depth, and soil fertility, while the biotic aspect includes types associated with

trees and herbs with medicinal plants [3]. The strategy of ethnobotanical processing of medicinal plants around the house yard in Gapura District can be analyzed using SWOT in Table 2. Based on the SWOT points in Table 2, the following is a conservation strategy using the SWOT matrix (Table 3).

Table 3. Conservation Strategy of Medicinal Plants in Gapura District

Internal factors / External factors	Strength	Weakness
	S-O Strategy	**W-O Strategy**
Opportunity	Preserving the wealth of natural resources owned, including local species that exist and the fertility of the soil	Providing knowledge to the younger generation about the importance of medicinal plants and how to process them
	S-T Strategy	**W-T strategy**
Threat	Invites the community to use land or gardens for cultivating medicinal plants	Conducting educational activities about biodiversity conservation for the surrounding community

CONCLUSIONS

Based on the research results, there are 37 species of 30 families utilized by Gapura societies. On the other hand, the most frequent method used to process medicinal herbs production is by a grater. The conservation strategy of biodiversity, especially for medicinal plants in Gapura District, is individual cultivation through renewal habitation. Besides, Gapura District societies still believe in their ancestors' sciences about the medicinal herbs process. Unforgettably, they make farmer communities keep the medicinal plant's sustainability and the conservation of biodiversity.

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Ethnobotany of Homegarden in The Island of Gili Iyang, Sumenep Regency

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Abstract

This study aimed to assess the ethnobotany of home gardens and lad-use units in Gili Iyang Island, Sumenep Regency. It is expected for future strategic issues, such as global warming mitigation, biodiversity conservation, and food security. This study used an observational method with informal and semi-structured interviews with an indigenous community in Gili Iyang that has a homegarden or yard and uses the plants within for their daily life. Data were analysed by using the Used Values (UVs) and Index of Cultural Significance (ICS). The results showed that there were 63 types of plants located in two places (in the land unit and the homegarden). The community of Gili Iyang widely used the plant of *Zea mays* L. as the staple food (UVs=1.0), *Borrasus flabellifer* L. that produce sap (UVs = 0.9), and *Lannea coromandelica* (Houtt.) Merr.t) for land fence and animal food (UVs 0.9). In the area of the house yard, several plants are often used by the people of Gili Iyang, including the *Mangifera indica* L for its fruit (UVs=0.8), *Piper betle* L. for its medicinal use (UVs=0.7), and *Manilkara zapota* (L.) P. Royen for its fuitr (UVs=0.7). The three-highest ICs were *Cocos Nucifera* L, *Borrasus flabellifer* L., and *Zea mays* L for 162, 136, and 105, respectively, due to their multipurpose uses. *Taniyan Lanjheng* house and *Pamengkang* (homegarden) as local custom need to be conserved to support the sustainable cultural and plant conservation effort in Gili Iyang.

Keywords: Ethnobotany, house yard, land unit, Gili Iyang.

INTRODUCTION

Madura Island is part of East Java Province with four Regencies, namely Bangkalan, Pamekasan, Sampang, and Sumenep. Geographically, Sumenep Regency is located at the eastern tip of the island of Madura. Topographically, Sumenep Regency is classified as lowland and slightly hilly. Sumenep Regency has 126 islands scattered in the eastern area and forms a cluster of small islands. One of these small islands is the island of Gili Iyang.

Gili Iyang is known for its oxygen that 3.3 – 4.8% higher than normal oxygen (20%) based on LAPAN and Environment Office of East Java joint research in 2011 [1]. Another study in 2013 by Technical Center for Environmental Health and Disease Control (BBTKL-PP) showed a 20.9 - 21.5% oxygen level [2]. It was assumed that the high oxygen level related to the biodiversity of plants within the Island, that maintained by the local conservation effort through homegarden local wisdom.

Community development in small islands can be done by optimizing the potential of local resources, namely utilizing and managing natural resources and local wisdom with a conservation concept [3]. Belief values, *adat* (tradition) content, and local knowledge are important elements in formulating local wisdom in the community [4]. According to Hakim [5], local communities played an important role in plant conservation and ensuring food security locally, regionally, and globally.

The small island communities have not made optimal use of natural resources. Therefore, the role of ethnobotany in the development of small islands is needed, one of which is by optimizing plants in the yard. Agbogidi and Adolor [6] stated that large yards found in rural areas with complex uses and structures are designed to provide benefits to the community and the ecosystem. The community of Gili Iyang Island has its own custom in the use of its natural resources. Likewise, the use of herbal medicine, called *jamu* by Madura ethnic in Pamekasan, is another regency in Madura Island [7].

Most of the community activities on the island are fishermen and farmers. Meanwhile, the socio-economic status of the potential home garden, yard, and land units in the people of Gili Iyang Island has yet to be identified. So far, data and ethnobotany inventory of homegarden and local wisdom in Gili Iyang Island, Sumenep Regency have not been studied much. Therefore, this study aims to assess the ethnobotany of homegarden and the land unit which was significant for future strategic issues, including global warming mitigation, biodiversity conservation, and food security program.

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MATERIAL AND METHOD

Description of the sampling area

This research was on Gili Iyang Island, Dungkek District. Gili Iyang Island is part of a small island located in Sumenep Regency and has two villages, namely Bancamara Village and Banraas Village. Geographically, Gili Iyang Island was located at 06°59'9" S and 114°10'29" E with an area of 921.2 ha. Based on data obtained from the census in 2016, the population reached 8,453 people were consisted of 3,907 men and 4,546 women. The research was conducted from December 2019 – March 2020.

Gili Iyang Island has a typology of beaches which is dominated by rocky beaches with many high coral cliffs. The existence of this rocky beach is almost evenly distributed around the island, almost 70% of the Gili Iyang Island area.

Small islands tend to have limited resources of plants (food, medicinal, etc.). Thus the local community has to plant their own resources by utilizing their house yard. Homegarden became a form of effort for the local community to the plant resources security, especially for food. The house is surrounded by homegarden, maintained for several generations, and planted with their local knowledge.

The sampling was conducted along the corridor of Gili Iyang Island. The data on the land unit was collected by GPS and then a map of land unit orientation was made (Fig. 1). The land unit was classified into the forest, orchard, house, and other public facilities. The green open space that supports plant conservation was also observed in this study.

House in Gili Iyang was named *taneyan lanjheng* (means long yard), surrounded by houses of family or their filial or other family members (Fig. 2). The house has homegarden for each sub house, on the outer side.

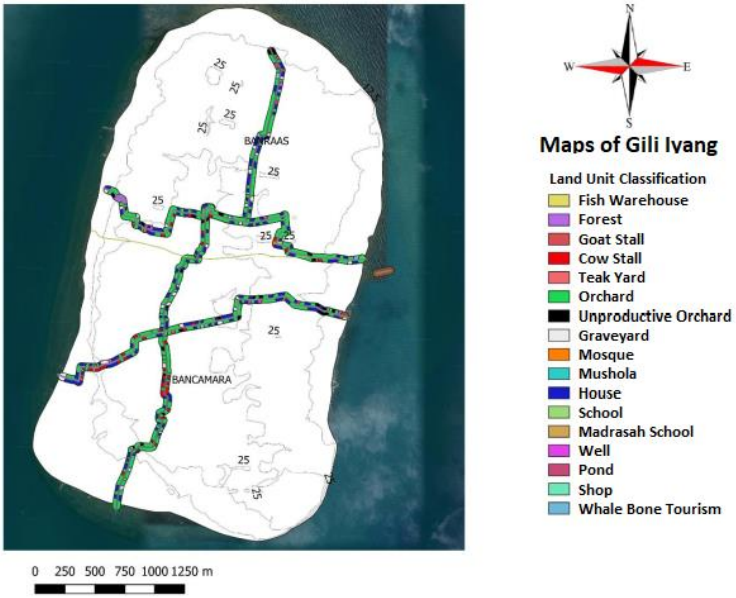

Figure 1. Orientation map of Gili Iyang Island

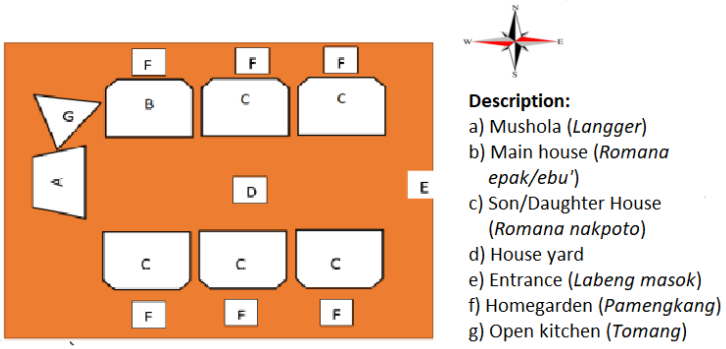

Figure 2. Traditional House of *Taneyan Lanjheng* Lay out in Gili Iyang

Data Collection

This research uses the method of observation of snowball sampling, namely by seeking information from the local community about the ethnobotany of the yard. Interviews were conducted in an informal and semi-structured manner with questionnaires [8]. A total of 60 respondents 55% male and 45% female, 25-72 years old who daily use house plants and know about the benefits of these plants. The respondent that has farming as their occupation was 82%, and the rest were employed and entrepreneurs. Respondents in this study are the indigenous people of Gili Iyang Island who have a house yard and know many things about the benefits of a house yard. Interview documentation using a voice recorder (audio). The interview and questionnaires related to the utilization of plants for daily basis or cultural use.

Data Analysis

The data from questionnaires were classified for analysis using the ethnobotany index. Data analysis in this study used quantitative methods. The important value of home garden plants was known based on the level of utilization using the Used Values (UVs) and Index of Cultural Significance (ICS) methods, with the following formula [9,10]:

$$UVs = \frac{n}{N}$$

Description:

UVs = Use values of a species
n = Number of uses for species mentioned by respondents
N = Total respondents who recommend

$$ICS = \sum_{i=1}^{n} (\mathrm{q\,x\,i\,x\,e})\, n$$

Description:

ICS = The sum of the calculation of the utilization of a plant species from 1 to n
n = Shows the n utilization of the last
i = values 1 through to n and so on.
q = Quality value by scoring
5 = staple food
4 = secondary/additional food and primary material
3 = others, secondary material, and medicinal plants
2 = rites, myth, recreation
1 = mere regocnition
i = Intensity value of utilization by scoring
5 = very high intensity 2 = low intensity
4 = high intensity 1 = rare intensity
3 = moderate intensity
e = Exclusivity value
2 = Favorites, main choice and second to none
1 = there are possibility to be options
0.1 = secondary material

RESULT AND DISCUSSION

UVs of Plants in Gili Iyang

In accessing the interests and uses of a local plant species, it is necessary to play an active role with a group of people in developing and preserving it. Each region has its structure and diversity and has functions and benefits by the customs and culture of each region. Identifying local ethnicity is an important part of the introduction of local plant species on small islands.

The people of Gili Iyang have their way of identifying and reproducing plants as a source of life, which can be seen in terms of morphology, cultivation methods, and characterization. Based on the observations, there were 63 types of plants located in two places, e.g. in the yard (homegarden) and on the land unit. The following are the results of the utility values for land used by the community (Fig. 3). The land used by the community is widely planted *Zea mays* L. (UVs = 1.0), *Borrasus flabellifer* L. (UVs = 0.9), and *Lannea coromandelica* (Houtt.) Merr.) (UVs = 0.9). Meanwhile, in the home yard area, several plants are often used by the people of Gili Iyang, such as *Mangifera indica* L (UVs = 0.8), *Piper betle* L. (UVs = 0.7), and *Manilkara zapota* (L.) P. Royen (UVs = 0.7).

The community said that the most widely used crop in each land was corn. The UVs data has the highest value reaching 1.0 for *Z. mays* L. It is because this crop was the staple food of the Gili Iyang community. The people of Gili Iyang used every part of the *Z. mays* in a beneficial value. This was in accordance with the results of interviews with the people of Gili Iyang and proven by the analysis of the interests value of the types of plants used by the community.

Secondly, the people of Gili Iyang knew the *Borassus flabellifer* L. tree as the local name of the *tarebung* (in Bahasa, it was called Siwalan). *Borassus flabellifer* is a palm species that produce sap with great potential in Indonesia. The tree can reach 30 meters or more with a straight trunk. The fan-shaped blades and leaves grow in clusters at the shoots with a growth diameter of about 150 cm and a stem 90-120 cm long. Male flowers are arranged in a series of long grains (20-45 cm) with a diameter of 2-3 cm [11]. The data on the distribution of *Borassus flabellifer trees* obtained from various literacy sources predicts that they tend to live in critical land. The ideal habitat for *tarebung* trees to grow on dry and open plains with an altitude below 800 m asl [12].

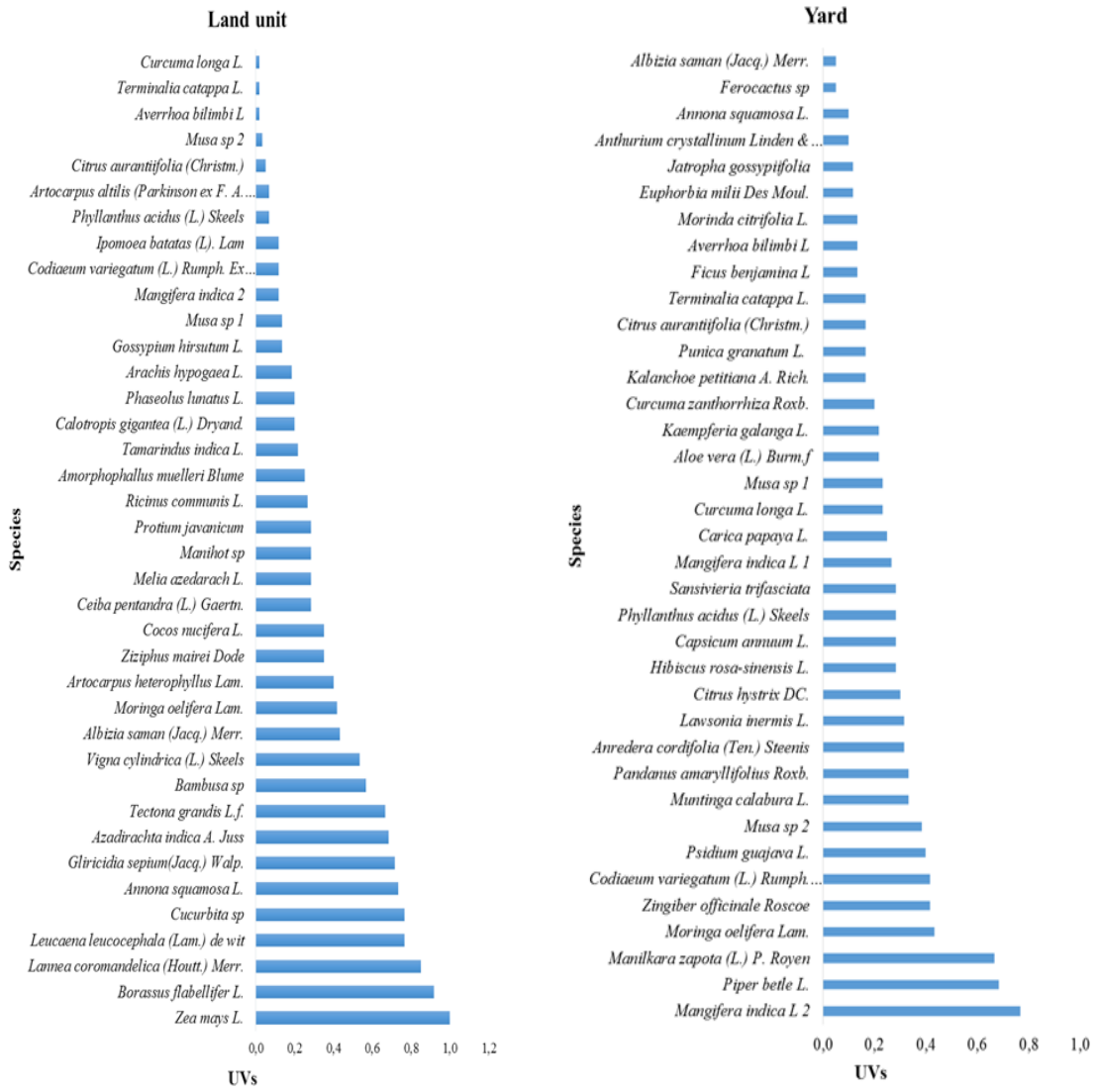

Figure 3. Graph of UVs value for plant species in Gili Iyang Island land unit and Yard (homegarden)

The *Lannea coromandelica* (Houtt.) Merr. trees, besides functioning as a divider for land units, the community also uses the leaves for animal feed sources. *Lannea coromandelica* in Madura is known as *palembeng*, while in Java it is known as the *kudo* or *jaranan* tree. In terms of morphology, *L. coromandelica* is a wild plant that is green in the color of the leaf, the surface of the leaves is leavis, an odd-pinnate compound, and the pinnate is oval and has a pointed tip [13].

Mango (*Mangifera indica* L) is a plant in great demand that is planted in front and back yards. The mango tree is very popular with the community because the fruit has many benefits and is consumed by the community. Apart from being consumed, mangoes have an economic value that can be processed into fresh drinks such as mango syrup, mango juice, etc. In addition, mangoes have many sources of vitamins and minerals [14], one of which is quercetin [15].

The benefits of mangoes are not only as food but also as a shade plant. Ecologically, mango functions as a protective plant for soil layers [16]. Mango is one of the seasonal fruit varieties that have become the mainstay of the agricultural sector and a source of the community's economy. There are several varieties of mangoes on the island of Gili Iyang, one of which is of great interest to the public is mango *manalagi*. *Manalagi* mango is the result of a cross between mango *golek* and *arumanis* [17].

Piper betle L. is a vine in the yard of the house and becomes a high-level plant for its use and importance in the people of Gili Iyang. The leaves are useful as a traditional medicine that has

always been used from generation to generation. Thus so many people plant *P. betle* in their yards. Morphologically, *P. betle* has a height of about 15 m and has greenish-brown stems and internodes where new roots can emerge [18]. The people of Gili Iyang mostly use *P. betle* leaves as a treatment for eye, stroke, nosebleeds, and others.

Piper betle leaves for eye treatment using its concoction that obtained from the boiled leaves. This kind of treatment is hereditary in the Gili Iyang community. Meanwhile, for the treatment of stroke, the betel leaves are boiled, then mixed with ice cubes, and added with enough kerosene and methylated alcohol. After that, it was soaked and rubbed to the affected body parts (e.g. limb and foot). Treatment for nosebleeds is merely done by rolling the green *P. betle* leaves, then plugging them into the nosebleed nose. Suranto [19] stated that in the use of *P. betle* leaves, it is necessary to use leaves that are still green and picked before sunrise to keep the aroma of the leaves. *Piper betle* leaves also contain antibacterial substances [20].

The UVs value that is also widely used by the people of Gili Iyang was *Manilkara zapota* (L.) P. Royen for 0.7. *Manilkara zapota* is a tropical fruit and is very promising to be developed. Besides functioning as sapodilla food, it also was an annual economic source. The people of Gili Iyang cultivate *M. zapota* due to its business opportunity. The cultivation is also easy, with the graft system and the care, it will bear fruit all year round.

Manilkara zapota has long been known and is widely planted from lowlands to places with an altitude of 1200 m above sea level, such as in Madura and Java. It is part of the Sapotaceae family and is cultivated for its fruit [21]. Morphologically, *M. zapota* is a large tree that has shady branches, 30-40 m in height, has low branches, has a thick trunk, and is blackish gray to dark brown. All parts of the plant contain a thick white sap. It has a single leaf located alternately, often gathering at the end of a branch. The leaves are flat-edged and slightly hairy, leavis dark green, round egg shape to a bit lanceolate 1.5x 3.5-15 cm, the base and tip are wedge-shaped, stem 1-3.5 cm, the main leaf bone protrudes from the lower [21].

ICs

The most important plant that is useful for the people of Gili Iyang is coconut (*Cocos nucifera* L.) which reaches 162 ICS values (Fig. 3). The coconut tree is a multipurpose plant because all parts of this plant are beneficial for human life. Coconut plants also have high cultural and economic value in people's lives [22].

The people of Gili Iyang make use of the coconut part based on its frequent uses. Coconut leaves can be used as a wrapping material for *ketupat* (traditional diamond-shaped rice cake). The leaves are yellowish and often used for wedding ceremony events. The old leaves weaving was used as the stall roof, house roof, mat, and container for offerings. While the leaflet was made into brooms and toothpicks.



Figure 3. The value of the importance of plant species used by the Gili Iyang community

The coconut has several parts, including the outer coat, coir, shell, copra, and coconut water. People in Gili Iyang stated that coconut coir is often used as raw material for making mats and firewood, while coconut shells can be used as home decorations, rings, ashtrays, and charcoal. Besides consumption, the coconut fruit is processed into coconut oil, vegetable ointment, coconut milk, and biological pellets. Lastly, coconut water is made for drink and also useful as a medicine to improve body health and an antidote. Meanwhile, coconut trunks are used as furniture, home furnishings, and firewood.

The second important plant that is often encountered or has useful species value in Gili Iyang is *Borassus flabellifer* L. Tree (ICs = 136), which is a potential sap-producing palm The people of Gili Iyang use sap as sugar. It has many functions and benefits, such as soil preservation and preventing erosion by its fibrous roots [23].

The people of Gili Iyang make use of *B. flabellifer* from all parts, thus, it is a versatile plant that has benefits and economic value for the people of Gili Iyang. The roots were used as fuel, while the old tree trunks can be used as building materials and house supports. The dense wood texture is durable, and not easily eaten by termites. Meanwhile, the leaves are made into woven mats, large baskets, and also for cow feed. The flowers of the *B. flabellifer* can be tapped and produce sap, and then the sap can be processed into brown sugar and vinegar.

Third important plant in Gili Iyang is corn (ICs=105). Madurese community, especially on the Gili Iyang Island, has the highest use of interest. Besides staple food and other various purposes, Bakhri [24] states that corn is a raw material for the food industry. Corn is included in the family of Poaceae order Poales, a single-house plants (monoecious), where male flowers are separated from female flowers but still in one plant. Corn can grow at 0-1,300m above sea level and survive well in tropical and non-tropical areas. The corn plant must get sufficient sunlight during growth.

The people of Gili Iyang knew that every part of the corn has benefits. The leaves are used as animal feed, as well as the young stems, while the old stem is used as firewood. The part that is used the most is the fruit part, as a staple food, a side dish, e.g. corn pancakes and corn *dodol* (sweet-toffee). The corn kernels were also used as firewood, while corn husks can be used as smoking paper, sugar candy wrappers, and containers for sap sugar. So every part of the corn has value in its use by the community.

Traditional Corn Agricultural System

The Madura people especially Gili Iyang still use simple cultivation, namely traditional which is usually carried out from generation to generation by their ancestors. On average, the people of Gili Iyang plant corn using cow power. It is still difficult for farmers to be invited to make changes and implement cultivation that can increase production, regarding the use of superior varieties, use of fertilizers, planting maintenance, and spacing. Until now, the types of corn being cultivated are still using local varieties with low production levels.

The people of Gili Iyang cultivate two types of corn varieties, namely small corn, and big corn; people usually call it *jegung jebe* (Javanese corn). Small corn is a local corn variety commonly cultivated and consumed by the people of Gili Iyang, while large corn (*jegung jebe*) is a hybrid corn variety. Not all people grow hybrid corn because, in addition to expensive corn seeds, local people tend to like the taste of local corn better.

In addition, the shelf-life of hybrid corn is very low compared to local corn. On the other hand, local corn has a long shelf life of about a year, so it can be used as an annual food reserve. Based on the results of research by Suhardjo and Lestari [25], local Madura corn has a high protein and fat content of 11.24% and 4.96%, respectively, compared to hybrid corn. The tongue of the Madurese community is already accustomed to local maize, which they think tastes better and savory than hybrid maize varieties. Thus, the reluctance of the Madurese community to change the type of farming from local corn to hybrid corn is thought to be closely related to the consumption pattern, customs, and culture of the Madurese community.

Rituals for crops

The people of Gili Iyang have their way of storing their crops. People store corn in the barn in the kitchen, with the aim that the corn is exposed to smoke from the kitchen while cooking so that the corn is more durable. The interest is in the ritual tradition of the Gili Iyang community before planting corn. There are four rituals performed by the people of Gili Iyang in implementing corn cultivation.

The first ritual is *selamatan bumi* (thanksgiving for earth) before farmers sow corn seeds. The community holds a prayer together to

provide food for the guardians of the earth. Thus they will protect their crops and away from any *bala* (crop problems, e.g. crop failure, obstacles, and pests).

The second ritual is when the corn plants have started to grow, about 15-20 cm. When they are 10-15 days old, the community holds a ritual called *La'ola'*. It is the Madurese language which means caterpillar. The farmers bring *La'ola'*, a food made from sago flour with a caterpillar shape. A plate of *La'ola'* is given to the *Kiyaji* (village's Muslim religious leader), so he can pray for the safety of the plants from pests, especially caterpillars.

The third ritual is named the *selamatan jagung* (corn thanksgiving). When the corn is mature to be harvested, the farmer gives a plate of roasted corn to the *Kiyaji* before harvest. The ritual is a form of gratitude for the Gili Iyang people because they have safely harvested their crops. And the fourth ritual is before entering the barn. The ritual is similar to the previous ritual, which asks *Kiyaji* to pray for the harvest that they want to put in the barn. This ritual aims to secure the corn in the barn that will be used as food capital for a year.

Plant Diversity Conservation Strategy on Gili Iyang Island

Concept of Taniyan Lanjheng House

For a long time, the people of Gili Iyang generally have a livelihood as fishermen and farmers. The community utilizes land units as an effort to conserve biodiversity by forming local communities in preserving biodiversity along the Gili Iyang Island corridor. The land units on Gili I Island are planted with teak and homegardens planted to sustain basic needs, spiritual activities, and traditional medicines. Each household optimizes its land to provide for their family needs [26].

The interesting thing about the concept of houses on Gili Iyang Island is *Taniyan lanjheng* (long yard) as a single traditional house. It has a great opportunity as an ecotourism destination based on local ecosystems and local culture as well as a center for studies on the topography of Gili Iyang customs.

To conserve the concept of traditional houses, it is necessary to hold the role of the community and the government to provide education about the importance of the concept of traditional houses and the importance of ethnobiology and ethnography from Gili Iyang Island. The government as a stakeholder needs to provide education and assistance to the community regarding the preservation of the traditional architecture of the Gili Iyang settlement, besides ethnobiology and ecotourism studies on Gili Iyang Island. Therefore, all elements of society, e.g. government institutions and community leaders, must coordinate with each other to maintain the local wisdom, customs, and culture of Gili Iyang Island and develop the homegarden optimization.

Pamengkang Optimalization

Some Gili Iyang people still do not understand the role and benefits of the *Pamengkang* (homegarden). Thus, the home yard management and layout of plants are less maintained. To overcome this, activities in the form of socialization, education, and assistance are needed in terms of managing, utilizing, and preserving local plants and homegarden of *Pamengkang*. In addition, it is also essential to make written and oral evidence to convey information to the younger generation for sustainability.

The existence of a homegarden has the opportunity as an additional economic and food resource for the family. If the villages apply the concept of a greenhouse by making good use of their yard, it will have the opportunity for ecotourism, and be used as an ethnobiological study. This concept certainly requires the role of the village government and the community to make it happen. Build a sense of love and enthusiasm for the community to cultivate in their homegarden, and give appreciation to the community in managing the homegarden well. Consistently, if the government continues to give appreciation to the community, then the community will automatically be moved to cultivate and conserve the homegarden well and in harmony.

It is needed to encourage mutual agreement to support the island conservation programs, especially in controlling the environment quality. Especially in maintaining the traditional culture and local wisdom on Gili Iyang Island. The community needs to involve the younger generation in the routine activities of local customs and wisdom events so that the younger generation can understand the heritage of their ancestors and they can preserve it for the next generation.

CONCLUSION

We found 63 types of plants on Gili Iyang Island, as the materials for sustainable

conservation on small Islands. People in Gili Iyang use plants as a source of food, economy, medicinal, and biodiversity conservation. The utility values for plants used by the local community in the land unit are *Zea mays* L., *Lannea coromandelica* (Houtt.) Merr.t and *Borrasus flabellifer* L for 1.0, 0.9, and 0.9 UVs, respectively. Meanwhile, in the area of the homegarden, plants that are often used by the community are *Mangifera indica* L, *Piper betle* L., and *Manilkara zapota* (L.) P. Royen for 0.8, 0.7, and 0.7 UVs, respectively. Meanwhile, the ICS value showed that *Cocos nucifera* L. (ICs=162), *Borassus flabellifer* L. (ICs=136), and *Zea mays* L. (ICs=105) have the three-highest importance used among the people of Gili Iyang.

The traditional corn agricultural systems in Gili Iyang use local corn for cultivation and established rituals for their crops, especially for corn crops. Their local wisdom in house layout makes it possible to support sustainable cultural and plant conservation in Gili Iyang, i.e. with *Taniyan Lanjheng* house and *Pamengkang* (homegarden) optimization. However, they need to involve the youth generation to support the government in maintaining the customary.

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Tourism Life Cycle Analysis of Saribu Rumah Gadang Region, South Solok Regency, West Sumatra Province

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Abstract

This study aims to analyze the development of the tourism life cycle in the Saribu Rumah Gadang Region. All stakeholders have been serious about developing and managing the area since 2013. Seeing the Saribu Rumah Gadang Region's development, which continues to increase significantly, and the government's assistance is quite massive, it is necessary to know the stages of the tourism life cycle in this area. Tourism life cycle analysis was chosen as the approach. Indicators and parameters use cooperative tourism success elements: attraction, access, amenities, and ancillary service, observed with the Buttler Tourism Area Life Cycle (TLAC) theory. This research was conducted with a descriptive-qualitative approach. The results showed that the Saribu Rumah Gadang area's tourism cycle process had just entered the development phase. Exploration phase from 2007-2014, the involvement phase from 2014-2018, and the development phase from 2018-2020. Stakeholders are expected to continue making improvements such as building international standard facilities, attracting foreign investors to invest, calculating carrying capacity, and carrying out international-standard promotions so that tourist visits continue to increase and become known to foreign tourists.

Keywords: Life Cycle Analysis, Saribu Rumah Gadang Region, South Solok

INTRODUCTION

The tourism sector is already recognized as the largest industry of the century, seen from several indicators: contributions to foreign exchange and labor absorption. With its various characteristics, the tourism sector has become a mainstay sector in economic development in various countries, including Indonesia.

The tourism sector is a sector that is relied upon as a contributor to foreign exchange for Indonesia. In 2019, the tourism sector was the second largest foreign exchange earner. The tourism sector also provides a multiplier effect on various other sectors. Tourism absorbed around 10% (13 million workers) of the total national workforce in 2019 [1]. The accommodation, food, and drink sector also absorbed 7% (8.5 million workers) of the total national workforce [2].

According to data from the Central Statistics Agency in 2019, foreign exchange contributions to Indonesia's tourism sector continue to increase from foreign tourist visits. Starting from 2015, as much as $12.23 billion to $19.29 billion in 2018. The number of foreign tourist arrivals increased by 12.58% in 2018, thereby increasing Gross Domestic Product (GDP), open employment, and improving the Indonesian economy level.

Various regions in Indonesia are also serious about developing and managing the tourism sector, including South Solok Regency, West Sumatra Province. Several tourist destinations began to be managed and developed, such as Saribu Rumah Gadang Region, Twin Waterfalls, Batu Kapal Cave, Tangsi Ampek Waterfall, Hot Water Boom Sapan Maluluang, etc. This is also marked by the increasing number of tourists visiting the South Solok Regency in the last five years (2014-2018).

One of the tourist destinations that is a priority for developing the South Solok Regency Government is Kawan Saribu Rumah Gadang. This area was developed in 2014 and has become a tourism icon in South Solok Regency. In this area, there are 125 Rumah Gadang from various tribes in Minangkabau [3]. It is a significant potential that must be managed and developed.

The existence of the Rumah Gadang, which is decreasing day by day, is a concern for many parties. The government and several related parties are considering the need to maintain the sustainability and existence of the Rumah Gadang in the future [4]. One of the steps that can be taken is the conservation of Rumah Gadang through tourism. Tourism activities that make the Rumah Gadang one of its attractions will improve the economy of the surrounding community and impact the preservation of the Rumah Gadang itself. It underlies the South Solok Regency Government to set the Saribu Rumah Gadang area as a tourism development priority [5].

After being declared a priority destination for tourism development, tourist visits to the Saribu Rumah Gadang area have increased yearly. The presence of these tourists is new hope for residents to improve the economy through the tourism industry. In addition, the government has allocated a lot of budget for infrastructure

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improvements, accommodation, and various other supports for the development of the Saribu Rumah Gadang area.

The South Solok Regency Government has made the Saribu Rumah Gadang area a priority destination. There are great expectations from both the government and stakeholders regarding developing the Saribu Rumah Gadang area. Therefore, it is necessary to analyze the development of the tourism cycle in this area. This paper will explain the development of the tourism cycle in the Saribu Rumah Gadang area using the TALC theory. This analysis is helpful for knowing the development of the Saribu Rumah Gadang area destination, which can be used as an evaluation that needs to be done so that development can reach the highest phase of the tourism cycle.

TOURISM DESTINATION

Tourism is a temporary movement of people to a destination outside their living area, work, and activities during their stay in those destinations [2]. Tourism is a link between goods and services combined to produce a travel experience [6]. Stated that the parts of tourism symptoms consist of three elements: (1) human beings (human elements as actors of tourism activities); (2) the place (the physical element that is actually covered by the activity itself); (3) the time (element of tempo spent on the journey itself and during the stay in the destination) [6]. Furthermore, the core components of tourism development are [7]:

1) attractions and tourist activities that include nature, culture, special features and related activities in an area that can attract tourists to visit;
2) accommodation, hotels and other forms of facilities and services related to the accommodation in which tourists stay;
3) other facilities and services necessary for tourism development, including travel agents, travel agencies, restaurants and other food service places, souvenir shops, handicrafts, information centers, personal services such as beauty and barber salons, health facilities, and public comfort facilities, police and fire departments;
4) transportation shall constitute access to an area and become a link between one region and another;
5) infrastructure, transportation facilities, and other infrastructure, including clean water, electricity, waste disposal, and telecommunications;
6) Institutions, it is necessary to develop and manage tourism.

Opportunities to develop the tourism sector are supported by several things, such as people's lifestyles which make travelling a necessity. This needs to be supported by the success of tourist destinations. The elements that determine success as a tourist destination are [8]:

a) tourist attractions that include natural and artificial attractions;
b) the ease of achieving access, such as the availability of local transportation, sea, and air, as well as supporting facilities and infrastructure;
c) conveniences such as accommodation quality, restaurant availability, financial services, and security;
d) Supporting services provided by the government and private sector (ancillary service), including regulations and legislation on tourism.

The explanation above can be seen in the tourism component, often referred to as the offer in tourism, namely attractions, facilities, amenities, accessibility, transportation, information, promotion, and tourism institutions. These components fill each other to build the attraction of the attraction. While the public, private sector, and government are actors who play a role in moving the tourism system.

TOURISM AREA LIFE CYCLE (TALC)

Tourism destinations will experience changes and developments from time to time, including the Saribu Rumah Gadang area, which has gone through several development phases (Fig. 1). Butler presents six phases of the tourism development cycle: discovery (exploration), engagement, development, consolidation, stagnation, and possible rejuvenation or decline phases [9].

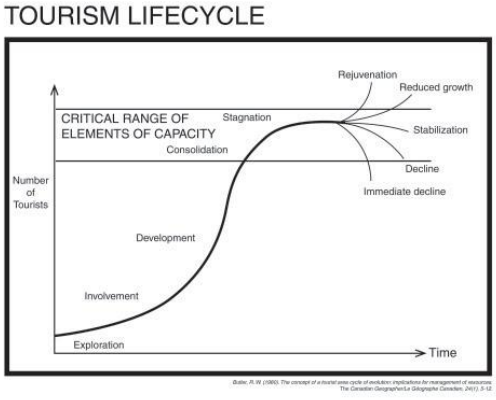

Figure 1. Butler's Tourism Area Life Cycle (TALC)

A conceptual approach to reading the life cycle of a tourism destination was by examining various aspects of its changes, such as land use, economic

development, and the destination's marketing efforts [10]. It will impact the direction of destination development and the evaluation that needs to be done, so that development can reach the highest phase. Tourist destinations must do a re-planning to avoid the stage of stagnation – decline to stimulate rejuvenation [11].

Phase 1. Exploration

The exploration phase is characterized by tourist visits, adventurers, or allocentric type [12]. Tourism potential is in the identification stage, marked by the potential to be developed into an attraction or tourist destination because it is supported by natural beauty. There have been tourist visits but in small numbers. Infrastructure and facilities are not inadequate; even some of them are facilities used by local residents.

Phase 2. Involvement

The involvement phase is characterized by increasingly intensive contact between tourists and local communities. It happens because tourist visits are increasing. The community began to provide various facilities intended explicitly for tourists. The community began to form tourism business units and began to conduct promotional activities on a limited scale. The infrastructure needs to be increased and got the government involved to provide or improve transportation and other facilities for visitors [13].

Phase 3. Development

Furthermore, the development phase is characterized by a well-defined tourist market area, shaped in parts by heavy advertising in tourist-generating areas [13]. The tourist market has a relative pattern and tends to have mass tourism. At the peak of the visiting season, the number of tourists often exceeds the number of local residents. Transformation in the area's physical appearance happens due to the pressure to develop tourism objects that are quite prominent and are usually undesirable by the surrounding community.

Phase 4. Consolidation

The rate of tourist growth in this region began to decline at the consolidation stage, although the figure increased in absolute terms. Most of the community's economic activities are dominated or related to the tourism sector. Business units, institutional forms, licensed foreign businesses, cross-offender partnership models, and government regulations become references in business activities. Cross-institutional collaboration grows based on shared interests, and the format is increasingly complex, called institutionalism [14].

The logical consequence is the emergence of a public attitude of rejection and antagonism towards tourism. They tend to be antipathy because tourism is seen as restricting their space and access to public facilities, which is also their right [15]. This adverse reaction can be understood as one form of social, economic, and cultural impact from tourism development [16], which is crucial in managing tourism destinations.

Phase 5. Stagnation

In the stagnation phase, tourism development is still relatively as same as before. Nevertheless, the number of tourists and the ability of the tourism industry are maximal. To some extent, the region's physical carrying capacity appears excessive, resulting in negative impacts on the environment, society, and economy. For example, the positive impression as a tourism area began to fade, although repeaters' volume persisted. In general, the appearance of tourism areas is more artificial. It is one of the reasons for physical development outside the region. Promotional programs are carried out very intensively, but efforts to bring in new tourists or customers are arduous. Butler emphasized that the type of tourists visiting at this stage are organized and mass travelers, as identified [17] or psychometric tourists described [12].

Phase 6. Decline or Rejuvenation

After reaching the stagnation phase, the tourist area faces two possibilities: decline or rejuvenation. This decline's characteristics include: tourists usually leave the area except for weekends, and ownership of tourism businesses occurs intensively. Some tourism facilities have been converted into public non-tourism facilities, and local residents can repurchase the properties at lower prices. As a result, the area is less and less attractive to tourists.

MATERIAL AND METHOD

Related to the research purpose, to analyze Tourism Life Cycle Analysis of Saribu Rumah Gadang Region, this research was carried out with a descriptive-qualitative approach. Descriptive studies of analysis were aimed at studying the problems that exist today [10]. A qualitative method with a descriptive study approach was used in this research. Qualitative is the method to obtain in-depth data, data containing meaning [18]. In this study, descriptive data in the form of written or spoken words from the interviewees, the results of observations in the field and the results of researchers' observations as observers on external and internal environmental conditions

will be interpreted according to their parts to solve research problems.

Data Collection

The data from this study were categorized into two classifications: primary and secondary data. Primary data obtained through observation and interviews. These interviews were categorized into in-depth interviews with open-ended questions, structured interviews with closed questions, and Focus Group Discussions (FGD). Two literature studies and institutional surveys of various documents related to the research focus were secondary data. Data analysis used in this research is data obtained through observation and interviews, which are then analyzed descriptively based on the TALC concept stages' characteristics.

Research Variable

Determination of this variable is helpful to stay focused on the corridor of the research object. Research variables are everything in any form determined by the researcher to be studied so that information is obtained and then concluded [13]. Life cycle analysis in this study identifies and describes the condition of existing components. The variables studied were existing components that were then identified based on the tourism life cycle (TLAC) phase.

Study Area

Saribu Rumah Gadang Region is located in Koto Baru, Sungai Pagu District, South Solok Regency. It is about 33 km from Padang Aro, South Solok Regency's capital, and 3 km from Muara Labuh, the Sungai Pagu District center (Fig. 2). It is located at position S1°29'4,887" South Latitude and E101°3'33,433" East Longitude with an area of approximately 181,000 m² (based on the Statistic Center of South Solok in 2018).

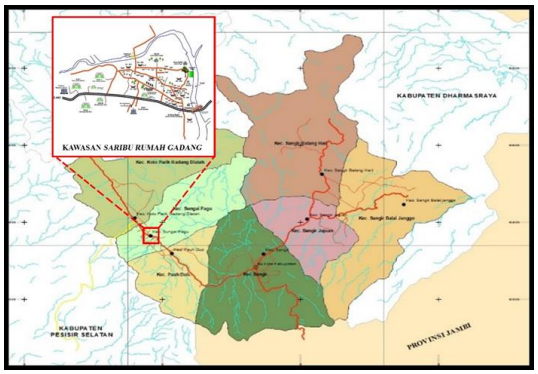

Figure 2. Map of Saribu Rumah Gadang Region

Saribu Rumah Gadang Region is located in 3 *jorong* (at the RW/hamlet level), namely: Jorong Kampuang Nan Limo, Jorong Bariang Rao-Rao, and Jorong Lubuk Jaya. The area is located in the lowlands with a mean elevation of 450 m above sea level and located in the Bukit Barisan Mountains (Fig. 3).



Figure 3. Landmark and gate of Saribu Rumah Gadang Region (**Sources:** Personal Documentation)

RESULT AND DISCUSSION

Saribu Rumah Gadang Region

Saribu Rumah Gadang Region has a tropical climate with temperatures varying from 20°C to 33°C with rainfall of 1,600-4,000 mm.year^{-1} and humidity ranging from 80% to a wet tropical climate. The rainy season generally occurs from January to May, and September to December, while the dry season is from June to August. Winds generally went from the Southwest - Southeast direction.

The majority of the population is the Minangkabau tribe. The kinship principle of the Minangkabau community is matrilineal descent, which fosters kinship through the mother line, which means that a child follows the tribe of his mother [19]. Based on Statistic Center data in 2018, the main livelihood of the community in the Saribu Rumah Gadang Region is farming. The main product of agriculture in this area is rice. It is very relevant to the topography and climate of the South Solok Regency.

Saribu Rumah Gadang Region's transportation system is available by road land transportation and has a terminal on a rural scale. For public transport, service areas are by rural transportation that serves from one market to another. As for transportation outside the district, it is served by regular buses and unofficial trips serving the Padang - Padang Aro, Padang - Muara Labuh, Solok - Padang Aro, and Solok - Muara Labuh routes (Fig. 4).

The name "Kawasan Saribu Rumah Gadang" was coined by Meutia Hatta when she visited South Solok Regency on May 30, 2007. Bung Hatta's first daughter, who was then used as Minister of Women's Empowerment during President Susilo Bambang Yudhoyono, was amazed by the number of *Rumah Gadang* clustered in one Nagari (RW/hamlet) not found anywhere else.

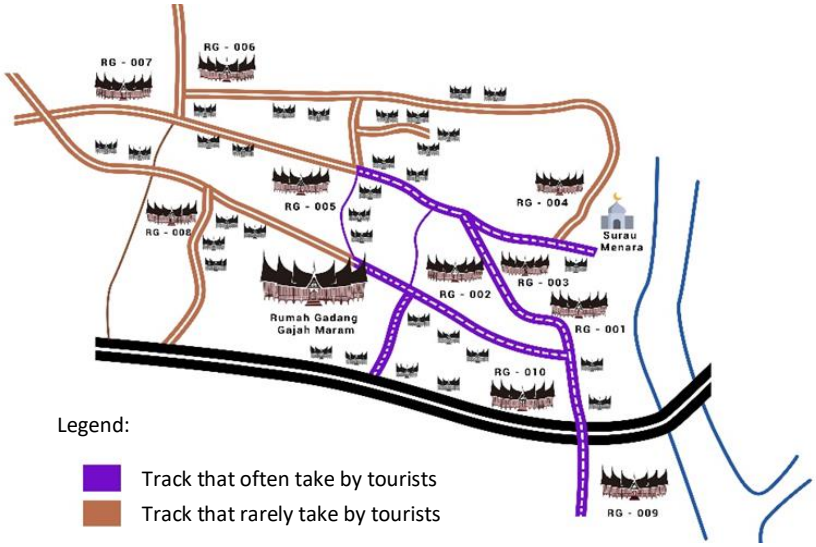

Figure 4. Tourist Map of Saribu Rumah Gadang Region (**Sources:** Research Ilustration) [5]

Since the naming, Saribu Rumah Gadang is widely known and has become an icon of the South Solok Regency (Fig. 5). The Regional Government of South Solok manages this area, the Saribu Rumah Gadang Tourism Awareness Group (*Kelompok Sadar Wisata*), and the Youth Organization (*Karang Taruna*).



Figure 5. Saribu Rumah Gadang Region (**Sources:** Personal Documentation)



Figure 6. Rumah Gadang as a Homestay (**Sources:** Personal Documentation)

Indonesian Travel Sales Association (ASATI) West Sumatera created the concept of staying offered that tourists are invited to live with the *Rumah Gadang* owner with a bed in the living room with a row of mattresses complete with blankets and pillows. Male and female tourists in different *Rumah Gadang*, but women only get one or two people who can sleep in the *Rumah Gadang* room.

The existence of a homestay (Fig. 6) to extend the stay of tourists and introduce local traditions. Introducing Minangkabau arts and traditions such as dance, martial arts, culinary, and daily life for the people. The number of *Rumah Gadang* recorded as homestays is 13 *Rumah Gadang*, and this figure is very small compared to the total number of 125 *Rumah Gadang*.

Time Series Development of Saribu Rumah Gadang

Since the name of the Saribu Rumah Gadang area was pinned by Meutia Hatta in 2007, it took a long time for the local community to realize the existing tourism potential. After the tourism sector grew rapidly and local tourists strarting arriving for selfies, the local community and the South Solok Regency Government began to glance at the Saribu Rumah Gadang Region's potential.

The local community cooperated with the district government to develop Saribu Rumah Gadang Region became a tourist destination in 2013 - until now. Some of the funds began to be disbursed for the development of this area. Tourism training is also provided to the surrounding community. Several tourist facilities that have been built are:

1. Attractions

- Build landmarks of "Kawasan Saribu Rumah Gadang"
- Presenting traditional arts as a tour package
- Making cultural heritage an attraction (Fig. 7)
- Building viewing tower with the name Songket Tower (Fig. 8)

2. Accommodation

- Developing the *Rumah Gadang* into a homestay with a total of 13 homestays
- Provide training and assistance for homestay management

3. Amenities

- Create a tourist map route
- Provides directions

4. Facilities

- Provide public facilities such as toilets
- Provides free internet facilities at certain points

5. Stakeholders

- Doing promotions through social media

All stakeholders began to maximize their respective roles. Local governments provide phased support for training and provide a budget for the development of facilities. Tourism Awareness Group (*Pokdarwis*) creates tour packages aimed at group tourists such as schools, communities, and others. The local community started to create Small and Medium Enterprises (SMEs), such as culinary specialties, souvenirs, and rattan woven crafts.

Other than that, the Saribu Rumah Gadang Region also received assistance from the central government through the Ministry of PUPR in 2019. The assistance amounted to Rp.69.8 billion to revitalize 33 *Rumah Gadang*, make master plans and area arrangements, and build Songket towers as tourist attractions (Fig 8).



Figure 7. Traditional Performance (**Sources:** Personal Documentation)

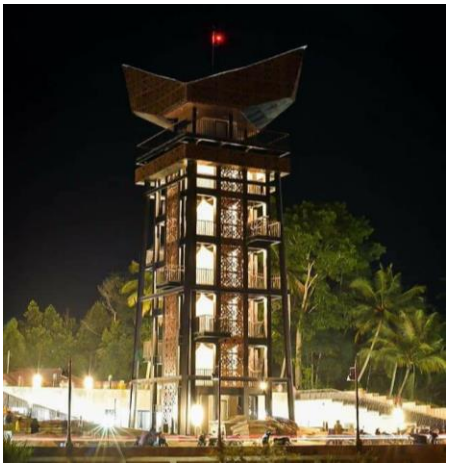

Figure 8. Songket Tower (**Sources:** Personal Documentation)

Tourism Life Cycle Analysis of Saribu Rumah Gadang Region

Based on the tourism life cycle analysis classification, the Saribu Rumah Gadang area enters the development phase (Fig. 9). That is marked by a big promotion carried out by the government and stakeholders involved in the Saribu Rumah Gadang area. The government is aggressively promoting and creating a heart of Minangkabau tagline. Tagline as a brand personality has been acknowledged as an important component of branding in the tourist destinations [20].

It is also reinforced by the results of observations that are adjusted to the characteristics of each stage and will be clarified in the following Table 1. Classification of the development of the tourism cycle in the Saribu Rumah gadang are a per time segment.

a) 2007-2014: exploration
b) 2014-2018: involvement
c) 2018-2020: development

In addition, the Saribu Rumah Gadang area was awarded the most popular traditional village at the 2017 Indonesian Pesona Anugerah (API). It is the struggle of the South Solok Regency Government to popularize and develop the tourist attraction of the Saribu Rumah Gadang Area. In addition, the government invited a team from the University of Malaya as an institution that accompanied the area to bring the Saribu Rumah Gadang area to the United Nations Educational, Scientific, and Cultural Organization (UNESCO).

The promotions carried out paid off. The Saribu Rumah Gadang area is crowded with tourists, especially when visitors increase rapidly during peak season. The increase in visits to the Saribu Rumah Gadang area also affects tourist visits to other destinations in South Solok Regency.

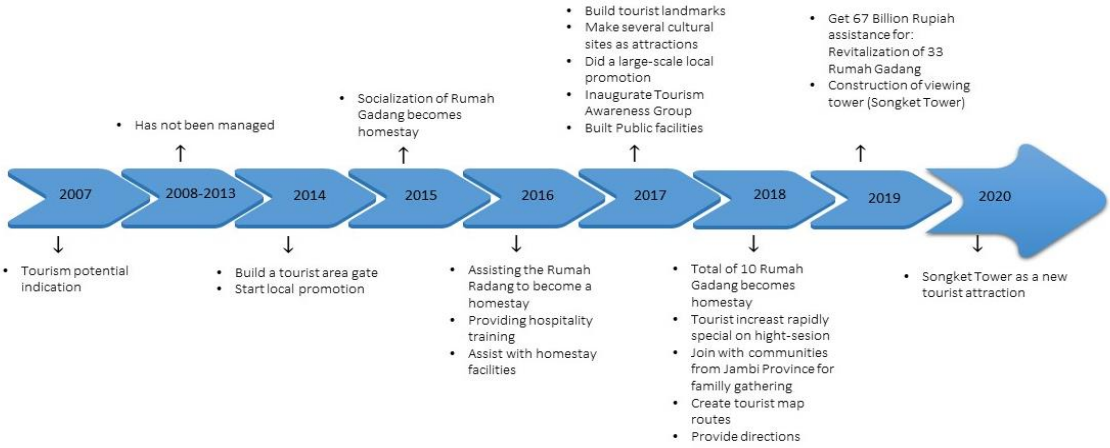

Figure 9. Development of Saribu Rumah Gadang (**Sources:** Data Analysis)

Table 1. Indicator Tourism Area Life Cycle Saribu Rumah Gadang Region

Phase	Indicator	Observation Results	
		Relevant	Irrelevant
Exploration	A place that has tourism potential and has only recently been discovered by tourists.	√	
	Access to the location is difficult but attractive to some tourists because it is still natural and not crowded	√	
	Tourism infrastructure and facilities are inadequate.	√	
Involvement	There are initiatives from the local community to build tourist facilities but still minimum.	√	
	Increased number of tourist visits.	√	
	The community started to build a tourism business unit.	√	
	The community began to carry out promotional activities on a limited scale.	√	
	The government has begun to get involved in infrastructure development.	√	
Development	Did a big promotion.	√	
	At peak season, the number of visitors increases rapidly.	√	
	The volume of outside (external) investment increased rapidly.		√
	Physical changes in the area.	√	
	Artificial attractions have started to be developed.		√
	Build international standard facilities.		√
Consolidation	The number of tourist visits increased, but slowly.		√
	Most of the community's economic activities are dominated by the tourism sector.		√
	Cross-institutional collaboration grows based on common interests.		√
	Many visitors and the increasing number of tourist-oriented facilities make the public's interest often neglected.		√
	People began to feel their space and access to public facilities is limited.		√
Stagnation	The capacity exceeds the carrying capacity, causing economic, social, and environmental problems.		√
	The industry has started to work hard to manage facilities owned especially with expected repeaters or convention/business tours.		√
	Artificial attractions have dominated natural tourism.		√
	The initial image has begun to fade, and its purpose is no longer popular.		√
	Promotion of the program was carried out very intensively, but efforts to bring in new tourists or customers were difficult.		√
Decline or rejuvenation	Decreased number of tourist visits.		√
	The function of tourism facilities has begun to be diverted to non-tourism activities.		√
	Tourists are becoming disinterested in the tourist attraction offered.		√
	Prices fell sharply due to weak market conditions.		√
	Destinations can develop into low-class destinations (slum tourism) or completely lose themselves as a tourist destination.		√
	Dramatic changes can occur (as a result of various efforts from various parties) toward improvement or rejuvenation.		√
	There is innovation in the development and vibes of new products or utilizing natural and cultural resources that were previously untapped.		√

The government strongly supports the development of this area by continuing to accelerate and promote collaboration with related parties through the 2021 national culture week. The Saribu Rumah Gadang area is one of the shooting locations to introduce Minangkabau culture to be better known by local and foreign tourists.

In addition, to support from the government, the community also supports the construction of the Saribu Rumah Gadang area. The community feels the impact of the construction and development of the Saribu Rumah Gadang area. However, one of the perceived benefits is getting additional income from the tourism industry. The impact of tourism development on economic life in tourist destinations such as in Mulyosari village, Pagerwojo sub-district, Tulungagung district, because the presence of tourism activities in the region opens up many business opportunities. [21].

Even though it has entered the development stage, there are still many things that need to be done by all stakeholders involved in managing the Saribu Rumah Gadang area. Construction of international standard facilities will increase the number of tourist visits [22]. In addition, efforts should also be made to attract foreign investors to invest in the construction of the Sariibu Rumah Gadang area.

CONCLUSION

Based on the above indicators, it can be concluded that the tourism cycle process in the Saribu Rumah Gadang area has just entered the development stage. The exploration process took place from 2007 to 2014. The involvement process took place from 2014 to 2018. Then it entered the development process from 2018 to 2020. It was marked by zoning, massive promotions, and tourist visits that increased rapidly during peak seasons. Even though it has entered the development stage, there are still many other tasks that must be done, such as building international standard facilities, attracting outside investors to invest, calculating carrying capacity, and carrying out promotions with international standards.

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Makassar City Tourism Readiness in the New Normal Period of the COVID-19 Pandemic

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Abstract

Tourism plays a crucial role in driving economic growth, but the COVID-19 pandemic has severely affected the industry, including in Makassar City, Indonesia. This study aims to investigate the readiness of tourism to address the challenges posed by the pandemic and to identify the factors influencing this readiness. Specifically, the study focuses on the perceptions of tourism readiness based on the Travel and Tourism Competitiveness Index (TTCI) sub-index. Data was collected through surveys conducted in Makassar City using non-probability quota sampling. A quantitative-descriptive approach was employed, and the collected data were analyzed using multiple linear regression techniques. The study primarily examines the impact of two factors, namely the enabling environment and travel and tourism policy and enabling conditions, on tourism readiness. The study's findings reveal that enabling environment, travel, tourism policy, and enabling conditions contribute significantly to tourism readiness in Makassar City. However, the travel and tourism policy and enabling conditions variable influence tourism readiness substantially. Indicators such as the prioritization of travel and tourism indicators and the openness indicator received high scores, further supporting the significance of these factors. The implications of these findings are valuable for policymakers and government authorities involved in the tourism sector. The study provides valuable insights into the areas that need to be prioritized and improved to enhance tourism readiness in Makassar City. By focusing on creating an enabling environment and implementing effective travel and tourism policies, the government can shape strategies that foster resilience and recovery in the tourism industry amidst the ongoing challenges posed by the COVID-19 pandemic.

Keywords: COVID-19 Pandemic, Economic Growth, Tourism Readiness, TTCI Sub-Index.

INTRODUCTION

Tourism is a crucial sector for a country's economy as it contributes to its income. Tourism is anticipated to play a key role in accelerating economic growth in Indonesia by generating employment and business opportunities, foreign exchange earnings, and promoting infrastructure development [1]. Hence, all forms of positive or negative developments in the tourism sector should be carefully evaluated. The number of foreign tourist visits to Indonesia has quarterly fluctuations yearly. Figure 1 illustrates the table on foreign tourist visits from 2015 to 2020. It shows a consistent decrease in foreign tourist arrivals to Indonesia over the past five years. The most significant decline occurred between April and June 2020, reaching 99.2% after experiencing a 48.6% decline between January and March 2020. This decline in the tourism sector was also observed in Makassar.

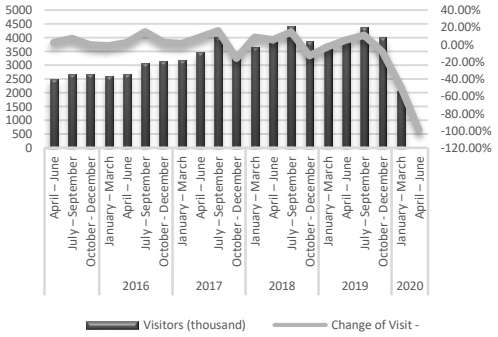

Figure 1. Changes in Foreign Tourist Visits to Indonesia in 2015-2020. **Sources:** BPS-Statistics Indonesia 2015 – 2019 [2-6].

A preliminary study included interviews with hospitality sector managers and the Chairman of the Indonesian Hotel and Restaurant Association (PHRI) of South Sulawesi. It was found that hotel visitors in Makassar experienced a decline during the COVID-19 pandemic until August 2020. Prominent tourist destinations in Makassar, such as Losari Beach, Fort Rotterdam, Makassar City Museum, and Bugis Water Park, suffered losses due to the pandemic. According to the BPS-Statistics Indonesia 2020, foreign tourist arrivals in South Sulawesi have continued to decline since January 2020. Table 1 presents data on tourist visits in South Sulawesi from January to July 2020 [7].

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Table 1. South Sulawesi Tourist Visit Data 2020

Month	Number of Tourist Visits	Percentage Change
January	1333	-
February	1210	-9%
March	1029	-15%
April	0	-100%
May	0	0%
June	0	0%
July	0	0%

The decrease in tourist visits can be attributed to the direct and indirect impacts of the COVID-19 pandemic. Statistical data from the BPS-Statistics Indonesia aligns with a previous study by Nicola *et al.*, indicating that the global pandemic has significantly affected the tourism sector [8]. Other studies also highlight the severe impact of the COVID-19 outbreak on the tourism industry, leading to disruptions in travel supply and demand [9–10]. Despite being a vulnerable industry susceptible to various environmental, political, and socio-economic risks, Novelii *et al.* explain that tourism has demonstrated resilience in recovering from crises and outbreaks, including terrorism, earthquakes, Ebola, SARS, and Zika [11].

The current era presents an opportunity for the tourism sector to resume operations by implementing necessary strategies. Efforts suggested involve providing new travel alternatives during the pandemic and prioritizing health, hygiene, comfort, and conditions to attract tourists in the new normal [12–14]. The initial revival of the tourism sector during the pandemic is expected to contribute to the local economy and receive support from various stakeholders.

Tourism competitiveness in the new normal era of the COVID-19 pandemic can be assessed to determine the readiness of the tourism sector. Competitiveness refers to adapting to new markets and achieving profitable growth [15]. The Ministry of Tourism in Indonesia introduced the Indonesian Tourism Index (IPI) as a measure of tourist destination readiness, based on the Travel and Tourism Competitive Index (TTCI) developed by the World Economic Forum and the United Nations World Tourism Organization, adjusted to suit Indonesian conditions [16]. The TTCI includes various determinants of tourism competitiveness, including sub-indices for safety and security, as well as health and hygiene, which have become crucial during the pandemic [17].

However, studies examining the readiness of tourism in the new normal era specifically in terms of the supporting environment, travel and tourism policies, and available provisions, particularly in cities like Makassar, are currently lacking. Therefore, it is important to conduct an assessment of tourism readiness in Makassar in the context of the COVID-19 pandemic, focusing on analyzing the supporting environmental aspects, travel and tourism policies, and available provisions. This assessment is expected to provide valuable insights and information for other regions and countries to develop their respective tourism sectors during the pandemic and beyond. Additionally, it can help formulate strategies to enhance tourism readiness in Makassar. Furthermore, the research aims to contribute by examining the efficiency and effectiveness of implementing the tourism industry in areas gradually recovering from the pandemic.

The tourism industry plays a significant role in the regional and national economy and has the potential to rebound in the current era. This can be achieved by adhering to and implementing health protocols outlined in the Decree of the Minister of Health of the Republic of Indonesia Number HK.01.07/ MENKES/328/2020, which provides guidelines for preventing and controlling COVID-19. In the new era, the tourism sector aims to normalize tourism in a safe and comfortable manner by implementing health and hygiene standards, as well as safety and comfort standards [12–14].

Tourism recovery will occur gradually with the implementation of government policies. According to Hall *et al.*, the recovery will initially focus on the domestic level, particularly in areas where new COVID-19 cases are no longer increasing [18]. It will involve protocols that combine health and travel elements as the sector's core. As Angelopoulous *et al.* described, international tourism involves two health sectors and a highly regulated aviation industry [19]. Lai and Wong suggest that hospitality is a significant indicator of the tourism sector during the ongoing pandemic, and stakeholders recommend increasing marketing efforts post-COVID-19 due to decreased interest during the pandemic, reduced workforce, limitations in maintenance costs, and government support [20].

Tourism and the Tourism Industry

Tourism is a multifaceted activity involving travel for leisure, business, and personal pursuits, with a broad range of societal and economic impacts. Suwena and Widyatama [21] highlight its diverse dimensions, including sociological, psychological, economic, and ecological aspects. Sejahtera stresses its role in fueling economic growth, creating jobs, boosting income, and stimulating various sectors in host countries [22].

The tourism industry encompasses services, transportation, accommodations, destinations, and attractions catering to consumer preferences. Guccio *et al.* emphasize its economic significance in many nations [23], while Cucculelli and Goffi underline its role in driving economic expansion, aiding export diversification [24].

Travel and Tourism Competitive Index (TTCI)

The Travel and Tourism Competitive Index (TTCI) is a globally recognized tool for evaluating countries' tourism potential. It has been adapted to assess the readiness of Indonesian tourism, particularly in the context of the COVID-19 pandemic [17]. This index offers insights valuable for pandemic management by the government. To evaluate Indonesia's tourism sector in the new normal, TTCI measures readiness by examining four main aspects: Enabling Environment, Travel and tourism Policies and Enabling Conditions, Infrastructure, and Natural and Cultural Resources [16,25]. The indicators used in TTCI were developed by the World Economic Forum [17].

Enabling Environment

1. *Business Environment*

   The business environment encompasses all factors impacting internal company operations. Competitiveness involves adaptability, continuity, and navigating competition. Kompula emphasizes creating a favorable environment to attract investors via facilities and business promotion [26].

2. *Safety and Security*

   Safety is vital for tourists, impacting their decisions in the service sector like tourism. Security greatly shapes consumer behavior [27]. A study by Rudiyanto and Sugiarto in 2020 stress recovery efforts, including managing visitor numbers to enhance tourist security in changing circumstances [28].

3. *Health and Hygiene*

   Health and hygiene are vital, especially in a pandemic. Both heavily impact destination trustworthiness for tourists [29].

4. *Human Resources*

   This indicator highlights human capital and the labor market. Croes *et al.* identify development opportunities through diverse population segments. Human resources enhance tourism via productivity, innovation, and creativity [30].

5. *ICT Readiness*

   Chabbra underscores digital platforms' role in recovery, emphasizing their interconnectivity [31]. In today's digital era, ICT is vital for promoting, disseminating location information, and enabling resource access. ICT availability maximizes tourism benefits.

Travel and Tourism Policy, and Enabling Conditions

1. *Prioritization of Travel and Tourism*

   Tourism prioritization involves overall development, policies, and promotion [32]. The Ministry of Culture and Tourism, with stakeholders, backs this through advertising [33]. Focusing on business travel enhances global competitiveness for European and Asia Pacific nations [34].

2. *Openness*

   Tourism marketing is open and customer-oriented, positively impacting the economy and satisfaction. Tourists drive the sector, but readiness for their enjoyment is a question. Unlike established destinations like Bali [24].

3. *Price Competitiveness*

   Price's impact on tourism competitiveness is intricate. It affects global and local tourism flows. Competitive prices coupled with site quality attract consumers [35].

4. *Environmental Sustainability*

   Environmental sustainability connects to stricter regulations. It safeguards the ecological environment and aligns with a social consensus, driving tourism development [36].

Infrastructure

1. *Ground Infrastructure*

   As per Syam *et al.*, city transportation, including public and chartered options, alongside well-established infrastructure like roads, ports, terminals, and airports, ensures

convenient access to all regional tourist attractions [37].

2. *Tourist Service Infrastructure*

   Service facilities are essential in ensuring tourist convenience [38]. Effective tourism management considers accommodations, transport, finance, and communication in destinations. Infrastructure, like hotels and ATMs, aids tourism, often unnoticed but crucial for seamless activities [39].

Natural and Cultural Resources

1. *Natural Resources*

   Enhancing tourism competitiveness requires focusing on natural resources [40, 41]. Preserving the environment around attractions through investments in rehabilitation and protection [41].

2. *Cultural Resources*

   Culture enhances tourism services, boosting visit potential. Cultural activities, including traditions, elevate indicators' importance for attracting tourists and enhancing tourism competitiveness [42].

Tourism Readiness

Tourism readiness means having a comprehensive plan to facilitate tourism, addressing all supporting elements for different situations. Adwiyah emphasizes three readiness pillars: security, economics, and social-cultural aspects [43]. To assess business readiness, standards are applied to tourist protection and service quality [44].

Tourist destinations in Indonesia are ready for the new normal, evaluated through the Indonesian Tourism Index (IPI) based on TTCI [16]. The new normal benefits local economies around tourist spots [45]. Ministry of Tourism and Creative Economy policies focus on health and CHSE protocols (Cleanliness, Health, Safety, and Environment sustainability) driven by regional policies [45].

Readiness of Tourism in Makassar City during the New Normal Period

Tourism readiness is linked to various tourism components. Under the law No. 10 of 2009, tourism involves diverse activities and services from communities, entrepreneurs, central and local governments.

Government Policy

The Ministry of Tourism introduced a CHSE-based health protocol guide for tourism [46]. It involves opening destinations and implementing CHSE protocols.

MATERIAL AND METHOD

Research Design

This quantitative survey study aims to assess tourism readiness in terms of safety and security, as well as health and hygiene. The study utilizes an independent variable called Enabling Environment (X1), consisting of five indicators: Business Environment, Safety and Security, Health and Hygiene, Human Resources and Labor Market, and ICT Readiness. Another independent variable is Travel and Tourism Policy and Enabling Conditions (X2), which includes four indicators: Prioritization of Travel and Tourism, International Openness, Price Competitiveness, and Environmental Sustainability. The dependent variable is Tourism Readiness in the Pandemic (Y).

Instruments

The instrument used in this study was a questionnaire with Likert score (Table 2). It contain a review of two subindexes on the travel and tourism competitiveness index, i.e.

1) ***Enabling Environment***, namely business environment (BE), safety and security (SS), health and hygiene (HH), human resources and labour market (HRLM), and ICT readiness (ICR).
2) ***Travel and tourism policy, and enabling conditions***, namely prioritization of travel and tourism (PTT), openness (O), price competitiveness (PC), and environmental sustainability (ES).
3) ***Tourism readiness***, namely the readiness of Makassar City tourism in the New Normal pandemic (RMC) and government policies (GP).

Table 2. Score or weighted answers based on a Likert scale

Score	Categories
5	Very Good
4	Good
3	Sufficient
2	Insufficient
1	Strongly insufficient

Sources: Sugiyono [47]

Samples and Data Collection

The data collected for this study is quantitative data obtained from the results of a questionnaire. The population for this study consists of tourists who engaged in tourism activities in Makassar City during the New Normal era. A non-probability sampling technique is employed, combining purposive and accidental sampling methods.

The sample elements are selected based on specific criteria, and the selection is based on chance encounters with the researchers, meaning anyone who happens to meet the researchers can be included as a sample. The criteria set by the researchers include being 18 years old or above and traveling within the specified locations (Pantai Losari, Bugis Waterpark, 99 Kubah Mosque, Terapung Mosque, and Akkarena Beach). The sample size for quantitative data is determined according to Roscoe's recommendation [48], which suggests that a minimum sample size of 30 individuals is appropriate for a study. For multivariate research, the sample size should be at least ten times the number of variables in the study. Based on this guideline, the sample size for this study is 67 people.

Data Analysis

The data analysis method used in this study is descriptive analysis. Descriptive analysis is employed to determine the frequency distribution and response rates of the collected questionnaires by describing the items in the questionnaire. The items are described by calculating the average results and categorizing them into a scale range (Table 3). The formula used to determine the interval for each class is interval = (highest score - lowest score) / number of classes. In this case, the interval is calculated as (5 - 1) / 5 = 0.8.

Table 3. Average Value

No	Average Value	Evidence
1	1.00 – 1.80	Strongly insufficient
2	1.81 – 2.60	Insufficient
3	2.61 – 3.40	Sufficient
4	3.41 – 4.20	Good
5	4.21 – 5.00	Very Good

Source: Riduwan [49]

The classical assumption tests are conducted to assess the validity of the model that will be used for regression analysis. Four classical assumption tests are employed: the normality test, multicollinearity test, heteroscedasticity test, and autocorrelation test. After performing these tests, the hypothesis test is conducted using the Simultaneous F Significance Test and Partial T-test to examine the hypotheses.

Validity and Reliability Test

Validity and reliability tests were conducted on all instruments in this study using SPSS. The validity test utilized the product-moment correlation coefficient to assess the relationship between each item and the overall score of the statements.

Meanwhile, the reliability test was deemed reliable if it had a coefficient value of > 0.6 and was conducted on a sample of 67 respondents. The results of the validity and reliability tests are presented in Table 4.

Table 4. Instrument for validity and reliability test results

Variabel	Item	rTest	Sig	R Table	Evidence
1. EE (X1)	X1.1.1	0.455	0.000	0.237	Valid
	X1.1.2	0.535	0.000	0.237	Valid
	X1.1.3	0.620	0.000	0.237	Valid
	X1.2.1	0.551	0.000	0.237	Valid
	X1.2.2	0.697	0.000	0.237	Valid
	X1.2.3	0.641	0.000	0.237	Valid
	X1.3.1	0.732	0.000	0.237	Valid
	X1.3.2	0.622	0.000	0.237	Valid
	X1.3.3	0.676	0.000	0.237	Valid
	X1.4.1	0.729	0.000	0.237	Valid
	X1.4.2	0.665	0.000	0.237	Valid
	X1.5.1	0.677	0.000	0.237	Valid
	X1.5.2	0.926	0.000	0.237	Valid
AlphaCronbach's		0.873		0.6	Reliabel
2. TTPEC	X2.1.1	0.714	0.000	0.237	Valid
(X2)	X2.1.2	0.631	0.000	0.237	Valid
	X2.1.3	0.686	0.000	0.237	Valid
	X2.2.1	0.709	0.000	0.237	Valid
	X2.2.2	0.569	0.000	0.237	Valid
	X2.3.1	0.557	0.000	0.237	Valid
	X2.3.2	0.679	0.000	0.237	Valid
	X2.3.3	0.719	0.000	0.237	Valid
	X2.4.1	0.592	0.000	0.237	Valid
	X2.3.2	0.462	0.000	0.237	Valid
	X2.3.3	0,651	0.000	0.237	Valid
AlphaCronbach's		0,852		0.6	Reliabel
3. TR (Y)	Y1.1.1	0.824	0.000	0.237	Valid
	Y1.1.2	0.832	0.000	0.237	Valid
	Y1.1.3	0.835	0.000	0.237	Valid
	Y1.2.1	0.838	0.000	0.237	Valid
	Y1.2.2	0.695	0.000	0.237	Valid
	Y1.2.3	0.744	0.000	0.237	Valid
AlphaCronbach's		0.884		0.6	Reliabel

Source: Data processed (2021)

Notes: EE = Enabling Environment, TTPEC = Travel and tourism policy, and enabling conditions, and TR = Tourism readiness.

RESULTS AND DISCUSSION

Descriptive analysis

Descriptive analysis in this study is a description of each variable. It includes frequency, percentage, mean, highest or lowest average score of each item and variable indicators**.**

Enabling Environment Variable

The description of each item on the supporting environment variables is as follows. Details available in Table 5 for frequency distribution.

X1.1.1: Quality of the business environment
X1.1.2: Quality of media information
X1.1.3: Government support
X1.2.1: Application of a ban on entry to tourism for symptoms of COVID-19

X1.2.2: Application of Social Distancing
X1.2.3: Limitation on the number of visitors
X1.3.1: Hand wash basin and hand sanitizer
X1.3.2: Mandatory application of masks at tourist sites
X1.3.3: Check body temperature
X1.4.1: Manager's understanding of the Health protocol
X1.4.2: Manager compliance with Health protocols
X1.5.1: Availability of non-cash payment methods
X1.5.2: Availability of virtual tickets

Based on the descriptive analysis of the supporting environment variables, the average overall score was 3.65, indicating that the supporting environment variables are in the good category. The indicator with the highest average value is health and hygiene, with an overall score of 3.82 (Table 5).

It is supported by the item *mandatory application of masks*, which has the highest average score of 4.03, with 25 respondents indicating that the mandatory application of masks at tourist spots is very good, accounting for 32.1% of the respondents. On the other hand, the indicator with the lowest mean is ICT readiness, with a score of 3.40, indicating a moderate level. The item that contributes the least to this indicator is the availability of virtual tickets, with an average score of 3.34, also in the moderate category, as reported by 32 respondents, accounting for 41% of the total respondents.

Travel and Tourism Policy and Enabling Conditions Variable

The description of each item in the travel and tourism policy variable indicators and supporting conditions is as follows, with details in Table 6.

X2.1.1: Quality of advertising or tourism marketing to attract tourists
X2.1.2: Complete data on the travel and tourism industry
X2.1.3: Update on travel and tourism industry data
X2.2.1: Attitudes of the population towards immigrants
X2.2.2: Level of consumer orientation
X2.3.1: Transportation costs during the COVID-19 pandemic
X2.3.2: Quality and price of souvenirs
X2.3.3: Quality and price of hotels
X2.4.1: Waste management
X2.4.2: Tourist behavior towards vegetation
X2.4.3: Air quality from carbon dioxide emissions

Based on the results of the descriptive analysis of the tourism readiness variable during the pandemic, the average overall score was 3.58, indicating that the tourism readiness variable during the pandemic period is in a fairly good category (Table 6).

The indicator with the highest average value is government policy during the pandemic, with an overall score of 3.67. It is supported by the item *application of operational hours*, which has the highest average score of 3.88, with 29 respondents stating that the implementation of operational hours at tourist attractions is in a good category, accounting for 37.2% of the respondents.

On the other hand, the indicator with the lowest mean is tourism readiness in Makassar, with a score of 3.50, indicating a good level. The item that contributes the least to this indicator is the readiness of public facilities and services during the pandemic, with an average score of 3.45, also in the good category, as reported by 33 respondents, accounting for 42.3% of the total respondents.

Table 5. Frequency Distribution of EE (Enabling Environment) Variables

Indicator	Item	Score										Mean	
		Very Good		Good		Sufficient		Insufficient		Strongly insufficient			
		f	%	f	%	f	%	f	%	f	%	Item	Indicator
BE (X1.1)	X1.1.1	6	7.7	35	44.9	21	26.9	5	6.4	0	0.0	3.63	
	X1.1.2	10	12.8	27	34.6	24	30.8	6	7.7	0	0.0	3.61	3.59
	X1.1.3	10	12.8	23	29.5	26	33.3	8	10.3	0	0.0	3.52	
SS (X1.2)	X1.2.1	18	23.1	27	34.6	16	20.5	6	7.7	0	0.0	3.85	
	X1.2.2	10	12.8	23	29.5	28	35.9	5	6.4	1	1.3	3.54	3.68
	X1.2.3	8	10.3	31	39.7	24	30.8	4	5.1	0	0.0	3.64	
HH (X1.3)	X1.3.1	16	20.5	29	37.2	15	19.2	6	7.7	1	1.3	3.79	
	X1.3.2	25	32.1	23	29.5	15	19.2	4	5.1	0	0.0	4.03	3.82
	X1.3.3	15	19.2	23	29.5	19	24.4	9	11.5	1	1.3	3.63	
HRLM (X1.4)	X1.4.1	15	19.2	34	43.6	14	17.9	4	5.1	0	0.0	3.90	3.76
	X1.4.2	9	11.5	26	33.3	26	33.3	5	6.4	0	0.0	3.63	
ICTR (X1.5)	X1.5.1	10	12.8	24	30.8	23	29.5	6	7.7	4	5.1	3.45	3.40
	X1.5.2	7	9.0	19	24.4	32	41.0	8	10.3	1	1.3	3.34	
Mean Variable													**3.65**

Source: Data processed (2021)

Notes: BE = Business Environment, SS = Safety and Security, HH = Health and Hygiene, HRLM = Human Resources and Labour Market, and ICTR = ICT readiness.

Table 6. Frequency Distribution of TTPEC (Travel and Tourism Policy and Enabling Conditions) Variable

Indicator	Item	Score										Mean	
		Very Good		Good		Sufficient		Insufficient		Strongly insufficient			
		f	%	f	%	f	%	f	%	f	%	Item	Indicator
PTT (X2.1)	X2.1.1	10	12.8	20	25.6	30	38.5	5	6.4	2	2.6	3.46	
	X2.1.2	7	9.0	18	23.1	36	46.2	5	6.4	1	1.3	3.37	3.42
	X2.1.3	7	9.0	23	29.5	28	35.9	9	11.5	0	0.0	3.42	
O (X2.2)	X2.2.1	10	12.8	26	33.3	23	29.5	8	10.3	0	0.0	3.57	3.51
	X2.2.2	8	10.3	21	26.9	32	41.0	6	7.7	0	0.0	3.46	
PC (X2.3)	X2.3.1	3	3.8	12	15.4	36	46.2	16	20.5	0	0.0	3.03	
	X2.3.2	8	10.3	15	19.2	40	51.3	4	5.1	0	0.0	3.40	3.25
	X2.3.3	8	10.3	15	19.2	34	43.6	10	12.8	0	0.0	3.31	
ES (X2.4)	X2.4.1	5	6.4	12	15.4	39	50.0	11	14.1	0	0.0	3.16	
	X2.4.2	11	14.1	23	29.5	31	39.7	2	2.6	0	0.0	3.64	3.35
	X2.4.3	5	6.4	12	15.4	45	57.7	5	6.4	0	0.0	3.25	
Mean Variable													**3.38**

Source: Data processed (2021)

Notes: PTT = Prioritization of Travel and Tourism, O = Openness, PC = Price Competitiveness, and ES = Environmental Sustainability.

The Classical Assumption Test

Normality Test

Normality testing is done by using a test of the residual value, while testing is carried out using the One-Sample Kolmogorov-Smirnov Test. In the normality test, it can be seen in Table 7.

Table 7. Normality Test Results

		Unstandardized Residual
N		67
Normal Parametersa,b	Mean	.0000000
	Std. Deviation	.93554859
Most Extreme Differences	Absolute	.078
	Positive	.073
	Negative	-.078
Test Statistic		.078
Asymp. Sig. (2-tailed)		.200c,d

The result of the normality test value through the One-Sample Kolmogorov-Smirnov Test for the dependent variable is 0.200. This value is greater than the significance value of 0.05. It shows that the data on all variables are normally distributed.

Multicollinearity Test

Multicollinearity test aims to test whether the regression model found a correlation between independent variables. A good regression model should not have a correlation between the independent variables.

Table 8. Multicollinearity Test Results

Variable	Collinearity Statistics			
	Provisions Tolerance	Tolerance	Provisions VIF	VIF
Enabling Environment	>0.10	0.162	<10.00	6.175
Travel and Tourism Policy and Enabling Conditions	>0.10	0.162	<10.00	6.175

Based on the results of the multicollinearity test conducted using the tolerance method and variance inflation factor (VIF), it was observed that the tolerance values for the supporting environmental variables, tourism policy variables, and supporting conditions were greater than 0.10 (Table 8). Additionally, the VIF values for all independent variables were less than 10.00.

Heteroscedasticity Test

The heteroscedasticity test was carried out by using the Glejser method to determine whether there were similarities in the variance of the residual values for all observations in the regression model.

Table 9. Heteroscedasticity Test Results

Variabel	Sig.
Enabling Environment	0.090
Travel and Tourism Policy and Enabling Conditions	0.080

Based on the results of the heteroscedasticity test, it was found that the significance value of the supporting environment variable, and the significance value of the travel and tourism policy variables and the supporting conditions was greater than> 0.05 (Table 9). Based on this value, it can be concluded that there are no symptoms of heteroscedasticity.

The heteroscedasticity test is supported by the scatterplot graph (Fig. 2), found points that spread from point 0 to the Y-axis and do not collect into one, so it can be concluded that heteroscedasticity does not occur.

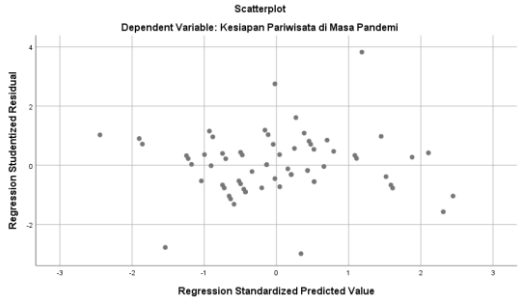

Figure 2. Results of the Scatterplot Heteroscedasticity Test

Hypothesis Test

Simultaneous F Test

The first test's results were carried out by washing the whole independent variable against the dependent variable. Based on the results of the simultaneous F test, it was found that the significance value (sig. F) is 0.000 and the F value is 543.417. Since the sig. F value (0.000) is less than the significance level (α) of 0.05, and the F value (543.417) is greater than the critical F value (311.284), the alternative hypothesis (Ha) is accepted. Therefore, it can be concluded that the Enabling Environment variable (X1), Travel and Tourism Policies, and Enabling Conditions (X2) collectively have a significant influence on the Tourism Readiness variable in the New Normal Pandemic Period (Y).

Table 10. Simultaneous F Test Results

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	980.980	2	490.490	543.417	0.000[b]
	Residual	57.767	64	0.903		
	Total	1038.746	66			

Table 12. Coefficient of Determination

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.972	0.944	0.943	0.95005

The coefficient of determination (R2) obtained is 94.4%, indicating that the variables X1 and X2 contribute to 94.4% of the tourism readiness variability during the pandemic in Makassar City. The remaining 6.6% is influenced by other variables that the researchers did not study.

Partial T Test

Based on the t-test results between the Enabling Environment variable (X1) and the Readiness of Tourism in the New Normal Pandemic Period (Y), a significant t-value of 0.000 and a t-table value of 6.587 were obtained. Ha is accepted since the significant t-value is less than the critical value α (0.05) and the t-table value (1.999) is greater than the t-value.

The conclusion is that the Supporting Environment variable significantly influences the Tourism Readiness variable in the New Normal Pandemic Period. Increasing the elements of the Supporting Environment will also lead to an increase in Tourism Readiness.

Table 13. Partial T Test Results

Model	Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1(Constant)	-3.898	.779		-5.001	0.000
Enabling Environment	0.260	0.040	0.483	6.587	0.000
Travel and Tourism Policy and Enabling Conditions	0.351	0.050	0.510	6.969	0.000

Similarly, based on the results of the t-test between the travel and tourism policy and enabling conditions variable (X2) and the Readiness of Tourism in the New Normal Pandemic Period (Y), a significant t-value of 0.000 and a t-table value of 6.969 were obtained. Since the significant t-value is less than the critical value α (0.05) and the t-table value (1.999) is greater than the t-value, H0 is rejected, and Ha is accepted. The conclusion is that the travel and tourism policy variable and enabling conditions significantly influence the Tourism Readiness variable in the New Normal Pandemic Period. Improving travel and tourism policy elements and enabling conditions will improve Tourism Readiness.

Discussion

In the discussion, the researcher will describe the findings regarding the contribution of each independent variable to the dependent variable based on the analysis of the hypothesis testing results.

Contribution of the TTCI sub-index (Enabling Environment and Travel and Tourism Policy and Enabling Conditions) to Tourism Readiness during COVID-19 Pandemic

The simultaneous F-test found that 94.3% of the two subindexes contributed to the travel and tourism competitiveness index. The contribution of TTCI is very high for tourism readiness during the new normal pandemic in the city of Makassar.

It supports the research conducted by Asthu that the indicators listed by TTCI in the competitiveness calculation model are classified as good [50]. The study conducted by Nisthar *et al.* suggests that the factors included in TTCI contribute to research on tourism competitiveness through regression analysis [34].

Based on the abovementioned points, the TTCI influence model on tourism readiness is highly suitable. This research contributes significantly to informing government policies and guiding tourism managers on the necessary steps for tourism during the new normal pandemic, particularly in Makassar.

The tourism readiness of Makassar City during a pandemic is strongly influenced by two variables, each comprising several indicators. The first variable is referred to as the Enabling Environment (X1) and encompasses five indicators: Business Environment, Safety and Security, Health and Hygiene, Human Resources and Labor Market, and ICT Readiness. The second independent variable is the Travel and Tourism Policy and Enabling Conditions (X2), which includes four indicators: prioritization of travel and tourism, (international) openness, price competitiveness, and environmental sustain-ability.

Contribution of the Enabling Environment to Tourism Readiness during COVID-19 Pandemic

In the results of the partial hypothesis test, it was found that the t-value significantly affects tourism readiness during the pandemic period in the city of Makassar. The descriptive analysis indicates that this variable falls into the good or high category in influencing tourism readiness during the pandemic. Additionally, all indicators in the enabling environment variable strongly influence tourism readiness during the pandemic. Health and hygiene, mainly, is a high-value indicator supporting this variable. Other indicators, such as Business Environment, Safety and Security, Human Resources and Labor Market, and ICT Readiness, also contribute value to supporting this variable.

The findings of this study support the existence of an enabling environment index for the city of Makassar, ranked 52nd among all districts and cities in Indonesia [25]. Furthermore, the World Economic Forum reveals several indicators strongly support the enabling environment in the index [17]. Implementing health and safety measures is crucial in attracting tourists during a pandemic [13,14]. Wearing masks, promoting handwashing, and maintaining physical distancing are identified as key factors in initiating a tourism recovery [12]. Therefore, it is evident that health and safety serve as indicators within the enabling environment. Supportive environment, reinforced by various favorable indicators, can positively impact tourism readiness during the pandemic period in the city of Makassar.

Contribution of Travel and Tourism Policies and Enabling Conditions to Tourism Readiness during COVID-19 Pandemic

The partial hypothesis test found that the t-value of this variable had a significant effect on tourism readiness during the pandemic period in the city of Makassar. Descriptive analysis indicates that travel and tourism policies and enabling conditions fall into the good or high category influencing tourism readiness during the pandemic. All indicators within this variable demonstrate a high influence on tourism readiness during a pandemic. These indicators include prioritization of travel and tourism, openness, price competitiveness, and environmental sustainability. Among these indicators, openness holds significant value in influencing tourism readiness in Makassar.

The findings of this study support the travel and tourism policies and enabling conditions in the city of Makassar, as reflected in the index conducted by the Indonesian Ministry of Tourism in 2019 [25]. Makassar was ranked 52nd in Indonesia. The World Economic Forum also revealed that several indicators strongly support travel and tourism policies and enabling conditions within the TTCI index [17]. Tourism promotion and marketing, encompassed by this variable, boosts tourist interest in traveling [18]. Prioritizing tourism within the tourism sector is also crucial in addressing various issues [9].

Furthermore, price competitiveness plays a stimulating role in contributing to the influence of this variable on tourism readiness during a pandemic. As mentioned by Massida and Etzo, competitive pricing in tourism contributes to domestic tourism [51]. Moreover, environmental protection supports the tourism sector hand [52]. Based on this description, it can be concluded that travel and tourism policies and enabling conditions, supported by various favorable indicators, have a positive impact on tourism readiness during the pandemic period in Makassar.

CONCLUSION

The enabling environment and tourism travel policies and enabling conditions contribute significantly, 94.4% to the readiness of tourism during the New Normal pandemic in Makassar. The enabling environment positively contributes to tourism readiness during the New Normal pandemic in Makassar.

The study emphasizes the positive and significant role of travel and tourism policies and supporting conditions in enhancing tourism readiness during the New Normal pandemic in Makassar City. This research provides several suggestions. It is recommended that tourism managers, who are responsible for operating tourist attractions and organizing tourism activities, prioritize the establishment of an enabling environment. The manager also need to strict adherence to travel and tourism policies and supporting conditions. These measures are expected to positively influence the successful implementation of tourism activities during the pandemic, particularly in Makassar City.

The government as policymakers and overseers of the tourism industry, should enhance their attention to implementation, control, and monitoring efforts. They need to focus on the enabling environment and the implementation of travel and tourism policies and enabling conditions to support tourism readiness during the New Normal pandemic in Makassar.

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Interconnection between Business and Activism in Managing Waste: Case in Community-Based Waste Organization in Small Island Tourism of Gili Trawangan, Indonesia

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Abstract

Much has been studied about community-based waste organizations in Indonesia. Yet, most studies are concentrated in urban areas, and only some studies try to build a historical and comprehensive analysis of how the practice could exist, especially in a small island tourism context. To extend the discussion within this field, this study aims to analyze the trajectory and characteristics of community-based waste management in the Gili Trawangan since this organization has a unique character: It is a fusion between a waste transportation business, a waste bank, and a waste clean-up program. By using qualitative methods, case study approaches, and interviewing 13 key informants, this study concludes as follows. The Community Concern for the Environment (FMPL), the only community-based organization in Gili Trawangan's waste management sector, emerged and existed on a specific historical trajectory with the development of the tourism industry. The formation of this organization is inseparable from the group of local people in business's influence, yet along the way, the contribution of environmental NGOs on this island plays a significant role in promoting activism and environmental-based management. Hence, the interconnection between business (economy) interests and activism (environment) characterizes the uniqueness of how this island manages its waste.

Keywords: Community-Based Waste Management, Gili Trawangan, Indonesia, Small Island Tourism.

INTRODUCTION

The tourism sector has become a catalyst for social and economic development both locally and nationally. In Indonesia, tourism has a vital role in terms of state revenue, which is illustrated by the multiplier effect. This effect causes all tourist spending, investment spending, and government spending to have an economic impact on increasing output, income, and job creation [1]. The small island's economy also benefits from the tourism industry, which is a substitute source of income for the few existing livelihoods [2]. However, because tourism and the environment are interconnected on a two-way basis, development may only be accomplished from an economic standpoint while environmental concerns remain. The rise and expansion of the tourism industry leave an ecological impact, namely environmental degradation or, most recently, the waste issue [3,4].

A clean and liveable environment is a crucial element behind the attraction of tourist places [5]. According to the sustainable development aspect, improving waste management techniques is a crucial part to be enhanced. Inadequate environmental management will result in restricted tourist visits, high levels of water and soil pollution, a decline in the aesthetic value of the environment, and a foul odor that would make people uncomfortable visiting the place [6–8]. The key, then, is to optimize waste management based on a sustainable development model and circular economy (by reducing, reusing, and recycling) [9]. Since the primary concern is not just on factors of environmental sustainability but also on economic impact, this technique started to be intensified [10]. In other words, reducing waste is consistent with the idea of sustainability from both a social and environmental standpoint [11,12].

According to previous studies, community organizations' involvement in waste issues has been widely studied in Indonesia. However, the focus has tended to be on environmental management frameworks, which include technological limitations and recycling innovations [13–16]. Others focus on organizational capacity [17–19] and regulatory and institutional aspects [20–22]. Meanwhile, there are few discussions of how the community-based waste organization could emerge, develop, and be stable in specific locations. In addition, much of the prior study on Indonesian waste management has focused on urban areas. It brings a preassumption that waste management outside the urban area might not have any concern. In the context of a small island, whose economic characteristics are dominated by the tourism industry, managing waste becomes a

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challenge since there are geographical limits and a lack of access to public service infrastructure, which is generally controlled by the mainland areas [23]. Considering that Indonesia, as an archipelago, consists of many small islands, studying how the small island manages its waste becomes relevant.

To extend the discussion within this field, this paper highlights the practice of community-based waste organization in Gili Trawangan as a case study. Waste management on this island is run by the Environmental Defenders Community Front (FMPL), a waste organization functioning since 1998. Unlike most waste management in Indonesia, this small island distinctively manages waste by combining a door-to-door waste transportation service business, waste recycling techniques, and a waste education movement with environmental non-governmental organizations based in Gili Trawangan [19]. In addition, one of the achievements of this organization in managing waste is marked by the acknowledgment of the AMPL AWARD award in 2019 for carrying out various innovations. Thus, this study will explore how such a unique characteristic could emerge, develop, and continue to exist.

MATERIAL AND METHOD

Data Collection

This study uses a qualitative method with case studies. The case studied is about the uniqueness of community-based waste organizations in the context of the small island of Gili Trawangan, Indonesia. The data obtained are based on secondary and primary data. Secondary data (both digital and physical) is used to track the dynamics of waste management in Trawangan, including 1) waste organization documents (brochures, videos, and annual reports); 2) waste organization social media and websites and their networks; 3) local government documents (regional regulations and annual statistical reports); 4) local and national media news (online and print) about Gili Trawangan.

Meanwhile, the primary data collection was carried out through observation and in-depth interviews with key informants from December 2020 to March 2021. There were 13 informants representing a variety of social groups, including former and current members of waste organization, e.g. *Front Masyarakat Peduli Lingkungan* - FMPL, Gili Eco Trust (an environmental NGO based in Gili Trawangan), Gili Trawangan Businessman Association (*Asosiasi Pengusaha Gili Trawangan* - APGT), Trawangan Sub-village Government and Local Government of North Lombok. Additional information was collected from the customers of waste service.

Data Analysis

Data that has been collected is categorized and analyzed. The analysis is not limited to the interactions between actors but considers the many events in Trawangan as well. The quality of data was verified by using a triangulation technique in which each informant was validated with the data from other informants [24]. This technique is necessary to find data consistencies and even the possibility of discrepancies [25].

RESULT AND DISCUSSION

Tourism Industry of Gili Trawangan

In Gili Trawangan, marine tourism is the main tourist attraction due to the island's stunning underwater scenery, which is well-known throughout the world. Tourism is the backbone of the economy of the Gili Trawangan community and is the greatest contributor to North Lombok's local revenue (*Pemasukan Asli Daerah*-PAD). Gili Trawangan has been known as a tourist destination since the 1980s, mainly among foreign backpackers from Bali who are looking for low-cost travel. Throughout the archipelago, international tourism is spatially concentrated in certain islands and coastal areas (Fig. 1), but Bali remains the leading destination considering the adequate infrastructure.

Indonesia, like other developing countries, has also hosted thriving international tourism since the late 1960s, along with the World Bank and other international assistance [26]. In addition, considering that the island of Bali in the 1980s experienced an increase in tourist visits, especially foreign tourists, plus its geographical proximity to Lombok Island, the abundance of tourists to Gili Trawangan is a logical consequence [27].

As a result of changes in Indonesia's aviation policies during the Soeharto regime, there has been an increase in foreign tourists arriving in Bali by international flights [26]. In the first Five-Year Development Plan (*Rencana Pembangunan Lima Tahun - Repelita*) 1968-1973, to promote tourism on the Bali Island, foreign airline companies were granted the right to land directly at Bali's Ngurah Rai airport. It was only in 1986 that the Suharto government consistently set the airport in Bali to openly accept direct landings of foreign airlines without the need to transit to Soekarno Hatta airport in Jakarta.

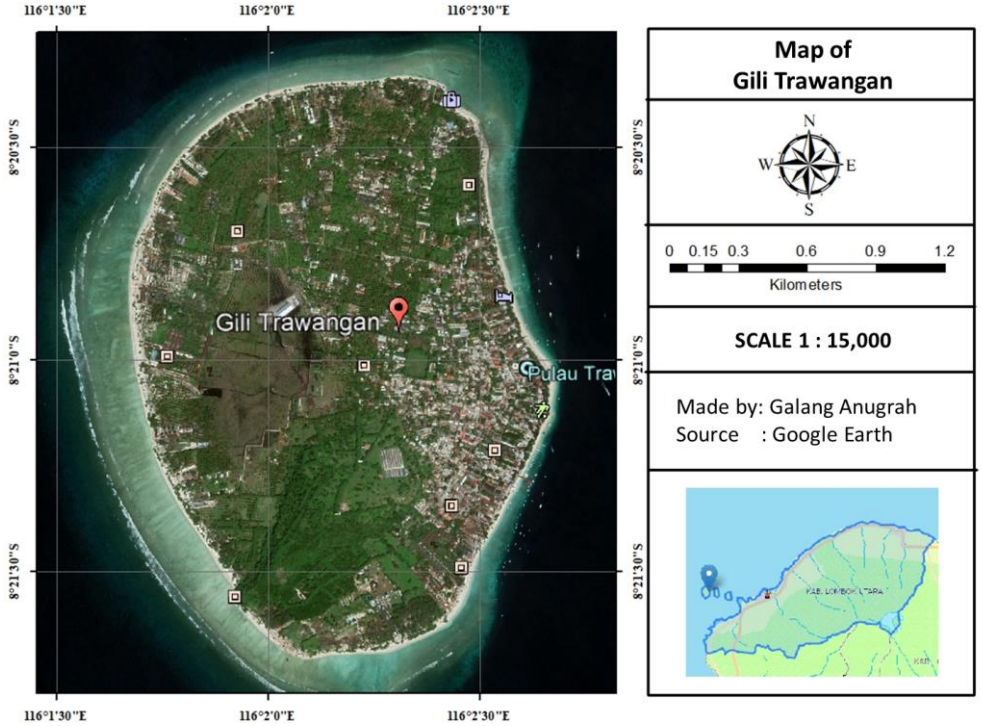

Figure 1. Gili Trawangan Island (**Source:** author's compilation, 2021)

Tourism has been promoted as a source of economic growth ever since *Repelita* 2 (1974–1979). Until 1983, the fall in oil prices globally, which made the flow of foreign exchange earnings plummet, urged the Indonesian government to seek to increase the role of international tourism. Later, in the 1980s, Indonesia's tourist industry was formally included in a diversification attempt to reduce reliance on exports of primary and agricultural products. The removal of visitor visa requirements, the opening of the tourist industry to foreign investment, and the promotion started by Garuda Indonesia are just a few concrete actions taken to increase tourism [26]. The institutionalization of international tourism in national development goals has also been strengthened by the emergence of organizations like the Ministry of Tourism, Post, and Telecommunications. In 1981, the Directorate General of Tourism adopted the motto *to promote tourism and to promote tourism to the community* (*memasyarakatkan pariwisata dan memariwisatakan masyarakat*) [26].

The dynamics of macro-level policies during the Soeharto era focused on Bali tourism simultaneously and unintentionally led to the public recognition of Gili Trawangan as a tourist destination. Gili Trawangan offers an attraction for tourists who want to do scuba diving and snorkeling. As more foreign tourists visit Gili's islands, the local population responds by developing hotels and other tourism-related amenities. The Paradiso Bungalow was the first bungalow to be built in 1981, and more bungalows and hotels began to appear in 1984. [28]. In the 1990s, Gili Trawangan saw a rise in the number of visitors from abroad, particularly those from Australia and Europe [29], which led to the construction of many tourism-supporting facilities and infrastructure.

While Indonesia continues to open up to international tourists, development at the local level is increasing. Satria *et al.* in 2006 showed that foreign investors in Gili Trawangan contribute to constructing bungalows and hotels by collaborating with the island's elite fishing groups [28]. While foreigners provide funding to develop tourism-supporting facilities and accommo-dation, locals give their names to be included in the administration—such as land certificates. On the one hand, increasing visitor numbers to Gili Trawangan has helped the local economy flourish. On the other hand, because this industry generally appears to be more lucrative, tourism encourages social change from an agrarian society (agriculture and fisheries) to a tourism community [30]. The flow of migration, which is indicated by population growth from 400 in 1996 [31] to 1,089 in 2003 [28], is another logical outcome of these developments.

In the last decade, tourism has been re-promoted as a priority economic sector in Indonesia. Besides Moyo Island and Tambora in West Sumbawa, the Indonesian government has designated Lombok and Gili Matra as one of the two National Tourism Destinations (DPN) in West Nusa Tenggara since 2011. It is easier for tourists to come because rapid boat services are available to get visitors directly to Gili Trawangan from the island of Bali. Tourism contributes significantly to local tax revenues, but *no financial incentives* have ever been offered by district governments, despite funding from central to local levels for tourism development in the decentralization agenda since the reform era [32].

The Beginning of Community Based-Waste Organization: The Role of Local Business Actors

In the Global South countries, most of their waste management is controlled independently by community organizations. In general, waste management is considered the duty of the public sector run by the government. However, issues in the waste management sector are dominated by the problems of inadequate human resources, availability of funds, and support for waste management technology [33–36]. Non-government actors, such as the private sector and community organizations, fill the gap left by the public sector's inadequate provision of waste management services to the larger community [17,22,37,38].

Similar to what is occurring in Gili Trawangan Island, Indonesia. A waste organization has managed waste on this small island called the Community Cares for the Environment (FMPL) since 1998. FMPL was initiated and formed bottom-up by the local community to keep the tourism industry free of waste. Locals were worried that if waste was not properly managed, it might become a problem in the future and threaten the stability of people's livelihoods in the tourism industry. As a small island, Gili Trawangan is forced to handle its waste within the island.

Institutionally, the waste organization is relatively autonomous with the state, both central and local governments. Because the function and engagement could be stronger, waste management is carried out independently and informally by the local community. When the state cannot provide a proper service for the community related to social security and legal certainty to the need for public services, they will rely more on informal social networks [39].

Since its establishment, FMPL has been the sole waste organization in Trawangan. The waste management concept was initially applied in a straightforward and conventional manner. In addition, FMPL is an organization with an informal institutional model because it does not have a legal entity (Personal Communication with founder of FMPL (M), 2021). The emergence of FMPL cannot be separated from its connection with the network of local business groups in Gili Trawangan. Local business actors play a significant role in influencing the direction of waste management to be business-oriented because state assistance has historically been lacking in the socio-economic life of the Gili Trawangan community [28,40]. The founders behind the formation of FMPL consisted of local business owners (Personal Communication with APGT representation (AB), 2021).

The fundamental reason for the absence of state intervention on this island, both by the national and local governments, is its geographical location. Geographical location is a significant reason because in the 1990s, during the period of the emergence of FMPL, Gili Trawangan was still in the jurisdiction of West Lombok Regency. While the government area of West Lombok is concentrated in the Gerung sub-district (southern part of the island of Lombok), Gili Trawangan is located in the Pemenang sub-district (Northern part of Lombok Island), thus making the distance too far. That is why dealing with administration and bureaucracy is not a top priority for the trawangan community, as long as they can still be handled collectively. Furthermore, even before tourism began to arrive on Trawangan in the 1980s, residents had yet to see any official participation in the island's institutional development. It explains why waste organizations appear bottom-up because the state does not participate in facilitating it. It enables the Trawangan society to self-govern the island's environmental management, including waste.

Although FMPL is built and operated with an informal-based mechanism, it has a clear organizational structure consisting of a chairperson, secretary, financial manager, advisor, and field workers. The organization started by recruiting two local youths to fill field staff positions. By 2005, the number of field employees had risen to seven in total, and this expansion followed the demand for tourist growth. FMPL had at least 20 customers at that time. This number at least shows that the

tourism sector in Trawangan has not experienced a significant increase. Some people still handle their waste independently, considering the volume is reasonable, even though it is done by burning it in their respective yards.

During this time, the end-of-pipe approach was frequently used to control trash without additional processing. Besides the lack of knowledge of alternative methods to manage waste more eco-friendly, this method emphasized the efficiency aspect. Because the most crucial was maintaining tourism operations running a business-as-usual, this simple method was the best way to carry out.

Other than that, the formation of field workers was divided into two parts: the transportation section and the garbage disposal area. In the transportation department, five people operate the *cidomo* to collect the trash throughout the Trawangan area, while the rest are at the dumpsite to help unload the trash from the *cidomo*. *Cidomo is horse-drawn buggies* that become the main transportation in Gili Trawangan. Cidomo is the only vehicle allowed on this small island since there is an *awig-awig* (local custom) that prohibits any motorized vehicles from reducing air and noise pollution (Personal Commincation with former FMPL chairman (A), April 2021).

Since the beginning, waste management by community-based organizations in Gili Trawangan has intertwined with the tourism industry's trajectory. Local governance of Gili Trawangan Island, especially the practice of managing waste, has been handled with an informal-based mechanism. As a small island with a low population density (compared to the mainland of Lombok, West Nusa Tenggara), it is possible for an institution to emerge from below by and for the needs of the community itself.

Environmental Issues and Local NGO Interventions in Waste Management

Tourism in Gili Trawangan rose dramatically from 40,124 to 315,959 people in 2009 – 2014 (Fig. 2) [3]. The number of visits linearly contributes to the increase in tourism development, including large hotels, bars, cafes, and dive shops. In other words, Gili Trawangan tourism is a lucrative sector and a magnet for business investors.

The growing development has not only impacted environmental degradation for Trawangan Island but also increased the volume of waste, considering that consumption activities grow along with it. This island might produce up to 5 tons of rubbish per day on average in 2010, with the tourism sector dominating waste production [19]. Along with increased visits to this small island, trash volume rapidly rose to 15-20 tons.day^{-1} in 2018 (Table 1).

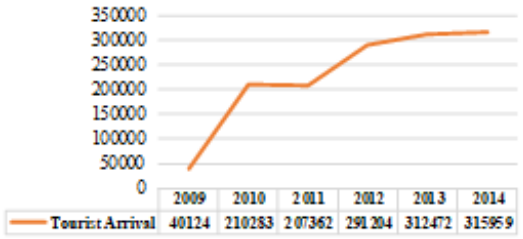

Figure 2. Tourist arrival in Trawangan in 2009-2014 (**Source:** Tourism Agency of North Lombok, 2015).

Table 1. Categorization of waste in Gili Trawangan by type [41]

Type of Waste	Kg.day^{-1}	%
Organic	8.716	48,35%
Papers	1.292	6,46%
Aluminum	884	4,42%
Metal	508	2,54%
Glass*	5.090	25,45%
Plastic	2.310	11,55%
Others	234	1,23%
Total	**19.034**	**100%**

***Note:** Glass is the second most common type of waste after organic waste on the island. Considering Gili Trawangan is famous as a party island, alcoholic beverages, especially beer, are frequent drinks enjoyed by the tourists. However, because of the many brands of alcoholic beverages sold in Trawangan, only one local beer accepted the return of the bottles for refilling. Because of this urgency, glass waste needs to be recycled.

Since waste from the tourism industry began to pollute waters and coral reefs [3], it has caused the engagement of Gili Eco Trust (GET), an environmental non-governmental organization (NGO) located in Gili Trawangan, concerning the waste issue. GET is dedicated to environmental issues (mainly related to coastal areas and coral reefs), but it was only in 2011 that the organization became concerned about the waste problem in Trawangan. At the time, GET began to work more directly with FMPL by offering advice on horse care, as well as supporting the practice of sorting and recycling trash and campaigning through beach clean-up actions (Interview with Delphine, GET member, May 2021). GET established this cooperative to help the current waste management become a more sustainable organization. Through *Reduce*, *Reuse*, and *Recycling* (*3R*), GET aims to challenge the outdated approach (the end-of-pipe concept)

and switch to a more sustainable one. Therefore, waste management institutionalizes practices that are more ecologically conscious and does not just concentrate on the trash transportation business model.

Recycling was started in 2014 by GET and FMPL (Personal Communication with the manager of FMPL (CK), 2021). Ever since, FMPL started to ship metal, plastic, and paper products to mainland Lombok for sale to UD. Medana Mandiri, a waste collector in Pemenang sub-district, North Lombok. Meanwhile, at the same time, GET arranged for the recycling of tetra pack products to be sent to Bali through contact with a private waste management company there. GET has also started to organize FMPL workers to utilize glass waste from alcohol bottles to be processed as a mixture of bricks. With three permanent workers, waste processing activities start between 07.00 am - 04.00 pm every day.

Additionally, GET advertises volunteer and visitor opportunities at the Waste Bank via the internet and social media. These volunteers are generally dominated by foreign tourists who are spending their holidays in Indonesia. In its implementation, the Waste Bank is incorporated institutionally into the internal structure of FMPL. The waste transported by FMPL is collected at the Waste Bank to be sorted, which can be of sale value before being disposed of in open dumping. Meanwhile, revenue from recycling is used for FMPL operational costs. The waste bank itself may produce roughly IDR 14 million per month. (Personal Communication with the manager of FMPL (CK), 2021).

Furthermore, GET initiated a beach clean-up activity called Debris Free Friday. As the name implies, this event is held regularly every Friday, where the activity is picking up trash around the island. This activity, based on the gotong-royong (collective) principle, invites the tourists and local communities—in collaboration with local businessmen—to clean up the island's environment along with GET and FMPL. GET is the project's initiator, while FMPL handles the technical work on the ground. Soft drinks or beer would be provided as an appreciation to participants who took part in the activity. This program aims to raise public awareness of the value of properly disposing of waste while visiting the island of Trawangan and to educate them about it. This program was launched in 2013 and has continued to run regularly.

However, considering that expatriate networks dominate the members of this group, GET realizes that there are cultural obstacles between them and the local community. There are some values, norms, or unwritten rules that apply informally in Trawangan that expatriates or foreigners are not allowed to occupy structurally strategic positions in society, such as the head of an institution. In other words, native people maintain a prominent position in the social structure of the Trawangan society, while outsiders remain guests on the island (Personal Communication with GET member (D), 2021). Apart from that, however, GET's role and involvement at least contribute to waste management on this island. The practice, which was initially still conventional, was *challenged* by the emergence of GET through the institutionalization of recycling practices, awareness campaigns on waste issues, and beach clean-up actions in Trawangan public spaces. GET's strategy to institutionalize progressive values in waste management is carried out through a collaboration with FMPL.

Interconnection between Business and Environmental Concerns

Since GET has engaged with FMPL in waste management, the actual practice of handling waste on this island is no longer merely running a waste transportation service business but also formalizing sustainable and environmentally oriented approaches. Even though the end-of-pipe way is still the prevalent pattern, the position of the NGO could be a balancing act. Hence, waste management on this island lies between two interests: business and activism.

In terms of business, FMPL began to expand. Tourism development in Gili Trawangan, between the 2010s and 2016, experienced an exponential increase and shifted from small-scale community-based development to large-scale development with capital flows from investors. These changes are marked by an increase in the number and variety of tourism businesses, tourist visits, and population [3,20]. With the increasing number of tourism entrepreneurs in Trawangan, it is almost certain that the number of FMPL customers will increase. In 2016, the waste organization had 494 customers, whereas in a month, this waste organization requires approximately IDR 100 million for operational costs (Table 2).

Moreover, since 2014, FMPL has been institutionally incorporated with Trawangan's sub-village government. The *one-gate system* (also known as *sistem satu pintu* locally) was the

name given to the integration. Since the beginning of this arrangement, the FMPL's status has been integrated with the sub-village. This institution was in charge of collecting user fees from entrepreneurs and the community, as well as being responsible for reporting financial flows to the public. At the same time, FMPL formulates the operational budget for waste management.

Table 2. Operational Budget of FMPL (Monthly)

Component	Amount	IDR.month^{-1}
Horse Feed	1 month	27.300.000
Maintaining production tools	1 month	6.150.000
Water	1 month	1.200.000
Electricity	1 month	850.000
Sallary	27 people	40.500.000
Worker's logistic	27 people	6.750.000
Waste purchased	1 time	14.500.000
Total allocation		**IDR 99.750.000**

Source: FMPL's monthly report (October, 2017)

Decisions regarding operational costs, service fees, and employee salaries were not the authority of the sub-village head but rather were controlled by the internal management of the waste organization. Therefore, there is little significant difference between waste management before and after implementing the one-gate system.

Given that the one-gate system had no official legal justification or control, the police unfortunately conducted a sting operation (OTT) in 2017 against the sub-village authority for operating an illegal system. There were at least two changes after the incident: firstly, the formalization of the organization from an informal to a formal business entity (*Perseroan Terbatas* - PT). It is reasonable considering that to run waste management services legally; a formal institutional status is needed. Secondly, the implementation of local regulations for waste management and the presence of the North Lombok district government as a regulator in the waste management sector in this region (Fig. 2).

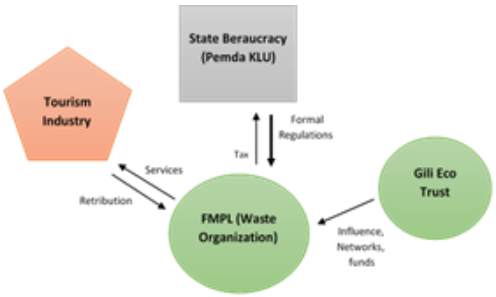

Figure 2. Waste scheme in Trawangan Island (**Source:** author's compilation).

Apart from the above, there has been no substantial change in the waste management sector in Gili Trawangan. Even though the status of this waste organization has been transformed into a formal business entity, in practice, the waste management before and after the sting operation remains the same: a fusion of waste transportation services, waste banks, and activism.

Since the sting operation in 2017, the local and central governments have started to get involved in the waste management sector on this island, which is marked by the project plan for the construction of an Integrated Waste Management Site (TPST). When viewed in a macro context, the government's active involvement is part of implementing policies regarding waste management. Recently, a national policy and strategy entitled Indonesia Free of Waste has been intensified by the central government (under the jurisdiction of the Ministry of Environment and Forestry). At the regional level, the West Nusa Tenggara provincial government is running its flagship program, which is named *NTB zero waste*. Through the Zero-Waste jargon, the government is committed to solving the waste problem, which, in the context of Trawangan, the TPST project is the embodiment of regional policies. So far, the project is more oriented towards supporting the tourism sector going business as usual, given its potential as one of the most significant contributors to regional income.

In the TPST development plan, FMPL is the organization that will be partnered with local governments. This consideration is based on the existence and track record of FMPL in handling waste since Trawangan tourism developed in the 90s. However, the continuation of this project was delayed due to the Covid-19 pandemic outbreak in early 2020. It delayed all government activities and projects to concentrate more on handling the pandemic. At the same time, the pandemic also shook the tourism industry, including Trawangan, due to the limited rate of travel mobility of people at the local, national, and international levels. In turn, the lack of tourist visits also impacts the waste sector, considering that waste management on this island lives on a business scheme that provides waste transportation services. Thus, this is a challenge not only for the tourism industry in Trawangan but also for the waste management field dependent on this industry.

CONCLUSION

The FMPL, as solely a waste organization in the Trawangan small island, emerged and developed on a historical trajectory that is linear to the dynamics of the tourism industry. Without state involvement, FMPL is created from the bottom up and is initiated by a local business actor (APGT) to fulfill their interests in keeping the tourism industry free from waste problems. Since the local community's economy is increasingly concentrated on the tourism industry—while state intervention in Trawangan is limited—local business actors are crucial to forming a waste management organization on this island. In other words, inadequate state involvement is merely a precondition for establishing FMPL on this island. There is an interdependent relationship between waste services and tourism. While the tourism industry requires waste management to maintain the smooth running of economic activities, the actors who run the waste organization benefit from these waste management practices. It is the reason why, on its emergence, the practice of waste management was applying the end-of-pipe waste transportation service model due to prioritizing efficiency.

Furthermore, there has been a gradual change in managing waste in Trawangan due to influences besides the tourism industry: environmental issues. Environmental issues arise because garbage begins to pollute not only the terrestrial environment but also marine areas and coral reefs. It, in turn, makes Gili Eco Trust (GET), a non-governmental organization that was born in the midst of the post-reform democratization process, a 'challenger' who intervenes in waste organizations to be environmentally oriented through the institutionalization of waste recycling and collective clean-up actions.

Thus, the interaction between local business actors in the tourism industry (economy) and NGO actors in activism (environment) shapes the organizational character and actual waste management practice in this region. When discussing how waste organizations emerged and existed in a particular community, it is essential to have the intention to go beyond the technical issues where the focus has been placed so far. In another sense, understanding a community-based organization in governing waste must recognize how the social structure and larger institutional context shape the organization's order that exists and continues.

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The use of English language should followed proper grammar and terms. Name of organism shoul be followed by its full scientific name in the first mention, in *italic* [3]. Author of the scientific name and the word of "var." typed regular. Example: *Stellaria saxatillis* Buch. Ham. First abbreviation typed in colon after the abbreviated phrase.

Author must use International Standard Unit (SI). Negative exponent used to show the denominator unit. Example: g l^{-1}, instead of g/l. The unit spaced after the numbers, except percentage [4]. Example: 25 g l^{-1}, instead of 25gl^{-1}; 35% instead of 35 %. Decimal typed in dot (not coma). All tables and figures should be mentioned in the text.

RESULT AND DISCUSSION (Calibri 10 Bold, Left, Capslock)

This section contains the results of the analysis and interpretation or discussion of the results of the analysis. Describe a structured, detailed, complete and concise explanation, so that the reader can follow the flow of analysis and thinking of researchers [5]. Part of the results study should be integrated with the results of the

analysis and the results and discussion are not separated.

Table

Table should be submitted within the manuscript and in separated file of *Microsoft Excel* (xls.). Table whould not exceed 8 cm (one column) and 17 cm (two columns). Table should be embedded in different page after references.

Table should be numbered in sequence. Table title should be brief and clear above the table, with uppercase in initial sentence. Vertical line should not be used. Footnote use number with colon and superscripted. Symbol of (*) or (**) was used to show difference in confidence interval of 95 and 99%.

Table 1. Example of the Table (Calibri 8.5 Left)

No	Point (Calibri 8.5 Justify)	Description
1		
2		
3		
4		
5		

Sources: Journal of PPSUB (Calibri 8.5 Left)

Figures

Figures should be in high resolution and well contrast in JPEG or PDF with the following conditions:

- Monochrome image (line art), figures of black and white diagram (solid/no shades of gray), resolution 1000-1200 dpi (dot per inch).
- Combination Halftone, combine figure and text (image containing text) and coloured graphic or in grayscale format. Resolution 600-900 dpi.
- Halftone, coloured figure or grayscale format without text. Resolution 300 dpi.
- Black and white figure should be in the grayscale mode, while coloured figures should be in RGB mode.
- Figure should not exceed the width of 8 cm (one column), 12.5 cm (1.5 columns) or 17 cm (two columns).
- Figures title typed clearly below the figure.
- Figure with pointing arrow should be grouped (grouping).
- Figures were recommended in black and white.
- Legend or figure description should be clear and complete. If compressed, the figure should be readable.
- Statistic graphic should be supplemented with data sources.
- If the figures come from the third party, it should have the copyright transfer from the sources.

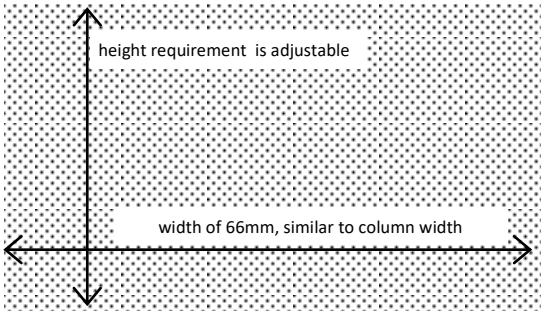

Figure 1. Illustration of Dimensional Figure of one column width. Figure dimension adjusted to the width of one column. Name the figure (diagram) written below the image. (Calibri 8.5 Justify)

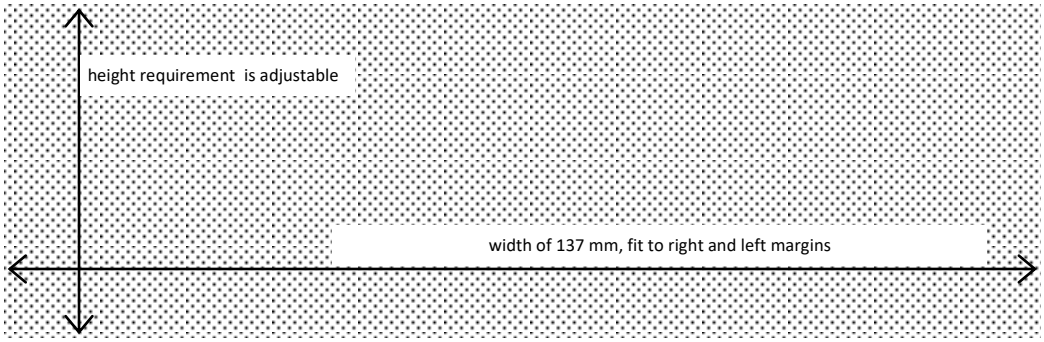

Figure 2. . Illustration of Dimensional Figure of two column width. Figure dimension adjusted to the width of two columns (137 mm). Figure were align top or bottom of the page. (Calibri 8.5 Justify)

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].

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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