

PAPER • OPEN ACCESS

Ethnoecology and ethnomedicine study to ensure maritime conservation in Bangsring Underwater (Bunder) Banyuwangi, Indonesia

To cite this article: N Athiroh *et al* 2020 *IOP Conf. Ser.: Mater. Sci. Eng.* **846** 012073

View the [article online](#) for updates and enhancements.

You may also like

- [Living within a One Planet reality: the contribution of personal Footprint calculators](#)
Andrea Collins, Alessandro Galli, Tara Hipwood *et al.*
- [Assessing radiation risk perception by means of a European stakeholder survey](#)
Sara Della Monaca, Valentina Dini, Sveva Grande *et al.*
- [The Community Health Volunteers description in Exclusive Breastfeeding Promotion and Improved Knowledge Through Training Based on The Concept of "Insufficient Milk Supply"](#)
A. Kartikasari, M. Dwi Anggraeni, L. Latifah *et al.*



244th Electrochemical Society Meeting

October 8 – 12, 2023 • Gothenburg, Sweden

50 symposia in electrochemistry & solid state science

Abstract submission deadline:
April 7, 2023

Read the call for papers &

submit your abstract!

Ethnoecology and ethnomedicine study to ensure maritime conservation in Bangsring Underwater (Bunder) Banyuwangi, Indonesia

N Athiroh¹, I Pujiwati², A Hayati³
University of Islam Malang, East Java, Indonesia

Email: *nur_athiroh_mlg@yahoo.co.id*

Abstract. The purpose of this study was to assess ethnoecology and ethnomedicine as support for marine conservation in Bangsring Under Water (Bunder) Banyuwangi. This research used descriptive exploratory techniques. The samples were done using random sampling techniques. The results of ethnoecology studies are as follows: 63% of respondents knew the Bunder area as a conservation area of coral reefs; 61% of respondents stated that they have access to the socio-ecological Bunder, 79% of respondents knew how to use the fish in Bangsring village, 71% utilize fish in Bunder, 72% of respondents see the type of fish that is used by the community, 45% of respondents knew how to preserve local fish. The results of the ethnomedicine study showed that 83% of respondents knew about medicinal plants, 83% of respondents have used medicinal plants, 88% of respondents knew how to use medicinal plants, 72% of respondents never planted medicinal plants, 85% of respondents identified the plant parts used drugs, 9% respondents are interested in using medicinal plants, 81% of respondents need to cultivate medicinal plants. Bunder ecologically waters have a positive impact on people's lives. People use these waters for tourism and livelihood as a fisherman, as a conservation area. In the Etnomedisin aspect, the community had an enthusiastic response to the medicinal plants. There are 25 species of medicinal plants used by the community as a medicine. The survival of medicinal plants in Bangsring Village is well guaranteed due to the high interest of the community to keep the sustainability of medicinal plants.

1. Introduction

The Bangsring Under Water (Bunder) Banyuwangi Regency, East Java are located between the Bali Sea and the Bali Strait. This area is a commercial and crossing shipping lane that has high fisheries productivity. Bangsring Under Water (Bunder) has well-known ornamental fish and coral resources. Potential of Bunder and Tabuhan Island as tourism places are very popular with both local and foreign tourists [1] [2].

Things that must be done to support Bunder as a tourism city include increasing public understanding of the threat of damage to the marine ecosystem. Lack of knowledge on ethnoecology, resulting in damage to marine ecosystems. One of the damages to the Bangsring Sea ecosystem is that it is caused by fishing exploitation activities [3].

A large number of sharks that were injured also showed the ecosystem damage in the area. The Bangsring coastal area ranged from 2-49 meters. The deepest region is in the southeast of the research



area. Based on the depth of the waters, the locations that can be an alternative placement of fish apartment are located by a distance of 200- 250 meters in front of Bangsring coastal area with a total area approximately 30 Ha [4].

Fishermen treat injured sharks using chemical drugs that harm the fish and the environment. Initial observations around Bunder show that coastal communities have not utilized many ethnomedicines. Ethnomedicine herbs are sourced from the ocean and in the coastal environment around the coast. One of the ethnomedicine herbs that are often found in coastal areas is neem. Mimba has potential as an herb that can maintain human health and marine life. This phenomenon is an innovation that needs to be studied further to support maritime conservation in the area of the Bunder.

2. Method

This study uses descriptive exploratory techniques, including literature study, field observations, interviews with questionnaires, data analysis, and documentation of research objects. Problem-solving is done by describing the state of research under the actual situation in the field. Data collected in this study were obtained from the results of interviews with the public about various potential medicinal plants. The determination of the selected sample is done using random sampling techniques.

The data collection was done through the determination of respondents, interview techniques, and documentation techniques. The number of respondents was 100 people who were determined by the random sampling method. Researchers conducted direct observations in Bangsring Village and then noted the Bangsring Village community's perception of bioprospection of medicinal plants. Researchers conducted interviews directly with community leaders and the community of Bangsring Village in general predetermined to find out things that are closely related to the activities to be carried out. Researchers take pictures directly and record the important things at the research site as documentation material and as evidence that researchers investigated that place.

Social science research is central in a “reality-based community.” It relies on people carefully studying experiences, events, and facts in social reality. While social research helps us answer questions about the social world, it also raises new questions and may change how we look at the world as well [5].

3. Result

3.1. Ethnoecology Study

The interview results with 100 respondents on public knowledge of Bangsring village are shown in Figure 1.

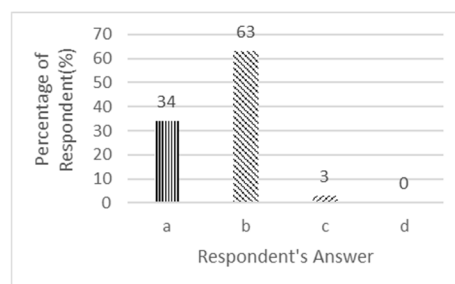


Figure 1. Percentage of knowledge about the area of Bunder

Noted: a. strongly agree; b. agree; c. disagree; d. strongly disagree

Figure 1 shows that 63% of respondents know well the Bangsring Underwater area. Bangsring Underwater is a coral reef conservation area as well as ecotourism in the Bangsring village. The existence of this conservation area causes the preservation of marine ecosystems in the town of Bangsring. The **scientific community** is a social institution of people, organizations, and roles, as well as a set of norms, behaviors, and attitudes that all operate together [5].

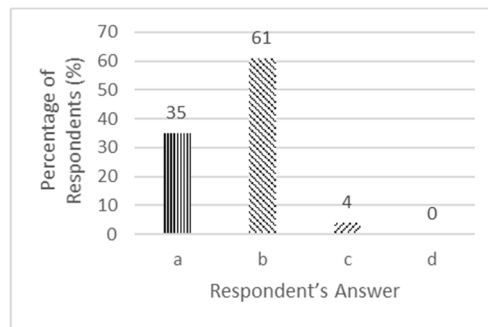


Figure 2. Percentage of benefit about the area of Bunder
 Noted: a. strongly agree; b. agree; c. disagree; d. strongly disagree

Figure 2 shows that 61% of respondents answered "feeling" the benefits of the Underwater Bangsring area. According to the results of the interview, the perceived benefits include the availability of jobs, the ease of catching fish, and the increasing number of fish in the waters of Bangsring village.

Bunder creates new jobs in transportation, culinary, hospitality, and other sectors. Besides, in Bunder marine tourism have various creates new jobs that improve the economy of the local community. This study showed that the presence of Bunder had created new jobs, and as a contributor, to regional income whose income potential continues to grow [1].

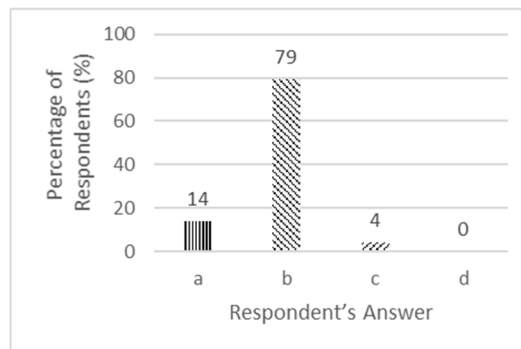


Figure 3. The use of fish in Bunder
 Noted: a. strongly agree; b. agree; c. disagree; d. strongly disagree

Figure 3 shows that 79% of respondents know how to use fish in Bangsring village. From the interviews, there were two types of fish that were utilized in the town of Bangsring, namely ornamental fish and "eating" fish. Ornamental fish is used by trading. While fish "eat" are used for personal consumption or also traded to residents around Bangsring.

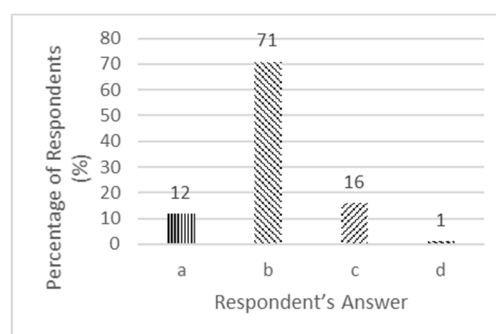


Figure 4. Percentage of fish used in Bunder

Noted: a. strongly agree; b. agree; c. disagree; d. strongly disagree

Figure 4 shows that 71% of respondents consume fish in the waters of Bangsring village. The fish is used as food and sold as ornamental fish. The majority of the Bangsring residents are fishermen. Thus, They always use fish in the waters of the Bangsring village.

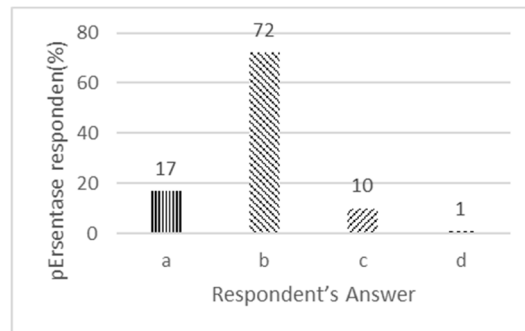


Figure 5. Knowledge of the types of fish used in Bunder

Noted: a. strongly agree; b. agree; c. disagree; d. strongly disagree

Figure 5 shows that 72% of respondents know the types of fish used in the village of Bangsring. Fish that are used are diverse, both ornamental fish and eating fish. According to the results of the interview, eating fish is the most commonly used by the Bangsring village community. Fishers catch fish only in the dry season. A kind of type of fish caught by fishermen bangsring consisting of 34 species that belong to 14 families and one new species. Fishers catch ornamental fish according to size and the amount had been determined due to maintaining ornamental diversity fish [6].

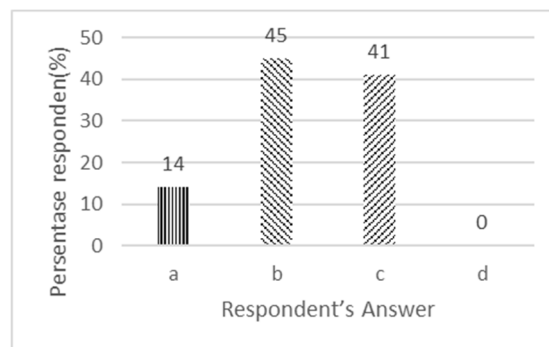


Figure 6. Knowledge of how to preserve fish in Bunder

Noted: a. strongly agree; b. agree; c. disagree; d. strongly disagree

Figure 6 shows that 45% of respondents know how to conserve fish. This knowledge was obtained through the Bangsring Underwater area, which carries out community-based marine waters conservation. It means that the Underwater Bangsring includes the community in every conservation step they take.

According to the results of interviews conducted by researchers, it is known that conservation efforts in the Bangsring waters area are related to the Samudera Bakti ornamental fish fishermen group. This group of fishermen was initially a group of ornamental fish fishermen in the village of Bangsring. After learning about the damage to the Bangsring village marine ecosystem due to excessive use of potassium, this group became the group that initiated the conservation of coral reefs in Bangsring waters. The aim is to increase fish populations in the region. After the area's ecosystem has recovered now, the group has formed an ecotourism area called the Bunder. The research was a

participatory case study where primary and secondary data were collected using the purposive sampling technique [3].

The study showed that the estimated total economic value (TEV) of the coral reefs of Bangsring was IDR 38.2 billion per year or IDR 2.9 billion per hectare per year, with tourism contributing 66 %or IDR 25 billion per year of the TEV. The healthy coral reefs of Bunder support local communities and generate billions of rupiahs annually; therefore, it is critical to managing the coral reefs of Bangsring sustainably for current and future generations [7].

Social capital in Bunder has a positive influence on the success of empowerment programs conducted to the fishermen in changing fishing patterns and preserving the marine environment. Lastly, substantial social capital in the community can reduce transaction costs [8].

That besides Bangsring village, located in the district of Wongsorejo, it had excellent tourism potential. The potential of tourism in Bangsring Village needs for increased promotion and marketing management. The mobile application Bunder based on android was one of the marketing strategies and promotion of village tourism potential in Bangsring [9].

There are many steps of strategies to develop the ecotourism for Bunder those are: enhance the promotion and publication intensively, adding facilities and infrastructure, development and increasing the ecotourism potential management, division of tasks to employees in every ecotourism product, conducting the training programs to the increasing the human resources of fisherman and the effort to the processing waste to be more productive [6].

3.2. Ethnomedicine Study

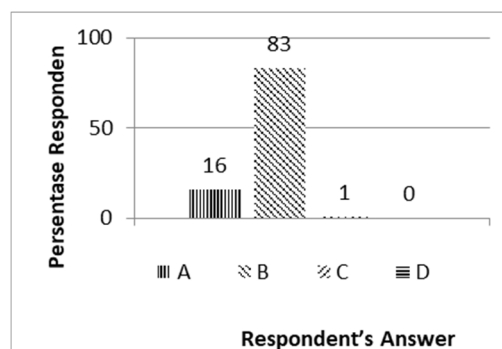


Figure 7. Knowledge about medicinal plants

Noted: a. strongly agree; b. agree;c. disagree; d. strongly disagree

Figure 7 shows that 83% of the respondents know about medicinal plants. Community knowledge about medicinal plants was passed down from parents in the past. In ancient times parents treated their sick children using medicinal herbs.

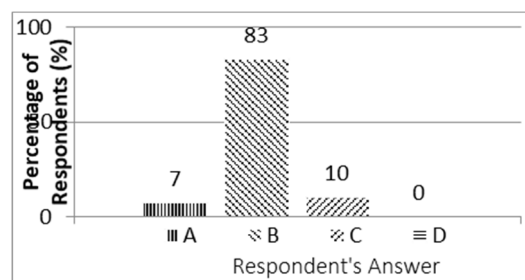


Figure 8. Percentage knowledge of medicinal plants

Noted: a. strongly agree; b. agree;c. disagree; d. strongly disagree

Figure 8 shows that 83% of Bangsring Village people have used medicinal plants. These medicinal plants are obtained from residents' yards, around agricultural gardens, and along village roads. One of the informants said that although most people have used medicinal plants, people more often use chemical drugs because they are more practical and easy to use.

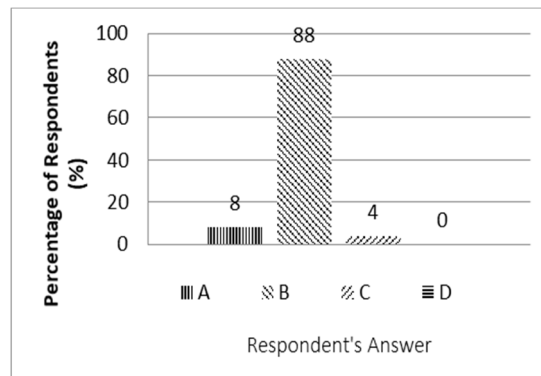


Figure 9. Percentage of knowledge on how to use medicinal plants
Noted: a. strongly agree; b. agree; c. disagree; d. strongly disagree

Figure 9 shows that 88% of respondents know how to use medicinal plants, that is, drinking boiled water from one part of the intended medicinal plant (leaves, roots, etc.).

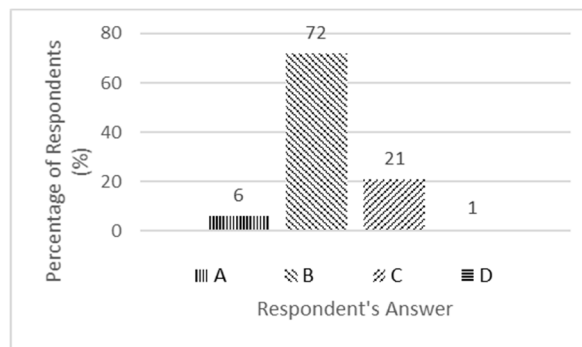


Figure 10. Percentage of planting medicinal plants by the community
Noted: a. strongly agree; b. agree; c. disagree; d. strongly disagree

Figure 10 shows that 72% of the Bangsring villagers had planted medicinal plants. These plants are mostly planted in the housing yards, but some grow wild around the residents' gardens. Plants in the village of Bangsring can grow well because the climate is suitable for the types of plants that exist so that some wild medicinal plants are found easily in this village.

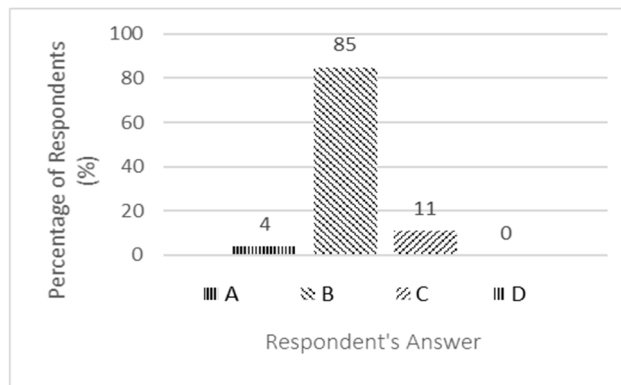


Figure 11. Percentage of knowledge of plants parts utilized
 Noted: a. strongly agree; b. agree;c. disagree; d. strongly disagree

Figure 11 shows that 85% of respondents know the parts of medicinal plants that are utilized. Each plant has benefits in different parts of the plant. The part that is often used is the roots and leaves.

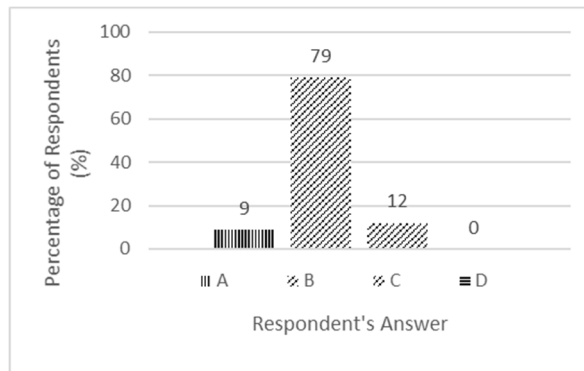


Figure 12. Percentage of interest in plant use attractiveness
 Noted: a. strongly agree; b. Agree;c. disagree; d. strongly disagree

Figure 12 shows that 79% of respondents were interested in using medicinal plants. Although the use of medicinal plants is not practical, people have an interest in medicinal plants.

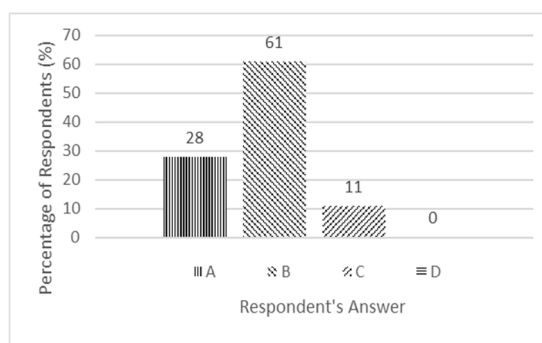


Figure 13. Percentage of the need to cultivate medicinal plants
 Noted: a. strongly agree; b. agree;c. disagree; d. strongly disagree

Figure 13 shows that 81% of the respondents felt the need to cultivate medicinal plants. It shows that the community is interested in preserving medicinal plants in Bangsring village.

Table 1. Types of Medicinal Plants Used by the Bangsring Village Community

No.	Local name	Latin namen	Benefit
1	Kunyit	<i>Curcuma longa</i>	reduce bloating, relieve pain
2	Jahe	<i>Zingiber officinale</i>	warm body
3	Mimba	<i>Azadirachta indica</i>	increase appetite, anti worms
4	Asam	<i>Tamarindus indica</i>	launched digestion, lose weight
5	Jarak pager	<i>Jatropha curcas</i>	launched digestion treat arthritis
6	Simbukan	<i>Paederia foetida</i>	launched flue gas, treat itchy skin reduce bloating
7	Serai	<i>Cymbopogon citarus</i>	relieve pain, lower cholesterol
8	Daun salam	<i>Syzygium polyanthum</i>	lower diabetes mellitus, relieve pain
9	Lidah buaya	<i>Aloe vera</i>	lower diabetes mellitus, hair health
10	Katus gunung	<i>Sauropus sp</i>	increase endurance, treating injury
11	Binahong	<i>Anredera cordifolia</i>	treat an ulcer, cough, uric acid
12	Kemangi	<i>Ocimum tenuiflorum</i>	Increase appetite, prevent smell agencies and mouth
13	Sirsak	<i>Annona muricata</i>	strengthen the immunity of their bodies salubrious the skin
14	Pepaya	<i>Carica papaya</i>	launched digestion
15	Bawang putih	<i>Allium sativum</i>	overcome rheum, lowering blood pressure
16	Kumis kucing	<i>Orthosiphon aristatus</i>	lower diabetes mellitus, salubrious the kidneys
17	Suruh	<i>Peperomia pellucida</i>	relieve pain, headache
18	Belimbing wuluh	<i>Averrhoa bilimbi</i>	overcome rheum, cure <i>gondongan</i>
19	Pinang	<i>Areca catechu</i>	launched digestion, anti worms, increase appetite
20	Kelor	<i>Moringa oleifera</i>	healthy eyes, antioxidant, launched digestion
21	Jarak	<i>Ricinus communis</i>	launched digestion, overcome rheum sprue
22	Temulawak	<i>Curcuma zantorrhiza</i>	launched digestion
23	Kencur	<i>Kaempferia galanga</i>	Headache, cough, influenza
24	Sambiloto	<i>Andrographis paniculata</i>	cure rheum and flu, cure an infection
25	Bawang merah	<i>Allium cepa</i>	overcome constipation, increase immunity the body

Types of medicinal plants contain antioxidants, extract in our study may include quercetin, quercetin-3-Oglucoside, quercitrin (glycoside rhamnose of quercetin), and kaempferol. Quercetin exerts its antioxidant activity through scavenging reactive oxygen species [10][11][12][13].

Flavonoids such as polyphenols can increase the activity of Nitric Oxide Synthase (NOS) in vascular endothelial cells. Active substances can be diffused directly and synthesize Nitric Oxide (NO) in smooth muscle and iroendothelial further stimulate guanylate cyclase to form cGMP cause vasodilation [14].

Flavonoid compounds can function as natural antioxidants, which protect the biological system and inhibit cellular oxidation through reduction-catching active oxygen and free radical especially superoxide.

It is also supported by the previous study that the community's response to the Neem tree is quite high. The use of the Neem by the community of Bunder as a medicinal plant is used as a medication for hives, appetite enhancer, and cure for diabetes. The Bunder community manages Neem as an adjuvant medicine by drinking from the leaves. The bioprospection aspects observed in this study were: use as a drug, availability, collaborative management as a drug, conservation efforts, and its benefits as a medicinal plant for the community [15].

4. Conclusion

Bunder ecologically has a positive impact on people's lives. The conservation process involved people who participate in it. In the Ethnomedicine aspect, the community had an enthusiastic response to the medicinal plants. There are 25 species of medicinal plants used by the community as a medicine. The survival of medicinal plants in Bangsring Village is well guaranteed due to the high interest of the community to keep the sustainability of medicinal plants.

5. Acknowledgments

Thanks to the Directorate for Research and Devotion Society, Ministry of Research, Technology, and the Higher Education Republic of Indonesia, Nomor: 124/G164/U.LPPM/K/B.07/IV/2019, which has supported grant funding for research Penelitian Dasar Unggulan Perguruan Tinggi (PDUPT) with the title "Kajian Etnoekologi dan Etnomedisin untuk Menunjang Konservasi Maritim Bangsring Underwater (BUNDER) Banyuwangi." Thanks also to the team of research.

6. References

- [1] AS Tindi, M Darwin, HA Kusworo, and PM Kutaneegara 2009 Membangun Wisata Bahari: Studi Kasus Bangsring Underwater di Kabupaten Banyuwangi **2** pp. 159–176
- [2] Khotimah K and Hasanudin H 2017 Desain Kapal untuk Wisata Rute Bangsring- Pulau Menjangan – Pulau Tabuhan *J. Tek. ITS* vol. **5**
- [3] MA Asadi and A Andrimida 2017 Meconomic Valuation of Coral Reefs Ecosystem of Bangsring, Banyuwangi, Indonesia *ECSOFiM Econ. Soc. Fish. Mar. J.* **04** pp. 144–152
- [4] MAZ Fuad, AB Sambah, A Isdianto, and A Andira 2016 Pemetaan batimetri sebagai informasi dasar untuk penempatan fish apartment di perairan Bangsring, Kabupaten Banyuwangi, Jawa Timur (Bathymetry mapping as basic information for fish apartment placement in Bangsring waters, Banyuwangi, East Java) *Depik* **5** pp. 143–150
- [5] YK Djamba and WL Neuman 2002 *Social Research Methods: Qualitative and Quantitative Approaches*, **30** (Harlow: Pearson)
- [6] N Aini, H Zayadi, and S Laili 2018 Studi dan Strategi Pengembangan Produk Ekowisata Bunder (Bangsring Underwater) di Desa Bangsring Kecamatan Wongsorejo Kabupaten Banyuwangi *Biosaintropis (Bioscience-Tropic)* **3** pp. 46–52
- [7] R Damayanti 2012 Pemetaan Terumbu Karang di Perairan Pulau Tabuhan Kabupaten Banyuwangi Menggunakan Citra Satelit Quickbird *J. Kelaut* **05** pp. 62–71
- [8] U A Kusuma, D Satria, and A Manzilati Modal Sosial Dan Ekowisata: Studi Kasus Di Bangsring Underwater, Kabupaten Banyuwangi *Jiep* **2** pp. 1–30
- [9] A A Hidayati and DK Saputra 2016 Application of Information Technology for Promotion and Sustainable Management on Marine Ecotourism: A Case Study in Bangsring, Banyuwangi *JIAT- J. Innov. Appl. Technol.*, **02** pp. 354–357
- [10] N Athiroh, N Permatasari, D Sargowo, and M A Widodo 2014 Antioxidative and blood pressure-lowering effects of *Scurrula atropurpurea* on deoxycorticosterone acetate-salt hypertensive rats *Biomarkers Genomic Med.* **6** pp. 32–36
- [11] N Athiroh, N Permatasari, D Sargowo, and A Widodo 2014 Effect of *Scurrula atropurpurea* on nitric oxide, endothelial damage, and endothelial progenitor cells of DOCA-salt hypertensive rats *Iranian journal of basic medical sciences* **17** 622

- [12] N Athiroh and E Sulistyowati 2013 *Scurrula atropurpurea* Increases Nitric Oxide and Decreases Malondialdehyde in Hipertensive Rats *J. Nas. Terakreditasi J. Universa Med* **32** pp. 44–50
- [13] N Athiroh and E Sulistyowati 2015 Evaluation Of Methanolic Extract Of *Scurrula Atropurpurea* (Bl.) Dans Sub-Chronic Exposure On Wistar Rat Liver *American-Euroasian Network for Scientific Information Journal* **9** pp. 245-250
- [14] N Athiroh and D Wahyuningsih 2017 Study of Superoxide Dismutase and Malondialdehyde Concentrations in Mice After Administration of Methanolic Extract of *Scurrula atropurpurea* (BL.) *J. Kedokt. Hewan - Indones. J. Vet. Sci.* **11** pp. 19–22
- [15] A Baidarus, A Hayati, N Athiroh 2019 Bioprospection of Neem (*Azadirachta indica* Juss) as Medicinal Plant in Bangsring Village, Wongsorejo, Banyuwangi District *Jurnal Ilm. SAINS ALAMI (Known Nature)* **2** pp. 50–56



CERTIFICATE

Nomor: 2374/LP2M/HM.00/10/2020

Awarded to:
Nour Athiroh
as
Presenter

in "The 2nd International Conference on Engineering, Technology, and Social Science"
Malang, October 31st 2020
organized by Lembaga Penelitian dan Pengabdian Masyarakat (LP2M),
Universitas Islam Negeri Maulana Malik Ibrahim Malang

Head of LP2M
UIN Maulana Malik Ibrahim Malang



Prof. Dr. H. Tutik Hamidah, M.Ag.
NIP. 195904231986032003



📧 uinmlg 🌐 www.uin-malang.ac.id