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STUDY OF LOKAN CLAM ECOLOGY AND CONSERVATION STRATEGIES AS A SOURCE OF SCIENCE LEARNING ON THE MATERIAL OF DIVERSITY OF LIVING THINGS IN THE AGAM RIVER, AIR RAMI VILLAGE, MUKOMUKO REGENCY

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ABSTRACT

This study aims to address the problems surrounding the ecology of lokan clams around the Agam River, Air Rami Village, Mukomuko Regency. In addition, this study also aims to design science learning resources based on ecological studies and conservation strategies in the region. The research method used is exploratory descriptive with a qualitative approach.

The results showed that the ecology of lokan clams around the Agam River, Air Rami Village, Mukomuko Regency is strongly influenced by factors such as temperature, pH, salinity, and water currents. To maintain the lokan clam population, a conservation strategy has been implemented by imposing a minimum size limit for lokan clams in the Agam River. It aims to preserve the population of lokan mussels in the region.

However, this conservation strategy faces obstacles such as lack of village planning, budget constraints, lack of community knowledge, and lack of government attention to the Agam River. This obstacle affects efforts to preserve lokan clams in the Agam River.

In an effort to convey information about the ecology of lokan clams and their conservation strategies, this study designed science learning resources in the form of poster media.

Keyword : Ecology, Lokan Shell, Agam River.

INTRODUCTION

Indonesia, as a maritime country, has a very large sea area, with about 2/3 of its total area in the form of ocean. As the largest archipelagic country in the world, Indonesia has a sea area of 5.8 million square kilometers, consisting of a territorial area of 3.2 million square kilometers and an Indonesian Exclusive Economic Zone (EEZ) of 2.7 million square kilometers. In addition, Indonesia has 17,504 islands, large and small, each of which has its own characteristics and patterns, with a coastline reaching about 95,181 kilometers.[1]

One of the areas that is the focus of attention in this context is Mukomuko Regency, located on Sumatra Island, Bengkulu Province. The district has a long coastline, reaching about 98,218 kilometers, and is geographically located between 101°01'15.1"–101°05'29.6" E and 02°16'32.0"–03°07'46.0" S. With an area of sea waters reaching about 727.60 square

[1] Erick Nograha, dan Mugi Mulyono, "*Laut Sumber Kehidupan''*, (Jakarta: STP Press, 2017), hal. 1

kilometers within 4 miles of the coastline, Mukomuko Regency is one of the seven regencies or cities in Bengkulu Province that have coastal areas. The district is directly adjacent to the Indian Ocean, making it an integral part of the coastal region that has an important role in the transition between land and sea.[2]

Coastal areas, with their coastal environments and coastal waters that are part of them, have high ecological significance as ecotones reflecting the transition from land to influences from the sea. The notion of coastal can be described from two opposing perspectives: From a land perspective, a coastal is an area that includes land to sea that is still influenced by land properties such as land winds, freshwater drainage from rivers, and sedimentation; While from the perspective of the sea, the coast is an area that includes the sea to land which is still influenced by marine properties such as tides, salinity, seawater intrusion into land areas, sea breezes, and others.

One of the sub-districts on the coast of Mukomuko is Air Rami District, which is located in the north of Bengkulu Province. This sub-district has an area of about 99.20 square kilometers and its capital is Arga Jaya District. Air Rami is bordered by Ipuh District and Malin Deman District to the north, North Bengkulu Regency to the south, Jambi Province to the east, and the Indian Ocean to the west. Although most of the villages in this sub-district are located in non-coastal areas, there is one village, namely Air Rami Village, which is directly adjacent to the Indian Ocean.[3] In addition to sea waters, this area is also surrounded by inland waters in the form of rivers.

One of the significant rivers in this area is the Agam River, which follows the axis road and forms the boundary between Air Rami Village and North Bengkulu. The Agam River has a length of about 1.5 kilometers, but in the rainy season, this river can merge with the Therapeutic River, making its total length reach 30 kilometers.[4]

Aquatic ecosystems in Indonesia include seas, rivers, lakes, and lakes. The existence of these diverse types of waters provides vital support for various forms of aquatic life, ranging from invertebrate organisms to vertebrates. One of the prominent groups of organisms is mollusks, which have a wide distribution both geographically and geologically. Mollusks are commonly found in marine waters along coasts and shallow waters, although some also live in deep water and actively swim in open water.[5]

Rivers, as one type of terrestrial water, form flowing ecosystems that have important benefits in the balance of nature and human life. A river is a natural waterway that flows from upstream to downstream, with flow boundaries on both sides. In the beginning, rivers were

[2] Eko Nofridiansyah, Zamdial, Dede Hartono, Dan Deddy Bakhtiar, "*Studi Identifikasi Kerusakan Wilayah Pesisir Di Kabupaten Mukomuko Provinsi Bengkulu*'', Program Studi Ilmu Kelautan Universitas Bengkulu, Jurnal Enggano, Vol. 2, No. 2. Tahun 2017. hal 197

[3] Tatty Yuniarti, Dwi Anggi Saputra, Dan Yenni Nuraini, "*Identifikasi Potensi Wilayah Perikanan Di Kecamatan Air Rami Kabupaten Mukomuko Provinsi Bengkulu'',* Program Studi Penyuluhan Perikanan Politeknik Ahli Usaha Perikanan. Jurnal Penyuluhan Perikanan Dan Kelautan. Volume 14(1). Tahun 2020. hal 94

[4] Dedi H, "*Wawancara Awal",* 19 Maret 2023

[5] Eko Jatmiko, Endang Sulaiman, Santoso, Merri Sri Hartati, dan Nurwiyoto, "*Keanekaragaman Mollusca yang Terdapat di Kecamatan Batik Nau Kabupaten Bengkulu Tengah*'', Mahasiswa Program Studi Pendidikan Biologi FKIP Universitas Muhammadiyah Bengkulu, Program Studi Pendidikan Biologi FKIP Universitas Muhammadiyah Bengkulu. Jurnal Riset dan Inovasi Pendidikan Sains, (JRIPS), Vol.xx No.xx (20xx) pp.xx-xx. Tahun 2022, hal. 60

resources that were managed and utilized jointly by the community, becoming public property.[6]

River aquatic resources are valuable assets in deep and complex aquatic ecosystems. One of the prominent organisms in this ecosystem is the Lokan clam (Geloina erosa), which belongs to the Family Corbiculidae. Lokan clams are bivalve creatures that inhabit the bottom of muddy waters, with their habitat covering areas such as downstream and riverbed, estuaries, as well as brackish and fresh waters that have water flow. The family group Corbiculidae can generally be found on substrates that have a fairly good level of oxygen (O2), such as coarse sand or a mixture of sand and gravel. These substrate characteristics have the potential to influence morphology, functional behavior, and interactions with Benthos animal nutrients. Benthic organisms such as Bivalves are able to adapt to the type of substrate they live on, and these adaptations affect physical morphology, physiology, and response to environmental factors such as temperature and chemical quality of waters.[7]

Lokan mussels (Geloina sp) have a tendency to immerse themselves in sandy sediments or muddy sand by using byssus. The existence and abundance of this group of shellfish has an important impact on human life. The high nutritional content in meat makes it a valuable food source, with protein around 7.06%-16.87%, fat around 0.40-2.47%, carbohydrates around 2.36-4.95%, and energy around 69-88 kilocalories per 100 grams of meat. In addition to the meat, the skin or shell also has economic value, used as a material to make accessories and industrial ornamental. One of the main species of this group of shellfish that is widely used by humans in coastal areas is the mangrove clam Geloina erosa.[8]

The use of Lokan shells has become part of the culture and life of the Mukomuko people, especially in the Air Rami District area located around the Agam River. Lokan clams are processed into delicious dishes such as rendang Lokan and Lokan satay, and the shells are used as ingredients to make wall hangings and key chains. However, this high level of use cannot be ignored, as it may result in an indirect decline in the population of Lokan mussels.[9]

The increasing demand for fresh Lokan mussels has resulted in increased exploitation (capture) of Lokan mussel populations in their natural habitat. This fishing is usually done by the community by digging the substrate in the River Estuary by hand, and sometimes do not pay attention to the size and reproductive conditions of the shellfish caught. This often results in the capture of shellfish that are ready to reproduce. In addition, factory waste disposal activities can also have a negative impact on environmental quality in the Lokan clam habitat. This accumulation of increased fishing and environmental pressures will ultimately affect the size, number, and frequency of Lokan clam discoveries in nature. Therefore, to restore and preserve Lokan mussels, it is necessary to make captive breeding efforts for Lokan mussels.[10]

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[6] Didiek Surjanto, Sifa Nurseptiani, M. Mukhlis, dan Taryono, "*Pengelolaan Perikanan Perairan Darat Di Sungai Sebangau Taman Nasional Sebangau Kalimantan Tengah''*, Fakultas Perikanan dan Ilmu Kelautan, IPB University, Vol. 11 No 2. Tahun 2021. hal. 92

[7] Ma'ruf, ''*Analisis Kepadatan Kerang Lokan (Geloina erosa) (Density Analysis of Lokan Shells (Geloina erosa)''*, Jurnal Tarjih: Fisheries and Aquatic Studies, Volume 1 Nomor 1 Tahun 2021, hal. 25-031

[8] Satino, ''*Diktat Kuliah Biologi Perairan*'', Yogyakarta: FMIPA UNY, Tahun 2022, hal 46

[9] Nofrianto, *"Observasi Awal"*, 19 Mater 2023

[10] Joni Asdi, "Observasi Awal", 19 Maret 2023

To prevent population decline and avoid the potential extinction of Lokan mussels, it is necessary to conduct a thorough ecological study and nature conservation strategy. This agenda must be integrated into local government policies, especially in the Agam River basin, to maintain the sustainability of the Lokan mussel population. In-depth knowledge of the basic biology and ecology of Lokan mussels is required through an approach that involves analyzing their populations and habitats, which includes parameters such as size, population density, population dispersal, gonad maturity, and nutrient content present in Lokan mussels.

Efforts to improve basic understanding of Lokan clam ecology can be done by integrating this information into the learning process. The teaching and learning process that connects students with relevant learning resources becomes very important, where students can gain knowledge, information, and experience through various media such as writing, photos, images, real objects, and their surrounding environment.[11]

One environment that can be a source of learning that is close to students is the Agam River environment. In addition to understanding basic ecological concepts and biological concepts, students can also learn about the conservation strategies of Lokan shellfish necessary to avoid the impact of massive exploitation on their populations.[12]

Based on the background above, this research raises a very important topic, namely " Study of Lokan clam ecology and conservation strategies as a source of science learning on the material of diversity of living things in the Agam River, Air Rami Village, Mukomuko Regency." This research is expected to provide deeper insight into the ecology of Lokan shells and design a conservation strategy as a source of learning natural science (IPA) in the context of diversity of living things in the Agam River area, especially in Air Rami Village, Mukomuko Regency.

METHOD

A. Types and Approaches of Research

This research is a type of exploratory descriptive research with a qualitative approach. Descriptive research aims to describe the nature of something that is ongoing when research is carried out and examine the causes of a particular symptom. On the other hand, exploratory descriptive research aims to describe the state of a phenomenon without testing a particular hypothesis, only describing what a variable, symptom, or state is. Therefore, this form of research is qualitative research, which is used to describe or describe the ecological study of Lokan Mussels and their conservation strategies as a source of science learning in the Agam River, Air Rami Village, Mukomuko Regency.

B. Place and Time of Research

The location of this research is in Air Rami Village, Mukomuko Regency. The research was conducted after the proposal seminar exam which took place from June 7 to July 7, 2023.

C. Data Sources

[11] Ma'ruf, ''*Analisis Kepadatan Kerang Lokan (Geloina erosa) (Density Analysis of Lokan Shells (Geloina erosa)''*, Jurnal Tarjih: Fisheries and Aquatic Studies, Volume 1 Nomor 1, Tahun 2021, hal. 25-31

[12] Umi Nur Afifah Rahmawati, ''Pemanfaatan Lingkungan Sebagai Sumber Belajar Di Mimpundungrejo Tahun Pelajaran 2019/2020'', Ba Aisyiyah Pundungrejo, Jurnal Of Policy And Elementary Education Issues, Vol 1 No 1, 2020, hal. 40

The source of qualitative research data can be spoken or written words observed by the researcher, as well as objects observed to certain details in order to capture the meaning implied in the document or object. Data sources are of two types, namely primary data sources and secondary data sources.

1. Primary Data Source

Primary data is the main data directly related to the object of research. This data was obtained through field surveys, interviews, observations, distribution of questionnaires, documentation, and direct observation at the research site. In this study, primary data were obtained by conducting direct interviews with three informants, namely one village official and two fishermen. In addition, the use of Lokan shells is also a primary data source.

2. Secondary Data sources

Secondary data sources are obtained from secondary sources or skunder sources relevant to the study. This secondary data can come from documents such as research journals, books, internet publications, and documentation related to research on Lokan shells.

D. Data Collection Techniques

Data collection in this study involved three main techniques, namely ecological observation, interviews, and documentation.

1. Ecological Observation

Ecological observation is the initial stage before the research is carried out, with the aim of obtaining information and an overview of the object of research and the condition of the Agam River. This observation was made on March 20, 2023, when researchers visited Air Rami Village. During observation, researchers can also conduct site surveys on the Agam River to evaluate the study area.

a. Tools and Materials

Tools and materials used in observation include gauges, buckets, raffia ropes, knives, plot pipes, stationery, pH meters, thermometers, refractometers, calipers, and plastic bags.

b. Procedure

Observations were made by establishing observation plots, sampling Lokan shells, and morphometric measurements. Sampling is carried out using purposive sampling techniques.

2. Interview

The interview was conducted on March 20, 2023 with the village head of Air Rami Village, Mr. Khairani, to obtain information about the community and activities in the research area. Interviews were conducted to understand the role of Lokan clams in people's lives.

3. Documentation

Documentation is used to support and complement data obtained from interview and observation techniques. Documentation can be in the form of pictures taken during the field observation process and documents.

RESULTS AND DISCUSSION

1. Description of the Neighborhood Around the Agam River

This journal provides a description of the environment around the Agam River, including water temperature, salinity, water pH, as well as substrate characteristics in the

area. The measurement results show that the environmental conditions around the river support the life of Lokan clams.[13]

2. Lokan clam adaptation

Lokan clams are one of the Bivalves that live at the bottom of muddy waters. They have the ability to adapt to different types of substrates, which affects their morphology and behavior.

3. The Importance of Agam River for Society

Agam River has an important role for the people of Air Rami Village, especially as a source of livelihood, including fishing for Lokan fish and shellfish. The availability of natural resources from this river is important for the survival of the local community.

4. Constraints in the Preservation of Lokan Mussels

There are several obstacles that affect the conservation strategy of Lokan Mussels around the Agam River, including lack of village planning, budget constraints, limited knowledge and public awareness, and lack of government attention to the condition of the Agam River. These constraints can affect the preservation of natural resources.

5. Utilization of Poster Media in Education

To increase public understanding and awareness, researchers developed a poster media containing information about Lokan Mussels and their habitat around the Agam River. Poster media is expected to attract the attention of students and the public and provide important information.

In the context of preserving the environment and natural resources such as Lokan Mussels, it is important to continue to educate the community and design conservation strategies that are appropriate to local conditions. In addition, the use of media such as posters can help in conveying important messages and information to the public.

CONCLUSION

Based on the summary of the discussion that has been carried out in this chapter, the following can be concluded:

1. Lokan Shell Ecology Around Agam River Air Rami Village, Mukomuko Regency

   The environment around the Agam River affects the sustainability of the Lokan Clam. Factors such as temperature, pH, salinity, and water currents play an important role in the ecology of Lokan Mussels in the area.

2. Lokan Mussel Preservation Strategy

   To maintain the sustainability of Lokan Mussels in Agam River, a conservation strategy has been implemented. One of the efforts is to provide a minimum size limit for catching Lokan shells, which is not less than 5 cm. This measure aims to maintain the population of Lokan Mussels and ensure that there is no overfishing.

3. Constraints in Preservation Strategy

   Some of the obstacles in the Lokan Mussel conservation strategy include lack of planning at the village level, budget constraints, limited community knowledge, and lack

[13] Ma'ruf, ''*Analisis Kepadatan Kerang Lokan (Geloina erosa) (Density Analysis of Lokan Shells (Geloina erosa)''*, Jurnal Tarjih: Fisheries and Aquatic Studies, Volume 1 Nomor 1 Tahun 2021, hal. 25-031

of attention from the government to the condition of the Agam River. This obstacle can be an obstacle in maintaining the sustainability of Lokan Mussels.

4. Science Learning Resource Design

As an effort to increase public understanding and awareness and students about Lokan Shells, learning media in the form of posters have been developed. This poster media is designed with the aim of providing interesting and educational information to the people of Air Rami Village. It is hoped that this poster can be an effective means of learning.

Thus, this chapter provides a comprehensive overview of the ecology of Lokan Mussels, conservation strategies, obstacles faced, and educational efforts through poster media in the context of the Agam River in Air Rami Village, Mukomuko Regency, Bengkulu Province.

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