

Ethnozoology of Lanun community towards biodiversity conservation at Tebat Rasau ancient lake geosite in Simpang Renggang District, East Belitung Regency

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Abstract. Tebat Rasau ancient lake geosite in Simpang Renggang District, East Belitung Regency is part of the Belitong UNESCO Global Geopark in 2021. Tebat Rasau Ancient Lake has high biodiversity, and is specifically home to protect primitive species namely ornamental arowana fish (*Scleropages formosus*), among fish (*Channa marulius*) and green-spotted puffer fish (*Dichotomyctere nigroviridis*). This research examined the ethnozoology of the Lanun community as an effort to conserve lake resources. The objective of this research is to study the ethnozoology of Lanun community towards conservation efforts of Tebat Rasau ancient lake resources. The research method was a survey with FGD technique with participants of all 13 members of Lanun community, Lintang Village Government, Renggang Sub-District Head, and East Belitung Regency Research and Development Agency. The research was conducted in Simpang Renggang District, East Belitung Regency. Data collection methods in this research included primary data and secondary data. In supporting data collection to calculate the economic value of the area, this research used economic resource valuation techniques with questionnaires, interviews, observation and documentation. Secondary data collection was supported by relevant literature studies. This research also applied explorative descriptive data analysis method. The results of the research showed that the Lanun community's efforts to preserve the Tebat Rasau geosite are preserving the local culture of environmentally friendly fishing known as nirok nanggok and bebanjor. This local tradition is expected to prevent the extinction of fish resources in the future.

Key Words: economic value, freshwater fishes, Lintang Village, local culture.

Introduction. The Belitong UNESCO Global Geopark is a part of Bangka Belitung province that has prominent geological elements, surrounded by Karimata Strait in the north and Gaspar Strait in the west. Its geographical boundaries are 107°13'00"-108°51'00" East longitude and 02°29'30"-03°25'00" South latitude. The Belitong Geopark has a total area of about 4,800 km² of land and 13,000 km² of sea and is surrounded by 241 small islands, including Mendanau, Kalimambang, Gresik and Selu islands (Pranit & Musthofa 2021).

Belitong Global Geopark, designated by UNESCO in 2021, is a home for more than 288,000 people from diverse cultures including the Sawang Tribe, as well as home for plant and animal species endemic to Belitung Island. The unique Tor granite landscape, meteorite impact remnants, mining heritage, and diverse local culture make it a site of significant tourism potential. At the same time, however, its complex ecology requires careful and integrated management to ensure long-term sustainability (en.unesco.org).

Belitong UNESCO Global Geopark tourism is included in the green tourism category. According to Arismayanti (2015), Jumadi & Aditya (2021), and Alvianna et al (2022), green tourism is a form of ecotourism that focuses on sustainable tourism, meaning tourism activities that do not damage tourist sites (environmentally friendly). In addition, Parmawati et al (2020) and Megawati et al (2023) stated that green tourism development strategies include high community involvement, and high participation of

tourists in protecting the environment. According to Zuhri et al (2021), Belitong Geopark is an environment-based tourism.

One of the geosites of the Belitong UNESCO Global Geopark is Tebat Rasau ancient lake (Figure 1). The lake has high biodiversity, and is particularly home to ornamental arowana (*Scleropages formosus*), among fish (*Channa marulius*) and green-spotted pufferfish (*Dichotomyctere nigroviridis*) (belitonggeopark.net). According to Djapani et al (2021), freshwater and forest ecosystems in Tebat Rasau, apart from having an important role for the community, can also be a natural laboratory. For generations, local people have had the knowledge to utilize natural resources there, such as how to catch fish and use plants as spices. The Geopark concept helps add the scientific reference that the Lenggang River is the habitat of the primitive species Asian arowana (*S. formosus*) which is an endangered species and is included in the IUCN Red List.



Figure 1. Tebat Rasau ancient lake (Source: babelinsight.id).

The investigation of the utilization of biodiversity, particularly indigenous lake fish, to meet the requirements of local communities has not yet been explored in scholarly research. Hence, the accurate recording of used data has been lacking. It is crucial to ensure the maintenance of protected primitive fish species in order to sustain their conservation (Ndobe et al 2022; Valen et al 2023). Djapani et al (2021) said that the Lanun Tebat Rasau community refers to the Tebat Rasau Geosite Management community, which was established in the early part of 2018. The primary objective of this community is to conserve the Tebat Rasau Rawa and the Lenggang River, which serve as vital sources of freshwater for the local communities residing in the vicinity. The community regularly traverses the Lenggang River and the surrounding Kerangas forest on a daily basis. Subsequently, in the year 2019, the organization transitioned into the Tourism Awareness Group (Pokdarwis) and initiated conservation initiatives aimed at preserving indigenous and native fish species.

This research aims to examine the ethnozoology of the Lanun Community as an effort to conserve lake resources. According to Hasan et al (2022), ethnozoology discovers the knowledge of local people about the use of animals around them. Ethnozoology studies the utilization and management of animal species diversity that is closely related to the culture of society and to an ethnic group (Hassan et al 2022). Moreover, ethnozoology examines the relationship from the past to the present between people and the animals around them (Hunn & Brown 2011).

Sustainable management of lake resources should also consider economic, ecological and social aspects (Hasan et al 2023a). The economic dimension entails augmenting the local community's revenue in the vicinity of Tebat Rasau by means of educational tourism centered on ethnozoology. The ecological dimension involves safeguarding and conserving aquatic biota and the surrounding environment. Lastly, the social dimension encompasses the community's involvement in endeavors aimed at

preserving the resources of Tebat Rasau. Therefore, this research aims to examine the ethnozoology of the Lanun community towards conservation efforts of Tebat Rasau Ancient Lake resources.

This research is expected to give some benefits to: 1) the local government, policy brief as input in the preparation of management policies for the Tebat Rasau ancient lake geosite; 2) the community, providing direction for lake resource conservation efforts; and 3) researchers, as a contribution to sustainable lake resource management.

Material and Method. The research was conducted in Simpang Renggiang District, East Belitung Regency (Figure 1) from April to June 2023. The location selection technique was carried out with purposively sampling, with the consideration that Tebat Rasau ancient lake has protected primitive species, as a resource conservation effort. Belitung Island is approximately 200 km to the east of the nearest locality in Sumatra, and 250 km to the west of the nearest locality in Borneo (Hasan et al 2023a; Hasan et al 2023b).

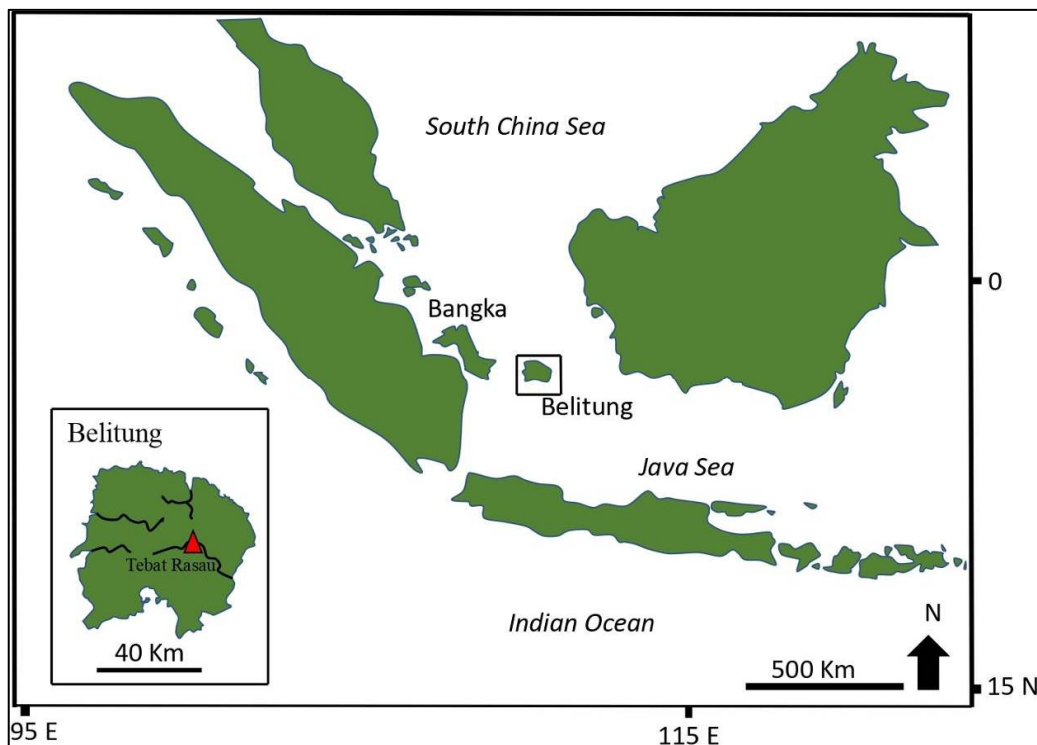


Figure 1. Location of research in Tebat Rasau, East Belitung Regency (red triangle).

The method used in this research was the survey method, in which the main sources of data and information were obtained from respondents as research samples (Bidayani et al 2023). Data collection was done through focus group discussion (FGD) with participants, namely all the 13 members of the Lanun community, Lintang Village Government, Renggiang Sub-District Head, and the Regional Research and Development Agency of East Belitung Regency.

In this research, the primary data collection employed questionnaires, interviews, observation and documentation. Secondary data collection was supported by relevant literature studies. The data analysis method used is the exploratory descriptive method, which describes the situation that occurs systematically and factually with the aim of describing and solving the research problems.

Results. From the research, it was shown that the types of fish with economic value produced from Tebat Rasau Lake included *Wallago* sp., *Channa maruloides*, *Scleropages formosus* and others. The utilization of fish was for consumption and as ornamental fish. In detail, the types of fish sampled from Tebat Rasau lake are presented in Table 1.

Table 1

Fish species of Tebat Rasau Lake

No	Types of fish	Price (Rp)
1	Tapah (<i>Wallago</i> sp.)	50.000-75.000 kg ⁻¹
2	Ampong (<i>Channa maruloides</i>)	25.000 kg ⁻¹
3	Tupok (<i>Channa lucius</i>)	40.000 kg ⁻¹
4	Tengkelesak (<i>Scleropages formosus</i>)	≥100.000 head ⁻¹ < 20 cm
5	Baong (<i>Hemibagrus nemurus</i>)	50.000 kg ⁻¹
6	Mengkawak (<i>Channa striata</i>)	40.000-50.000 kg ⁻¹
7	Mentutu (<i>Oxyeleotris marmorata</i>)	70.000 kg ⁻¹
8	Kaca (<i>Gymnochanda filamentosa</i>)	2.000 head ⁻¹
9	Cincang nangka (<i>Eirmotus</i> sp.)	2.000 head ⁻¹
10	Tempalak (<i>Betta</i> sp.)	5.000 head ⁻¹
11	Tilan (<i>Mastacembelus</i> sp.)	100.000 head ⁻¹
12	Temelayar tanggok (<i>Sphaerichtys</i> sp.)	4.000-5.000 head ⁻¹
13	Gersik (<i>Nemacheilus</i> sp.)	1.000-5.000 head ⁻¹
14	Lelais (<i>Kryptopterus</i> sp.)	1.500 head ⁻¹
15	Bantak (<i>Osteochilus</i>)	50.000-70.000 kg ⁻¹
16	Keperas (<i>Cyclocheilichthys apogon</i>)	35.000 kg ⁻¹
17	Seluang (<i>Bebidis</i>)	50.000 kg ⁻¹
18	Ban (<i>Barbodes</i> sp.)	35.000 kg ⁻¹
19	Buntal Air Tawar (<i>Pao palembangensis</i>)	20.000-25.000 head ⁻¹
20	Kelik (<i>Clarias</i> sp.)	50.000 kg ⁻¹
21	Kepinding (<i>Pristolepis</i> sp.)	40.000 kg ⁻¹
22	Cempedik (<i>Osteochilus spilurus</i>)	50.000-75.000 kg ⁻¹
23	Semupuk (<i>Nandus</i> sp.)	35.000-40.000 kg ⁻¹
24	Kepuyu (<i>Belontia</i> sp.)	40.000-50.000 kg ⁻¹
25	Temerucong (<i>Luciocephalus pulcher</i>)	15.000 head ⁻¹
26	Temelijong (<i>Chaca bankanensis</i>)	45.000-50.000 head ⁻¹
27	Lenjing (<i>Macrogathus</i> sp.)	15.000-20.000 head ⁻¹
28	Senggarong (<i>Mastacembelus notophthalmus</i>)	35.000 head ⁻¹
29	Kemuring (<i>Striuntius</i> sp.)	35.000-50.000 kg ⁻¹
30	Timah timah (<i>Aplocheilus panchax</i>)	1.000-2.000 head ⁻¹

Source: Primary data processed (2023).

Jackfruit minced fish is also the raw material for making crackers, which are sold at Rp 5,000/pack of 50 grams, and sambel ingkung (Fish Floss) at Rp 25,000/pack of 100 grams. Besides fish, Tebat Rasau lake also produces a variety of non-fish food products with economic value, including kelulut honey, sepang tea, gelam leaf tea, pelawan leaf tea, berebat tea, and yellow root tea. Food ingredients and product selling prices are presented in Table 2.

Table 2

Food ingredients and product selling price

No.	Type	Price (Rp)
1	Kelulut honey (<i>Trigona</i> sp.)	50,000/bottle of 100 mL
2	Sepang tea (<i>Caesalpinia sappan</i>)	10,000/pack of 10 grams
3	Gelam leaf tea (<i>Melaleuca cajuputi</i>)	10,000/pack of 10 grams
4	Contrarian leaf tea (<i>Tristaniopsis merguensis</i>)	10,000/pack of 10 grams
5	Tea berebat (<i>Rubus moluccanus</i>)	10,000/pack of 10 grams
6	Yellow root tea (<i>Xanthorhiza simplicissima</i>)	10,000/pack of 10 grams

Source: Primary data processed (2023).

Tebat Rasau Lake is home to a number of native and endemic fish species, making it an ideal location for educational tourism. The Tebat Rasau geosite offers tourists the opportunity to engage in cultural tourism activities, including the traditional practices of catching the fishes (nanggok, nyirok, and gasing). Additionally, they can indulge in culinary tourism by participating in communal dining experiences known as bedulang. Furthermore, the geosite offers educational tourism opportunities, allowing visitors to learn about the endemic and native fish species that inhabit Tebat Rasau Lake. In addition, tourists originate from several other nations, including America, England, Germany, and France, as well as from the local and domestic population, and they have unrestricted access without any associated fees.

Tebat Rasau Lake serves as a habitat for indigenous fish species, providing a source of sustenance for local communities and contributing to their economic well-being. Additionally, the lake serves as a recreational destination for fishing enthusiasts, while also playing a crucial role in the preservation of cultural traditions and local knowledge. Moreover, Tebat Rasau Lake attracts tourists due to its unique characteristics and offerings. According to Djapani et al (2021), the name Rasau is taken from a type of pandanus plant that grows in swamps and rivers. The Kerangas forest ecosystem around the lake also holds unique flora and herbal medicine potential. This geological heritage and biodiversity shape the culture of the local community, which is evident in the way they capture and manage natural resources in the Tebat Rasau area.

Lanun community was established on January 17, 2018. This community has a chairman, vice chairman, treasurer and members with a total of 13 people. Community members come from the people of Lintang Village. Lanun community has a vision and mission. The vision of the Lanun community is to become an organization that participates in developing the potential of members and community involvement and other stakeholders in identifying developing issues and implementing various new approaches in efforts to preserve regional culture, nature conservation, education and entrepreneurship. In addition, the community's mission is: 1) to be active in the preservation of regional culture; 2) preservation of nature, forest ecosystems and wetlands of the Lenggang River; 3) being active in providing education; and 4) entrepreneurship. The tasks and roles of community members include: guiding educational tours to introduce types of fish, providing culinary tours, and others.

According to Utina (2012), traditional values, attitudes and behaviors with ecological insight in the life order of local communities form the ecological intelligence of a community. This local value, for example, applies to coastal communities, which is quite effective in managing natural resources and efforts to preserve their ecosystems.

The Lanun community's effort to preserve Tebat Rasau geosite is to preserve the local culture of environmentally friendly fishing known as nirok nanggok, and bebanjor. Nirok nanggok is a traditional way for Belitung people to catch freshwater fish and it is usually done in group in the river. This activity that is usually carried out by rural communities, has become a routine after the dry season arrives. This routine is still carried out every year during the long dry season between August and September. The areas which still preserve this culture include Belantu Village, Kembiri Village, Membalong Village, and the southern part of Belitung Island. During the dry season, a lot of rivers and swamps recede, the water cannot flow, and the stagnant river water holds many types of freshwater fish.

The name "nirok nanggok" comes from the name of the tools used for fishing, namely tirok and tanggok. Tirok is a kind of sharp wooden stick, approximately 1 cm in diameter, the length of the stick varies from about 2 to 4 meters, at the base of the stick is mounted a spearhead of metal, usually white iron that is pointed and sharp. While tanggok is a kind of net-like tool made of rattan, small in size and with a curved handle, this tool is used for catching/netting fish. Tanggok also has another form, which uses a net mounted on a rectangular rattan frame.

Nirok nanggok tradition is led by a local water shaman and witnessed by village leaders and the local community. This tradition has the function of fostering cohesiveness and strengthening community compliance because residents only take fish for the needs of serving meals together and also do not carry out large-scale exploitation. Furthermore,

this activity serves as a manifestation of the indigenous knowledge and cultural practices within the Belitung community.

In addition to nirok nanggok, a regional tradition that is preserved to maintain the sustainability of Tebat Rasau geosite is bebanjor (fishing), which is looking for freshwater fish using fishing rods along the Lenggang and Tebat Rasau rivers. Fishermen usually stay in huts around the river that is made from sago leaves as a place to rest while waiting for the banjor (hook) to be eaten by the fish.

According to Djapani et al (2021), the Lanun community is a community group that offers tourism services with the main treats being educational and gastronomy tourism. Tourists can go on an excursion while increasing knowledge of geology, biodiversity and local wisdom. The bedulang meal menu, sepang tea spice drinks, pelawan tea and tanggar coffee are very interesting treats. In addition to tour activities, Tebat Rasau also organizes a Nature School that aims to introduce local children to the richness of nature so that the preservation of Tebat Rasau's nature continues from generation to generation.

Discussion. The local wisdom of the community in utilizing fish resources aims to preserve the environment for future generations. The nirok nanggok and bebanjor traditions that are carried out by the Lanun community are conservation efforts to maintain fish resources in Tebat Rasau lake so that they are sustainable. This is in accordance with the opinion of Saputri & Setiawan (2020), that the self-defense process in the form of local wisdom is a form of manifestation and the role of the community in efforts to protect areas that are useful for the lives of rural communities. According to Juniarta et al (2013), the community's local wisdom-based management model has several cultures that have the potential as local wisdom which can later be used as a basis for community empowerment in environmental management.

According to Pinto (2015), coastal and marine resources are currently experiencing degradation as a result of utilization behavior that is not environmentally friendly. Utilization tends to be destructive and damaging and does not consider aspects of conservation and sustainability of resources (Jerikho et al 2023; Hasan et al 2023c). The community plays an important role; therefore management is based on local resource empowerment. Tradition and customary law are related to and beneficial to coastal and marine resource management efforts in Lembata Regency, East Nusa Tenggara Province (Pinto 2015).

Local wisdom is life values which are passed down from generation to generation in the form of religion, culture or customs, generally in oral form in a social system of a society (Witasari 2022). Sulaiman (2010) defines local wisdom in more detail as knowledge built by the community from generation to generation, related to relationships with nature and natural resources. The existence of local wisdom traditions as a form of marine resource conservation includes control tools, not using dangerous tools, a commitment not to catch and kill sea turtles and a commitment not to throw garbage into the sea as well as seeding and planting mangroves (Zamzawi et al 2017).

Some regions in Indonesia have already owned a lot of local wisdom, as example in environmental management such as PhanglimaLaot, Awig-awig, and Mane'e. The wisdom applied almost fell by the local community, such as phanglimalaot in Aceh and awigawig in Buleleng, Bali. Its existence greatly affects the sustainability of the local environment (Zamzawi et al 2017).

Conclusions. Tebat Rasau ancient lake has high biodiversity. The types of fish with economic value produced from Tebat Rasau Lake include *Wallago* sp., *Channa marulioides*, *Scleropages formosus* and others. The utilization of fish was for consumption and as ornamental fish. The Lanun community's effort to preserve Tebat Rasau geosite is to preserve the local culture of environmentally friendly fishing known as nirok nanggok, and bebanjor. This local tradition is expected to prevent the extinction of fish resources in the future.

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Conflict of interest. The authors declare that there is no conflict of interest.

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