Existence and utilization of sea turtle by community of Meti Island at North Halmahera Region

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Abstract. Sea turtles are one of those protected animals according to government regulation no. 7 1999. Living turtle migrates along area the Pacific Ocean, the Indian Ocean, and Southeast Asia Ocean including Sea of Halmahera. In Indonesia, there are 6 species of 7 species of sea turtle in the world and 3 of them are in The Meti Island namely the green sea turtles (Chelonian mydas), hawksbill sea turtle (Eretmochelys imbricata) and olive ridley sea turtle (Lepidocheys olivacea). All species of sea turtles in Indonesia categorized as a protected animal, but until now the exploitation of sea turtle still widely practiced by the community of The Meti Island. The objective of this study, therefore, was to analyze the knowledge and community understanding of existence and the utilization of the sea turtle. The data was taken through observation of sea turtle existence and interview with The Meti Island community. The result showed as 68.15 % of respondents knows about the existence of sea turtle, 37.5 % know about the impact of utilization to its sustainability but 43 % still harvesting and using sea turtle as a consumption and trade. This shows the lack of awareness in the community about the sustainability of sea turtle around The Meti Island. The high level of utilization of sea turtle shows the weakness of the function in the monitoring and supervision by the regional government against the utilization of an animal that should have to be protected.

1. Introduction
Sea turtles are one of the long-lived ancient reptiles in the world with long migratory marine organism along the Pacific Ocean, Indian Ocean, and Southeast Asia regions. Their complex life cycle covering several development habitats and migration of hundreds of thousands miles between feeding zone and nesting beaches, expose them to many threads to their survival both natural and anthropogenic [1, 2]. Ecologically, sea turtles have an important role in maintaining the balance of marine ecosystems such as maintaining productive coral reef ecosystems [3]. It is widely recognized that there are 7 species of sea turtles exist worldwide within the Cheloniidae and Dermochelyidae families [4, 5], of which 6 species are found in Indonesia i.e. the green turtles (Chelonian mydas), hawksbill sea turtle (Eretmochelys imbricata), Olive ridley sea turtle (Lepidocheys olivacea), leatherback sea turtle (Dermochelys coriacea), flatback sea turtle (Natator depressus), and loggerhead sea turtle (Caretta caretta) [6].

Sea turtle species are protected by national and international environmental laws, and they are listed at different levels ranging from vulnerable to critically endangered in the IUCN red list [4]. Internationally, all sea turtles are listed in Appendix I of CITES meaning all trading is sea turtles are prohibited. The government of Indonesia has ratified this convention since 1978. In 1999 through Government of Indonesia Regulation Number 7 of 1999 concerning the preservation of plant and
animal species, all species of turtles in Indonesia are by the state. However, in many places, people still harvesting sea turtles for their meat, shell, and eggs, or incidentally caught as a bycatch [7 cited by 8].

Based on field identification, there is three species sea turtle found around Meti Island of North and Pasir Timbul Island of Halmahera Regency, North Maluku Province i.e. green turtle (*Chelonia mydas*), hawksbill turtles (*Eretmochelys imbricata*), and olive ridley turtle (*Lepidochelys olivacea*). By local people of Meti Island, these three species are harvested as a food source as well as for commercial purposes. This activities and other environmental change such as climate change will threaten the presence of turtles and reduce the turtle population [3, 4, 6]. The purpose of this study, therefore, was to determine the level of knowledge and understanding of the community about the existence and utilization of turtles.

### 2. Materials and Method

#### 2.1. Study sites

The Meti Island is located geographically at the coordinates of 128°03’11”E - 1°34’11” N (Figure 1) and has an area width of ± 2000 ha. The island is surrounded by sandy beaches, coral reefs and clusters of seaweeds.

![Figure 1. Map of research locations at Meti Island and Pasir Timbul Island](image)

#### 2.2. Sampling and handling procedure

The research was carried out from May to June 2018 in Meti Island and Pasir Timbul Island, the areas where the turtles lay their eggs and hatch. The respondents used in this study were 30 local fishermen form this area. Determination of the sample is focused on the fishermen harvesting sea turtle, and this
makes the respondents a homogenetic sample. The level of utilization of turtles is allegedly through a descriptive statistic presented in percentage.

2.3. Data analysis
A survey and interview method was used in data collection. A questionnaire was distributed to the respondents selected purposely. A series of close questions covering topics of community knowledge about the existence of sea turtle, the purpose of harvesting sea turtle, the impact of harvesting sea turtle, and knowledge and the existence of regulations regarding the sea turtle management. The data collected was then analyzed descriptively [9].

3. Result and Discussion
The green turtles (*Chelonia mydas*) is long-lived organisms but have a slow reproductive period hence the pace of their generation is not comparable to the threat of extinction [10]. Based on observations, in one nesting period, a turtle can produce ± 1000 eggs, while in one egg-laying period, a green turtle produces ± 80-250 eggs. This turtle takes ± 25-30 years to mature. From 1000 eggs hatched, only one can survive and mature [11].

The hawksbill sea turtle (*Eretmochelys imbricata*) is a turtle that has a distinctive beak-shaped snout, its upper jaw curves downward and is relatively sharp like an older parrot so it is often called hawksbill sea turtle [12]. Olive ridley sea turtles have dark-olive green carapaces and have 5 pairs of costal scutes with pores on the carapace [13]. Green turtles are known also as fish turtles because of their thick and odorless flesh and olive ridley sea turtles that have dark green carapaces. Based on the taste and quality of meat, people in Meti Island prefer green turtles followed by hawksbill turtles and then olive ridley turtles.

Communities on Meti Island are the same as coastal communities in general, where their work related to seasonal condition of the sea, a fishermen during calm weather and farmer during rough sea weather. Most of the fishermen from Meti Island work as fishermen as well as as farmers. Based on the results obtained from the survey and interview, 68.15% of the respondents aware of the presence of sea turtles around the waters of Meti Island, however only 5.56% of the respondent have seen sea turtle directly (Figure 2.) This is mainly due to the behavior of sea turtles which goes to the beach to lay eggs only at night time and at certain period of time.

![Figure 2](image_url)

**Figure 2.** The percentage of public knowledge about the presence of sea turtles in Meti Island and Pasir Timbul Island

From an interview with respondent, the harvesting of sea turtle in Meti Island and its surrounding area started from 1987. For 31 years, sea turtles were captured and their eggs are taken right after the turtles placed the eggs at the nesting site. The turtle was captured by turning the turtle's body upside down and breaking the turtle's neck so the eggs can be taken out.
down so the abdomen of sea turtle is facing upwards, then they will be tied up with rope. Approximately 43% of the respondents still use sea turtles meat and the eggs as food while some are sold (Figure 3). Turtle meat and eggs are used as a substitute for fish. The carapace is processed into accessories (hand bracelets) and the whole carapace is sold as ornaments. One individual sea turtle was sold for IDR. 100,000 - IDR. 200,000, whilst the meat was sold for IDR. 20,000 – IDR. 25,000 kg\(^{-1}\) and turtle eggs were sold for IDR 1,000 - IDR. 2,000 eggs\(^{-1}\). The price of sea turtle meat sold per kilogram or per individual is quite cheap compared to the price of fish, chicken or beef, and the price of sea turtle eggs per gram is also relatively cheap compared to the price of chicken eggs or duck eggs in some traditional markets in North Halmahera.

The high level of exploitation of sea turtles and its eggs in Meti Island is not balanced with the knowledge and understanding of the community about the utilization of sea turtles and its eggs. As many as 38% of respondents knew about the fishing ban and the impact of harvesting sea turtle and the eggs, but 32% of respondents did not care about the impact of sea turtle exploitation (Figure 4.) From interviewed it was found that the community believes that sea turtles will always breed and always exist every year at the same location even harvesting is taking place all the time. On the other hand, all respondents realize that the number of sea turtles comes to lay eggs decreased in number from year to year. Such figures show that the limited knowledge of the community about the life cycle of sea turtles and the low survival rate of hatching egg and its effect on sea turtle sustainability.

![Figure 3](image3.png)
**Figure 3.** Percentage of sea turtle and turtle eggs employed by the community of Meti Island

![Figure 4](image4.png)
**Figure 4.** Percentage of knowledge of local fishermen of Meti Island about the fishing ban and the impact of sea turtle utilization on sea turtle sustainability.

The conditions that occur in Meti Island and Pasir Timbul Island related to the activity of harvesting of sea turtles and its eggs by the community without regarding the restrictions and regulations will become the main cause of sea turtle extinction in Meti Island in the future. This is in
accordance with Dermawan et al (2009) [10], that the granting of protection status alone is not enough to restore or maintain sea turtle populations in Indonesia. The attitudes and concrete actions with a comprehensive management include an ecosystem approach is needed. The high utilization of sea turtles that occur on Meti Island has also become one reason that sea turtle populations have become a major focus in conservation activities throughout the world [14]. The low awareness of the community on the sustainability of sea turtles is inseparable from the weak role of local government in monitoring and surveillance in the utilization of fish resources. The socialization of aquatic organism listed as the protected organism by Government Regulations has never been carried out by the government. Moreover, law enforcement and strict sanctions against the perpetrators of sea turtle hatching has also never been carried out by the local authority.

4. Conclusion
The application of regulations, monitoring the utilization of protected aquatic resources and the establishment of conservation areas need to be implemented so that it can be a management strategy for sea turtles harvesting and eggs. In addition, the establishment of sea turtle breeding centers at Meti Island can be a sea turtle learning media so that it can directly change people's perceptions of turtle utilization.

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