

Local Wisdom Used Wildlife Behavior as Indicators of Natural Phenomenon in Maluku Small Islands

Manuel Kaya*, Ernywati Badaruddin, Ivonne R. G. Kaya

Faculty of Agriculture, Pattimura University, Ambon, Maluku, Indonesia

* **Email Corresponding Author:** emanuel_kaya@gmail.com

ARTICLE INFO

Keywords: *Local wisdom, Nanaku, an indicator of natural phenomena, small islands*

Received : 20 March 2022

Revised : 14 April 2022

Accepted : 29 June 2022

ABSTRACT

The people of Maluku, since their ancestors, have been known as a society with various social institutions which are, in fact, very appreciative of the living and non-biological natural resources around them. It has caused some historians to argue that the Maluku people are religious people oriented toward the nature surrounding their lives. The various forms of "traditional local wisdom" that are owned and still applied to this modern century have no difference. They are even more adhered to by the community regarding the conservation of living natural resources and their ecosystems. Meanwhile, the government enforces various laws and regulations but is not adequately socialized to society. In the future, challenges (Hotu mese) are already a philosophy of the Maluku people. They use it as a "Nanaku" (experience) to serve as an indicator to recognize natural phenomena and use it for their resilience to conquer the surrounding nature. This research was conducted to know the various forms of local wisdom of traditional communities in Maluku that have beneficial values for human life. The expected output of the research was that scientists can be motivated to conduct research to "answer scientific truth" to the forms of local wisdom of traditional communities, which are often judged as "sacred", "archaic", or "superstitious" for today's modern society. The Maluku people who inhabit small islands have integrated with their limited natural life. This limitation causes them to utilize all available components of living natural resources and ecosystems to fulfil their daily needs. The results showed that the local wisdom of the Maluku people can still be used to meet the needs of ecologists and the general public in carrying out activities in the wild, both in the forest and at sea, so as not to experience unwanted things.

Introduction

Maluku has a specific natural resource richness potential in terrestrial and aquatic areas as an archipelagic area dominated by small islands. The fact shows that not only natural resources but also human resources that are owned are also very the potential to be used as tourist attractions (DTW), especially in the category of Special Interest Tourism. Maluku people have traditionally been integrated with nature since their ancestors "know the sounds of nature," produced by Wildlife, plants, and the ecosystem. They can determine when to plant certain plants, annual and seasonal crops (palawija), when fishing for certain fish, hunting for certain animals, and times for socio-cultural activities. The challenges faced by ecotourists on small islands differ from large islands, including changes in climatic conditions relatively quickly from one island to another. Transportation and communication are obstacles faced in small islands, so traditional communities seek to "learn from nature" to "conquer natural phenomena around them". Thus, they "can blend with nature" to seem "people can communicate with nature". Modern ecotourists today, equipped with various equipment resulting from advances in science and technology, should also know these "sounds of nature". They cannot use a cell phone to tell the time when it runs out of battery. Then, the compass may be broken, so it cannot determine the cardinal directions and others.

On the other hand, people in rural areas should not feel "low self-esteem" with their local wisdom because they can tell the time when they do not have a watch. Without a compass, they can quickly know the direction of the wind. The Maluku Islands, consisting of small islands, are separated by the ocean. It causes isolation related to communication. The people of Maluku are already integrated with aquatic and terrestrial nature because they have to face the ferocity of sea waves, challenges in the mountains, and climate change (rainy season and dry season) which varies significantly from year to year.

Research Methodology

This research was collaborative research conducted by applying the Survey Method regularly for the entire Maluku region. The survey was carried out directly if the researcher could reach the location and observe and experience it directly. The indirect survey was conducted through interviews with resource persons in the form of community leaders or respondents who participated it directly.

The research time was as long as the researchers became lecturers at the Faculty of Agriculture, Pattimura University, Ambon, intensified over the last few years.

Results And Discussion

Wildlife As Rain Telle

The types of Wildlife that were used as "*Nanaku*" for rural communities, especially those who are active in gardens and forests to detect rain will occur, are:

Glossy Swiftlet bird (*Colocalia esculenta*)

Glossy Swiftlet bird (*Colocalia esculenta*) in Indonesian is known as Sriti birds belonging to the Apodidae family by the people on the island of Saparua, they are often referred to as "rain birds" because before it rains, they will fly in groups in the air. Their purpose of flying was to prey on insects that would usually fly back to the nest about 30 minutes before it rains in groups. However, during the early rains, it is often seen that they are still flying because there are still flying insects. This insect-catching activity is also carried out after it rains because there are insects that, while it is raining, sheltering under the leaves, will fly to continue their journey to their nests. Generally, when people see flying movements of Glossy swiftlet birds in the air in groups, they must make preparations because there will be rain. This prediction is also supported by direct observation of weather conditions, namely a collection of Cumulus clouds and the blowing wind.



Figure 1. Glossy Swiftlet bird (*Colocalia esculenta*)

Gong Bird (*Unidentified*)

In early September 1989, Researchers conducted a potential forest survey for PT. Mangole Timber Producer on the southern island of Wetar by interviewing with the Hiai village community. Data obtained that there is one type of bird that makes sounds like the sound of Gong,

namely Doong... Doong... Doong so it is called the Gong Bird. However, the local community has never found this bird because its habitat is in the mountainous area of the central part of the island, starting from Lake Tihu to the western tip of Wetar Island.

The sound of birds is "*Nanaku*", the arrival of rain in the dry area, which peaks from December to February every year. In September, the leaves started to fall to adjust to the drought to reduce the evapotranspiration rate. Traditionally, according to local wisdom, starting in summer, the Gong bird will fly from Lake Tihu to the western tip of Wetar Island. Usually, when people hear the Gong Bird moving towards the west, they will immediately shout and say, "Go and hurry back so that we do not suffer too long because of the long dry season". If the sound is heard at the end of the west, that time is the peak of the dry season. When the Gong moves back towards Lake Tihu, the rain will follow behind it. Therefore, the people in the central part of Wetar Island hope that the Gong Bird will quickly return to Tihu Lake because, at that time, the entire Wetar Island experienced rain to overcome the drought.

Brahminy kite (*Haliastur indus*)

The Brahminy kite, which is often referred to by the community as the "Manei bird" from the Accipitridae family, is also used by the people of the island of Saparua as "*Nanaku*" when it rains. Symbiosis or interdependence relationship between two different types of Wildlife. Usually, this phenomenon will stop after it rains because no more insects are flying in the air.



Figure 2. Brahminy kite (*Haliastur indus*)

Honey Bee (*Apis dorsata*)

Communities on the island of Saparua, Central Maluku, and the area of East Seram Regency are accustomed to using the behaviour of the honey bee (*Apis dorsata*) as an indicator

to determine the arrival of rain. It is even more helpful when they are in a primary forest area because the dense tree canopy makes it difficult to see the condition of the clouds in the sky. It turns out that local people use "*Nanaku*," which is unique. If many bees are flying (clusters), it is a sign that they will soon return to the nest because it will rain.

Bees are used to looking for food alone (solitary) and returning to the nest every day, so they are not in groups. However, when it rains, all of them will return quickly to the nest, so that inadvertently large groups will form which move towards the nest. Farmers or foresters will immediately get ready to find alternative places to take shelter if they see conditions like this because it will soon rain with the wind. Usually, when it rains with low intensity, the bees will return to the hive in relatively small groups. People will be cautious of "pig bees" because this type of bee has an excruciating sting. It can even cause death. If someone accidentally collides with a honeybee (*Apis dorsata*), it is not too much of a problem because these bees will avoid it. However, they can increase the body's immunity if they collide and are stung in small quantities. The honeybee sting (*Apis dorsata*) is traditionally used to treat several diseases. Conversely, if a person is stung by many pig bees, it can cause death.

Water Frog (*Fejervarya carnivore*)

The water frog from the Ranidae family is an aquatic biota that needs water for its life. Although it can also live on land for a certain period, it is classified as Wildlife that lives in 2 realms aquatic and terrestrial (Amphibia). Through their life experiences, people have observed that before it rains, these water frogs will make loud noises with a specific frequency different from usual. Generally, they speak together until it rains, and then they stop. The community uses this phenomenon as "*Nanaku*," that when the frogs make noises, it will soon rain.



Figure 3. Honey bee



Figure 4. Water Frog

Wildlife As Tidal Teller

Kum-kum bird (*Columbia spp*)

Communities on Jamdena Island, Tanimbar Islands Regency, have had to integrate their lifestyle with the sea's natural conditions surrounding the island from all directions. Farmers are used to going to the garden relying on sea transportation by boat or outboard motor boat (ketinting).

Fishermen's activities depend highly on the time of high and low tide because it will determine the distance between the mainland and the farthest low tide ("Meti Kei"). It is influential because the distance can exceed 500 meters, and it is not easy to land or go back to sea.



Figure 5. Kum-kum bird (*Columbia spp*)

Especially for farmers who garden relatively far from the coast, it will not be easy to know whether the water has been high tide or not. So, naturally, the farmer would repeatedly walk to the beach to find out. Their ancestors, with their local wisdom, have known a unique way for farmers in the middle of the forest to know whether the seawater has risen or not. *Nanaku* (indicator), as a clue they use, is the Kum-kum bird (*Columbia spp*) from the Columbidae family, which sounds in groups and reciprocates. If the Kum-kum bird is heard, the farmers immediately prepare themselves to go to the beach because the seawater has started to rise, making it easier for them to lower the boat or ketinting to the beach.

Free-range chicken (*Gallus gallus*)

The sound of free-range chickens (*Gallus gallus*) from the male family Phasianidae crowing in crowds in the morning indicates that it will be noon. If we hear the crowing of a rooster repeatedly and reciprocally at other times, including during the day, then this is a *Nanaku* (sign) that the sea water is starting to rise.

Thus, fishers have begun preparing to go down to the sea to catch fish because it will make it easier for them to lower the boat into the sea.

Wildlife As Danger Alert Teller

Toi Bird (*Geofreyus geofroyii*)

Communities on the island of Saparua in Central Maluku Regency have local wisdom by using the sound of the Toi bird (*Geofreyus geofroyii*) from the Psitaciidae family as "*Nanaku*" to detect dangers such as the presence of humans or large wild animals such as cows, deer, horses or the snake was right under the tree where the Toi bird had perched earlier. The Toi bird will immediately fly winding between the trees while screaming like a panicked person with his distinctive voice when it sees a human or large animal such as a cow (*Bos babulus*), wild boar (*Sus scrova*), deer (*Cervus timorensis*) or a snake (*Python reticulatus*) that approaches the tree where it perches. The behavior of the Toi bird is crucial for indigenous peoples, especially in unfriendly security situations. For example, there are disputes between villages, so everyone who goes to the forest must be aware of their safety.



Figure 6. Toi Bird (*Geofreyus geofroyii*)

Wildlife As Fish Position Teller For Fishermen

The main occupation of the Maluku people is "coastal farmers," they are active in the garden during the day and at night fishing in the sea. As traditional fishermen, their ability to know the fish's position to be caught is very limited because the sea is so wide. Following their local wisdom, it turns out that they take advantage of the presence of birds as "*Nanaku*" that the fish are in a position where these birds fly, namely:

1. Gutter Bird (*Fregatha* sp)

2. Seagulls (*Sterna* spp).

These two types of birds usually eat the types of pelagic fish (skipper, komu, kawalinya, momar) which are surface fish. They usually fly on the sea surface in large numbers and always follow the direction of movement of their prey fish. It makes it easier for fishers to know the direction of movement of the group of fish



Figure 7. *Fregata* sp.



Figure 8. *Sterna* sp

Wildlife Ocean Waves Situation Teller

As an archipelagic area, sea waves are a challenge that must be faced throughout the year, both by fishers and the general public, in carrying out sea transportation activities between islands. The strength of sea waves is strongly influenced by the east and west monsoons, which periodically change throughout the year.

The general public, both fishermen and inter-island voyagers, will feel calm when the sea waves around the ship/boat appear "Tuing-tuing"/flying fish (.....) and Pig-fish/dolphins (...). The appearance of 1 of these 2 types of fish indicates that the ocean waves will soon calm down again in the next few minutes.

In general, it is known that the Tuing-tuing fish is a fish that is active on a calm sea surface so that when there is a fierce sea wave, it will dive into the sea. When the sea waves have calmed down, they will return to their activities on the sea surface, often interspersed with "flying on the water's surface" so they are called "flying fish."

Pig Fish is a type of fish that belongs to the Mammal group because it breathes with lungs, so it has to move on the sea's surface to be able to breathe air. It causes when the sea waves to start to calm down, they must immediately rise to the sea surface to carry out breathing activities.

Wildlife As Time Teller

Advances in science and technology have made it possible for humans to live practically and economically in various aspects of life, including knowing the time. However, if we observe, the reality shows that many people no longer use watches because we can see a lot by using cell phones, including the day, date, and time.

Science and technology also have weaknesses, including limited cell phones with the presence or absence of a "Signal Network" and the ability of the battery to last for several days in a Tourist Destination Area (DTW), especially in a tourist area full of challenges in the forest. In addition, there are often problems with areas where electricity only comes on at night or PLN does not operate for several days. Maluku people traditionally have local wisdom to know changes in time in general by using "wildlife sounds" as an indicator (*Nanaku* = using human behavior, Wildlife, and natural phenomena as indicators to recognize them), for example :

a. Human

Suppose someone (e.g., Pieter) is usually drunk and noisy at night. Then, if someone makes a noise at night, people will spontaneously conclude that it is Pieter, which is not necessarily Pieter.

b. Plant

If many fruit trees such as guava and manga begin to flower, many people will experience colds (flu), so children are limited to playing around them.

c. Moon

If the moon's rotation period is bright, the fishers should not go fishing at night because the catch is very difficult to find.

Some types of Wildlife that are used by the community as "time tellers", are:

Day Bird (*Philemon subcorniculatus*)

The species of midday bird, generally known as Cikukua Seram from the Meliphagidae family, is a bird that eats honey, fruit, and insects. The people of the island of Buru call it "Polocium bird" because they translate its sound like the word "polo kiss."

The sociality of these birds is relatively high compared with humans. Therefore, they can spread to the back of residential areas if they are not disturbed. His habit of living in groups causes his voice in the morning to be very crowded.

Afternoon birds always sing loudly in the morning from 05.00 to 06.00 at dawn. People in the forest use it as "*Nanaku*" when the day is approaching noon, so most Maluku people call it "Afternoon Bird."

Arikal (*Porphyrio porphyrio*)

Arikal bird, in Indonesian known as the Great Mandar bird belonging to the family Rallidae, is a chicken breed that lives in thickets in plantation areas to secondary forests. They generally carry out foraging near agricultural plant gardens, especially tubers (cassava, taro). It often also approaches residential areas as long as the security situation allows.

As a group of chickens, Arikal also usually crows and makes sounds in the early morning between 05.00 – 06.00, which indicates that the day has started.

The population of this Arikal bird has been greatly reduced, so it needs to be protected from extinction. Many people catch it because they eat plant products, both bananas, pineapples, and tubers such as cassava, taro, patatas, and others.



Figure 9. Arikal (*Porphyrio porphyrio*)

Jungle fowl (*Gallus varius*)

The community uses the sound of crowing and squawking Jungle fowl belonging to the Phasianidae family to signify the arrival of the morning dawn. In contrast to the destructive Arikal, the partridge only eats seeds and insects.

The population is very small in plantation areas and secondary forests because farming communities often hunt them using snares (Dodeso) for consumption. Like the free-range chicken, the jungle fowl every morning, starting at 05.00 has crowed to wake up the farmers and foresters in the forest and declare that the day has begun.

Free-range chicken (*Gallus gallus*)

The animal that has long been awakening humans in the morning is the free-range chicken (*Gallus gallus*) from the Phasianidae family, crowing from 05.00 to 06.00. For urban communities, the sound of a rooster crowing in the morning is no longer needed, but for ecotourists who love "nature sounds" such as the sound of birds whistling, the sound of waves, and waterfalls ripples, "the sound of a rooster crowing in the morning that reciprocates" is a distinct phenomenon.



Figure 10. Free-range chicken (*Gallus gallus*)

Especially the sound of a young rooster just starting to learn to crow following an adult rooster will be an even more unique phenomenon if the chickens are perched while sleeping on different trees. Several parents who studied this incident, including Mr. Jusuf Lilipaly (81 years old) in Ihamahu, stated that the crowing of chickens and wild animals in the forest in the morning was a sign of gratitude that they were still blessed and given the breath of life by Allah the Almighty. The *Nanaku* is when the rooster crows, the bird whistles, or the animal screams in the morning. No one bows their head, but their head is always held up to face their Creator.

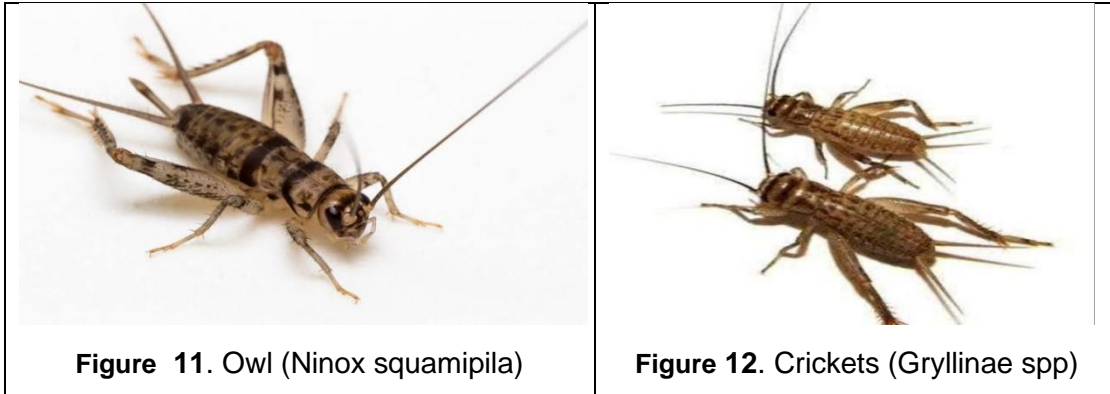
Owl (*Ninox squamipila*)

Unlike the four types of Wildlife above, Owls (on Saparua Island called O-ONO birds) from the Strigidae family will start making loud voices at around 17.30 regularly. The farming community marked it (*Nanaku*) as it was getting late, so they had to prepare to return to their village as soon as possible. It happens every afternoon because owls usually "sleep during the day" and only start getting up around 5:30 p.m. to forage for food at night.

The population of owls on the island of Ambon and its surroundings has begun to decrease and is rarely found anymore. In terms of its benefits, it is significant for the balance of the ecosystem, namely as a population controller for wild rats and snakes that roam in nature.

Crickets (*Gryllinae* spp)

One living creature beneficial for humans to tell the time is crickets (*Gryllinae* spp) from the Gryllidae family. People on the island of Saparua refer to it as "joyful" because they sound like they are happy (joyful). Usually, they start to make noises in a group at around 5:00 p.m. If this happens, the farmer who is currently busy working immediately remembers that it is already getting late.



Wildlife Alert Teller Of Earthquake And Volcano Erupts

The earthquake and tsunami's natural disaster provide ample examples of the relationship between animal behavior and this natural phenomenon, including Volcano Erupts. Various writings and reports related to the occurrence of a volcano about to erupt can be learned from the behavior of Wildlife that carries out different activities from usual, including Wildlife descending from the mountain. Some reports state that a few days before the volcano erupts, it will occur that the Wildlife in the area of the mountain will move down below it, even entering residential areas. Some expert opinions state that this happens because Wildlife can detect the temperature in its surroundings which is increasing due to the pressure of hot larvae from inside the earth. Earthworms come out of the earth. In addition to Wildlife that lives on the ground surface, it turns out that soil organisms such as earthworms also move out to the earth's surface. It is predicted that the worms cannot adapt to the high-temperature increase because the soil temperature increases. It turns out that the vibrations caused by tectonic earthquakes can also cause the soil microorganisms to move out because these vibrations significantly affect the body's resistance. Aceh Tsunami 2004. Aceh Tsunami was a terrible natural disaster in 2004 in several countries, including Indonesia, in Aceh. It gave rise to various stories about wildlife behavior related to these events, including Seabirds. One of the TNI (Indonesian National Army) companies from East Java, which had just disembarked from the ship, was saved because its commander had

experience with local wisdom. He carefully observed the movement of sea birds, which simultaneously flew towards the mountainous area after the earthquake. He ordered all his men to move to a high area immediately, and all his men survived the tsunami disaster. Elephants at Khao Lak Zoo in Thailand. It is said that before the earthquake with a magnitude of 9.0 on the Richter scale was accompanied by a tsunami, it turned out that the elephants in the zoo went berserk and fled to mountainous areas to survive the tsunami disaster. Flamingos on the coast of south India. At the same time, many people in southern India were saved by studying the behavior of the Flamingo bird, which suddenly flew into the mountains after the earthquake..People who followed the bird's behavior and fled to the mountains were saved from the tsunami, which was quite powerful and caused many victims.

Traditional Conservation Wildlife

In connection with the importance of one of the biological natural resources that exist around us, including birds and insects, which have a crucial role, including as a "time-teller," then:

- a. Supriharyono (2009) states that the conservation of living natural resources and ecosystems has a high and unique tourist attraction. Its preservation cannot be separated from the active role of tourists who visit it. Ecotourists should be wiser in preserving the environment than people with local wisdom.
- b. Alikodra (2012) concluded that Wildlife could rehabilitate itself naturally as long as it is not affected by extreme human activities such as excessive logging, high environmental pollution, and other forms of physical damage.
- c. Kaya Manuel (1999) revealed that Wildlife plays an essential role in spreading fruit and seeds of fruit trees in Dusung on Saparua Island, so many people do not plant in Dusung but harvest fruit from economically valuable plants that grow naturally.
- d. The people of Leihitu Subdistrict, especially Mamala *Negeri*, should try to preserve the surrounding Wildlife because it is not only beneficial for plants and the environment but also for telling time

Conclusion

1. Wildlife as a component of biological natural resources is God's creation that will mutually influence one another, so it must be used and possible.
2. Animals can be used as indicators (*Nanaku*) to find natural phenomena around us.

3. Animals such as day birds (*Phyllemon subcorniculatus*), arikal (*Porphyrio porphyria*), jungle fowl (*Gallus varius*), Free-range chicken (*Gallus gallus*), owl (*Ninox squamipila*), and crickets (*Gryllinae* spp) are beneficial for telling time an ecotourist in the forest.

Ecotourists are expected to play an active role in rural communities as a motivator to manage living natural resources and the ecosystems around them sustainably and efficiently for humans and the environment itself

References

- Alikodra Hadi S. 2012. *Konservasi sumberdaya alam dan lingkungan, pendekatan ecosophy bagi penyelamatan bumi [Conservation of natural resources and the environment, ecosophy approach to save the earth]*. Penerbit Gadjah Mada University Press. Yogyakarta.
- Badaruddin E, Manuel Kaya, Ivonne R. G. Kaya. 2021. *Wildlife biogeography on mangrove community in Saparua island*. The small island .. Tropical Small island Agriculture Management. 1 (1) 38 - 56. 2021.
- Badaruddin E, Manuel Kaya, Ivonne R. G. Kaya. 2007. *Distribusi jenis burung di dusun Seri, Kecamatan Sirimau, Kota Ambon [Distribution of bird species in Seri hamlet, Sirimau District, Ambon City]*. Jurnal Agroforestry.
- Darsoprajitno Soewarno. 2001. *Ekologi pariwisata[Tourism ecology]*. Penerbit Angkasa. Jakarta.
- Gunawan Myra. 1997. *Perencanaan pariwisata berkelanjutan [Sustainable tourism planning]*. Penerbit Intitut Teknologi Bandung. Bandung.
- Kaya Ivonne R. G., F. de Lima, Manuel Kaya, J. M. Matinahoru. 2020. *Managemen ekosistem pesisir pulau pulau kecil untuk ekowisata berkelanjutan di pulau Saparua [Small islands coastal ecosystem management for sustainable ecotourism on the island of Saparua]*. Makila, Jurnal Penelitian Kehutanan. 14 (1), 14 - 24. 2020.
- Kaya Manuel, 1999. *The dusung agroforestry system in Central Maluku and its role in maintaining tree species diversity*. Georg August Universitat, Gotingen. Germany. Thesis.
- Kaya Manuel, L. Kammesheidt, H. J. Weidelt 2002. *The forest garden system of Saparua island, Central Maluku and its role in maintaining tree species* . Agroforestry system . 54 (3) 225 - 234. 2002.
- Kaya Manuel, L. Kammesheidt, H. J. Weidelt 2003. *The forest garden system on saparua island, Central Maluku , a model for biodiversity conservation. Sustainable development socio-economic and environmantal problems focused. 2003*.
- Kaya Manuel, E. Badaruddin, Ivonne R. G. Kaya. 2021. *Dusung system as forest garden system in Saparua island. Plant Cell Biotechnology and Molecular Biology. 118 - 126. 2020*.
- Keraf A. Sonny. 2006. *Etika lingkungan [Environmental ethics]*. Penerbit Kompas, Jakarta.

- Putileihalat M, Hittipeuw, J. Ch. Salim Emil. 1982. *Kesadaran lingkungan hidup*. Dharma Bhakti [Environmental awareness. Dharma Bhakti]. Jakarta.
- Soekadijo, R. E. 2001. *Anatomi pariwisata, memahami pariwisata sebagai systemic linkage* [Tourism anatomy, understanding tourism as a systemic linkage]. Penerbit PT. Gramedia. Jakarta.
- Supriharyono. 2009. *Konservasi ekosistem sumberdaya hayati di wilayah pesisir dan laut tropis* [Conservation of biological resource ecosystems in tropical coastal and marine areas]. Penerbit Pustaka Pelajar. Yogyakarta.