



The Ethnozoology: Traditional Knowledge and Animal Use by Osing Tribe in Banyuwangi, Indonesia

Budi Prasetyo*

*Biology Study Program, FST, Open University, Cabe Raya Street, Pondok Cabe, Pamulang District, South
Tangerang City, Banten Province, Indonesia, 15418*

Email: budi-p@ecampus.ut.ac.id

Abstract

The Osing tribal community has very strong characteristics, especially consistency, order, and obedience to carry out and preserve the traditions and cultural heritage of their ancestors, in the midst of modern social conditions and sophisticated information technology. However, in supporting a healthy and hygienic daily routine, they also consider the importance of the need for animal protein in addition to vegetable protein because most of them work as farmers who rely on physical energy to carry out their activities. The research aims to reveal the traditional knowledge of the Osing people about the wealth, role, and benefits of animals that live in their environment, as well as the economic value of domesticated animals for their welfare. The research uses an exploratory method based on an emic approach, besides that data collection is also carried out through unstructured interviews, and data analysis using cross-checking, summarizing and synthesizing methods. The results showed that the number of animal species richness known by the Osing community was 91 species from 66 families and 12 classes. All of these animals have roles and benefits for the lives of the Osing people as follows: 1) basic intake of animal protein, 2) cultivated plant pests, 3) the need for pleasure, 4) traditional medicinal ingredients, 5) traditional ritual purposes, 6) animal predators livestock, and 7) decomposer organic matter. The economic value of the 4 animal species that have been domesticated to meet the subsistence needs of the Osing people is IDR 2,252,610,000/head of family/year or IDR 187,717,500/head of family/month.

Keywords: The ethnozoology; emic; unstructured interviews; economic value of animals.

* Corresponding author.

1. Introduction

The Ethnozoological studies include the local knowledge system of a traditional community in interacting with all fauna, both wild and domestic. The interaction in question includes the use, management, conservation efforts, understanding of fauna behavior and ecology by traditional communities in a wise, prudent, just and sustainable manner. Ethnozoological research studies also make it possible to examine the reciprocal relationship between objects in past situations and conditions with similar objects in present conditions [1]. The research studies in question include activities of classifying, naming, traditional knowledge related to traditional community culture, as well as traditional knowledge about the use of various kinds of wild and domestic animals by traditional communities. Specific ethnozoological boundaries are examining human perceptions of animals in relation to moral teachings that contain spiritual noble values [2]. Fields of study that are the main scope of ethnozoology include ethnoornithology, ethnoichtology, ethnoentomology, and ethnomalacology [3].

The integration between the beliefs held by traditional communities and their mindsets and perceptions of the environment they live in is shown by the local knowledge that they have preserved from generation to generation. In the study of interactions between humans and animals, both wild and domesticated, one of the starting and foundational steps for local knowledge about animal behavior and ecology is naming and grouping the species of these animals [4].

The Osing tribe is one of the ethnic minorities who live in the Banyuwangi Regency, East Java Province. Historical records and facts in the field show that the Osing tribe is known as a tenacious and capable farmer in rice cultivation [5,6]. In addition, the Osing tribal community also has a fairly strong characteristic in social life in the environment where they live, namely they tend to be independent and have a strong spirit of life that never gives up. Based on the various characters possessed by the Osing tribe and supported by geographical conditions, fertile soil, and excess water sources, it is very appropriate if the Banyuwangi area becomes one of the centers of food granaries in the province.

Another very dominant characteristic of the Osing tribal community is that they are consistent, orderly, and obedient to carry out and preserve the traditions and cultural heritage of their ancestors, in the midst of the current swift currents of globalization and modernization, especially in the field of information and technology based on digital and online [5,6]. However, even though they live in a very sophisticated era, the management and utilization of their biological resources still considers their sustainability. This condition is reflected in the high diversity and richness of plants and animals found in their agricultural lands such as yards, rice fields, gardens, and fields [6].

In daily life to keep the body healthy and have stamina, the Osing people also consider the importance of animal protein needs because most of them work as farmers who rely more on physical energy in their activities in the paddy fields. Therefore, to meet these needs they get it from the livestock they raise or buy it from vegetable and meat sellers in traditional markets. How the perceptions, thinking patterns, and conceptions of the Osing tribal community are actualized in the form of local knowledge regarding the various animals that exist in their living environment, is something that is quite interesting to study ethnozoologically. The purpose of this

research is to reveal the traditional knowledge of the Osing people about the wealth, role, and benefits of animals that live in their environment, as well as the economic value of domesticated animals for their welfare.

2. Method

2.1 Field research

The location of ethnozoological data collection was carried out in three villages in the Banyuwangi Regency, East Java Province, namely Kemiren Village, Glagah District, Taman Suruh Village, Glagah District, and Jambe Sari Village, Giri District (Figure1). The reason for determining the location was because of the following considerations: *first*, the results of the statistical data survey showed that in the three villages the majority of the population were native to the Osing tribe and it was relatively easy to get key informants who were community leaders or traditional leaders of the Osing tribe; *second*, Kemiren Village is a picture of the Osing tribal village that consistently carries out Osing traditions and culture as a legacy from their ancestors in daily life, while the other two villages represent Osing villages which are relatively less concerned about the traditions of the Osing ancestral heritage.

Topographically, the three villages are located at the foot of the Ijen Mountains, most of the soil is alluvial with a black texture, contains clay and dust, has the following altitudes: Kemiren Village at 187 meters above sea level, Taman Suruh Village at 276 meters above sea level. and Jambe Sari Village at 197 meters above sea level. The climatic conditions in the three villages are on average 2,000-2,060 millimeters of rain with 4-5 months of rain, 36-43% humidity, and an average temperature of 20⁰-31⁰ C. The population in the three villages is as follows: following Kemiren Village totaling 2,571 people, Taman Suruh Village totaling 4,047 people, and Jambe Sari Village totaling 3,440 people.

2.2 Data sampling

The research uses an exploratory method based on the emic approach [7]. In addition, data collection was also carried out through unstructured interviews [8] on key informants and respondents, both male and female [9,10]. The determination of the criteria for key informants and respondents is based more on the researcher's need for valid and correct data sources related to the research topic [11,12]. The total number of respondents and key informants in the three villages is 396 respondents and 10 key informants. The data analysis process uses cross-checking, summarizing and synthesizing methods [13].

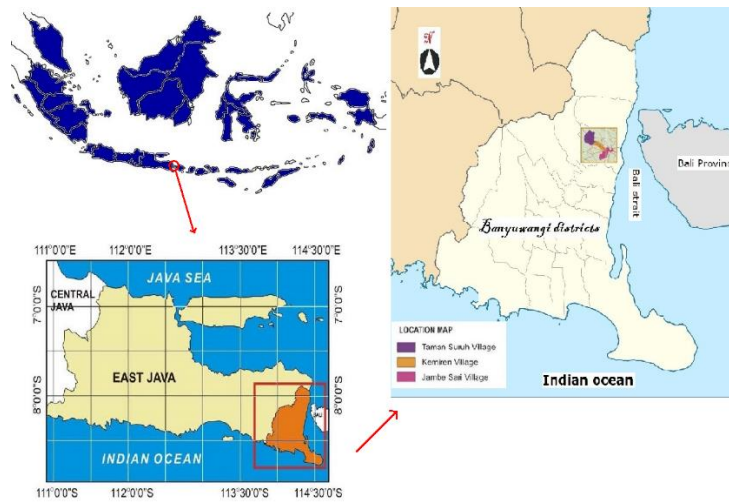


Figure1: Research location in Banyuwangi Regency

3. Results and discussion

3.1 Traditional knowledge of the Osing tribe community about the wealth of animals in their environment

The attitudes of traditional people towards the environment are formed from the results of experiences, observations, and trial efforts in overcoming life problems that have been going on for years [14]. As in the Osing tribal community in the research location, they have a mindset that the existence of animals and plants on earth is at the will of the Almighty Creator, God Almighty. The existence of living things and the environment in which they live to complement each other in supporting their survival, so that they do not become extinct and their regeneration continues.

Starting from this mindset, the Osing community view that animals as one of the living creatures on earth should be respected, through ways of protecting, not hurting, even killing without a good reason, or if it is necessary to die, the cause of death must be determined in a way that does not conflict with religion or ethics. This is reflected in the use of various animal species by the Osing community for food materials, enjoyment, or cultivation through ways such as using catapults, *pulut* (tree sap), hunting with mutts, and fishing, all of which are full of local culture with the values of wisdom for the sustainability of the desired animal so that it does not become extinct.

In the view of the ecosystem concept, the existence of four landscape units (yards, paddy fields, gardens, and fields) which is the result of the interaction of the Osing community with their environment through farming activities [5], the existence of various animal species that live in them is a single entity that cannot be separated from the environment and other living things. The results of interviews and direct observations in the research place revealed that there were 92 animal species from 66 families and 12 classes that were properly recognized by the Osing tribe community.

Based on the total wealth of 92 species of animals, the following is a breakdown of the distribution of the

number of species known to the Osing community based on taxon class groupings in the environment where they live (Figure2). The Aves class ranks first in the distribution of 24 species, followed by Insecta (19 species), Mammalia (17 species), Actinopterygii (11 species), and Reptilia (9 species). Meanwhile, there are also 7 classes with a distribution of less than 4 species, namely Arachnida, Amphibia, Clitellata, Gastropoda, Malacostraca, Osteichthyes, and Sauropsida. The high number of species in the Aves/bird (*manuk*) group known to the Osing community because in their natural habitat the bird has a fairly active movement from one place to another, and generally between each species has special characteristics both in terms of sound and physical appearance, so that easier to be recognized by the public.

Insects, Mammalia (mammals), Actinopterygii (fish), and Reptilia (reptiles) are groups that have a relatively high number of species known to the Osing community. One of the reasons why the number is quite high is because some of the animals included in this group are easy to find and have been known for a long time (even when they were children) by the Osing community in their daily activities. Some of the species in question include mosquitoes/*nyamuk* (*Anopheles* sp.), flies/*laler* (*Musca domestica*), black ant/*semut ireng* (*Dolichoderus thoracicus*), bees/*tawon* (*Apis* sp.), grasshopper/*walang* (*Oxya japonica*), butterflies/*kupu-kupu* (*Papilio demoleus*) from the Insecta group. Likewise, some pets belonging to mammals such as cattle/*sapi* (*Bos javanicus domesticus*), goat/*wedus* (*Capra aegagrus*), sheep/*wedus gimbal* (*Ovis aries*), water buffalo/*kebo* (*Bubalus bubalis*), cat/*kucing* (*Felis domestica*), rabbit/*kelinci* (*Lepus nigricollis*), and monkey/*kethek* (*Macaca fascicularis*). Meanwhile, examples belonging to the Actinopterygii group include various types of fish/*iwak* such as goldfish/*iwak emas* (*Cyprinus caprio*), tilapia fish/*mujaer* (*Oreochromis mossambicus*), snakehead fish/*kutuk* (*Channa striata*), java carp/*tawes* (*Barbonymus gonionotus*), Nile tilapia/*nila* (*Oreochromis niloticus*), and *pindang* (*Euthynnus affinis*). Examples of reptile groups that are often known in everyday life are house lizards/*cecak* (*Hemidactylus frenatus*), lizards/*kadal* (*Mabouya multifasciata*), geckos/*tokek* (*Gekko gecko*), Malayan krait/*ulo weling* (*Bungarus candidus*), and chameleons/*bunglon* (*Bronchocela jubata*).

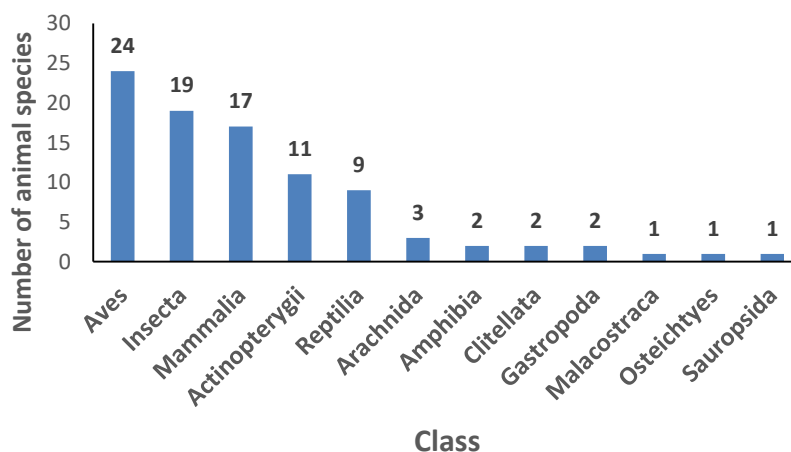


Figure 2: Distribution of the number of animal species by taxon class

Indirectly, the use of animals in the life of the Osing tribe is not only to meet the most basic intake needs of animal protein, but also as additional income to support the family economy through the cultivation of several animals that have direct and fast selling values. The results of field surveys in three villages on various animal species cultivated by the Osing community show that there are about 33.7% of animal species with domesticated status and the rest (66.3%) living in the wild. In the following, data on groups of animals in both domesticated and wild categories are presented in detail (Figure3). The most widely domesticated animal species by the community, namely from the Aves group, amounted to 14 species, followed by Actinopterygii and Mammalia (8 species), and Osteichtyes (1 species). The animals with the most wild status are from the Insecta group, namely 19 species, followed by Aves with 10 species, followed by Reptilia and Mammalia with 9 species. Groups with less than five species are Actinopterygii, Arachnida, Amphibia, Clitellata, Gastropods, Malacostraca, and Sauropsida. So the group of domesticated animals with the highest number is Aves (14 species) and the lowest is Osteichtyes (1 species), while the wild animal group with the highest number is Insecta (19 species) and the lowest is Malacostraca and Sauropsida with 1 species each.

The Aves/birds (*manuk*) group has the highest value in the category of widely domesticated species, although there are not a few species with wild status, which is around 10 species. Some of the species that are widely cultivated by the community are the free-range chicken/*pitik kampung* (*Gallus gallus*), duck/*bebek* (*Anas domesticus*), *manuila* duck/*entok* (*Cairina moschata*), pigeons/*manuk doro* (*Columba domestica*), and turtledove/*manuk perkutut* (*Geopelia striata*). The wild birds include the sparrow/*manuk gerejo* (*Passer montanus*), owl/*manuk hantu* (*Glaucidium castanopterum*), crow/*manuk gagak* (*Corvus* sp.), birds of a feather/*manuk gemak* (*Turnix sylvaticus*), sparrows/*manuk emprit* (*Lonchura leucogastroides*), swallow/*manuk sriti* (*Collocalia esculenta*), bar-winged prinia/*manuk prenjak* (*Prinia familiaris*), and yellow-vented bulbul/*manuk trocokan* (*Pycnonotus goiavier*).

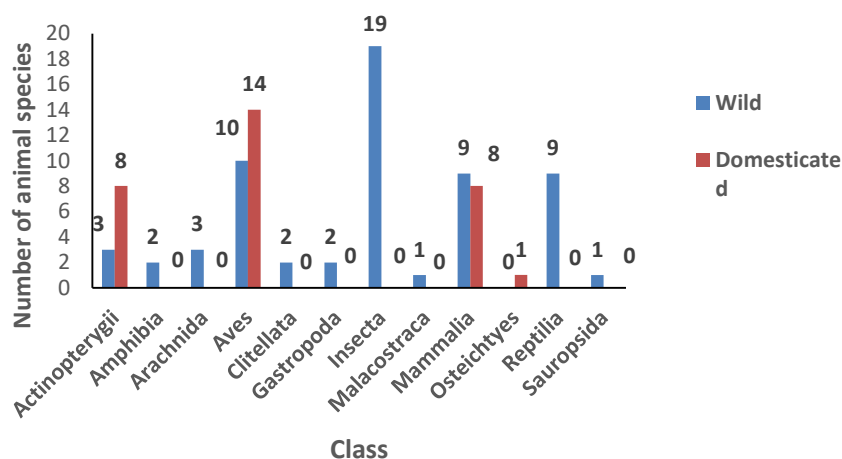


Figure 3: Category of animal groups with domesticated and wild status

The Actinopterygii (fish) group has a high number of domesticated species, for example several fish species that are widely cultivated by the community include tilapia fish (*Oreochromis mossambicus*), goldfish (*Cyprinus caprio*), carp (*Osphronemus goramy*), Nile tilapia (*Oreochromis niloticus*), snakehead fish (*Channa striata*), and

catfish (*Clarias batracus*). The wild species of fish include eel (*Monopterus albus*), silver rasbora (*Rasbora argyrotaenia*), and salted fish (*Leiognathus* sp.).

Mammals are also included in the category of groups that have a relatively high number of domesticated species. Several species of mammals are cultivated in the Osing tribal community, namely water buffalo/kebo (*Bubalus bubalis*), goat/wedus (*Capra aegagrus*), cattle/sapi (*Bos javanicus domesticus*), dog/asu (*Canis familiaris*), cat/kucing (*Felis domestica*), rabbit/kelinci (*Lepus nigricollis*), and sheep/wedus gimbal (*Ovis aries*). However, there are also mammals with the status of wild animals, including the mongoose/garangan (*Viverricula indica*), squirrel/cowot (*Callosciurus notatus*), monkey/kethek (*Macaca fascicularis*), bat/kalong (*Emballonura monticola*), mongoose/luwak (*Paradoxurus hermaphroditus*), and rat/tikus omah (*Rattus rattus*).

Figure 3 also illustrates that all species of the Insecta group known to the Osing community are included in the wild category so that they have the highest wild status, this happens because most people do not want to cultivate this group species on consideration of some of its properties, including poisonous, has a sting, and is disgusting. In addition, some insects can also act as plant pests and disease carriers. These characteristics are more detrimental to humans than their benefits, and some examples of insect species in question are weaver ants/semut rangrang (*Oecophylla smaragdina*), honey bee/tawon madu (*Apis cerana*), bumblebee/tawon endas (*Bombus* sp.), bad-smell grasshopper/walang sangit (*Leptocoris acuta*), leafhopper/wereng (*Nilaparvata lugens*), cockroach/coro (*Blattella asahinai*), fly/laler omah (*Musca domestica*), bluebottle fly/laler ijo (*Lucilia sericata*), and mosquitoes/nyamuk (*Anopheles* sp.). The Osing community also believes that there are some members of the Insecta group who have positive traits (beneficial to humans) such as helping pollinate plants, producing honey for human health, helping the decay process, and increasing the family's economic income. The species in question are the butterfly (*Papilio demoleus*), the honey bee (*Apis cerana*), the fruit fly/laler uwoh (*Drosophila melanogaster*), and the ant eggs/kroto (*Oecophylla smaragdina*).

3.2 The roles and benefits of various animals known by the Osing tribe community

In general, the dependence of humans on animals is not much different from the dependence of humans on plants, because the existence of these two creatures in nature complements each other to meet human needs so that all living things survive and regenerate. The Osing community's understanding of the roles and benefits of various animals in their environment has various meanings, they classify them into 7 groups, namely animals that are useful and play a role in a) basic intake of animal protein totaling 22 species, b) pests of cultivated plants totaling 10 species, c) need for pleasure totaling 10 species, d) traditional medicinal ingredients totaling 9 species, e) traditional ritual purposes only 1 species, f) predators of livestock totaling 10 species, g) and decomposers of organic matter totaling 6 species. However, the community of tribe Osing also know some animals whose benefits are not widely known.

a) Animals as a basic protein intake

The basic needs of the Osing tribe community for sources of protein intake are not only met from the availability of vegetable protein in their environment such as tofu, tempeh (fermented soybean cake), and nuts,

but also from several animal protein sources. Observations in the three research villages show that there are at least 22 species of animals that are known as sources of basic protein intake to meet the needs of the community. Animals that are useful as a source of protein consist of three classes, namely Aves, Mammalia, and Actinopterygii. The largest number of protein-contributing species came from the Actinopterygii (fish) group. Species belonging to the Actinopterygii group are generally relatively very affordable, so they are often found in the menus of the Osing people. Such as carp, snakehead fish, tilapia fish, catfish, goldfish, *pindang*, Nile tilapia, salted fish, eel, Java carp, three spot gourami/*sepat*, silver rasbora, and shrimp/*urang*, while the examples of the Aves group are free-range chicken, ducks, Manilla duck, and swan/*banyak*, as for examples of groups Mammals include cattle, goat, sheep, rabbits, and water buffalo.

The free-range chicken/*pitik kampung* is the most widely cultivated poultry species by the Osing community in the three research villages because the maintenance system does not require high costs. In general, the *pitik kampung* are kept without being caged but released into the environment around the house so that at night they perch a lot in the trees in the yard of the house. For the consumption of *pitik kampung* meat by the community, it can be done by directly slaughtering their own *pitik* or buying it at a vegetable seller. As for the cultivation of ducks, generally only a few people do and in large enough numbers, namely around 35-300 heads, while the Manilla ducks and swan are only kept by a few members of the community. Generally, the three birds are used by the community when the consumption of *pitik kampung* meat is difficult to obtain in traditional markets or vegetable sellers.

The number of cattle breeders is relatively large in the three research villages. A total of 205 breeders are registered in Kemiren Village, while in Taman Suruh Village there are 403 farmers, and the number of cattle breeders in Jambe Sari Village is around 215 farmers, with an average number of 2-4 cows for each breeder (Figure 4A). In general, the use of beef by the community is carried out by buying according to the desired needs at the mobile vegetable seller or staying, while the slaughter of cows is only carried out by the owner if there is a need for a big celebration in the family or to make sacrifices on the Muslim holiday, namely Eid al-Adha.

b) Animals as pests of cultivated plants

Indirectly, the life pattern of the Osing tribe as farmers is able to recognize animals that often damage cultivated plants, especially stingrays. Among the animal species classified by the community as stingray pests are grasshopper (*Oxya japonica*), bad-smell grasshopper (*Leptocorisca acuta*), leafhopper (*Nilaparvata lugens*), rat (*Rattus rattus*), golden conch (*Pomacea canaliculata*), snail (*Achatina fulica*), and crickets (*Gryllus campestris*), while the destroyers of cultivated crops such as fruit are the monkey (*Macaca fascicularis*), bat/*codot* (*Emballonura monticola*), bigbats/*kalong* (*Pteropus vampyrus*), and squirrel (*Callosciurus notatus*).

In general, stingray plant owners prevent pest attacks in several ways depending on the type of destructive pest. Examples of prevention between leafhopper and rats are very different, the prevention of leafhoppers can be done by spraying insecticides on plants or by using natural enemies such as spiders and beetles. Rat pest control is done by using rat poison or its natural enemy, namely paddy field snakes. The community of Osing tribe take these precautions so that pest attacks can be controlled so that the rice harvest is not damaged much.

c) Animals as fulfillment of pleasure needs

The fulfillment of the need for human pleasure for animal species that have been cultivated comes from the beautiful physical appearance or the melodious sound it produces. Sometimes to achieve the pleasure they have to spend energy, time, not even a little money. In the social life of the Osing people, there are several species of animals that are deliberately kept by their owners in addition to fulfilling pleasure and tranquility in life, the species in question include the turtledove, swamp bird, white starling, black starling, spotted dove, *tekukur bird*, finches, and pigeons. In addition, as a complement to happiness in the family, there are people who keep pets such as dogs and cats. At certain times they will get satisfaction and inner pleasure when they hear the sound of chirping or look at the birds they are caring for, but there are also those pleasures that arise when stroking their beloved dog or cat.

d) Animals as ingredients for traditional medicine

The use of traditional medicinal ingredients for healing various diseases in the lives of the Osing tribe community is not only obtained from plants but also comes from several species of animals around where they live. The results of data collection obtained from respondents show that there are 9 species of animals that can be used as ingredients for traditional medicine to cure several diseases suffered by the community. The nine animals are earthworms, geckos, little spider's white nest, honey bee, bat, snake, lizards, lizards, and snail.

In general, the Osing tribe community process various animal species for traditional medicine in a single way or not mixed with other animal species. Likewise, the processing method is relatively very simple, some types of diseases are treated by means of roasting, pounding, burning, frying in cooking oil, smeared, some by drinking. In addition, in the process of making traditional medicine, the Osing tribe community use several animal organs, including meat, nests, mucus, and all body organs. The most use of animal organs for processing traditional medicines is all organs of the body. The method of utilization and the types of animal organs used are detailed in Table 1.

Honey is a thick sweet liquid produced by honey bees, derived from various flower nectars that are in bloom [15]. Pure honey contains various nutrients, including carbohydrates, proteins, amino acids, minerals (Na, Ca, K, Mg, Cl, Fe, and Zn) and vitamins (B1, B2, B3, B6, C, A, E, and flavonoids) [16]. Honey has many benefits for human health because the glucose content in it can be an effective source to increase endurance [17].

Table 1: Species of animals used as ingredients in traditional medicine

Serial number	Local name	Scientific name	Body organs used	Efficacy	How to use
1.	Earthworms	<i>Lumbricus terrestris</i>	All body organs	Typhoid medicine.	From several earthworms, all the organs of the body are washed and then fried in a roaster, after being cooked, pounded until smooth, then sieved. Worm powder brewed with warm water add a little honey, continue to drink.
2.	Geckos	<i>Gekko gekko</i>	All body organs	Itchy skin disease	The entire body of the gecko is cleaned, then burned, then eaten with sauce.
3.	Little spiders	<i>Araneus diadematus</i>	Little spider's white nest	The medicine stops the blood flow in the wound	Take a small white spider's nest, stick it on the bleeding wound, let it sit for a while
4.	Bat	<i>Emballonura monticola</i>	All body organs	Asthma medicine	The whole body of the bat is cleaned, then burned, then eaten with sauce
5.	Snake	<i>Python reticulatus</i>	Body flesh	Skin pain medicine and strong body medicine	A snake that has been killed, the skin is peeled off and the flesh of the body is washed clean, then fried until cooked, then eaten
6.	Lizards/ cecak	<i>Hemidactylus frenatus</i>	All body organs	scurvy medicine	The lizards are turned off and all the lizard's organs are cleaned, then burned when it is cold eaten with sauce.
7.	Lizards/ kadal	<i>Mabouya multifasciata</i>	All body organs	Itchy skin disease	The lizard is killed and the entire body of the lizard is cleaned, then burned, then eaten with sauce
8.	Snail	<i>Achatina fulica</i>	Mucus	The medicine stops the blood flow in the wound	Take the snail that is still alive then apply the mucus it produces on the new wound, and wait a few moments for the mucus to dry
9.	Honey bee	<i>Apis cerana</i>	Bee hive	Drugs increase the body's resistance to stay healthy	Honey obtained from beehives is drunk in moderation, once a day until the body is healthy.

e) Animals for traditional ritual purposes

The life of the Osing tribe community is very closely related to the implementation of traditional rituals they believe in, and at least one year in Kemiren Village, there are two agendas for celebrating traditional rituals that must be routinely carried out by the community, namely *Ider Bumi* and *Tumpeng Sewu*. However, several other traditional ritual celebrations that are more individual or family in nature are still carried out by each family member when needed, such as marriage congratulations, births, commemorate the birthday of 35 days (*selapanan*), circumcision, and death. The traditional *Ider Bumi* ritual celebration which is generally held on two days after Eid al-Fitr aims to clean the village so that people's lives are protected from various disasters or dangerous diseases. *Tumpeng Sewu* is a traditional ritual ceremony carried out by the Osing tribe community whose purpose is almost similar to the *Ider Bumi* traditional ceremony, which is to ask the Almighty so that the community is protected from calamities (diseases) and disasters, usually held about one to two weeks before Eid al-Adha [6]. In various traditional ritual ceremonies, only one species of animal is used as a food dish, namely the *pitik kampung* (*Gallus gallus*) and it is usually served in the form of processed '*pecel pitik*' cuisine (Figure 4 B).



Figure 4: Utilization of animals as protein intake (A) and as a the need for traditional rituals (B) by the Osing tribal community

f) Animals as predators of livestock (hunting animals)

The existence of pets living in the vicinity of the Osing tribe community's residence cannot be separated from the supervision of their respective owners, so that if it is felt that the number of pets is decreasing, it can be ascertained that one of the causes is being preyed upon by wild animals that roam around the place. In connection with the various experiences that befell their pets, it is natural that people are familiar with the names of animal species that have the character of being predators of other, weaker animals. The animals in question are estimated at 10 species, including mongoose, paddy field snake/*ulo sowo*, malayan krait/*ulo weling*, cobra, rattlesnake/*ulo gadung*, water snake, weaver ants/*semut rangrang*, owl, mongoose, and monitor lizards. Most of these animal species live wild in the wild around people's residences, have savage and murderous behavior, either through bites, stings, or deadly poisons.

g) Animals as decomposers of organic matter

Most community tribe Osing know animal species that decompose organic matter from types of organic matter that have been physically damaged, such as plant organ matter (fruit, leaves, twigs, branches, flowers, and stems) that have decayed and crumbled, door leaves, windows of houses that are porous, as well as other examples. Some of these animal species mostly live in the wild and are kept around people's homes, the species in question are fruit fly, earthworms, termites, black ants, weaver ants, and cockroach.

Groups of animals whose uses are not yet known

The names of various animal species that often live in the vicinity of the Osing tribe's residence have been used to be heard in the ears of community members, but generally the existence of these species is not understood for their benefits. Even though they live wild, the characters of these animal species are tame, some are wild/savage. There are approximately 23 species of animals whose positive benefits for human life are not yet known, these animal species include chameleons, swallow, *srigunting* bird, crow, birds of a feather, dragonfly, whip scorpions/*ketonggeng*, scorpions/*kolojengking*, bluebottle fly, fly, and mole cricket/*orong-orong*.

The use of various animal species by the Osing community cannot be separated from its management system, because the two activities complement each other to achieve results that are in accordance with the owner's expectations. The Osing community manages its various pet species in a conventional and very traditional way. The traditional knowledge of the Osing people is obtained from their ancestors and to this day they are maintained and preserved in the management of livestock in their environment. For example, they feed their livestock such as cattle, goat, sheep, and water buffalo using natural grass instead of concentrate feed, they harvest their livestock meat by slaughtering it, not cutting it using machines, even their livestock cages are cleaned manually using human labor instead of using a machine. Traditional knowledge about skills in caring for these animals to grow and develop in a healthy way in everyday life in the environment and they are also taught to children so that later they can be practiced in their day.

Indirectly, many of the activities carried out by the Osing tribe community are related to meeting the needs of animals that have traditional conservation values, such as getting various fish in the river to meet their family's nutritional consumption, doing so by fishing or using nets, not by using electric shocks or explosives. Some people also keep expensive chirping birds such as swamp bird/*cucak rowo* which are obtained from captivity. Likewise, in obtaining wild turtledove, spotted dove, or *tekukur* bird, they have a way of catching them by using traps that are given *pulut* (trees sap) or with networks so that the desired bird does not die, and there are many other examples of wisdom practice. other traditional.

The values of traditional wisdom that exist in the lives of the Osing tribe community, both in the management of various species of livestock and the use of various wild animal species for cultivation, are proof of the seriousness of the community in preserving the culture of their ancestors so that they are used sustainably.

3.3 The economic value of domesticated animals for the life of the Osing tribe community

The existence of animals that live in the environment where the Osing tribe community live, indirectly has an important meaning in supporting their lives even though most members of the community rely more on farming and gardening for their livelihoods. To find out how big the direct contribution of several animal species that have experienced domestication and which have potential economic value for the survival of the Osing community, it is necessary to calculate the economic valuation of these animal species. The calculation of the economic value of several animal species can be done through the “direct use value” and “market price” approaches [18].

Several animal species that have potential economic value and are used to meet subsistence needs, are generally harvested from animals that have long been domesticated by the Osing people in the three villages, including: meat of pitik kampung (*Gallus gallus*), eggs of pitik kampung, meat of duck (*Anas domesticus*), eggs of duck, goat (*Capra aegagrus*), and cattle (*Bos javanicus domesticus*). The following parameters can be used to calculate the economic value of animals that have been domesticated by the Osing community, namely the amount harvested according to the average household need, the frequency of harvesting in 1 year, and the total harvest per household (head of family) per animal species.

Details of the calculation of the economic value for each animal species are presented as follows. Some of the Osing tribe community in the three villages have a hobby of raising *pitik kampung* (*Gallus gallus*). They do this on purpose because the meat and eggs of these animals can be sold when they need money. The prediction results of the number of *pitik kampung* kept in three villages were 5,771 from a total of 1,605 owners. In general, of the total number of *pitik kampung*, the number of female *pitik* is more than the male species, and not all of them are sold to traditional markets, because of all female species, there is a small number that is used as broodstock for the next generation. Likewise, not all of the male species are sold but are always left as the type of male needed during the mating season. In addition, the failure factor in the growth and development of these animals is also taken into account. Referring to some of these things, if it is calculated on average per household, both those who have *pitik kampung* and those who don't, an assessment is obtained that in 1 year at least they can earn IDR 392,400,000 from selling *pitik*. The calculation of this value is obtained from $(5,771 - 866 \text{ or } 15\%) \text{ multiplied by IDR } 80,000$ (average price per *pitik kampung*).

The estimated results of the calculation of the *pitik kampung* eggs sold to traditional markets are as follows, approximately 10-15% of the 5,771 females are used as broodstock, and in one year a *pitik kampung* reproduces 3 times so it is estimated that there are 45 eggs it produces. The next calculation is $866 \times 45 \times \text{IDR } 2,500 = \text{IDR } 97,425,000$, meaning that in 1 year they can earn IDR 97,425,000 from selling *pitik kampung* eggs.

In general, the details of the calculation of the selling value of meat and eggs of kampung pitik also apply to the calculation of the selling value of duck meat and eggs (*Anas domesticus*). The prediction results of the number of ducks kept in the three villages are 3,231 from a total of 30 owners, if the average is calculated per household, both those who have ducks and those who do not, an assessment is obtained in 1 year at least they can produce $(3,231 - 485) \times \text{IDR } 60,000 = \text{IDR } 164.760,000$ from the sale of ducks.

The productivity period of laying eggs in ducks can reach the age of 2 years and after that the ability to lay eggs decreases, and in one year the ducks are able to produce 250 eggs. The calculation results of the selling value of duck eggs in 1 year is estimated as follows $485 \times 250 \times \text{IDR } 2,100 = \text{IDR } 254,625,000$.

The population of goats (*Capra aegagrus*) in the three villages is estimated at 238 from a total of 60 owners. In general, goats are sold to traditional markets in the season leading up to the Muslim holiday of Eid al-Adha because they are designated as sacrificial animals. The prediction of the calculation of the selling value of goats still refers to several requirements that apply to native chickens, so the results of calculating the selling price of goats in 1 year for the welfare of the Osing tribe community are as follows, $(238 - 36 \text{ or } 15\%) \times \text{IDR } 2,700,000 = \text{IDR } 545,400,000$.

There is a slight difference in the prediction of how to sell cattle (*Bos javanicus domesticus*), because in three villages, cattle are very strong assets to be maintained so that they are not sold to traditional markets, except in emergency situations (ill animals and large celebrations). The total number of cattle from the Osing tribe community in the three villages is estimated to be 1,897 from 823 owners, and about 1-3% of this number are sold to traditional markets each year, so the calculation result of the selling price of bulls is $38 \times \text{IDR } 21,000,000 = \text{IDR } 798,000,000$.

Overall, the economic value of the four animal species that contribute to meeting the subsistence needs of the Osing tribe community is $\text{IDR } 2,252,610,000/\text{household/year}$ or $\text{IDR } 187,717,500/\text{household/month}$. This contribution is quite high to support and realize the achievement of sustainable development for the Osing tribe community in Banyuwangi.

3.4 Conclusion

The traditional knowledge of the Osing tribe community in recognizing animal names and the practice of using them is only limited to animal species that are often found living in their surroundings, both species that have experienced domestication and species that live in the wild. The total wealth of animal species known by the Osing community is 91 species from 66 families and 12 classes. From the total value of animal wealth, the highest number of species distribution is Aves class (24 species), followed by Insecta (19 species), Mammalia (16 species), Actinopterygii (11 species), Reptiles (9 species), and 7 other classes have distribution values under 4 species, namely Arachnida, Amphibia, Clitellata, Gastropods, Malacostraca, Osteichthyes, and Sauropsida. As many as 49% of animal species are domesticated and the rest (51%) are wild. These animals have roles and benefits for people's lives, including being useful as a) basic intake of animal protein, b) pests of cultivated plants, c) need for pleasure, d) traditional medicinal ingredients, e) needs for traditional rituals, f) predators livestock, and g) decomposer of organic matter. The prediction results of the calculation of the economic value of 4 animal species that have been domesticated by the Osing community to meet subsistence needs are $\text{IDR } 2,252,610,000/\text{household/year}$ or $\text{IDR } 187,717,500/\text{household/month}$.

Acknowledgement

I would like to thank the Osing tribe community in the three research villages, especially Mr. Suhaemi in

Kemiren Village for their contribution to data collection. My highest gratitude goes to Mrs. Tatik Chikmawati, Mr. Eko Baroto W, and Mr. Ervizar AMZU for their guidance and contribution of ideas in writing a dissertation.

References

- [1] L.M. Johnson, "Ethnobiology: Traditional Biological Knowledge in Contemporary Global Context." Athabasca Univ. Pr, 2002.
- [2] R. Ellen, "The Cultural Relations of Classification, an Analysis of Nuauulu Animal Categories from Central Seram." Cambridge: Cambridge Univ, 1993.
- [3] B. Meehan, "Shell Bed to Shell Midden." Canberra: Australian Institute Of Aboriginal Studies, Canberra, 1982.
- [4] E.S. Hunn, "Ethnozoology." E.N. Anderson, M.P. Deborah, S.H. Eugene, and J.T. Nancy (Ed.) Hoboken, New Jersey. John Wiley & Sons, Inc, 2011.
- [5] B. Prasetyo, T. Chikmawati, E.B. Walujo, and E. Amzu, "Ethnoecology: The traditional landscape of Osing Tribe in Banyuwangi, Indonesia." *Biodiversitas* 19(6): 2003-2009, 2018.
- [6] B. Prasetyo, "Etnobiologi masyarakat suku Osing di Kabupaten Banyuwangi." Disertasi. Bogor. Departemen Biologi Tumbuhan, Sekolah Pascasarjana Institut Pertanian Bogor, 2019.
- [7] M. Rosa and D.C. Orey, "The field of research in ethnomodeling: emic, ethic and dialectical approaches." *Educ Pesqul Sao Paulo* 38(4): 865-879, 2012.
- [8] Ajd.R. Silva and Ld.H.C. Andrade, "Cultural significance of plants in communities located in the coastal forest zone of the State of Pernambuco, Brazil." *Human Ecology* 34: 447-465, 2006.
- [9] F. Vodouhe, O. Coulibaly, A. Adegbidi, and B. Sinsin, "Community perception of biodiversity conservation within protected areas in Benin." *Forest Pol & Econ.* 12: 505-512, 2010.
- [10] T.H.White Jr., A.J. Camacho, T. Bloom, P.L. Diéguez, and R. Sellares, "Human perceptions regarding endangered species conservation: a case study of Saona Island, Dominican Republic." *Latin American Journal of Conservation* 2(1): 18-29, 2011.
- [11] H.R. Bernard, "Research Methods in Anthropology: Qualitative and quantitative methods 3rd edition." AltaMira Press, Walnut Creek, California, 2002.
- [12] J.L. Lewis and S.R.J. Sheppard, "Culture and communication: can landscape visualization improve forest management consultation with indigenous communities?." *Landscape and Urban Planning* 77: 291-313, 2006.

- [13] H. Newing, C.M. Eagle, R.K. Puri, and C.W. Watson, "Conducting Research in Conservation: Social science methods and practice." Routledge, London and New York. ISBN: 9780415457927, 2011.
- [14] T. Whitten, R.E. Soeriaatmadja, and S.A. Afiff, "Ekologi Jawa dan Bali." Jakarta. Prenhallindo, 1999.
- [15] Apriari Beekeeping Center of Pramuka, "A Little Information and Benefits of Honey, Bee Pollen, Royal Jelly." Jakarta: Pusat Perlebahan Apriari Pramuka, 2002.
- [16] Inayah, A. Marianti, and Lisdiana, "Efek madu randu dan kelengkeng dama menurunkan kolesterol pada tikus putih hiperkolesterolemik." Unnes J Life Sci. 1(1): 8-12, 2012.
- [17] S. Bogdanov, T. Jurendic, R. Sieber, and R. Gallmann, "Honey for nutrition and health: a Review." Amer J Coll Nutri. 27: 677-689, 2008.
- [18] Y. Purwanto, R. Saparita, and E. Munawaroh, "Keanekaragaman Jenis Hasil Hutan Nonkayu Berpotensi Ekonomi dan Cara Pengembangannya di Kabupaten Malinau." Bogor: LIPI Pr, 2011.