Animal utilization based on local knowledge in Ciletuh Geopark, Ciemas Subdistrict, Sukabumi, West Java, Indonesia

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³Center of Environment and Sustainable Science, Directorate of Research, Community Services and Innovation, Universitas Padjadjaran. Jl. Raya Bandung-Sumedang Km 21, Jatinangor, Sumedang 45363, West Java, Indonesia

Abstract. Wulandari I, Shanida SS, Husodo T, Megantara EN, Tresna D. 2019. Animal utilization based on local knowledge in Ciletuh Geopark, Ciemas Subdistrict, Sukabumi, West Java, Indonesia. Biodiversitas 20:2781-2789. Ciletuh Geopark has high biodiversity but has not been supported by local knowledge about the use of animals to support sustainable development. This study aims to investigate: (i) the number of species that are used, (ii) distribution of local knowledge about animals using, and (iii) the dependency of communities on creatures in Ciletuh Geopark, Ciemas Subdistrict, Sukabumi. Mixed methods of qualitative (semi-structured interviews) and quantitative methods (proportional random sampling) were applied in this study. The community uses 153 species, consisting of 58 Avifauna species, 13 mammals species, nine Herpetofauna species, three insects species, 16 species of freshwater fish, 43 species of seawater fish, two Mollusca species, and nine crustacean species. Utilization of fauna is not distributed in all villages. An animal utilization base is only conveyed through oral form from generation to generation, so that their knowledge is threatened with being lost because it is not documented in writing.

Keywords: Animal utilization, Ciemas, Ciletuh Geopark, Sukabumi

INTRODUCTION

Ciletuh-Palabuhanratu Geopark of West Java, Indonesia is an area with a concept of tourism-based education, and conservation of geological diversity, biodiversity, and cultural diversity to support sustainable development. Ciletuh-Palabuhanratu Geopark is divided into several regions, one of them is Ciletuh Geopark. Ciletuh Geopark is located in Ciemas Subdistrict, Sukabumi District, West Java, Indonesia. This area has a uniqueness compared to other geoparks because Ciletuh Geopark is shaped like an amphitheater. Ciletuh Geopark has a diverse ecosystem ranging from marine ecosystems in the lowlands to forest ecosystems in the highlands so that Ciletuh Geopark has a variety of biodiversity (Gunawan 2018).

Based on exploratory studies found various species of fauna in Ciletuh Geopark, including avifauna as many as 88 species from 41 families, while 28 species among them have REEPS status (Rare, Endemic, Endangered, and Protected Species). Mammals species are found as many as 25 species from 16 families and 7 orders, whereas 10 species among them have REEPS status. Species of herpetofauna are found as many as 35 species, including 11 species of Amphibian (5 families) and 24 species of Reptile (8 families). As many as 11 species of herpetofauna have REEPS status. Besides exploratory study, in 2016 was conducted the interview about biodiversity in Ciletuh Geopark, Ciemas Subdistrict, Sukabumi, West Java, Indonesia. According to Partasasmita et al. (2016) that Javan Leopard is often hunted, traded, and consumed by the local community in Girimukti Village. According to Ramadhani (2018) unpublished, that several birds are also consumed by the local community in Girimukti Village. Based on the previous studies, we should reveal the information of local knowledge about animals, especially animal utilization.

The high biodiversity in Ciletuh Geopark has not been completed with information of local knowledge about animal utilization, so that it is necessary to study about them. To be able to support sustainable development, good and wise management is needed (Wulandari et al. 2018), one of which is the local knowledge in Ciletuh Geopark. However, the knowledge that is owned by the community is only conveyed in oral form from generation to generation, so that their knowledge is threatened with being lost because it is not documented in writing.

The study of animal utilization in Ciletuh Geopark has never been carried out, while Geopark itself has high biodiversity around the community environment, so it is important to document local knowledge about animal utilization in Ciletuh, Ciemas Subdistrict, Sukabumi District, West Java Province, Indonesia. This study aims to investigate: (i) the number of species that are used, (ii) distribution of local knowledge about animals using, and (iii) the dependency of communities on creatures in Ciletuh Geopark.
MATERIALS AND METHODS

Study area
Based on the Central Bureau of Statistics of Ciemas Subdistrict (2017) that the topography of Ciemas Subdistrict consists of hilly terrain and mountains, with slopes varying between 0.3%, 8-15%, and >40%. Relatively flat land with a slope of 0.3% is found in the central part of the district and around the Ciletuh River, a slope of 15-25% is found in the North and South, while a slope of >40% is found in the central part in Panenjoan area. The elevation of Ciemas Subdistrict is between 0-500 meters above sea level. The climate in Ciemas Subdistrict is still influenced by regional climatic conditions in the Sukabumi District which has a tropical wet climate. The rainfall heavily influenced by the wind that blows from Australia and Asia with temperatures ranging from 20-32°C.

Procedures
Mixed method
The study was conducted using a mixed-method approach, a combination of qualitative and quantitative (Newing et al. 2011; Albuquerque et al. 2014). This mixed-method is carried out with the assumption that collecting various types of data that are considered best can provide a thorough understanding of the problem under study (Creswell 2009).

Semi-structured interview
Qualitative data collection is carried out by semi-structured interviews. The semi-structure interview was undertaken by deep interview with competent informants (local experts) (Iskandar et al. 2016). Interview was conducted with guidelines for interviews that had been made previously and could be developed during the interview (Husodo et al. 2019) Informants were chosen by the snowball sampling technique. The categorization of the informants in this study are poachers, community elders, and animal traders.

Figure 1. Study area in Ciletuh Geopark, Ciemas Subdistrict, Sukabumi, West Java, Indonesia (7˚13’31”S 106˚29’29.98”E)
Structured interview

Quantitative data collection is carried out through structured interviews. The interview was conducted using questionnaires for respondents who were randomly selected. Respondents selected were head of the family with the assumption that the head of the family was considered representative and represented the knowledge of his family. In the quantitative approach, the number of respondents is based on the Frank Lynch formula. Respondents selected proportionally random sampling.

In Ciomas Subdistrict, there are nine villages including Tamanjaya, Mekarjaya, Ciemas, Girimukti, Mekarsakti, Cibenda, Mandrajaya, Ciwaru, and Sidamulya Village. One village that is not selected is Sidamulya Village because this community is a Javanese tribe so that the habits and traditions of the community will be different from other villages which are Sundanese people.

The respondents were chosen through proportionally random sampling, based on the Lynch formula found that the number of respondents in this study was 94 respondents. Based on the number of respondents, as many as 94 respondents and the calculation of the formula proportions obtained the proportion of respondents in each village, including Tamanjaya (12 respondents), Mekarjaya (15 respondents), Ciemas (11 respondents), Girimukti (8 respondents), Mekarsakti (11 respondents), Cibenda (14 respondents), Mandrajaya (9 respondents), and Ciwaru Village (14 respondents).

Data analysis

Qualitative data

Qualitative data analysis must pay attention to the consistency of two perspectives, namely the perspective of the informant (emic) and the analysis of the researcher (ethics). Qualitative data are analyzed by cross-checking, summarizing, synthesizing, and descriptive analysis (Newing et al. 2011).

Quantitative data

Quantitative analysis is carried out after the data collected from interviews with respondents, then analyzed using simple statistics. Simple statistical analysis used is the percentage (%) of respondents' answer. The percentage of respondents' answer is narrated in a descriptive analysis to describe the data collected descriptively.

RESULTS AND DISCUSSIONS

Species diversity of animal used

Based on the results of interviews, there were 153 species of animals used by communities in the Ciemas Subdistrict, both wild and domestic animals (see Table 1). Among 153 species, only 48 species were used by respondents, including insects (1 species), freshwater fish (10 species), crustaceans (4 species), mollusks (1 species), and seawater fish (32 species). Besides, as many as 127 species were used by key informants. The group of animals

Table 1. Distribution of species utilization, intensity, and utilization form in Ciemas Subdistrict, Sukabumi
| Local name            | Scientific name            | Villages | UI | Utilization form |
|-----------------------|----------------------------|----------|----|------------------|
| Avifauna              |                            | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Co | Me | Ac | SV |
| Asi topi-sisik        | Malacopteron cinereum      | +         |    | VR                 | + |
| Ayam hutan hijau      | Gallus varius              | +         |    | VR                 | + |
| Ayam hutan merah      | Gallus gallus              | +         |    | VR                 | + |
| Ayam kampung          | Gallus gallus domesticus   | +         |    | M                  | + |
| Bebek                 | Anas sp.                   | +         |    | M                  | + |
| Beluk ketupa          | Ketupa ketupa              | +         |    | VR                 | + |
| Bentet kelabu         | Lantus schach              | +         |    | VR                 | + |
| Beo                   | Gracula religiosa          | +         |    | VR                 | + |
| Betet                 | Psittacula alexandri       | +         |    | VR                 | + |
| Blekok                | Ardeola speciosa           | +         |    | VR                 | + |
| Bondol jawa           | Lorchura leucogastroides   | +         |    | VR                 | + |
| Bondol peking         | Lorchura punctulata        | +         |    | VR                 | + |
| Babut alang-alang     | Centropus bengalensis      | +         |    | VR                 | + |
| Babut besar           | Centropus sinusensis       | +         |    | VR                 | + |
| Caladi tilik          | Picosia moluccensis        | +         |    | VR                 | + |
| Caladi ulam           | Dendrocopos macei          | +         |    | VR                 | + |
| Cangak merah          | Ardea purpurea             | +         |    | VR                 | + |
| Cekakak jawa          | Halcyon cyanoventris       | +         |    | VR                 | + |
| Cekakak belukar       | Halcyon smyrnensis         | +         |    | VR                 | + |
| Cekcelek alang-alang  | Orthotomus sp.             | +         |    | VR                 | + |
| Cekcelek kasa         | Orthotomus sp.             | +         |    | VR                 | + |
| Cekcelek pohon        | Orthotomus sp.             | +         |    | VR                 | + |
| Cipoh kacat           | Aegithina tipha            | +         |    | VR                 | + |
| Ciuang mungkal        | Cochoa azurea              | +         |    | VR                 | + |
| Entog                 | Cairina moschata           | +         |    | M                  | + |
| Gelatik jawa          | Padda oryzivora            | +         |    | VR                 | + |
| Jalak suren           | Gracupica contra           | +         |    | VR                 | + |
| Kadalan birah         | Phaeicophaeus curvirostris| +         |    | VR                 | + |
| Kaeo padi             | Amaurornis phoenicurus     | +         |    | VR                 | + |
| Karik daun            | Columbidae                 | +         |    | VR                 | + |
| Karik haji            | Columbidae                 | +         |    | VR                 | + |
| Karik harendong       | Columbidae                 | +         |    | VR                 | + |
| Karik kebo            | Columbidae                 | +         |    | VR                 | + |
| Karik pohon           | Columbidae                 | +         |    | VR                 | + |
| Kerak kerbau          | Acridotheres javanicus     | +         |    | VR                 | + |
| Katilang              | Pycnonotus aurigaster      | +         |    | VR                 | + |
| Limukean              | Chalcophaps indica         | +         |    | VR                 | + |
| Manintin besar        | Enicurus leschenauti       | +         |    | VR                 | + |
| Manintin kecil        | Enicurus velatus           | +         |    | VR                 | + |
| Manyar jambal          | Ploceus manyar             | +         |    | VR                 | + |
| Merpait               | Columba livia              | +         |    | VR                 | + |
| Paok pancawarna       | Hydronis guajana           | +         |    | VR                 | + |
| Perenjak              | Prinia flaviventris        | +         |    | VR                 | + |
| Perkutat              | Geopelia striata           | +         |    | +                  | VR |
| Pijantung besar       | Arachnothera robusta       | +         |    | VR                 | + |
| Pipit                 | Anthus novaeseelandiae     | +         |    | VR                 | + |
| Puntai gading         | Treron vernans             | +         |    | VR                 | + |
| Puyuh gonggong        | Arborophila javanica       | +         |    | VR                 | + |
| Puyuh semak           | Perdicula asiatica        | +         |    | VR                 | + |
| Rangkong badak        | Buceros rhinoceros         | +         |    | VR                 | + |
| Sepah merah           | Aethopyga siparaja         | +         |    | VR                 | + |
| Serindit jawa         | Loriculus pusillus         | +         |    | VR                 | + |
| Takur baltok          | Psilopogon lineatus        | +         |    | VR                 | + |
| Takur tohtor          | Psilopogon armillaris      | +         |    | VR                 | + |
| Takur ungkit-ungkut   | Psilopogon haemacephalus   | +         |    | VR                 | + |
| Tikukar               | Streptopelia chinensis     | +         |    | VR                 | + |
| Trinil pantai         | Actitis hypoleucos         | +         |    | VR                 | + |
| Uncal                 | Macropygia emiliana        | +         |    | VR                 | + |
| Mammalia              |                            | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Co | Me | Ac | SV |
| Babi hutan            | Sus verrucosus             | +         |    | M                  | + |
| Kancil                | Tragulus javanicus         | +         |    | VR                 | + |
| Kelinci hutan         | Lepus nigricolis           | +         |    | VR                 | + |
| Landak                | Hystrix javanica           | +         |    | VR                 | + |
| Linsang                  | Prionodon linsang                        | + | VR | + |
|-------------------------|-----------------------------------------|---|----|---|
| Lutung                  | Trachypithecus auratus                  | + | VR | + |
| Macan tutul             | Panthera pardus melas                   | + | VR | + |
| Monyet                  | Macaca fascicularis                     | + | VR | + |
| Musang pandan           | Paradoxurus hermaphroditus              | + | VR | + |
| Surili                  | Presbytis comata                        | + | VR | + |
| Tikus                   | Rattus norvegicus                       | + | VR | + |
| Trenggiling             | Manis javanica                          | + | VR | + |
| Tupai kelapa            | Tupai javanica                          | + | VR | + |
| Herpetofauna            |                                         |   |    |   |
| Cicak pohon             | Draco volans                            | + | VR | + |
| Cicak rumah             | Hemidactylus frenatus                   | + | VR | + |
| Kadal langit            | Squamata                                | + | VR | + |
| Kadal pohon             | Squamata                                | + | VR | + |
| Kadal tanah             | Squamata                                | + | VR | + |
| Kodok rawa              | Anura                                   | + | VR | + |
| Orai kobra belang       | Reptilia                                | + | VR | + |
| Orai kobra pohon        | Reptilia                                | + | VR | + |
| Tokek                   | Gekko gecko                             | + | VR | + |
| Insect                  |                                         |   |    |   |
| Belalang                | Orthoptera                              | + | VR | + |
| Kumbang                 | Coleoptera                              | + | +  | VR | + |
| Tonggeret               | Tibicen linnei                          | + | VR | + |
| Freshwater fish         |                                         |   |    |   |
| Batak                   | Neolissochilus thienemanni              | + | M  | + |
| Belut sawah             | Monopterus albus                        | + | +  | +  | M  | + |
| Cingir putri            | Xiphophorus helleri                     | + | M  | + |
| Gabus                   | Channa striata                          | + | +  | +  | M  | + |
| Gurame                  | Osphronemus goramy                      | + | M  | + |
| Pantau janggat          | Esomus metallicus                       | + | M  | + |
| Lele lokal              | Clarus sp.                              | + | +  | +  | M  | + |
| Mas                     | Cyprinus carpio                         | + | +  | +  | +  | M  | + |
| Mejuaer                 | Oreochromis mossambicus                 | + | +  | +  | M  | + |
| Nila                    | Oreochromis niloticus                   | + | +  | +  | M  | + |
| Sapu                    | Pterygoplichthys sp.                    | + | M  | + |
| Sepat                   | Trichogaster sp.                        | + | M  | + |
| Sidat anjing            | Anguilla bicolor                        | + | +  | +  | M  | + |
| Sidat kembang           | Anguilla marmorata                      | + | +  | +  | M  | + |
| Tawes                   | Barbonyx gonionotus                     | + | M  | + |
| Wader                   | Barbodes binotatus                      | + | +  | +  | M  | + |
| Seawater fish           |                                         |   |    |   |
| Arwana                  | Scleropages sp.                         | + | VH | + |
| Baleragas               | Xiphias gladius                         | + | VH | + |
| Baracuda                | Sphyraena obtusata                      | + | VH | + |
| Basal                   | Pampus argenteus                        | + | VH | + |
| Beromang                | Siganus javus                           | + | VH | + |
| Balan-balan             | Megalops cyprinoides                    | + | VH | + |
| Buntal kelapa           | Arothron reticularis                    | + | VH | + |
| Buntal landak           | Tetraodon sp.                           | + | VH | + |
| Buntal pisang           | Tetraodon lunaris                       | + | VH | + |
| Capungan                | Pterapogon sp.                          | + | VH | + |
| Cavang                  | Leptomelanosoma indicum                 | + | VH | + |
| Cunang                  | Congresox talabon                      | + | VH | + |
| Deleus                  | Decapterus sp.                          | + | VH | + |
| Hiu bangbara            | Carcharhinus albimarginatus             | + | VH | + |
| Hiu botol               | Centroscymnus crepidater                | + | VH | + |
| Hiu lutung              | Alopias sp.                             | + | VH | + |
| Hiu monyet              | Alopias pelagicus                       | + | VH | + |
| Hiu petong              | Elasmobranchi                           | + | VH | + |
| Janggelius              | Istiophorus sp.                         | + | VH | + |
| Kakap merah             | Latjanus malabaricus                    | + | VH | + |
| Kawa                    | Euthynus affinis                        | + | VH | + |
| Kembang                 | Rastrelliger brachysoma                 | + | VH | + |
| Keong laut              | Neverta didyma                          | + | M  | + |
| Kerapa lodi             | Epinephelus sp.                         | + | M  | + |
| Karesi                  | Nemipterus japonicus                    | + | VH | + |
| Layang                  | Decapterus sp.                          | + | VH | + |
Based on the form of animal utilization as medicine, it is dominated by Herpetofauna and mammals species, while the others are used as consumption needs. Marine fish usually used for sale. The body part of the species used varies, such as the tongue, tooth, meat, internal organs, depending on the species that is used. Animals and their products derived from animal body organs are part of the supply of medicinal ingredients that have been widely used by society since ancient times (Unnikrishnan 1998 in Badge and Jain 2013). According to Costa-Neto (2005) in Afriyansyah et al. (2016), animals that are used as traditional medicine are usually dead animals. The animals that are used as traditional medicine, including meats, horns, bones, tails, feathers, nails, fat, bile, and shells. The animal products that can be used as traditional medicine are urine, feces, honey, and milk.

Utilization of mammals only is carried out by certain people who can hunt because not easy to hunt mammals. Mammals species that are used as medicine are nine species, including wild boar's bile (reducing asthma), porcupine's stomach (eliminating the fishy smell of blood in mothers who have given birth, as antibiotics, and cleansing body excrement), langur's meat (as antibiotics), monkey's meat (as an antibiotic), Pangolin's scales (treat all kinds of diseases), leopard's internal organs (tongue: treat heart and lung disease; bones: antibiotics; meat: anti-fever), grizzled monkey's meat (as antibiotics), meat of rat puppies (treat fever), Horsfield’s treeshrew's meat (diabetes that requires at least four tails, and treats fever).

Mammals species that are used for consumption are four species, including banded linsang, common palm civet, Indian hare, and Javan mouse deer. Those species are used because they have high selling value, including leopard and pangolin at IDR 1,700,000/kg. The species that are used as accessories include leopard tongue as a talisman and leopard tooth as a necklace. In the processing, most of them are carried out by burning for the species that are used as medicine or traded if the have excessive results.

Notes: +: present. 1. Tamanjaya Village, 2. Mekarjaya Village, 3. Ciemas Village, 4. Girimuki Village, 5. Mekarsakti Village, 6. Cibenda Village, 7. Mandrajaya Village, 8. Ciwarn Village. Ul: Utilization Intensity, VR: Very rare, M: Medium, VH: Very high, Co: Consumption, Mc: Medicine, Ac: Accessories, SV: Sale value. Utilization Form (Purwanto 2009, modified into categories for animal use): (i) Very High (VH): Including the species of animals that are used in everyday life, usually regularly every day in fulfilling the needs of life. (ii) High (H): Including the species of animals used in everyday life, used regularly daily, seasonally, or periodically. (iii) Medium (M): Regular use of animal species but at certain times, for example, seasonal uses. Usually, these species are used as medicine or traded if the have excessive results. (iv) Low (L): Covering the species that are rarely used and have no influence on people’s daily lives. (v) Very Rare (VR): The intensity of its use, including the species of animals that are very minimal or very rarely used in everyday life.
understand that Pangolin’s scales have a high economic value, and the hunting activities started to change its purpose from self-consumption to commercial. Scale price could be as high as IDR 100,000/kg, while living Pangolin could reach IDR 200,000-250,000/kg. Pangolin hunter sold at the average price of IDR 300,000/kg in Sukabumi and Cianjur Regencies (Withaningsih et al. 2018). 

Local people in Cisokan also hunted porcupine as if the expel a pest. Some of them kill it and make it a meal (Mustikasari et al. 2019). In Malaysia, porcupine meat was popular as an alternative meat product in the domestic market. Half of Malaysian urban consumers acknowledged that porcupine meat can be eaten (kadali) and has high nutritional values (Norsuhana et al. 2012). In Singapore, bexoars of porcupine are the most popular and it can be one of the main causes of overhunting (Chung et al. 2016).

Based on a study conducted by Partasasmita et al. (2016) regarding leopard utilization, Girimukti Village uses leopards as a medicine for skin diseases by applying leopard ash from the burning to the skin and recovering so that the community knows that leopards have benefits as antibiotics. The hunting of leopards is not because of the needs as a medicine, but the leopard has been disrupting the community by preying on livestock. As a result of leopard hunting, some people collect skins and mustaches in 2013 as private collections. In addition, several body parts that are utilized as bone have a selling value of IDR 250,000/kg and use as medicines, teeth for amulets, nails as accessories for necklaces decorated with gold, liver, and bile as antibiotics, the brain to cure lungs and heart diseases, heart to cure asthma, and skin has a high selling value, costing IDR 2,500,000 to IDR 6,000,000 as a talisman or home decoration, and a tongue for IDR 1,000,000 as a talisman.

Nine species of Herpetofauna also used as medicine including cicak pohon’s meat and cicak rumah (fever medicine), meat in kadali langit, kadal pohon, kadal tanah, and geckos (medicine for skin diseases such as eczema, scabies, and ringworm), kodok raya’s meat (medicine for asthma), bile in ular kobra belang and ular kobra pohon (medicine for all kinds of diseases). Not everyone can consume reptiles or amphibians and only be done by certain people who can hunt especially snakes and are not easy to hunt snakes because they are considered dangerous. The processing of Herpetofauna to be consumption is carried out by burning.

Utilization of species in each village

Based on Table 1 that animal utilization by respondents (94 respondents) in Ciletuh Geopark, Ciemus Subdistrict, Sukabumi is dominated by freshwater fishes in several villages, such as local catfish (Clarias sp.), Common carp (Cyprinus carpio), the Mozambique tilapia (Oreochromis mossambicus), and spotted barb (Barbodes binotatus). The utilization of these freshwater fishes is mostly done because it is easy to obtain, besides that the river as the location for catching the fish is near the settlement. The use of these fishes is carried out to fill spare time and protein needs for the family.

The dominant species are used by respondents, including local catfish used by nine respondents, common carp, the Mozambique tilapia, and spotted barb with each utilized by six respondents. Although marine fish, mollusks, and crustaceans are used every day with a large number of species, freshwater fish are more often used by many people in the Ciemus Subdistrict. This is because only a small number of the people who work as fishermen in Ciemus Subdistrict, not all people can take the time to sail to the sea, and the operational costs of the ship are quite expensive. Unlike fishing in the river that can be done near the settlement and at any time without paying a fee.

Most people in Ciemus Subdistrict do not use mammals, Herpetofauna, insects, and Avifauna because most of the land use in Ciemus Subdistrict was dominated by rice fields, swidden cultivation, and plantations. This certainly affects the livelihoods of the community dominated as farmers and seldom people who use species from the forest, so there is no local knowledge about the utilization of species, especially species from the forest. People don’t go to the forest because their needs have been fulfilled by the existence of the traditional market if they want to buy cooking fuel, health centers if they are sick and rarely use traditional materials. Because of these modernization factors, people’s knowledge of natural use will be lost over time. Besides, there are still easier options for using other species, such as poultry.

Indigenous ethnicities around the world believe that ingredients derived from animals can cure diseases without the need to prove them from scientific aspects. Jain et al. (2009) in Zubaida et al. (2012) states that every tribe or tribal community has extensive knowledge about drugs derived from nature, especially drugs derived from animals and plants.

According to Afryansyah et al. (2016) that the use of animals for drugs and food ingredients. These animals include goats, cows, eels, the striped snakehead, domestic chickens and catfishes. This is also stated by Ferreira et al. (2009) regarding local perception in Dinoyo Malang Village that Iguana iguana (common iguana), Bos taurus (cow), Gallus domesticus (chicken) are animals that can be used as food. This indicates that the importance of biodiversity as sources of treatment and nutritional products.

Comparison of previous study results

Several species found both through direct encounters and interview studies on biodiversity studies by the University of Padjadjaran in 2017 in Ciemus Subdistrict. The number of species based on interviews by UNPAD (2017) unpublished, compare with this study on animal utilization, including four species of avifauna and eight species of mammals. The number of species found directly, including 28 species of avifauna, nine species of mammals, three species of Herpetofauna, three freshwater fish, and two species of marine fish. In a study conducted by Ramadhani (2018) unpublished, examined the knowledge of the Avifauna found 39 species in Girimukti Village based on local knowledge and 15 species were found directly. Information on the existence of a number of these species is carried out to fill spare time and protein needs for the family.
species is known to have a function in the use of both consumption and non-consumption which was explained in this study.

As explained by Ramadhani (2018) unpublished, based on interviews with poachers, the extinct species of Avifauna as many as two species but they have been used, including green junglefowl (Gallus varius) and rhinoceros hornbill (Buceros rhinoceros), while eight species of Avifauna are rarely found, including red junglefowl (Gallus gallus), red-breasted parakeet (Psittacula alexandri), purple heron (Ardea purpurea), white-breasted kingfisher (Halcyon smyrnensis), Asian pied starling (Gracupica contra), breast malkoha (Chalcophaps indica), and Javan banded pitta (Hydrornis guajana). Besides, the utilization of Avifauna has been decreased because of community regulations regarding the prohibition of hunting avifauna, especially in Girimuki Village.

Herpetofauna species found a few numbers because some local names cannot be identified until Latin naming, so it cannot be compared with other studies. Direct encounters with freshwater and marine fish, insects, and crustaceans are few, due to studies by UNPAD (2017) unpublished, tend to focus on Avifauna, Mammalia, and Herpetofauna. This direct encounter shows that the species used by the Ciemas Subdistrict community are found in nature.

Knowledge resources on species utilization

Sources of the communities knowledge about animals utilization can be seen in Figure 2. Sources of local knowledge about the use of animals can be seen in Figure 2. The highest source of knowledge is obtained from personal, such as freshwater fish that can be consumed. Sources of knowledge about the use of mammals, insects, Avifauna, and Herpetofauna are obtained from the knowledge of parents who are passed on to the next generation. Sources of knowledge about the use of marine fish, mollusks, and crustaceans are obtained from neighbors, even though there is a knowledge of the use of them from parents. Others, N/A (not available) are people who don't utilize the fauna species.

Local knowledge derived by parents is relatively small compared to the knowledge that comes from personal/own experience. This certainly affects the loss of important knowledge about traditional animal knowledge from generation to generation. According to Zulkarnain and Franto (2014) in Afryansyah et al. (2016) on the study of ethnic Lom in Bangka that Lom ethnic knowledge is derived from parenting, exchanging ideas with community members, and the results of their own experiences. This means that this knowledge is only delivered orally from generation to generation in the community concerned, so that knowledge will be threatened with extinction.

Figure 2. Sources of knowledge about animals utilization in Ciemas Subdistrict, Sukabumi, West Java

In conclusion, the community of Ciemas Subdistrict uses 153 species, consisting 58 species of Avifauna, 13 species of mammals, nine species of herpetofauna, three species of insects, 16 species of freshwater fish, 43 species of marine fish, two species of mollusks, and nine species of crustacean. Utilization of fauna species in Ciletuh Geopark, Ciemas Subdistrict is not distributed in each village. Animal using of Avifauna, herpetofauna, insects, and mammals tends to be used by people of Girimuki Village. Marine fish, mollusks, and crustacean tend to be utilized by people of Ciwaru Village, while freshwater fish tend to be used in each village, except Girimuki and Cibenda Village. Utilization of fauna species in Ciemas Subdistrict has begun to be abandoned, although several people still use them.

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