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Human-Leopard Conflict in Girimukti Village, Sukabumi, Indonesia

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Abstract. *Partasasmita R, Shanida SS, Iskandar J, Megantara EN, Husodo T, Malone N. 2016. Human-Leopard Conflict in Girimukti Village, Sukabumi, Indonesia. Biodiversitas 17: 783-790.* Populations of leopards continue to decrease over time. This decline is caused by many factors, such as decreasing animal prey and habitat loss. Due to a lack of animal prey, leopards frequently enter villages to find food, including livestock. Therefore, some conflicts between human-leopard have frequently occurred, and in many cases the leopard has been hunted by the villager. Consequently, the abundance of leopard in some areas of West Java have decreased. The aim of this research is to investigate: (i) local knowledge of the Girimukti Village on morphological variation of leopard; (ii) conflict between leopard and the people of Girimukti Village based on local knowledge; (iii) local knowledge on the hunting of leopard; and (iv) utilization of leopard resulting from human-leopard conflict in Girimukti Village, Sukabumi, West Java, Indonesia. Mixed methods and field observation were applied in this study. The result of this study shows that the village people of Girimukti recognize variations of leopard and their behavior; conflict between humans and leopard has increased; hunting leopard is been undertaken by both traps and shotgun; and leopard are used for various purposes, such as trading skin and other body parts, food, traditional medicines, and as amulets. Based on this study, it can be inferred that many drivers of environmental changes that impact faunal and floral communities are social in origin and strongly related with peoples' activities. As a result, in addition to biological properties, the social, economic and political systems must be considered and integrated into the conservation program of Javan leopards.

Keywords: Girimukti Village, human-leopard conflict, leopard

INTRODUCTION

Human social systems, which consist of populations, technologies, social structure, knowledge, value and economic factors are closely interrelated with ecosystem components such as soil, water, climate, flora and fauna (Iskandar 2014). The ecosystem provides services by mobilizing materials, energy and information for the social system to meet various needs of people. Information, in this case, refers to any signs or indicators about the past, present or future state of individual components of an ecosystem, or to the system as a whole. Various information is received, processed, analyzed, and selected to shape appropriate responses to the environmental information that continually flows into the organism's receptors (Rambo 1984; Marten 2001). With regard to human ecology, local people's environmental information is culturally transmitted from the older to the younger generations as local knowledge or indigenous knowledge. Unlike Western scientific knowledge, local knowledge is predominantly communicated by oral transmission using the local or mother language and teaching through holistic, subjective, and experiential practices (Warren et al. 1995; Sillitoe 2002).

On the basis the local knowledge, the villagers of West Java recognize three races of big cats, namely *macan loreng*, *macan tutul*, and *macan kumbang*. However, based on the biological taxonomy, the diversity of big cats is categorized as two species - tigers (*Panthera tigris)* and leopard (*Panthera pardus)* (Iskandar 2014). Historically, tigers *(macam loreng)* in Java and Bali had two sub-species: *Panthera tigris sondaica* in Java and *Panthera tigris balica* in Bali. However, the Bali tiger was recorded as extinct before the middle of the twentieth century, and the Javan tiger is also determined to be extinct since the 1980s (Whitten et al. 1999). Leopards (*Panthera pardus)* are widely recognized by the local people as comprising two varieties based on dominant coloration with spotted variety being referred to as *macan tutul* and the black morph referred to as *macan kumbang*.

Javan leopards are identified as an identity species of West Java based on decree of the governor of West Java No.27 year 2005, as a form of conservation for this animal. The current population of Javan leopard has been estimated at 700 individuals within the conservation areas in Java (Santiapillai and Ramono 1992). The Javan leopard relative density value based a previous survey conducted at Bodogol, Gunung Gede-Pangrango National Park is one individual per 6 km^2 (Ario 2006), and at Mount Salak is one individual per 6.5 km^2 (Ario 2007). The density value at Gunung Halimun National Park is approximately one individual per 6.67 km^2, based on the primary and secondary forest categorization (Syahrial dan Sakaguchi, 2003). However, Javan leopard populations have recently

decreased in certain areas of Java has been estimated in 2010 between 491-546 individuals (Ario 2010). The factors implicated in the declining leopard populations are illegal hunting, decreasing diversity of prey species, and habitat conversion. Although the leopard had been protected by Indonesian law based on law no.5 of 1990 and listed as Appendix 1 of CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora), this animal continues to be illegally hunted (cf. Noerdjito and Maryanto 2001; Suhartono and Mardiastuti 2003; Iskandar 2015). Captured Javan leopard are usually sold in the illegal live animal trade, but some people have also consume leopard meat due to the belief that it has medicinal properties (Larisha et al. 2015). Another factor disturbing the Javan leopard population in nature is the loss of leopard habitat throughout West Java due to the conversion of forested areas into agricultural systems. Finally, the various species that leopard predate upon, such as wild boar and deer have decreased due to illegal hunting by rural communities (Iskandar 2014).

Because the natural balance system related to Javan panther life has been disturbed, namely due to illegal hunting, decreasing prey diversity, and decreasing or loss of forest habitats, the remaining Javan leopards have, particularly in the dry season, frequently sought feed in areas of human settlement. They have usually killed domesticated animals including dogs, sheep and calves. As a result, human-leopard conflict is increasing, particularly if individual animals have entered settlements to kill the various domestic animals of the villagers (Iskandar 2014). For example, in 2001, there was only one recorded case of human-leopard conflict, but in 2011 the number increased to 16 cases (Dipa 2016).

Because populations of Javan leopard are declining and human-leopard conflicts have increased, understanding the local knowledge of Javan leopards is considered very important. As such, this study, undertaken in the village of Girimukti, District of Sukabumi, West Java, documents local knowledge of Javan leopards and conflicts between village people and the focal animal. Additionally, this study has practical implications for the conservation program for Javan leopards. Specifically, the aims of this research are: (i) study the local knowledge of villagers with respect to the Javan leopard; (ii) study the local knowledge of hunting Javan leopards within the Girimukti village, Sukabumi; and (iii) study on the utilization of Javan leopards as related to the causes of conflict between village people and Javan leopard in the focal village.

MATERIALS AND METHODS

Study area

The study was carried out within the village of Girimukti, Sub-district of Ciemas, District of Sukabumi, in the province of West Java, Indonesia (Figure 1). The hamlets of Cingaleng and Cipicung were selected for this study. These hamlets were chosen based on their location close to forests occupied by Javan leopards and a known history of conflicts between Javan leopards and village people.

Procedures

The mixed methods approach used in this study is based on the disciplines of ethnoecology and ethnobiology and their tradition of combining qualitative and quantitative data collection techniques (Newing et al. 2011; Iskandar 2012; Albuquerque et al. 2014). Ethnoecology is defined as the study of how different cultural groups conceptualize the environment, including fauna and flora (cf. Lovelace 1984; Rambo and Percy 1984). Similarly, ethnobiology investigates dynamic human-nature systems through the incorporation of diverse perspectives. The qualitative research components were carried out by field observation and in-depth, semi-structured interviews with informants and local experts. In-depth interviews were completed with competent informants, and sampling across a variety of village members was conducted by snowball techniques. Some informants were intentionally selected namely, formal and informal leaders (*Kades* and staff), village elders (*sesepuh*), animal hunters (*pemburu binatang*), shamans (*dukun*), and animal traders (*pedagang binatang*). Additional field observations were conducted to observe the general condition of settlements, agricultural systems, and forests. In addition, dedicated field observations were undertaken to observe the presence of Javan leopards through the identification of footprints or tracks, prey animal carcasses,, scratches on the trees, and feces.

Quantitative methods comprised structured interview with respondents using questionnaires. Respondents were selected by *proportional random sampling*. Two of the five total hamlets were chosen within the Girimukti Village based upon their location close to forested Javan leopard habitat. Total households were randomly selected using statistical formula of Lynch et al. (1974) as described below:

$$n = \frac{N.Z^2.P.(1-P)}{N.d^2 + Z^2 (1-P),}$$

Where,
n= sample number (respondent) = 84 households
N = total population of households= 645
Z=normal variable value (1.96)
P=largest possible proportion (0.50)
d=error (0.10)

On the basis of statistical formula calculating, a total of 84 households were randomly sampled as respondent. Moreover, structure interviews were undertaken to each head of the household or respondent using questionnaire (cf. Newing et al. 2011; Iskandar 2012).

Data analysis

Qualitative data were analyzed mainly by cross-checking, summarizing, synthesizing, and descriptive characterization (cf. Newing et al. 2011). While quantitative data were analyzed using descriptive statistics, such as percentages of respondents' answers.

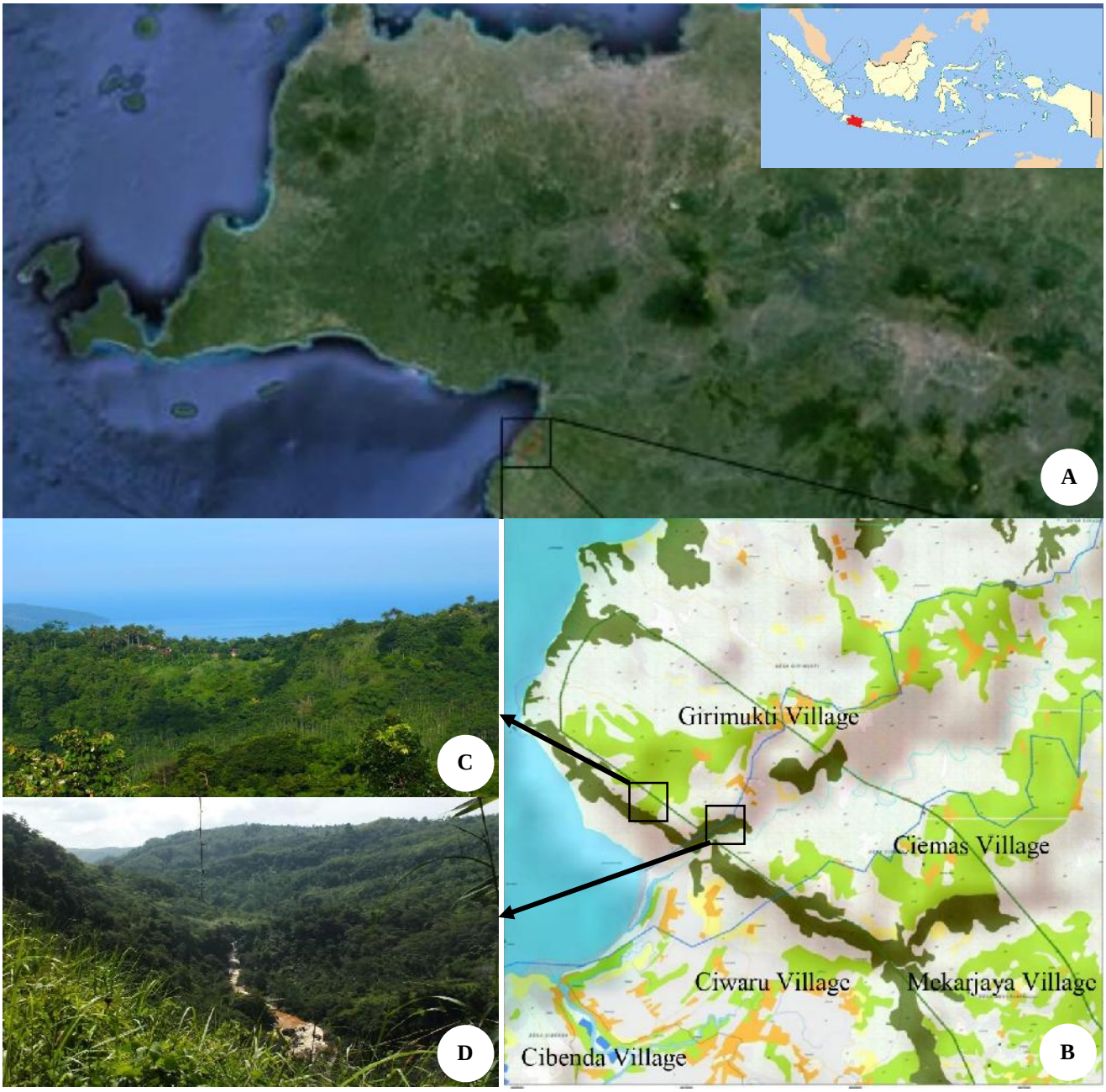

Figure 1. Location of Study Area in Girimukti Village (7° 8'54.01"S, 106°29'58.75"T), Sub-district of Ciemas, District of Sukabumi, Province of West Java, Indonesia. A. Research location; B. Map of sub-district of Ciemas; C. Leopard habitat in Balewer Hamlet; D. Cimarinjung and Dogdog waterfall of leopard habitat in Girimukti Village

RESULTS AND DISCUSSION

Local name of Javan leopard

Javan leopard is called locally by people of village of Girimukti as *selang* or *meong*. According to informants, it has been given name the *selang* to demonstrate both respect and fear of this animal. There are three named variants of Javan leopard namely *meong totol*, *sancang manik*, and *macan kumbang*. *Meong totol* is described as has having a distinct skin color pattern without dense spots, while *sancang manik* has distinctly dense spots with grey color with a short mane. *Macan kumbang*, as it is known more commonly, has black hair. The local perception of village people (emic view) on the variants of Javan leopard is different from that of Western, biological taxonomy (ethic view). For example, according Paripurno dan Raharyono (2001) all variations of this animal represents diversity within a single species, while based on van der Zon (1979) the Javan leopard is biologically classified as a single species (*Panthera pardus* Linnaeus 1758, Family Felidae) with sub-specific distinctions (Cuvier 1809) dispersed throughout Java.

On basis of informant perceptions, it can be inferred that local people of Girimurti, Sukabumi, West Java, has

well recognized animal, in this case Javan leopard, in level species and subspecies or variant in terms of biological classification. This result is similar to that has been revealed by other scholars, such as Diamond and Bishop (2000) and Iskandar et al. (2016) that generally local people are well known animals in level species (specific) and variants (varietal) instead of upper levels, such as folk genus and lifeform based on general principles of folk biological classification as presented in the work of Berlin et al. (1973) and Berlin (1992).

Characteristic of Javan leopard

Javan leopards, with respect to skin coloration, have a distinct pattern of spotted flowers (*rosette*). According to informants, and based on their experiences of hunting Javan leopard, the Javan leopard can be readily identified as either male or female based on the form of its feces. The feces form of male Javan leopard is intact, whilst conversely, the feces form of Javan leopard females is mushy, not smoothly shaped, and unevenly dispersed. These differences in the form of feces are caused by differences in how Javan leopards defecate and urinate. The defecation habit of female animals usually coincides with urination. The typical evacuation of urine by male animals is by forward projection of the urine stream. As a result, male feces are form a dry, smooth deposit due to not being mixed with urine.

In addition to the form of feces, the footprint is said to identify the sex and body weight of the Javan leopard. The footprint of male has a single, large rounded bulge with both nail and tread markings on the ground. The footprint of female animal is a wider smaller bulge with triangular form and the absence of distinct nail impressions.

In addition, age determination of Javan leopard can be identified by the characteristics of the animal's hair and nails. Adult Javan leopard have a small body, big feet, large nail projection, larger footprints, and blackish canine tooth color in the middle. Individual juvenile Javan leopard is more proportionate between the size of body and its feet, and pure white coloration of the canine teeth.

Generally, animal hunters active in the surrounding forest have a thorough understanding of the characteristics of individual Javan leopard they have caught and encountered. Because the village people who reside near to the forest have given various local names to the Javan leopard, it can inferred that they reliable observers of these animals. The Javan leopard classification is mainly based on morphological characteristics (Paripurno and Raharyono 2001), while the folk classification is based on a more diverse set of criteria, including behavioral characteristics and feces form between male and female animals. Indeed, as mentioned by Maffi (2004), local knowledge of the environment often proves to be more in-depth than scientific knowledge, and points the value of local knowledge for environmental conservation.

Conflict between Javan leopard and the village people of Girimukti

On the basis of ecological history, the Javan leopard initially began entering into the human settlements of Girimukti Village in 1960's and has continued to do so until the present time (2016). It was noted that the occurrence of Javan leopards entering into the human settlement most frequently occurred in the year 2013. This was confirmed by the recorded killing of many livestock animals by the Javan leopard at that time. Livestock, such as sheep, have usually grazed in close proximity to forest, a location slightly distant from the area of permanent human settlement. The village people consider that grazing livestock in a location far from the village results in increased security against livestock theft by other people.

One of the main factors related to the entering of Javan leopard into human settlement areas is the decreasing extent of forested areas. Many forests located to close to human settlements have been converted to agricultural areas through a process of forest cutting and forest burning. As result, the Javan leopards have frequently entered into the human settlements. Indeed, the destruction of forests in this manner has occurred for generations, and as a result, it has seriously affected both the Javan leopard and its prey animals, including primates and ungulate animals (with the exception of wild boar). According to respondents, Javan leopards have entered human settlements because of hunger (6%), to find livestock (36%), due to the loss of forest (15%), and for unknown reasons (43%). Moreover, based on the respondents, leopards have entered into settlements with the following frequency: one time per year (31%), three times per year (3%), only sometimes (14%), and never entering settlement (52%). Generally, the most respondents (84%) did not know the ecological role of Javan leopards in nature (forest), while others identified them as hunters of wild boar (11%), and consumers of livestock of (5%).

Hunting Javan leopard has been considered as a form of revenge by the village people and express a desire to decrease the population this animal because this animal has frequently entered the human settlements and killed livestock. In a period of six years (2010-2016), there were 14 individuals that were captured as a result of human-leopard conflict. Additional, there were five individuals that were captured, but we didn't know precisely when the conflict happened. For three years (2011-2013) people in Pasir Muncang have been hunting Javan leopard with gun or *bedil*. On the basis of the conflict between Javan leopard and local people of Pasir Muncang encountered at least one individual Javan leopard was captured by hunters in the condition of live.

Techniques of hunting Javan leopard

The hunting Javan leopard is typically carried out if there is evidence that the animal has killed livestock from the village of Girimukti. For the villagers, any animal, including wild boar, that disrupts their economic wellbeing will be killed. However, if there is a Javan leopard has just visited the human settlement without killing livestock, the leopard will not be killed by the village people.

Various techniques are used to hunt Javan leopards. First, the hunters look for the presence of the Javan leopard in the forest using the indicators of footprints or direct visual contact with the animal. This search is important for

estimating the size of Javan leopard. As a result, appropriate traps which are called *bakukung* can be prepared. After the Javan leopard has been located and the size known, the hunters leave the forest and conduct a meeting with community members to make *bakukung*. The *bakukung* is usually made by five people. It is typically made of bamboo due to this material being both durable and easily obtained. The bamboo is tied with the rope from either *kioray* (*sambiloto* plant) or *dolo* (*secang* wood tree). *Bakukung* has a length of between 4-5 meters with a width of 30 cm so that the Javan leopard cannot freely move and remain turned facing backward away from the door of the *bakukung*. The door of the *bakukung* must be heavy so it is difficult to be opened by the Javan leopard.

Moreover, a bait comprising white chicken and the remaining carcass of livestock that was eaten by the Javan leopard is put inside of the *bakukung.* The white chicken is usually used because it can be easily seen by Javan leopard at night. The bait is tied or connected to the door *bakukung* with rope and supported by a twig. As a result, if the Javan leopard enters and eats bait, the door of the *bakukung* will close and subsequently trap the Javan leopard. While inside the *bakukung* a Javan leopard will continuously roar in the presence of people. As a result, a blanket that smells of human sweat is used to cover the *bakukung* in order to silence the leopard. If the village people cannot restrain the leopard long enough inside the *bakukung*, then the animal will be killed by a shotgun (*bedil*).

If Javan leopard is to be evacuated to a rehabilitation center, then the animal is transferred from a *bakukung* made of bamboo to *bakungung* made of iron that is provided by the government authority. The transfer is completed by attaching the iron *bakukung* to the mouth of bamboo *bakukung.* Without removing the blanket cover, the Javan leopard will enter into the iron *bakukung*.

If the Javan leopard hunter will not use a *bakukung*, then a hunter from Girimukti will usually perform a traditional ritual. The hunt is to be done three days after the birthday of the hunter. In addition, some traditional prohibitions or taboos are applied to people who want to hunt the Javan leopard. For example, they are not allowed to use fragrances, to tell to anybody that they want to hunt the Javan leopard, to tell 'dead' (*paeh*), 'successfully caugh' (*beunang*).

While still at home, the hunter begins by conducting prayers to various gods prayers are directed to Brahma, as well as the god of wind (*dewa angin*), the god of water (*dewa air*), the god of trees (*dewa pohon*), and the god of sea (*dewa laut*) in order to ask permission to hunt a Javan leopard. After that, he takes a bath at midnight and prays again. At this point the, hunter enters the forest. On the basis of their tradition, they go to forest to hunt Javan leopard are not allowed to bring fish or shrimp paste (*terasi*) due to the animal can smell such goods and attract to come to the hunters and may be dangerous situation for the hunters. The hunter is not accompanied by a dog due to the potential to be killed by the Javan leopard. The hunter, however, has brought a shot gun, but not allowed to bring a machete (*golok*) to forest. The cutting trees have not been approved by god of trees (*dewa pohon*). After he has been in the forest, the hunter must undress and conduct prayers facing in an eastward direction. The prayers are directed to *Nabi Sulaeman* who keeps animals on earth. Thus, traditionally the local people to hunt the Javan leopard has been strongly embedded by cosmos or belief and traditional ecological knowledge (cf. Toledo 2002). However, today the traditional believe and traditional local knowledge of local people has dramatically changed due to influence of various socio-economic and cultural changes, including formal education, technological and market economic development (cf. Carlson and Maffi 2004).

In 2011, seven individual sheep were killed and eaten by Javan leopard. As a result, the village people made *bakukung* that is a kind of beat made of leftover beef has been eaten by the Javan leopard and is mixed with poison. The *bakukung* was placed in the same place when the Javan leopard had killed and eaten sheep. Generally the local people believe that Javan leopard always returns to that place for eating the rest of the sheep meat. After one night of waiting, a single Javan leopard individual was trapped by the *bakukung* and killed with a gun. The Javan leopard that was killed weighed approximately 45 kilograms, and was burned and consumed by some of the village's young people. Between 40 and 50 people report to having tasted Javan leopard meat. In addition, in 2012 one Javan leopard was hunted by the village due to having killed livestock. Hunting Javan leopard is predominantly undertaken by the village people due to an increased demand for animal skin and other valuable body parts. For example, one skin complete with the head and feet was sold 600,000 rupiah. Another case, in 2013 one individual Javan leopard was killed by the village people in Puncak Darma of Girimukti village.

In 2014, one perspon from Pasir Muncang found a footprint of a leopard in front of his neighbor's house. The footprint was bigger than the typical domesticated cat footprint. However, at that time there was no news about missing livestock due to leopard predation. In 2015 there was a case about a sheep that had been eaten by a leopard, but the villagers were unsuccessful in catching the leopard even after using the traditional trap, or *bakukung*.

Another case of killing a Javan leopard was recorded in 2014. We know that one leopard comes from Tonjong Forest in Ciangsana and has been evacuated by the authorities like people from the Center for Conservation of Natural Resources of West Java (BBKSDA-Jabar), Cikananga Wildlife Center (CWS), Indonesian Safari Park (TSI), and with the help of Perbakin (Indonesian Shooter Community). This leopard was evacuated to Cisarua Safari Park in Bogor. Another evacuation happened in July 2014. They found one leopard that comes from Balewer Village forest. This leopard is evacuated to CWS, Sukabumi. On the basis of the conflict between the Javan leopard and the village people, only two individuals have been successfully evacuated by the government authority because it has difficulty being managed by the government, while the village people are hesitant to keep the leopard in the *bakukung* for an extended time period.

From media reports there was news about two Javan leopard that had been caught in Girimukti. One leopard came from Ciangsana and was caught on 12 October 2013.

The sex of the leopard was male, and its age is approximately 7-8 years old with 50 kg body weight. This leopard was evacuated to Bogor Safari Park. Another leopard was caught in Balewer after eating eight sheep from a villager's ranch. After they caught the leopard they gave it to BBKSDA-Jabar, and then they evacuated it to CWS Sukabumi. This sex of that leopard was male with an age of about ten years old (RadarSukabumi.com 2014).

Another case happened in Cikeueus. In this instance there was three individual leopards that were killed. One individual was killed in 2014, and we don't know when specifically the other two deaths occurred. In yet another case, three individual Javan leopards were killed in 2012, and prior to that villagers of Margamukti/Balewer also killed two individual animals. Other than that, in June 2015, in forest near Margamukti/Balewer, a leopard was shot and killed. Additionally, two individual Javan leopards were killed in Pasir Salam hamlet and killed in 2010. Finally, one individual Javan leopard in Cibuti was killed in 1980.

Not all the people in the village of Girimukti village have a gun (*bedil*) to kill Javan leopard. Another alternative which can be used to kill this animal is the poison cyanide. This poison has been obtained from people working the gold mines in Ciletuh, Sukabumi. The cyanide poison is usually inserted into bait. Once the leopard has consumed the poison bait, it typically travels some distance from the site of consumption. As such, the village people generally unable to locate the animal after eating the poison bait. Between October 2015 and March 2016, two individual Javan leopards were killed due to the consumption of cyanide poisoned bait.

On the basis of the information of informants, in the last decades many individuals of Javan leopard have frequently entered into the human settlements and created continuous conflict between the Javan leopard and village people. For example, in February 2015, one of village people encountered an adult male Javan leopard in *Curug Dogdog*, Jembatan Cimarinjung. Nearby, a cave was found that was used as a habitat for this animal. Previously, in 2014, other villagers found the footprint of a Javan leopard in the front of cave which indicated that the animal had been present in this location. At the same year (2014) one of the village people of Pasir Muncang village found the footprint of the Javan leopard in the front of a villagers house. This footprint has a larger size compared to that of domestic cat. At that time, however, it has not been reported the livestock which are eaten by this animal. One year later, in June 2015, one adult Javan leopard was located in the forest near to Margamukti/Balewer hamlet.

Since 1960s, village people of Girimukti have directly or not directly encountered Javan leopard based on dead and live animals caught by *bakukung*. Only one individual Javan leopard identified as *macan kumbang* has been killed in this way. Until the present time, no village people have encountered *macan kumbang* within the forest near the village of Girimukti.

Almost half of the human-leopard encounters have happened during the rainy season (Table 1). This fact is consistent with the information from interviews that leopards often come to the village during the rainy season because they can't smell the leopard, and the leopards movements are less detectable during the rainy season. In the dry season, the sound of leopard footsteps is easily heard because of the dry leaves thereby making the leopard easily detectable. Also, in the dry season, leopards won't travel as far and may avoid hot places. Another cause of human-leopard encounters is also the movement of leopard prey, especially wild boar. In the rainy season, increased activity around villagers' farms attract wild boar. Frequent foraging by wild boar often damages or destroys. Gunawan (2014) states that leopards increase activity patterns in the rainy season because of increased prey activity and abundance. As we see from the movement of the wild boar in the dry season, the villagers alter farm activity so the wild boar won't enter the village. However, villagers increase activity near the river because of its comfort and suitability. This matches obtained information that suggested leopard won't go near the village during the dry season. Instead, they won't go far from the core area of their range and focus a lot of activity in watery areas such as those nearest to the river.

In addition, another case of killing Javan leopard was recorded in 2014. At that time two individual animals were hunted by the villagers. One individual leopard inhabited the forest of Tonyong Balewer and the other leopard came from the forest adjacent to Balewer hamlet. Both individuals have been evacuated by stakeholders, the BBKSDA-Jabar and TSI, and assisted by the Perbakin. One of the hunted Javan leopard individuals has been rehabilitated in the CWS, while the other one has been sent to TSI.

Table 1. Ecological history of encounter Javan leopard and humans at Girimukti village, Sukabumi, West Java, Indonesia

Year	Season/ Month	Location (hamlets/rivers)	Number of ind.	Condition of the animal
2010	-	Pasir Salam	2	Dead
2011	-	Pasir Muncang	1	Dead
2012	-	Balewer	2	Dead
2012	-	Pasir Muncang	1	Dead
2012	-	Cikeueus	1	Dead
2013	-	Pasir Muncang	1	Dead
2013	October	Ciangsana	1	Live
2014	July	Balewer	1	Live
2014	Wet season	Pasir Muncang	1	Live (footprint)
2015	-	Dogdog river-Cimarinjung bridge	1	Live
2015	January	Pasir Muncang	1	Live
2015	Juny	Balewer	1	Live
2015/2016	Oct-Mar	Cingaleng	2	Dead
-	-	Cikeueus	2	Dead
-	-	Cisaar	1	Dead

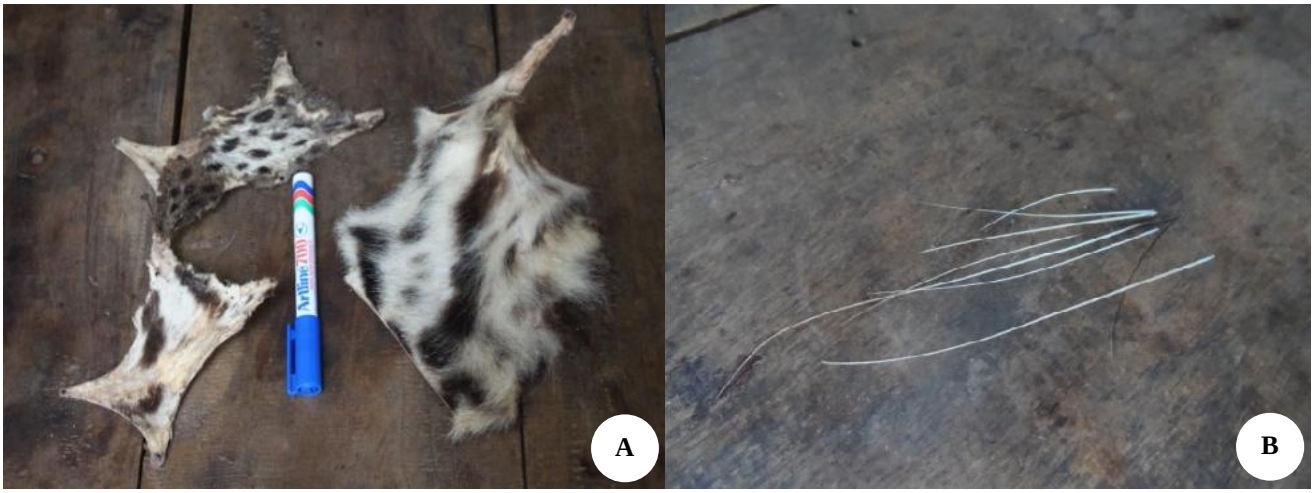

Figure 2. Skins (A) and facial hairs (B) of a Javan leopard hunted in 2013

Utilization of Javan leopard

It is historically known that a villager's sheep was killed by a Javan leopard in 1964. The resulting anger resulted in the Javan leopard being killed and burned by the villagers. In addition, some village people used the ash of the burned animal as traditional medicine. The ash was rubbed onto diseased skin, and the disease was cured. Since that time, the village people have believed that the skin of Javan leopard holds medicinal benefits with antibiotic properties. The purpose of hunting the Javan leopard, however, is mainly the result of having entered into a human settlement to predate upon livestock and not motive by obtaining animal parts for traditional medicine (Figure 2).

Contrastingly**,** Javan leopard hunters of Girimukti village have also been known to trade various parts of these captured animals. Additionally, their meat is freely distributed to people both the within the village of Girimukti and also to people outside of the village. According to some informants, the meat of Javan leopard has a spicy taste causes sweating. In addition, there are some parts of a Javan leopard's body, such as its bone, has been sold for 250,000 rupiah/kg for traditional medicinal purposes. Indeed, according to Negi and Veerendra (2007), the meat of Javan leopard is believed to enhance the strength and virility of men, and its bone can be used as an aphrodisiac. The ash of burnt Javan leopard hair can also be used as a treatment of foot and mouth disease.

In addition, the teeth of Javan leopard have traditionally been used by the village people as an amulet. As a result, nails of Javan leopard are usually decorated with gold and worn as a necklace. Additionally, the liver and bile are used as an antibiotic medicine, the brain for lung and heart disease, and the heart for treatment of asthma. The skin of Javan leopards have been sold for as much as 2.5-6 million rupiah which can be used for amulet and home decoration. In addition, the tongue of a Javan leopard can be sold for about 1 million rupiah. To process the tongue, it is inserted into wood and dried with in an upright position. For the religious leaders (*kiyayi*), the tongue of Javan leopard is wrapped in a cloth containing Arabic writing for an amulet that is called as *ajimah*.

Based on this study, it can be inferred that many drivers of environmental changes, including those impacting fauna and flora, are social derived and strongly related with human activities. As a result, in addition to biological properties, the social, economic and political systems must be considered and integrated into the conservation program of Javan leopards.

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