

## Semi-Commercial and Traditional Hunting of Baar Tribe in Riung, Flores, East Nusa Tenggara

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### ABSTRACT

Hunting is one of the aspects that influence number of wild animals. The article aims at describing semi-commercial and traditional hunting concept of Baar Tribe in East Nusa Tenggara as an alternative for wild animal conservation. The data collection methods are guided interview, in-depth interview and participant observation. The findings show that in the semi-commercial and traditional hunting concept of Baar Tribe in East Nusa Tenggara, traditional wisdom is represented by hunting techniques and equipments. It is likely that rapid semi-commercial hunting conducted by certain members of Baar tribe causes sharp decline in the population of wild animals. On the other hand, annual traditional hunting which strictly follows traditional code of conduct can maintain Timor deer population in Timor.

Keywords : hunting, semi-commercial, traditional, population, Timor deer

### INTRODUCTION \*

Hunting has had important role throughout human civilization. At the beginning of human population, people hunted for survival. However, the role of hunting has shifted from food to economic purpose or recreation [1]. Human being hunt for a number of different reasons, for example indigenous, traditional, subsistent hunting [2], hunting for meat and supporting rural household economy [3,4], and hunting for sports or recreational purpose [5].

Indigenous or traditional hunting tradition such as one in Papua [6,7,8,9] and Kalimantan [10,11] is passed from generations to generations. There is very little information related to traditional hunting tradition in East Nusa Tenggara. It is quite surprising since East Nusa Tenggara people more particularly Baar Tribe also has their indigenous hunting tradition. Baar tribe hunting tradition is conducted once a year at the end of dry season. Baar tribe consider the tradition as one means to control timor deer population.

Baar tribe is a small ethnic group in the northern part of Flores Island. Most of them live in villages called Sambinasi and Sambinasi Barat of which location is in Riung, Ngada, East Nusa

Tenggara. There are vast information about major tribes in East Nusa Tenggara such as Helong, Dawan, Tetun, Rote, Sabu, Sumba, Manggarai, Ende Lio, and Ngada [12]. However, information related to Baar tribe is pretty limited. Baar tribe is mixture between local tribes from Sulawesi and Bima. Baar tribe consists of several smaller ethnic groups namely Maki, Rungang, Baluk, Lokon, Sari, Nio, Pau, Medeng, Lindang, Tado, Wue, Bajo, Tado, Selayar, and some other smaller ethnic groups. In other words, Baar tribe unifies those smaller ethnic groups.

Hunting tradition of Baar tribe is different from that of other ethnic groups in Indonesia such as the ethnic groups in Papua and Kalimantan. Baar tribe hunt based on the historical background of their ancestors. Besides traditional hunting, there is another type of hunting concept that is individual semi-commercial hunting. There has yet been any literature about the semi-commercial hunting, but there are literature related to hunting for subsistent [2,6,8,9] and commercial purpose [13]. To analyze implication of traditional and semi-commercial hunting towards wildlife population, an analysis should be conducted to describe the types of hunting.

Purpose of the study is to elaborate individual semi-commercial hunting and traditional hunting of Baar tribe as an alternative for wildlife conservation. It is expected that the findings of the study provide an overview about sustainable harvesting and eventually support the

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government programs related to wildlife conservation.

## **METHODOLOGY**

### **Time and Setting of the Study**

The setting of the study is an area called Tanjung Torong Padang and neighboring villages namely Sambinasi and Sambinasi Barat, which administratively belong to Riung, Ngada, East Nusa Tenggara. The study lasted for three months between August 2014 and October 2014.

### **Materials and Instrument**

The main object of the study is Baar tribe living in villages called Sambinasi and Sambinasi Barat who carry out both traditional and semi-commercial hunting. The data are obtained using questionnaire, stationary, recording device and documentation device.

### **Data Collection and Analysis**

The study was conducted in two stages. The first is guided interview using questionnaire where some Baar tribe became the respondents and in-depth interview with the prominent figures of the tribe. The last stage was participant observation on the traditional hunting conducted in Tanjung Torong Padang [14]. The method used is descriptive method and the technique was case-study [8].

The respondents were 15% of the total household (232 households) or 35 households, locals living in Damu and Ruki which are located in Sambinasi village and Marotauk located in Sambinasi Barat village. From the 35 households, the researchers (i) identified which household that carried out traditional hunting until these days; it was found out that 22 households still did and (ii) identified which households that carried out both traditional and semi-commercial hunting; there were 3 households that did both of them.

On the first stage of the study, the researchers interviewed 35 respondents who had been selected previously. Guided interview was conducted based on the questionnaire prepared previously. To gain more accurate information, the researchers classified the result of the interview by interviewing 10 key informants (prominent figures of Baar tribe, hunters and prominent figures in the society). The second stage was participant observation where the researchers participated in the traditional hunting tradition conducted in Tanjung Torong Padang in order to classify some data related to

type and purpose of hunting, hunted animals, hunting location, hunting season as well as hunting techniques and hunting equipment. The data are then put into tables and analyzed descriptively.

## **FINDINGS AND DISCUSSIONS**

### **Hunting Purpose and Hunter**

Wildlife hunting carried out by Baar tribe in Sambinasi and Sambinasi Barat villages, Riung, Ngada, East Nusa Tenggara consists of two types, semi-commercial and traditional hunting. Semi-commercial hunting which is carried out by some members of the tribe aims at providing meat for household consumption and selling remaining meat, if any, to the villages or Riung or Bajawa, the capital of Ngada. On the other hand, traditional hunting of Baar tribe is known as "*Malang Onto*" (*malang* means hunting; and *onto* means area where the traditional hunting is carried out), since the traditional hunting can only be conducted in the particular *onto*. Those two types of hunting are different in terms of hunter, hunting technique and equipment, time and hunting seasons, hunted animals and hunting location.

Semi-commercial hunting is carried out by one or two people similar to what local people in Papua do [9]. There are only three semi-commercial hunters among Baar people; these people live in Marotauk. Semi-commercial hunting are their moonlighting that can help their family's economy [4,3]. At the opposite, one hundred and four people participated in the traditional hunting on September, 2014. Not only do the Baar people become the hunters, but they also become the hosts since they invite people from neighboring villages or people from other tribes who are fond of hunting.

Baar tribe semi-commercial and traditional hunting also have different motivates. The goal of the semi-commercial hunting is to provide meat for the household or to earn some money, just like the hunting concept of local people in Papua [8]. On the other hand, Baar tribe carry out their traditional hunting tradition to preserve their culture and customs, maintain relationship among members of the tribe as well as personal reason such as pride, especially when one can successfully catch many timor deers and strength or masculinity.

Baar people's motive for hunting changes from time to time. Based on the result of in-depth interview to the prominent figure of Baar tribe, in 1960s Baar people hunted to carry out

their tradition and practice their hunting skills. Some hunters rode horses and competed to catch one timor deer. Whoever caught the Timor deer became the winner and he would be famous among his tribe. Things have changed recently. Nowadays, Baar people hunt to preserve their culture and maintain relationship among the tribe members.

### Series of Hunting Events

Based on the series of events, semi-commercial hunting is a lot simpler than traditional hunting. Semi-commercial hunting begins when hunters go hunting for several days and return home with animals they catch or empty-handed. The traditional hunting consists of series of events, namely pre-hunting rituals, a three-day hunting and dividing the catch evenly. Pre-hunting ritual is commonly conducted by various ethnic groups that carry out traditional hunting as their tradition.



Picture 1. The second “Pintu Manuk” ceremony at Maroraja

Baar people traditional hunting begins with “Pintu Manuk” ceremony. “Pintu Manuk” ceremony is conducted to ask for blessing and protection from God using their ancestors as medium. It is also conducted in order that the hunters get abundant catch and come home safely. The ceremony is conducted twice. The first is conducted in the village and the second is conducted in Maroraja, the place where the traditional hunting begins (Picture 1). Both “Pintu Manuk” ceremonies are ended by slaughtering chicken and checking its liver and intestines. When both the liver and intestines are clean, the traditional hunting will be successful and God will protect all of the hunters. However, when there is dirt in the liver or the intestines, the traditional hunting will fail and misfortune will occur. A *tuang adak* from Maki tribe descent should lead the “Pintu Manuk” ceremony. Based on Baar

tribe history, Maki tribe descent is the one responsible for traditional hunting process. After the ceremony in Maroraja, the following procedure is to set up nets in Tanjung Torong Padang and on the following day, at dawn, the traditional hunting begins and it is symbolized by releasing dogs that helps tracking the catch.

On the first day, the hunters hunt in the east part of Tanjung Torong Padang such as the area called Poka Bendera, Kero Timus, Marorezo, Nelo, until Wae Nepong. On the second day, the hunters go to the west heading to Wae Nepong. The third day is the last hunting day or *sepa tumba* (the last hunt) as Baar people call it. The literal meaning of *sepa tumba* is to keep *tumba* on the attic, which represents the last hunt.

There are some traditional rules applied in Tanjung Torong Padang that all of the hunters should obey. They are: 1) whoever steals timor deer during the traditional hunting process (the timor deer is not taken to the basecamp in Maroraja), he will be fined one goat and 15 kilograms of rice; 2) during the traditional ceremony, one person (he should be off Maki tribe descent) should be tied until the hunters can successfully catch an animal regardless what type of animal being caught; 3) when the hunters come to an encounter with komodo dragon (*Varanus komodoensis*), they should not do any harm to the animal; 4) when the hunters come to an encounter with stripped timor deer (the tribe believe that stripped timor deer is the king of all timor deers), the traditional hunting process should end because they will not get any catch; 5) all hunters should obey the traditional regulations; otherwise it will fail and someone may get injured; and 6) if a person goes hunting outside the traditional hunting time, he will get an accident and be fined one goat and 15 kilograms of rice.

The first timor deer caught should be taken to the village and given to the head of the tribe (Baar people call the head of the tribe *Dor*). The meat is used to feed guests coming for *larik/caci* ceremony. When the hunters can catch another timor deer, the meat should be divided; the one who caught the timor deer will get half of the meat and the remaining will be given to other hunters. The hunters who kill the timor deer get the timor deer head and five ribs that lead to the head. The timor deer back, thighs (front and hind), lower ribs, stomach and liver are given to anyone participating in the traditional hunting.

The final stage of the timor deer traditional hunting in Tanjung Torong Padang is to divide the

timor deer meat. Some people are responsible for butchering the timor deer and another person is responsible for finding out how many people participate in the hunting. One representative from each group submits twigs of which total represents total members of the group. The meat and bones that have been cut into smaller pieces are distributed to everyone participated in the hunting regardless their ages. People will get the meat based on how much contribution they have during the traditional hunting, for example dogs owners or those who have hunting equipment will get more meat compared to other participants.

#### **Hunted Animals**

Generally, the hunters are opportunistic which means they will catch whatever animals they can [15]. In West Papua, typical hunted animals are wildhog, timor deer and bird [16]. Besides those animals, other types of catch in Papua are wallaby, bandicoot, fitch, cassowary, goura, crocodile and turtle [9]. Iban tribe in Kalimantan prefer hunting wildhog or large-sized timor deer [11]. Hunters in India hunt 114 species of mammals, more particularly large-sized mammals [17]. Due to their religion, Baar people hunt for timor deer. When they catch wildhog, they will sell the meat or give it to their non Moslem relatives living in Riung or Bajawa, the capital of Ngada and be given rice, betle nut, coffee or sugar in return.

Semi-commercial and traditional hunters catch different types of animals. Semi-commercial hunters catch timor deer and also porcupine while traditional hunters only catch timor deer.

#### **Hunting Location**

Semi-commercial and traditional hunters have different hunting ground. Baar tribe have specific hunting ground for their traditional hunting tradition namely Tanjung Torong Padang or *Tana Pirong Onto*. The local people in Papua also have specific hunting location. Each ethnic group or family has their own hunting location and therefore, they have an authority to prevent other people from hunting in their hunting ground [9]. According to Baar tribe, *Tana Pirong* is forbidden location; it is used as hunting ground only. Therefore, other activities such as farming and building house in the area are strictly forbidden. Semi-commercial hunters go to other areas for hunting such as in the forest or old village located on the south of their villages. They

may not go hunting in Tanjung Torong Padang. The hunters can go hunting in the conservation areas or an area near their residence [18].

#### **Time and Hunting Season**

Semi-commercial and traditional hunting are conducted in different time. Semi-commercial hunters go hunting everytime they want to have meat or when someone from Bajawa wants to buy meat from them. They go hunting for two or three days in the forest. They hunt every one or two months depend upon buyers in Riung or Bajawa. On the other hand, Baar tribe participate in the traditional hunting as one of the events in *larik (caci)* ceremony. The ceremony is conducted right before cropping season. The local people in Papua go hunting as religious and cultural rituals [9]. During *larik (caci)* ceremony, Baar people as the host invite other people such as the government and common people and as the consequence, they have to provide large amount of food for the guests.

Baar tribe traditional hunting takes place at the end of hot season between September and November. The birthing season for timor deer in Nusa Tenggara takes place in September [19], so the tradition occurs on either October or November to prevent female, pregnant timor deer being caught. In other words, Baar people allows the timor deer to breed naturally [9].

The traditional hunting lasts for three days. After three days, the hunters should stop although they cannot catch anything. Semi-commercial hunters go hunting individually in the afternoon or at night while the traditional hunters start hunting from 4 or 5 a.m. to 5 p.m.. In the evening, they rest and prepare themselves to go hunting the following days.

#### **Hunting Technique and Equipment**

Semi-commercial and traditional hunting requires different technique. The traditional hunting begins by burning down the savannah in Tanjung Torong Padang one month prior to the traditional hunting tradition begins. The savannah are burned down to increase hunting efficiency [20]. Semi-commercial hunters do not burn down anything.

Semi-commercial and traditional hunters use different hunting equipment. Semi-commercial hunters use net, blade, spear and dogs. The traditional hunters use net, spear, harpoon, *banso*, blade, dogs and horses. The local people in Papua use spear, bow, arrows, traos and dogs

while going hunting. They also mimic animal sound and other hunting techniques [8].

Some hunting techniques Baar tribe have been using are:

1. Riding Horse while Hunting

There are two hunting equipments Baar people use when they ride horse and go hunting; they are spear and net. The hunters will chase timor deer down, try to kill the timor deer using the spear and catch the timor deer using the net. Baar people once used a lot of horses while hunting but nowadays only some people ride horses while hunting. Baar people raise horses and sell them when they need some money to build or repair their houses and send their children to school.

2. Net, dogs and spear/ harpoon as hunting equipment

In the past, Baar people made their nets from roots of the plants they found in the forest and so do the local people in Papua [9]. Nowadays, Baar people use wire, sling and finally wire made of motorcycle tires to make their net. A hunter uses 10 to 40 nets for hunting. Well-experienced hunters know where to put the nets. A hunter can also claim in which locations he will put his nets and other hunters cannot put their nets in the same location unless the hunter does not participate in the year's hunting tradition.

Once all nets have been installed, the dogs will chase the timor deers so that they go out of the forest or bushes where they hide. The more dogs join the hunting process, the more likely it is to catch timor deer because the timor deers are afraid of the dog's bark. The timor deers will walk out from the forest and be caught in one of the nets. Nowadays, Baar people use fewer dogs for hunting due to their religion. Moslem people do not usually keep dogs as their pets. As the result, dog population in the area keeps decreasing and fewer dogs join the hunting process.

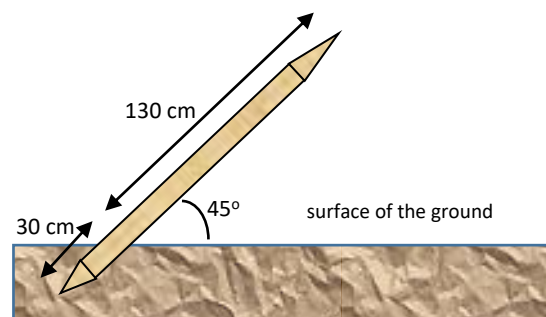


Picture 2. Spear and Harpoon, equipment used during traditional hunting process

The hunters who put the nets usually carry spear or harpoon (Picture 2), so that they can immediately stab and slaughter the timor deer. An iron blade is tied at on one end of the harpoon. The blade is then tied to a wood pole of which diameter is 2 centimeters and diameter is 2 meters.

3. Going Hunting using *banso*

*Banso* is one of the hunting equipments used by the ancestor of Baar people. *Banso* is made of bamboo that is cut into several pieces. *Banso* is three centimeter wide and 160 centimeter long. Both ends of the bamboo piece are then sharpened. *Banso* is installed in places where timor deer tracks are found or around the bush (valley). One-third part of is planted into the ground with slightly tilted position and covered with plants so that the timor deer cannot see it (Picture 3). Starting from the 1980s, the hunters did not use the equipment any longer because it may hurt the horses or the hunters.



Picture 3. Banso, one of the traditional equipments for timor deer hunting

4. Hunting Spells

Baar people ancestors considered traditional hunting as means of competition to determine who the best hunters were. Each

hunters spelled certain cast that helped him catching more animals. There was also spell that prevented other hunters from catching animals. However, Baar people have stopped these practices for a while.

Baar people have still believed whoever has "*sekur wakar*" can attract hunted animals. *Sekur wakar* is the mixture of red ginger, particular roots and oil. It is stored in small bottle. *Sekur wakar* should be carried during the entire hunting process so that the hunters will catch some timor deer. There is spell to be reiterated at the beginning of the hunting process that is "*Fuki bozot lae bozot, paka mai seni aku, bismillah*". The spell is casted when the nets are set and the dogs are released. Next, the "*sekur wakar*" is poured on the nets and the dogs.

### **Sustainable Hunting Consequence**

Using conventional hunting equipment and applying traditional techniques in the semi-commercial and traditional timor deer hunting have become the tradition of Baar people. Such attitude and principles are based on local knowledge through continuous socialization and internalization passed from one generation to another [21]. Baar people do not use modern hunting equipment during the traditional hunting because they believe conventional equipment and traditional techniques help preserving population of timor deer. Similar practice is implemented by Maybrat tribe in South Sorong Papua. Their hunting equipment, location and catch give positive contribution towards wildlife preservation.

Baar people understand that timor deer is near extinct animals. Traditional hunting has become their tradition from generation to generation. Baar people believe they have helped the government protecting Jacan deer population because the traditional hunting takes place annually. Another method that helps Timor deer preservation is the implementation of the traditional regulation in Tanjung Torong Padang. The regulations said that only certain people who can go hunting in Tanjung Torong Padang. When someone violated the rules, some misfortune will happen to him.

Semi-commercial hunters from the tribe go hunting every one or two months. Semi-commercial hunting may cause rapid decrease in wildlife population. Baar people believe their annual traditional hunting allows timor deers to breed. Napan people from Cendrawasih Bay also

go hunting on particular season only to preserve wildlife habitat [9]. Furthermore, Baar people believe that their annual traditional hunting increases deer population in their area. Deer population depends on habitat, migration and hunting intensity [22]. Not only does the traditional hunting keep the tribe's tradition, but it also maintain wildlife reservation and their habitat [23]. However whenever wildlife population decreases sharply, regulations that limit numbers of catch should be implemented. Hunters should also find out estimated deer population in order to determine how many deer they are allowed to catch, hunting time, duration and intensity [24]. Another alternative is to carry out joint-forest management program that facilitates wildlife preservation; but the program has negative contribution towards the hunter's income [25].

Baar people believe that deer population will increase due to their annual traditional hunting. The fact is still debatable. History has shown that massive hunting may decline wildlife population [26]. Wildlife utilization by human has implication towards wildlife population and condition [7]. Local people's activities during the traditional hunting represent conservation ethics that is to maintain the balance of wildlife population. Overpopulation results in several negative impacts because animals will fight over food.

It is indicated that neither semi-commercial nor traditional hunters pay attention towards hunting time/ season to get maximum sustained yield [27] and to prevent compensatory mortality [28]. Further research should be conducted to describe the most appropriate hunting time/ season so that hunters can achieve maximum sustainable yield and prevent compensatory mortality.

### **CONCLUSION**

Based on the findings, the semi-commercial and traditional hunting are different in terms of hunting purpose, hunters, hunting technique, hunting equipment, hunting time, hunting season, hunting process and hunted animals. Semi-commercial does not have any limitation in terms of hunting intensity and numbers of animals being caught which may potentially decrease wildlife population. On the other hand, the traditional hunting takes place only in Tanjung Torong Padang once a year and there are particular traditional regulations all hunters

should follow. These will maintain timor deer population and habitats.

## REFERENCES

- [1] Morrison, M. L., B. G. Marcot, and R. W. Mannan. 2006. Wildlife-Habitat Relationships, Concepts and Applications, Third Edit. Island Press. Washington. Covelo. London.
- [2] Altrichter, M. 2005. The sustainability of subsistence hunting of peccaries in the Argentine Chaco. *Biological Conservation* 126 (2005) : 351–362.
- [3] Hurtado-Gonzales, J.L. and R.E. Bodmer. 2004. Assessing the sustainability of brocket deer hunting in the Tamshiyacu-Tahuayo Communal Reserve, northeastern Peru. *Biological Conservation* : 116 : 1-7.
- [4] Nielsen, M.R. 2006. Importance, cause and effect of bushmeat hunting in the Udzungwa Mountains, Tanzania: Implications for community based wildlife management. *Biological Conservation* 128 (2006) : 509–516.
- [5] Fischer, A., V. Kerezi, B. Arroyo, M. Mateos-Delibes, D. Tadie, A. Lowassa, O. Krange, and K. Skogen. 2013. (De)legitimising hunting – Discourses over the morality of hunting in Europe and eastern Africa. *Land Use Policy* 32 : 261–270.
- [6] Pattiselanno, F. 2007. Perburuan Kuskus (Phalangeridae) oleh Masyarakat Napan di Pulau Ratewi, Nabire, Papua. *Biodiversitas* Volume 8, Nomor 4 Halaman: 274-278.
- [7] Pattiselanno, F. Dan J.F. Koibur. 2008. Cuscus (Phalangeridae) Hunting by Biak Ethnic Group in Surrounding North Biak Strict Nature Reserve, Papua. *HAYATI Journal of Biosciences* Vol. 15, No. 3. Halaman : 130-134.
- [8] Pattiselanno, F. dan G. Mentansan. 2010. Kearifan Tradisional Suku Maybrat dalam Perburuan Satwa Sebagai Penunjang Pelestarian Satwa. *Makara, Sosial Humaniora*, Vol. 14, No. 2, Desember 2010: 75-82.
- [9] Pattiselanno, F., J. Manusawai, A.Y.S. Arobaya, dan H. Manusawai. 2015. Pengelolaan dan Konservasi Satwa Berbasis Kearifan Tradisional di Papua. *Jurnal Manusia dan Lingkungan*, Vol. 22, No.1, Maret. 2015: 106-112.
- [10] Harrison, M.E., S.M. Cheyne, F. Darma, D.A. Ribowo, and S.H. Limin. 2011. Hunting of flying foxes and perception of disease risk in Indonesian Borneo. *Biological Conservation* 144 (2011) : 2441–2449.
- [11] Wadley, R.L., and C.J.P. Colfer. 2004. Sacred Forest, Hunting, and Conservation in West Kalimantan, Indonesia. *Human Ecology*, Vol. 32, No. 3, June 2004.
- [12] Badan Pusat Statistik. 2010. Kewarganegaraan, Suku Bangsa, Agama, dan Bahasa Sehari-hari Penduduk Indonesia. Retrieved on March 24, 2016 from <https://www.bps.go.id>.
- [13] Pattiselanno, F., B. Maryen, dan Y. Burako. 2013. Perburuan Rusa: Sumber Pendapatan Alternatif Masyarakat di Kepala Burung, Papua. *Warta Konservasi Lahan Basah*. Volume 21, No. 3, Juli 2013. *Wetlands International Indonesia*. Bogor.
- [14] Bungin, Burhan. 2012. Analisis Data Penelitian Kualitatif, Pemahaman Filosofis dan Metodologis ke Arah Penguasaan Model Aplikasi. Rajawali Pers – Divisi Buku Perguruan Tinggi PT RajaGrafindo Persada. Jakarta.
- [15] Wadley, R. L., Colfer, C. J. P., and Hood, I. G. 1997. Hunting primates and managing forests : The case of Iban forest farmers in West Kalimantan, Indonesia. *Human Ecology* 25: 243–271.
- [16] Pattiselanno, F. 2006. The Wildlife Hunting in Papua. *Biota* Vol. XI (I), Februari 2006.
- [17] Velho, N., K.K. Karanth, and W.F. Laurance. 2012. Hunting: A serious and understudied threat in India, a globally significant conservation region. *Biological Conservation* 148 (2012) : 210–215.
- [18] Naranjo, E.J., dan R.E. Bodmer. 2007. Source–sink systems and conservation of hunted ungulates in the Lacandon Forest, Mexico. *Biological Conservation* 138 (2007) : 412–420.
- [19] Takandjandji, M. dan E. Sutrisno. 2006. Teknik Penangkaran Rusa Timor (*Rusa timorensis timorensis*) di NTT. *Juknis. Aisuli Tahun* 2006. Badan Litbang Kehutanan – Balai Penelitian dan Pengembangan Kehutanan Bali dan Nusa Tenggara. Kupang.
- [20] Bird, D.W., R. B. Bird, and C. H. Parker. 2005. Aboriginal Burning Regimes and Hunting Strategies in Australia's Western Desert. *Human Ecology*, Vol. 33, No. 4, August 2005.
- [21] Sulaiman, R. Fauzi, A. Sodli, dan A.R. Dahlan. 2011. Menguak Makna Kearifan Lokal Pada Masyarakat Multikultural.

- Penerbit CV. Robar Bersama. Semarang.
- [22] Weckel, M. and R. F. Rockwell. 2013. Can controlled bow hunts reduce overabundant white-tailed deer populations in suburban ecosystems?. *Ecological Modelling* 250 (2013) : 143–154.
- [23] Constantino, P.d.L. 2015. Dynamics of hunting territories and prey distribution in Amazonian Indigenous Lands. *Applied Geography* 56 (2015) : 222-231.
- [24] Angulo, E. and R. Villafuerte. 2003. Modelling hunting strategies for the conservation of wild rabbit populations. *Biological Conservation* 115 (2003) 291–301.
- [25] Nielsen, M.R. dan T. Treue. 2012. Hunting for the Benefits of Joint Forest Management in the Eastern Afrotropical Biodiversity Hotspot: Effects on Bushmeat Hunters and Wildlife in the Udzungwa Mountains. *World Development* Vol. 40, No. 6, pp. 1224–1239.
- [26] Garfinkel, A.P., D. A. Young, and R. M. Yohe. 2010. Bighorn hunting, resource depression, and rock art in the Coso Range, eastern California: a computer simulation model. *Journal of Archaeological Science* 37 (2010) : 42–51.
- [27] Shaw, J.H. 1985. *Introduction to Wildlife Management*. McGraw-Hill Book Company. New York.
- [28] Peek, J. M. 1986. *A Review of Wildlife Management*. Englewood Cliffs, N.J.: Prentice-Hall.