

NGEBABALI AND ITS EXISTENCE IN ENVIRONMENTAL CONSERVATION PRACTICE IN WEST LAMPUNG SOCIETY

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ABSTRACT

Local knowledge and wisdom of people who live closely with biodiversity and forest ecosystems are usually manifested in traditional ceremonial traditions, myths, and other cultures. Some types of plants and animals are considered sacred and worshipped for particular needs, so they can be one of the efforts to protect biodiversity. However, in the development of information and technology, including the fragmented habitat of diverse biodiversity, the existence of these manifestations of human-nature relations needs to be questioned, such as the existence of the Ngababali tradition typical of Lampung Province. This study aims to identify the Ngababali traditional ceremony's existence and analyze its several conservation activities. The location of this research was in Pekon Kota Besi, Batu Brak District, West Lampung Regency, Lampung Province. This research has used a combination of virtual ethnographic methods and in-depth interviews with adults until the data is saturated. Research findings have shown that certain people still carry out Ngebabali in Pekon Kota Besi, which aims to ask God for prayer and protection after clearing land to construct houses and gardens. Although Ngebabali is a form of support for land clearing activities, in its implementation, several plant species are needed so that the availability of these species in a sustainable manner is required. In addition, there is also an obligation to replant previously existing plant species for those who carry it out. Thus, the existence of Ngebabali can indirectly preserve the variety of plant species used.

Key words: *ethnoecology, Lampung tradition, land clearing, local wisdom, Ngebabali*

INTRODUCTION

The relationship between humans and nature often manifests in several myths and local traditions. Individual values and beliefs collectively in developing an environment give birth to the traditional ecological knowledge (Richeri et al. 2013). This conception has conservation practices implications that are closely related to the protection of the natural environment; for example, there are species of plants and animals that are considered very sacred and worshipped (Sinha 1995; Gupta et al. 2014) and even sacred forests (Ormsby and Bhagwat 2010; Rim-Rukeh et al. 2013; Huang et al. 2020), so that it is protected by itself. Several fundamental principles in the Qur'an are also known to support and describe the role of humans in nature conservation (McKay et al. 2014). In certain ethnic groups and local communities in certain parts of the world, wildlife use is influenced by the religion adhered to (Costa et al. 2013; Novriyanti and Iswandaru 2020). Although it is difficult to state the significance of the impact of religion on attitudes toward biodiversity conservation, especially in wildlife (Bhatia et al. 2016), there are still people who do not hunt certain mammals for consumption because it is forbidden in Islam (Novriyanti and Iswandaru 2020), especially in Indonesia. This means local culture and people's beliefs born and attached to nature can help protect species. It is common for several conservation efforts of various protected species to require support

from the local community (Sidiyasa et al. 2005; Shrestha et al. 2010; von Rintelen et al. 2017; Batiran and Fisher 2020).

But the practice of using knowledge, which should go hand in hand with protecting or conserving nature, has yet to be widely reported scientifically. It is still being determined whether it reflects the theological attitude that might be regulated. At the same time, the concept of people's thinking which is the root of certain cultures in utilizing and managing natural resources has been passed down from generation to generation (Lohani et al. 2008; Gupta et al. 2014; Akande et al. 2019). One example is the manifestation of knowledge of natural materials; traditional construction techniques are helpful for the preservation of tree species used as local building materials (Kwanda 2010). Community wisdom in using wood species in traditional houses (Juwita et al. 2017; Febryano et al. 2021) can support the conservation of various species of these woody plants. Thus, biodiversity loss can be prevented. On the other hand, the erosion of ancestral and cultural heritage born of human-nature interactions can accelerate biodiversity loss. This happens because the preservation of cultural heritage values and nature conservation go hand in hand (Rachman 2012).

Lampung province is one of the provinces with a high rate of forest degradation. According to Global Forest Watch data, a primary forest in Indonesia

composed 93.8 Mha of Indonesia's total land area in 2001 or more than 50%. A loss of 203 kilo ha of the primary forest by 2021 will result in 157 million tonnes of CO₂ emissions. As much as 17.2 Kha of tropical primary forest were lost in Lampung between 2002 and 2021, accounting for 6.5% of the overall tree cover loss. In Lampung, the area of moist primary forest was reduced by 6.8% over this time (Global Forest Watch 2019a). If we refer to these data, the damage rate to biodiversity and its habitat in Lampung Province is also relatively high. This can also lead to the degradation of cultural diversity in Lampung Province. Preliminary social observation found in one area in Lampung Province, there is a tradition called *Ngebabali*, carried out in a traditional ceremony that is a sacred (Rakai and Hilal 2012). The *Ngebabali* traditional ceremony occurs when someone from the Lampung Tribe community clears forest land to cultivate crops or build a new residence.

Unfortunately, availability of scientific data regarding this traditional ceremony was not found. The current condition and decreasing forest area could lead to the extinction of one of Lampung's time-honored traditions. In addition, it can also be an indication of the decreasing local biodiversity. The community's existence with local wisdom values closely related to nature provides a positive value for the Indonesian people, at least protecting forest areas and nature conservation. On the other hand, it can also harm because the community cannot optimally provide protection (Larson et al. 2016; Walker and Weiler 2017; Puluhulawa and Harun 2020) if it is not accompanied by awareness. Considering that the practice of local wisdom that develops in the community is believed to be able to help with biodiversity conservation, it is necessary to conduct research that aims to assess the extent to which the preservation of flora and fauna and the environment is practiced by indigenous peoples through the *Ngebabali* traditional tradition as well as to review the relationship between their existence and land cover.

RESEARCH METHOD

This research was conducted in June-September 2021 in Pekon Kota Besi. The word *pekon* has the same meaning as the village. For the people of West Lampung, *Pekon Kota Besi* is also known as *Pekon Kuto Besi*. *Kota Besi Village* is administratively

located in Batu Brak District, West Lampung Regency (Figure 1). West Lampung is one of the regencies in Lampung Province, with 83.9% natural forest. Most of this administrative area is a national park area. The people of West Lampung have been known for a long time as a forest guard community, with their ability to manage nature (Lubis 1997). However, land degradation still occurs less severely than in urban areas. Over 20 years, West Lampung lost 39.2kha of tree cover, equivalent to an 8.3% decrease since 2000, and 26.6Mt of CO₂e emissions (Global Forest Watch 2019b).

This research is a combination of qualitative and quantitative. The research data consisted of the community's general knowledge of the concept of conservation and its practices, awareness to be involved in conservation, learning about the existence of *Ngebabali* in the area where they live (conditions of the activity, who is engaged, noble values), and their perceptions of the influence of local wisdom (*Ngebabali* tradition) to the environment. This data was collected using a combination of Virtual Ethnography interview techniques.

The virtual Ethnography (Hine 2000; Crichton and Kinash 2003; Angelone 2019) is a modification of the ethnographic method to understand the indigenous people's point of view and their relationships in everyday life. This method is also used in other research exploring strengths in integrating ecosystem restoration efforts (Wulandari et al. 2021). Like ethnography in general (Windiani and Nurul 2016), This research is also carried out in stages, starting from data collection to the study, where the study's end is determined entirely by the researcher (Berkes 1993; Novriyanti, Nursanti, et al. 2021).

The Virtual Ethnography technique was applied with a questionnaire instrument to find out initial information about the specific existence of *Ngebabali* in Lampung Province. The results of the observations were then continued to key informants who knew and were even directly involved in *Ngebabali* through in-depth interviews conducted now using an interview guide. Based on data saturation, ten informants fall into this category. The data obtained were then analyzed qualitatively and quantitatively. Data that has been grouped, sorted, analyzed, and presented descriptively. Qualitative data are grouped and reviewed according to the purpose of this study (Bungin 2008; Neuman 2014).

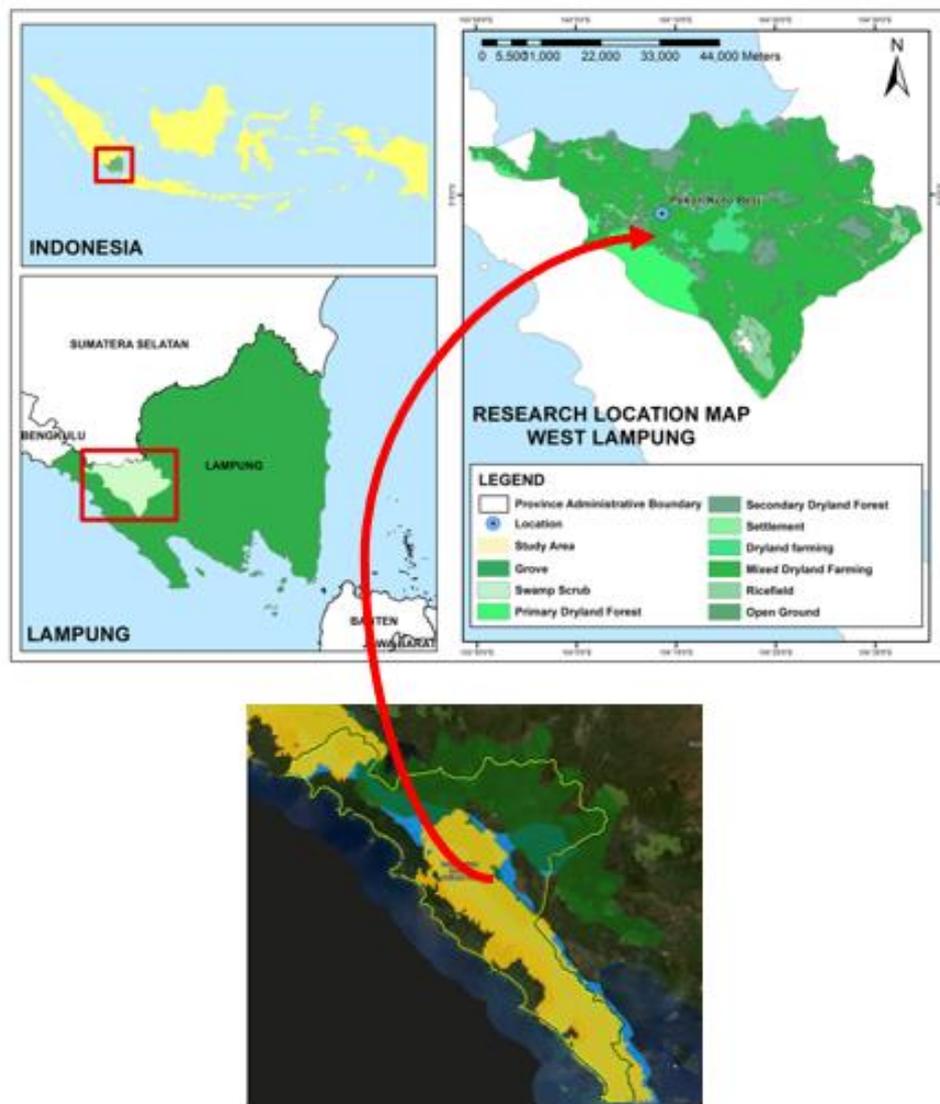


Figure 1. Tree Land Cover of Research location in Pekon Kota Besi is close to Bukit Barisan Selatan National Park in Lampung Barat Province (Source: Global Forest Watch Interactive Map)

RESULT AND DISCUSSION

1. The Existence of *Ngebabali* in Pekon Kota Besi Community

The cultural conditions of the people in Pekon Kota Besi are still strong. Almost all the people of Pekon Kota Besi have a piece of knowledge about any tradition in their beliefs. After primary interviews, community members are familiar with *Ngebabali* and recognize it as a tradition. *Ngebabali* is still thick amid the West Lampung people and spread over several regencies/cities in Lampung Province, not only in West Lampung. The *Ngebabali* tradition is known in several other districts, such as the West Pesisir, West Tulang

Bawang, and Tulang Bawang Regency. However, especially in Tulang Bawang Regency, *Ngebabali* is known as *Ruwah Bumei*. The language dialects between people in West Lampung and Tulang Bawang may influence the differences in names. But both *Ngebabali* and *Ruwah Bumei* are the same traditional activities.

The *Ngebabali* is a ceremonial ritual for opening new fields, clearing land for planting, and building new houses or residences. Still, it is sometimes used correctly to resist haunted places with an evil supernatural aura (Rakai and Hilal 2012). Not only for those purposes, but it turns out that *Ngebabali* also occurred for safety when having a new vehicle (Figure 2).

Based on Figure 2, the most frequent *Ngebabali* activities are building houses (45%) and clearing land for plantations (35%). Meanwhile, rituals for new vehicles are rarely done. This is because people's beliefs and behavior have changed over time, so trust in *Ngebabali* in buying cars begins to dwindle. Moreover, many youths need to be better acquainted with this *Ngebabali* tradition.

Although six out of 10 informants stated that they had been directly and actively involved in *Ngebabali* and participated in leading the formal event, the existence of *Ngebabali* is feared to be threatened because most of the people involved in this activity are elders. Moreover, in terms of education, only a few people with higher education still need to improve. Actors of the *Ngebabali* tradition are 80% at the Senior High School (SMA) level. The level of education is a factor that also influences people's knowledge. A good education can form positive behavior and awareness in a person. A proficient level of education affects a good mindset. The higher a person's level of education, the more knowledge they get. These people with a higher level of education are considered more aware and might positively influence *Ngebabali* on the environment and biodiversity. Things like this also

happen in many local traditional (Novriyanti et al. 2014; Wilder et al. 2016; Boedhihartono 2017; Joa et al. 2018; Novriyanti, Iswandaru, et al. 2021)

2. *Ngebabali* and Biodiversity Conservation

Almost all the people studied work as coffee plant farmers. The coffee plant has a canopy that acts as a permanent shade so that a layer of canopy strata is formed, which plays a vital role in reducing raindrop impact. Coffee plants can hold soil and water almost the same as forest plants, so coffee plants can also play a role in environmental conservation activities (Budidarsono and Wijaya 2004; Kessler et al. 2007; Hakim et al. 2019; Mertens et al. 2020; Campera et al. 2021).

The research findings show that the Pekon Kota Besi community still needs to understand conservation concepts well, including their relationship with *Ngebabali* activities (Figure 3). But the people have unconsciously conducted any conservation efforts. As many as 60% of the community studied became involved in conservation practices such as planting, using useful plants, farming, participating in routine cooperation activities, etc. These activities state that they cannot be separated from nature daily as farmers.

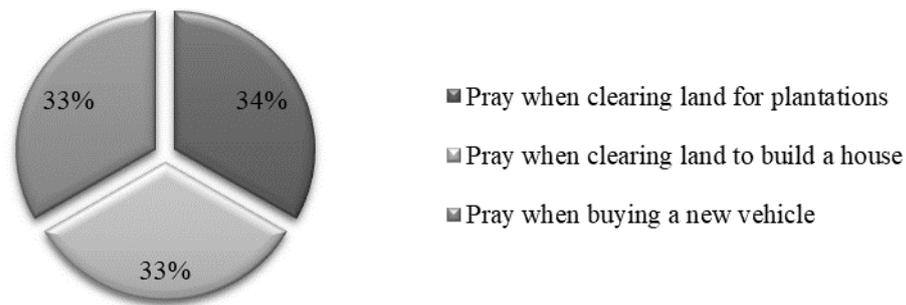


Figure 1 Forms of *Ngebabali* Traditional Activities.

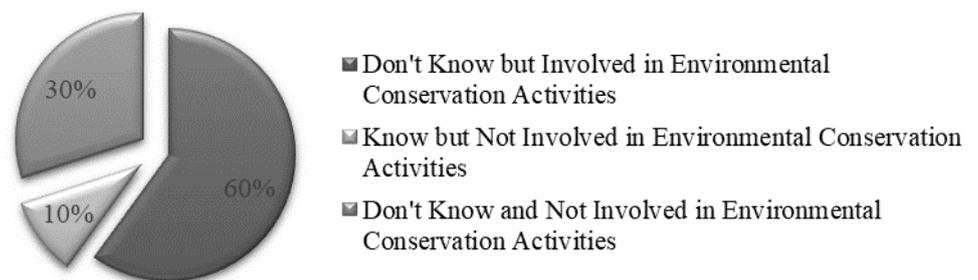


Figure 2. The level of community knowledge regarding the influence of the *Ngebabali* tradition on biodiversity and environmental conservation.

Generally, land clearing, which is converted into settlements, mining agriculture, plantations, and others (Ormsby and Bhagwat 2010; Gibson et al. 2011; Barber et al. 2014) considered to hurt the environment and cause deforestation that can cause forest land loss to threaten living things and the environment (Dinerstein et al. 2013; McKay et al. 2014). Several cases of land conversion play an essential role in the issue of biodiversity loss in the Indonesia (Novriyanti, Ihsan, et al. 2021; Novriyanti, Iswandaru, et al. 2021). Meanwhile, local wisdom manifests the community or society's behavior to coexist in the natural environment without destroying it. Local wisdom is a superior activity in specific neighborhoods; these advantages are not always tangible and material; often, it contains elements of belief or religion, customs, culture, or other valuable values such as health, agriculture, irrigation, etc. To maintain the integrity of the ecosystem, there is a need for harmony between natural resource utilization and conservation activities based on local wisdom.

The central perspective in *Ngebabali* is about the disturbance of supernatural beings after land clearing, which had been conducted because the forest is also considered their place, so it needs to be prayed for. This belief: praying solemnity to ask the Almighty for protection might prevent disturbances from invisible creatures. Although this activity was conducted to validate land clearing activities theologically,

Ngebabali can also be one of the pearls of local wisdom beneficial to the environment. Through *Ngebabali*, people can still take advantage of the environment and its biodiversity while maintaining it. The community uses 17 plant species in *Ngebabali* (Table 1). This act indicates that the community will protect the species important to their customs. Besides that, people's belief in *Ngebabali* as part of their obligatory religious rituals suggests that there must be consequences after land clearing.

In addition to praying after land clearing through the *Ngebabali* tradition, the community should plant trees to replace the cut trees inland clearing so the village would feel more comfortable, including cultivating the plants used (Table 1) in *Ngebabali* activities in their yard. And even though conducting *Ngebabali*, the community of West Lampung also has and continues to maintain the clan forest reserved to protect the local community life support system. The research also found that besides the *Ngebabali* tradition, *Ngumbai* is often held as a ritual. *Ngumbai* refers to the village's birthday celebration held every five years. At this event, the village/pekon community members prayed together in gratitude for having been given an abundant harvest. This all shows that traditions have personal, universal, and transcendental values that have been entrenched from generation to generation, which aim to protect the forests of the people of West Lampung.

Table 1. Identify the uses of plants in the *Ngebabali* Tradition

No.	Utilization of Plants	Plant Name	
		Local Name	Scientific Name
1	Served during the implementation of the <i>Ngebabali</i> tradition for a land clearing where the plant will be inserted into a hole in the land to be planted	1. Sweet potato	<i>Ipomoe batatas</i>
		2. Wild taro	<i>Colocasia esculenta</i>
		3. Cassumunar ginger	<i>Zingiber purpureum</i>
		4. Sugar cane	<i>Saccharum officinarum</i>
		5. Common rue	<i>Ruta graveolens</i>
		6. Black rice	<i>Oryza sativa</i> var. <i>glutinosa</i>
		7. Cassava	<i>Manihot esculenta</i>
		8. Betel palm	<i>Areca catechu</i>
		9. Turmeric	<i>Curcuma longa</i>
		10. Sweet flag	<i>Acorus calamus</i>
2	Coconut is served during the activity	Coconut palm	<i>Cocos nucifera</i>
3	Banana leaves are used as food wrappers which are served during traditional ceremonies	Wild banana	<i>Musa acuminata</i>
4	Made for plaiting as a container for tools and materials for carrying out traditions	Spiny bamboo	<i>Bambusa blumeana</i>
5	As a drink ingredient that will be served during the implementation of the tradition	Coffee	<i>Coffea arabica</i>
6	As a material used in the implementation of the tradition. The material is burned in a furnace which serves as a sign that the <i>Ngebabali</i> tradition is official and valid	1. Cultivated tobacco	<i>Nicotiana tabacum</i>
		2. Gum benjamin tree	<i>Styrax benzoine</i>
		3. Betel leaf	<i>Piper betle</i>

This conservation act is also found in the indigenous Mengkadai people who live by utilizing the *Hutan Adat Imbo Mengkadai* (HAIM). The Mengkadai community has rules for managing land with the aim of forest sustainability which is built based on village regulations: setting a minimum limit on the diameter of trees that can be cut, and after the wood is cut down, they are obliged to plant similar seeds as substitutes (Hidayat et al. 2014; Mahmudah et al. 2014). Protect and conserve nature is a perspective in this community

CONCLUSION

Ngebabali is one of the traditional traditions related to divinity and is still carried out in the West Lampung area in general. People offer prayers and protection from God after clearing land for gardening, houses, or buying a vehicle. In its implementation, the community still uses several plant species, including sweet potato, wild taro, cassava, betel pal, and others. Within the framework of biodiversity conservation, the existence of this tradition is relatively neutral for efforts to increase biodiversity because there are still efforts to replant (reforest) and cultivate essential plant species in the *Ngebabali* traditions.

REFERENCES

- Akande OA, Ahmad YA, Yusuf HO, Akinade TG. 2019. Assessment of Wildlife Conservation Awareness and practices in some selected secondary school around Kainji Lake National Park, Nigeria. *World Sci News*. 115(November 2018):91–103. www.worldscientificnews.com.
- Angelone L. 2019. Virtual Ethnography: The Post Possibilities of Not Being There. *Mid-Western Educ Res*. 31(3):275–295.
- Barber CP, Cochrane MA, Souza CM, Laurance WF. 2014. Roads, deforestation, and the mitigating effect of protected areas in the Amazon. *Biol Conserv*. 177:203–209. doi:<https://doi.org/10.1016/j.biocon.2014.07.004>. <https://www.sciencedirect.com/science/article/pii/S00632071400264X>.
- Batiran K, Fisher MR. 2020. From hunter to protector: The invention and reinvention of the Nuri Talud. *For Soc*. 4(1):35–47. doi:10.24259/fs.v4i1.7438.
- Berkes F. 1993. Traditional ecological knowledge in perspective. In: *Traditional ecological knowledge: Concepts and cases*. Vol. 1. Canadian Museum of Nature/International Development Research Centre, Ottawa.
- Bhatia S, Redpath SM, Suryawanshi K, Mishra C. 2016. The Relationship Between Religion and Attitudes Toward Large Carnivores in Northern India? *Hum Dimens Wildl*. 22(1):30–42. doi:10.1080/10871209.2016.1220034.
- as general theory as conservation is an effort to maintain what we have wisely, and ecologically conservation is an allocation of natural resources for now and in the future (Prosser et al. 2011; Costa et al. 2013; Ioki et al. 2019). Conservation efforts are actions/activities that aim to prevent the decline of biodiversity and environmental damage. Thus, various ecological conservation based on community measures is urgently needed (Danielsen et al. 2009; Singh and Dixit 2020).
- Boedhihartono AK. 2017. Can Community forests be compatible with biodiversity conservation in Indonesia? *Land*. 6(1):1–17. doi:10.3390/land6010021.
- Budidarsono S, Wijaya K. 2004. Praktek Konservasi dalam Budidaya Kopi Robusta Kerangka Analisis: Matrix Analisis Kebijakan. *Agrivita*. 26(1):107–117.
- Bungin B. 2008. *Metodologi Penelitian Kualitatif: Aktualisasi Metodologis ke Arah Ragam Varian Kontemporer*, PT Raja Grafindo Persada. 25.
- Campera M, Budiadi B, Adinda E, Ahmad N, Balestri M, Hedger K, Imron MA, Manson S, Nijman V, Nekaris KAI. 2021. Fostering a wildlife-friendly program for sustainable coffee farming: The case of small-holder farmers in Indonesia. *Land*. 10(2):1–16. doi:10.3390/land10020121.
- Costa S, Casanova C, Sousa C, Lee P. 2013. The Good, The Bad and The Ugly: Perceptions of Wildlife In Tombali(Guinea-Bissau, West Africa). *J Primatol*. 02(01):1–7. doi:10.4172/2167-6801.1000110.
- Crichton S, Kinash S. 2003. Virtual Ethnography: Interactive Interviewing Online as Method. *Can J Learn Technol / La Rev Can del'apprentissage la Technol*. 29(2).
- Danielsen F, Burgess ND, Balmford A, Donald PF, Funder M, Jones JPG, Alviola P, Balet DS, Blomley T, Brashares J, et al. 2009. Local participation in natural resource monitoring: A characterization of approaches. *Conserv Biol*. 23(1):31–42. doi:10.1111/j.1523-1739.2008.01063.x.
- Dinerstein E, Varma K, Wikramanayake E, Powell G, Lumpkin S, Naidoo R, Korchinsky M, Del Valle C, Lohani S, Seidensticker J, et al. 2013. Enhancing Conservation, Ecosystem Services, and Local Livelihoods through a Wildlife Premium Mechanism. *Conserv Biol*. 27(1):14–23. doi:10.1111/j.1523-1739.2012.01959.x.
- Febryano IG, Harum OMA, Wulandari C, Hidayat W, Banuwa IS, Prasetia H, Iswandar D, Novriyanti N, Duadji N, Tresiana N, et al. 2021. Raw material of Besemah traditional house construction in Indonesia. *Folia For Pol Ser A*. 63(1):74–80. doi:10.2478/ffp-2021-0008.
- Gibson L, Lee TM, Koh LP, Brook BW, Gardner TA, Barlow J, Peres CA, Bradshaw CJA, Laurance WF, Lovejoy TE, et al. 2011. Primary forests are

- doi:10.29244/medkon.26.1.9-16.
<https://journal.ipb.ac.id/index.php/konservasi/article/view/32239>.
- Novriyanti N, Masy'ud B, Bismark M. 2014. System and Ethnic Local Values in Wildlife Utilization of Rimba Tribe of Bukit Duabelas Jambi Province. *J Penelit Hutan dan Konserv Alam*. 11(3):299–313.
- Novriyanti N, Nursanti N, Wulan C. 2021. Short Communication: Do women have a piece of traditional knowledge on medicinal plants? A case study around Jambi Urban Forest, Indonesia. *Asian J Ethnobiol*. 4(2):115–120. doi:10.13057/asianjethnobiol/y040206.
- Ormsby AA, Bhagwat SA. 2010. Sacred forests of India: A strong tradition of community-based natural resource management. *Environ Conserv*. 37(3):320–326. doi:10.1017/S0376892910000561.
- Prosser CD, Bridgland DR, Brown EJ, Larwood JG. 2011. Geoconservation for science and society: Challenges and opportunities. *Proc Geol Assoc*. 122(3):337–342. doi:10.1016/j.pgeola.2011.01.007.
- Puluhulawa F, Harun AA. 2020. Developing collective awareness in providing local- based preservation of coastal area. 26(3):1012–1017.
- Rachman M. 2012. Konservasi Nilai dan Warisan Budaya. *Indones J Conserv*. 1(1):30–39.
- Rakai N, Hilal I. 2012. Tata Titi Adat Budaya Lampung. Biro Bina Sos Sekr Drh Provinsi Lampung.
- Richeri M, Cardoso MB, Ladio AH. 2013. Soluciones locales y flexibilidad en el conocimiento ecológico tradicional frente a procesos de cambio ambiental: Estudios de caso en Patagonia. *Ecol Austral*. 23(3):184–193. doi:10.25260/ea.13.23.3.0.1173.
- Rim-Rukeh A, Irerhievwie G, Agbozu IE. 2013. Traditional beliefs and conservation of natural resources: Evidences from selected communities in Delta State, Nigeria. *Int J Biodivers Conserv*. 5(7):426–432. doi:10.5897/IJBC2013.0576.
- von Rintelen K, Arida E, Häuser C. 2017. A review of biodiversity-related issues and challenges in megadiverse Indonesia and other Southeast Asian countries. *Res Ideas Outcomes*. 3:e20860. doi:10.3897/rio.3.e20860.
- Shrestha UB, Shrestha BB, Shrestha S. 2010. Biodiversity conservation in community forests of Nepal: Rhetoric and reality. *Int J Biodivers Conserv*. 2(5):98–104. <http://www.academicjournals.org/ijbc>.
- Sidiyasa K, Zakaria, Iwan R. 2005. Hutan Desa Setulang dan Sengayan Malina Kalimantan Timyr.
- Singh S, Dixit S. 2020. Diverse Role of Women for Natural Resource Management in India. *Asian J Agric Extension, Econ Sociol*. 38(i):27–32. doi:10.9734/ajaees/2020/v38i330320.
- Sinha RK. 1995. Biodiversity conservation through faith and tradition in India: Some case studies. *Int J Sustain Dev World Ecol*. 2(4):278–284. doi:10.1080/13504509509469908.
- Walker K, Weiler B. 2017. A new model for guide training and transformative outcomes: a case study in sustainable marine-wildlife ecotourism. *J Ecotourism*. 16(3):269–290. doi:10.1080/14724049.2016.1245736. <http://dx.doi.org/10.1080/14724049.2016.1245736>.
- Wilder BT, O'Meara C, Monti L, Nabhan GP. 2016. The Importance of Indigenous Knowledge in Curbing the Loss of Language and Biodiversity. *Bioscience*. 66(6):499–509. doi:10.1093/biosci/biw026.
- Windiani, Nurul F. 2016. Menggunakan metode etnografi dalam penelitian sosial. *Dimens J Sociol*. 9(2):87–92.
- Wulandari C, Novriyanti N, Iswandar D. 2021. Integrating ecological, social and policy aspects to develop peatland restoration strategies in orang kayo hitam forest park, jambi, indonesia. *Biodiversitas*. 22(10):4158–4168. doi:10.13057/biodiv/d221005.