Forest and Society
Vol. 8(1): 61-80, June 2024
doi: 10.24259/fs.v8i1.26593

REGULAR RESEARCH ARTICLE

Changing Livelihoods, Development, and Cultural Practices: Reshaping Forests Among the Tau Taa Vana People

Muhammad Alie Humaedi [1], Ibnu Nadzir [2, 3], Setiawan Khoirul Himmi [4], Sri Astutik [5], Adhis Tessa [6], and Rosita Novi Andari [1, *]

AFFILIATIONS

1. Research Center for Social Welfare, Villages, and Connectivity, National Research and Innovation Agency (BRIN), Jakarta, Indonesia
2. Research Center for Society and Culture, National Research and Innovation Agency (BRIN), Jakarta, Indonesia
3. University College London (UCL), London, United Kingdom
4. Research Center for Applied Zoology, National Research and Innovation Agency (BRIN), Jakarta, Indonesia
5. Doctoral Student of Tropical Forestry, TU Dresden, Dresden, Germany
6. Sociology Doctoral Program, University of Indonesia, Jakarta, Indonesia

*Corresponding author: rositanovi@gmail.com

RECEIVED 2023-05-04
ACCEPTED 2023-08-04

ABSTRACT

The Tau Taa Vana people live in the Bulang Highlands, Tojo Una-Una, in Central Sulawesi Province. The region's development has shaped the marginalization of forest-dwelling and forest-adjacent communities. From the 1980s to the 1990s, illegal logging networks served as the power holders, backed by Indonesia's authoritarian regime of that time. Illegal logging destroyed a large part of the Tau Taa Vana's sacred forest *(pengale kapali)*. As part of the massive logging agenda, the government launched many legal programs that further isolated the Tau Taa Vana people from their land. The first program was transmigration in 1995-1998, which converted sacred forests into plantation areas and worker camps. Meanwhile, the Tau Taa Vana people were forced to relocate from their forest livelihoods *(pengale lipu)*. In 2014, development shifted towards government-supported gold and nickel extraction identified in the Tau Taa Vana people's traditional regions. The government's planned material extraction of the region has forced the Tau Taa Vana people to adapt traditional environmental management systems. In the past, the forest had three main functions, as the source of food, medicine, and livelihoods. Nowadays, those functions are reduced drastically and the sacred forest with the *Kaju Marangka'a* region as the center has lost its cultural importance. Tau Taa Vana people today use the remaining forests as the center of their resistance movements and consider it as their last bastion for cultural preservation. In this regard, the role of traditional healers *(tau valia)* has become even more critical amidst the lack of traditional elders.

KEYWORDS

Sacred forests; Forest management; Tau Taa Vana people; Gold and nickel mining; Patchouli cultivation.

1. INTRODUCTION

Forest and Indigenous communities tend to be two inseparable entities, particularly in the historically extant forest regions of Indonesia (Atkinson, 1989). Many Indigenous communities still live within or adjacent to forests with their main livelihoods inextricably linked to these sites as hunters, cultivators, and more (Kementerian Kehutanan, 2012). While modern aspects of life have affected the lives of Indigenous communities, the tradition of the hunter and forest cultivator still exists. Their co-dependence on the forest serves as a source of food and medicine, indelibly linked to the community's cycle of life (Humaedi, 2017). In that context, forests function not merely as the source of basic needs but also entangle with rites, cosmology, and identity. The forest is their world, either as macrocosm or microcosm (Foster, 1969).

Concerning the close relationship between forest conservation and biodiversity, there are three classifications of biodiversity values, which are (i) direct use-value or the economic values of productive and consumptive profit; (ii) non-direct use value as the environmental benefit; and (iii) non-use value as cultural and civilizational heritage, also the existence of environment and its communities (Vermeulen & Koziell, 2002).

Nonetheless, the discussion on resources often limits the interpretation of productive assets that could generate surplus economic values.

On the other hand, holistic biodiversity, referring to the whole aspect of life, such as the social, ecological, and environmental dimensions, as well as the traditional knowledge, ethics, and other key aspects, despite being acknowledged for their importance, are still often neglected since it is often considered by outsiders to lack economic value (Astutik et al., 2019). The existence of tropical forests in Indonesia is currently under threat. The most significant problem comes from industrialization, which exploits various natural resources in the forest. Both Kalimantan and Sumatera Islands belong to the region where ecosystems are affected by industrialization. Total forest concessions, for example, amount to more than 210,000 hectares in the past five years. This builds on the many millions of hectares of concessions identified from data between 1990-2010 in Figure 1 (Margono et al., 2012).

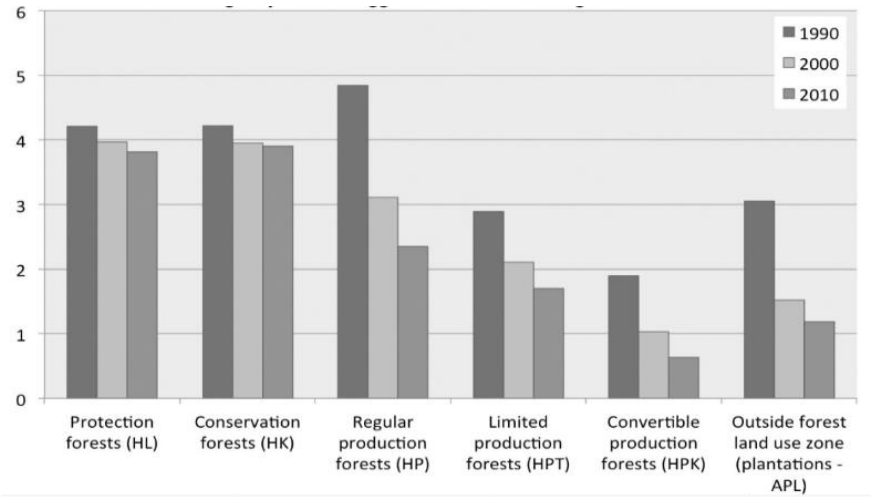

Figure 1. The Concession Area of Sumatran Primary Forest, 1990-2010 (millions of hectares) (Margono et al., 2012).

Alongside industrialization, demand for natural resources has drastically increased. Lands containing energy or industrial materials such as coal, nickel, uranium, asphalt, gold, and iron are essential raw materials for industry. It is common to find assessments that identify millions of cubic tons of minerals located within customary forests (Peters, 1987). Aside from fossil energy, there are woods, medicine materials, vast biodiversity of flora and fauna found in the same forests (Rochmyaningsih, 2020). Forests thus become highly contested regions for frontier exploration and massive exploitation (BPK Yogyakarta, 2015), and serve as sites of resistance for local communities that have strong ties to their land.

Furthermore, limited resources in Sumatra and Kalimantan prompted mining and other industrial activities to begin to expand their reach to other areas such as Sulawesi, Maluku, and Papua. Forest enclosures are not only for production natural resource extraction and development, as concession licenses on conservation forests have also reached hundreds of thousands of hectares. This also results in communities losing access to their land. The Collaborative Network for Participatory Mapping (JKPP, 2015) demonstrates how in 2015, the forest was divided into 38% or seven million hectares of land for other uses purposes, 26% (4.7 million) conservation forest, and 20% (3.7 million hectares) for limited production forest and conservation productive forest for

around 20% (3.7 million hectares). The rest is allocated for ecosystem conservation at about 10%. In Sulawesi, around 54% of the land in Sulawesi is already utilized for mining, licenses for businesses, such as HPH and HTI. Among those, mining covers around 25% or around 4.78 hectares. Second, the oil and gas industries utilize around 2.2 million hectares. The highest numbers took place mainly in Central Sulawesi and Southeast Sulawesi. There are at least 1,256 Mining Business Permits issued by the Investment Coordinating Board from 2010-2015 (Chandra, 2015).

Under the pretext of industrialization, critical research suggests the government works alongside a network of military-backed oligarchs to exploit minerals within forests (FWI-GFW, 2002; Hilmi, 2020). The opening of the national strategic industry region, as happened in Konawe, Southeast Sulawesi, and Morowali, Central Sulawesi, demonstrates forest conversion guided under the name of development (Chandra, 2015). To boost the interests of development, the government has enacted the region as *Kawasan Strategis National* (National Strategic Region) and labeled these sites as National Vital Assets (ARUPA, 2002; Kementerian PPN/Bappenas, 2016).

The role of the state is apparent in the practices of customary forest exploitation for industry. From 2000 – 2010, the state was involved in logging activities for almost 452,000 hectares. The amount grew even larger from 2010-2017 when the state was suspected of conducting forest logging in the region as large as 518,000 hectares (Forest Watch Indonesia/Global Forest Watch, 2002; Human Right Watch, 2013). Their involvement is significant in two aspects: the first is in the provision of easements for investors to exploit forest regions; and, the second is through the issuance of rights to manage forests without proper supervision and control from the state (Hidayat, 2018). Such conditions are evident from the many cases where government officials are caught for receiving economic incentives from entrepreneurs. According to Indonesia Corruption Watch (ICW), corruption practices related to natural resources caused the state's loss of almost Rp. 6.03 trillion in 2019. From all of those cases, Rp. 5.9 trillion comes from the four mining cases that are still related to forestry governance (Adjie & Prawira, 2020; Schütte & Syarif, 2020).

The exploitation of forest resources is not only conducted through major investments in palm plantation, nickel, gold, iron, and others. Such exploitation is also conducted under the pretense of traditional farming, regional housing development, and migration programs fundamental to the national development plan. The transmigration program is used as a legal justification to open conservation forests, as happened with the opening of the Mahalona transmigration region, which is part of the Malili conservation forest (Azis et al., 2018). Despite the limitations of regulations such as in Law Number 19 of 2004 on forestry, the related ministry and business owners tend to supersede regulations by using a substitute provision, namely Law Number 29 of 2009 concerning transmigration. Consequently, deforestation is increasingly common in conservation forests, particularly customary forests being claimed by transmigrants (Yayasan Merah Putih, 2008). By utilizing the regulatory loophole, timber entrepreneurs gain licenses for logging from the government as part of project to prepare the region for transmigration. The government then utilizes open spaces to be part of transmigration sites.

In actuality, economic actors could potentially exploit other forest regions beyond the designated transmigration area. Such practices also happened in the transmigration areas in the Bulang Highlands from 1997-2000. The extent of exploitation reached a radius of 10-20 km from the center of the transmigration area. Moreover, the exploitation also found gold and nickel reserves that further affected regulations for many years to come (Humaedi, 2017).

Specific to the context of Central Sulawesi, exploitation and logging have been common in conservation forests. The arrest of the Buol regent by the Corruption Eradication Commission (KPK) in July 2012 took place after evidence was obtained of receiving a bribe to open the Buol conservation region (Tempo, 2013) is one example of forest exploitation unfolding in the region. Meanwhile, nickel mining reserves found in Northern and Southern Bungku and Morowali also encroach on customary forests through the involvement of sub-national state apparatuses.

Alongside the increasing number of concession rights in Sulawesi, the threat to indigenous communities is also increasing. Various communities have lost control of the environment around them, followed by the threat to livelihoods. Moreover, communities also could not use their traditional medicine that for generations is taken directly from the forest. The community also experiences the loss of intangible aspects, including traditions and cultural practices that have strong ties to the forest. Forest, in this regard, is defined as an entity beyond the biophysical ecosystem with trees, but which is also embedded with myth and various cultural aspects linked to local identity (Humaedi, 2014). The forest is perceived to be an uninhabited area, which anyone could control and exploit without any consideration for humans that live in the region. The situation further marginalizes indigenous communities from the development framed as bringing welfare to them. They are not only taken away from their customary forest, but further are unable to fulfill their own needs, affecting their lives and livelihoods (Sajogyo Institute, 2019).

The observations of forest management and its cultural changes for indigenous communities thus are very important to be included in any discussion of policies and development plans. It is essential to consider various ways to reduce the marginalization of indigenous communities amidst the exploitation of forest areas. Despite offers from the government for farming lands and resettlement for their community in Mpoa, most of them decided to move even deeper into their customary forests. Even after the resettlement took place inside the forest, the change of culture and their interactions with the surrounding environment are inevitable. The situation led to confusion for many Tau Taa Vana people, who found themselves separated from their (livelihood system) and cultural practices centered around their forest.

Therefore, this study examines the dynamics of the Tau Taa Vana community in Tojo Una-Una in practicing their culture amidst changes in the ecosystem because of logging and mining around their customary forest. This research contributes empirical depth into the impacts of exploitation of forest areas on cultural practices and management systems of natural resources owned by indigenous peoples.

2. METHODS AND CONCEPTS

2.1 Context

The article follows an ethnographic qualitative approach (Kleden, 1986; Spradley, 1998). The subjects of this study were the Tau Taa Vana, people who live in the forest area of the Bulang Highlands. From deep within the forest of the Bulang Highlands, for example, there are at least 4,100 Tau Taa Vana families previously living in an area as large as 111.253 hectares (Yayasan Merah putih, 2008). They settled in several lipus (villages), as shown in Figure 2.

Remarks:

●	Lipu Salaki: Perbatasan Tojo Una-una & Morowali (Salaki village: Border Tojo Una-una & Morowali)
●	Lipu Sabado, Kabupaten Morowali (Sabado village, Morowali regency)
●	Lipu Ratuvoli, Tojo Una-una Ratuvoli village, Tojo Una-Una regency)
●	Lipu Vananga Bulang (Vatutana dan Lengkasa) Dataran Tinggi Bulang, Tojo Una-una (Vananga Bulang village [Vatutana & Lengkasa] Bulang highland, Tojo Una-una)
●	Lipu Mpoa, Dataran Tinggi Bulang Tojo Una-Una (Mpoa village, Bulang highland, Tojo Una-una)

Figure 2. Map of Tau Taa Vana Settling Areas (Departemen Pariwisata dan Kebudayaan, 2008).

Tau Taa Vana people belong to one of thirteen ethnic groups in Central Sulawesi. They are categorized as a specific ethnic group similar to other groups such as the Kahumamaon, Loinang, Sea-sea, Tolaki, Rampi, Ledo, Da'a, Ado, Lauje, Tandau/Tajio, Kori, Pandau, and Dondo (Atkinson, 1989; Social Department, 2003). For a long time, the community followed a nomadic tradition, moving from one dwelling place to another within the forest. Among the reasons for this: (i) There are cases of unexplainable death that happened to several family members. Such incidents are usually explained as the punishment from *pue* (God) or the act of *setang* (evil spirits), among others; (ii) increasing difficulty in hunting animals that could fulfill the needs of all group members; (iii) the main plantations (*nahvu*) are considered to be less productive due to the lack of soil fertility (Humaedi, 2017). When the community faces such problems, they will leave the village *(totos, lipu)* and look for other pastures and landscape conditions. To decide on the new location, they tend to stay away from rivers, and prefer to reside close to smaller springs. Large rivers are considered the source of *dotti* that will bring disaster to the community. *Dotti* is believed to be an endemic disease, such as malaria, that poses a serious threat to the community in the area.

Throughout the years, the Tau Taa Vana community slowly chose to reside permanently in certain regions that later became transformed into small kampongs (*lipu*) that administratively are recognized by the government to be part of villages (Figure 3). Some of those lipus, include: Lengkasa, Salaki, Ratuvoli, Panira, Kacipi, Mpoa, and others. Since 2020, Mpoa has become an independent village that is separated from Bulan Jaya village. Previously, Mpoa was part of the Tau Taa Vana residential area designated by the government through the Social Ministry as a relocation kampong of Tau Taa Vana community in the Bulang Highlands. The purpose

of this program was to prevent the Tau Taa Vana community from relocating periodically and opening the forest for their main plantations (*nahvu*). The relocation program was conducted after the Bulang Highlands had groups of transmigrants from Java, Bali, and Flores enter the area in 1997/1998 (Camang, 2008). The forest thus initially was only resided by Tau Taa Vana people.

Figure 3. Residence Area of Tau Taa Vana Communities (Humaedi, 2014)

2.2 Analysis of the dynamics of cultural practices of indigenous peoples in forest management

Forest management cannot be separated from the values and social practices of their society. These are developed and internalized from shared life experiences. The transmission of values and social practices depends on the sustainability of the environment and how parents adapt the values to their kids (Meggers, 2012). The idea is similar to those described in the cultural materialism approach (Meggers, 2012). Meggers argues that culture and environment mutually affect and shape one another. It then leads to creating a cycle of life where the social and economic needs are aligned with the environment. He also discusses cultural evolutionism, where the same technology is applied to a similar environment for production, distribution, and others. This process resulted in the same social groupings that justify and coordinate their activities through values systems and the same beliefs (Harris, 1968).

The above-mentioned cultural evolution leads to an understanding that the preservation and management of the surroundings could not be separated from values in society. The concept of deep ecology (Naess, 1989), which is a concept that combines environmental management with the tradition of society, is also a paradigm that was developed as a response to contemporary contexts. The term deep ecology is used to differentiate it from shallow ecology (Capra, 1996). Deep Ecology is a philosophical stream that was developed by Norwegian philosopher Arne Naess, in the early 70s. Naess emphasizes that environmental pollution and the control of resources should be opposed for the interest of health and sustainability.

As a consequence, Naess believes that activism is shallow since it does not consider the entirety of the ecosphere. Conversely, in deep ecology, conservation should not only consider the benefit for humans but also the rights of existence for other organisms. In this regard, the ecosystem is considered as a holistic network where all humans and other organisms are only a part of it. Moreover, the holistic approach in deep ecology also does not stop at seeing the relationship between parts of the ecosystem as a functional dependency. Instead, there is also consideration of dependency on the environment and its social basis (Keraf, 2010).

This perspective is a response to the failure of previous approaches that are limited by the singular focus on environmental management. The material ecology approach,

bases conservation on the number of trees. However, the classic approach is now considered to be less effective due to the lack of society's involvement in the process of conservation.

This study used various data collection methods, including in-depth interviews with 47 key informants consisting of (1) traditional leaders of seven men in each lipu (traditional village); (2) the Tau Taa Vana indigenous people consisting of 15 men and 12 women; and (3) transmigrants who have lived in the area from 2014 – 2017 numbering eight males and five females. Interviews were also conducted with five miners and two NGO facilitators. In addition, participatory observations were carried out to understand the cultural changes of the Tau Taa Vana indigenous people and their interactions with the forest environment over a longer research period.

The first research period was conducted in 2014, which initially identified the place, distribution, and socio-cultural characteristics of the Tau Taa Vana indigenous people. Research activities continued for two years, namely in 2016 – 2017, with notable observations on aspects of environmental resource management, cultural values, forest-related living practices, and the diversity of forest wealth and medicinal materials. This relatively long activity was carried out over the course of three travel periods, namely the period 12 May – 20 June 2016; 6 September – 12 October 2016; and, 4 May – 30 June 2017. The three field activities were then recalibrated to update the socio-cultural data on forest governance in 2021 from 12 February – 16 March 2021. As many as six researchers carried out participatory observations. The participatory observation was carried out by following the daily life activities of the Tau Taa Vana indigenous people in the forest environment, such as the practice of managing groves, yards, forests, hunting, capturing and collecting forest products, mining, and other agricultural activities on various nahvu (natural gardens) and totos (gardens) managed by women and economic activities of indigenous peoples in transmigration areas.

Furthermore, an analysis of the dynamics of the cultural practices of the Tau Taa Vana indigenous people in forest management in the Bulang Highlands was carried out by describing in a narrative manner the context and cultural characteristics that influence the social behavior of the Tau Taa Vana indigenous people in forest management in the Bulang Highlands.

3. RESULTS AND DISCUSSION

3.1 The Bulang highland forest: History and actors

The Bulang Highlands is the highest region in Tojo Una-Una Regency of Central Sulawesi. It is located in an area around 1,000 to 1,200 meters above sea level. The region is surrounded by lines of hills from the mountains of Lumut and Katimonjo, which are spread across three regencies: Tojo Una-Una, Morowali, and Toili (Dove, 2018). Within the region is a dense forest with high biodiversity. In this forest, the density of plants is very high, which shows the pristine conditions of the forest before intensive logging occurred (Himmi et al., 2014). In the same areas, there are also diverse local wildlife such as anoa, snakes, endemic birds (*maloa*), apes, wild boar, and other kinds of animals. We also documented various livelihood plants such as rattans, rubber, resin, and various local plants that are important for the Tau Taa Vana people. Tojo Una-Una at one point even became the largest region producing rattan in Central Sulawesi, albeit the numbers have declined over the years. The rattan production from the Bulang highlands as recorded by BPS (Statistic Central Agency) shows a trend of: 1,850 tonnes in 2012, 1,278 tonnes in 2014, and 11,770 tonnes in 2015.

Other data from the Forestry Office of Central Sulawesi Province shows that 19,697 tonnes of rattan in Central Sulawesi are produced from eight regencies/towns, including Palu, Donggala, Parigi Moutong, Poso, Tojo Una-Una, Banggai, Morowali, and Buol. Across these regions, Tojo Una-Una has the highest number of rattan, with almost 60% of production (Dinas Kehutanan Provinsi Sulawesi Tengah, 2017). Although the data does not tell the real potential for rattan production in this region, from around 2009 to 2015, there was a high number of unrecorded rattan transactions (Humaedi, 2017).

Aside from rattan, resin and rubber serve as an important commodity and are relatively abundant in the Bulang highlands. The amount of resin amounted to 1,866 tonnes (2012), 1,515 tonnes (2014), and 1,150 (2015) (BPS Kabupaten Tojo Una-Una, 2015). Unfortunately, rubber production has not been recorded in the same way as the two previous commodities. The existence of rattan, resin, and rubber in Bulang Highlands, however, has become a collective memory on its own about the "pleasure of living in the forest" for Tau Taa Vana people before the influx of transmigrants (1997/1998) and the period of nickel and gold mining (2014-2018). In between the periods, the natural resources from the forest have decreased throughout the years. Some of the community members chose to be involved in gold and nickel mining. After 2018, some of them also joined patchouli plantations.

The Bulang Highland is part of the Ampana Tete District, Tojo Una-Una Regency, which was previously divided into four administrative villages: Bulan Jaya, Wonosari, Wonokerto, and Sukmajaya. The villages developed from a residential unit of transmigrants from Java, Bali, and Flores that moved to the region in three waves. In 2020, the government added another village, Mpoa Jaya, as part of the Tau Taa Vana relocation program implemented by the Social Ministry.

While Mpoa Jawa was initially designated as the residence for Tau Taa Vana people, the village is mainly occupied by residents from other ethnic groups, such as Bugis, Tolaki, Kaili, Kulawi, Javanese, and others. Many houses previously given to Tau Taa Vana people as part of the relocation program were sold by their initial owners. They decided to move even further into the forest and join other family members at *lipu* (Salaki, Lengkasa, Pari'a, and Ratuvoli), far from the transmigrant areas.

The preference to live in the forest is primarily because of one or the combination of the following reasons: (i) Their inability to work outside of the forest; (ii) their struggle to develop social interactions with other ethnic groups who live in transmigration areas; and, (iii) the prospect of lucrative patchouli plantations that could be seeded in the forest (Interview with Apa Ansari, the chief of Lengkasa *opot*, 21 June 2021). Another factor that contributed to their choice of living in the forest is their lack of success in gold mining since they only used traditional mining practices.

In 2012, someone from Palopo, South Sulawesi, found an ounce of a gold nugget in this region. The first gold finding was said to be located inside the Tau Taa Vana customary forest (*pengale*), which covers an area of around 100,000 hectares. The number is just a rough estimation marked by the slopes of the Lumut mountain and the vast sacred forest (*Kaju Marangka'a*) near the border of Morowali. The government has not acknowledged the region as part of Tau Taa Vana's sacred forest (Dinas Kehutanan Provinsi Sulawesi Tengah, 2017).

From the point of view of the government, the forest belongs to the state and the governance of the region is part of the jurisdiction of the Morowali Conservation Area (www.ksdae.menlhk.go.id). The formal designation is addressed in Ministerial Decree No. 6747/MENLHK-PSKL/KUM.1/12/2016, 28 December 2016 regarding the Morowali Conservation Region located in between the regency of Northern Morowali and Tojo

Una-Una. On the other hand, the Bulang highlands itself, despite sharing its border with Morowali, is not a part of the Morowali Conservation Region (Yayasan Merah putih, 2008).

The official authorities often dismiss the claim of ownership among indigenous communities since they only used the oral claim based on collective memories and mythologies about the first human and their migrations (Bachriadi, 2017). Tau Taa Vana people believe that the area of *Kaju Marangka'a* is the sacred customary forest because it is the location of the first generation of Tau Taa that ascended from the sky. The descendants of this first couple spread to the Lumut slopes, which are around 92 kilometers from the *Kaju Marangka*'a region. Based on this mythology, the Bulang highlands, which previously included the sacred forest (*pengale kapalli* or *pue pengale*) and conservation forest (*pomvalipu pengale*), as well as the production forest *(pengale lipu*) will always be considered as the customary regions by Tau Taa Vana people (Humaedi, 2017).

In this context, the Tau Taa Vana community is often involved in land disputes with the transmigrant community. During 2015 – 2017, when the gold and nickel rush became the main issue of the region, claims of ownership became contested. Similar conflicts arose as well after patchouli plantations became the main commodity of the Bulang highlands, replacing the production of soy since the end of 2017. The existence of the transmigrant community since 1997/1998, the rush of gold and nickel mining in 2012-2017, and patchouli plantations from 2017-2021 affected the sustainability of the cultural system and traditional forest management among Tau Taa Vana community. The forest, which was sacred for conservation and functioned as a living space, started to shift only as a source of livelihood. Some cultural practices and traditions previously oriented to the forest and its inhabitants are now rarely practiced.

The tradition to conserve forests is conducted by dividing its role into three divisions: the sacred forest (*pengale kapalli* or *pue pengale*), conservation forest (*pomvalipu pengale*), and production forest *(pengale lipu*) is no longer practiced by the Tau Taa Vana community. They do not prevent various economic activities within the forest, such as traditional gold mining, exploiting nickel and the development of its access roads, and the expanding patchouli plantations. Moreover, many Tau Taa Vana people joined these activities previously dominated by migrants (Interview with Apa Gona, Customary Elders of Ratuvoli, 22 Juni 2021). It is inevitable for many Tau Taa Vana people to join the mining endeavors since they also face economic pressures to join this new source of livelihood. At the same time, the changes in Tau Taa Vana's cultural and social practices also endanger sustainable environmental governance (Vermeulen & Koziell, 2002).

3.2 Far into the forest, closer to gold, nickel, and patchouli: Shifting governance regimes

Economic-driven development and industrialization are the main factors that affect community dynamics, including socio-cultural behaviors and interactions with the surrounding forest. The forests are increasingly viewed by outsiders as a potentially valuable ecosystem service such as for carbon credits, emissions trading, and provision of clean water sources for surrounding communities. Meanwhile, the lands also contain valuable mining commodities such as gold, nickel, and coal, further elevating tensions over economic value and environmental protection. The forests rich in resources have become the objects of major economic interests (Hidayat et al., 2006).

Forests that were initially the mainstay of the traditional economy for hunting and foraging have become sites of new economic interests. The indigenous people of Tau Taa Vana made the forest their center of social and economic gravity long before the

transmigration program (Humaedi, 2017). Forests have medicine to prevent and heal illness (Atkinson, 1958). There are at least 112 natural raw materials with medicinal content (Astutik et al., 2019).

The Tau Taa Vana community initially divided their forest environment into several categories by considering various basic needs (Figure 4). *First,* the forest area is generally called *pengale.* The forest area is divided into three groups, namely sacred forest (*pengale kapalli* or *pengale pue*), forbidden forests (*pengale pomvalipu*), and production forest (*pengale lipu*). The sacred forest area is located in the *Kaju Marangka'a* area, filled with beliefs about *pue tantatua* (the power of God) and *watoampoana* (the tree with children). For this type of forest. Access to the area is restricted on sacred grounds. Only the traditional elders and *tau valia* (the healers) are allowed to enter this sacred forest to perform rituals. The rituals carried out are designated as *halaik* rituals, a kind of local belief in something transcendent (*Pue*) (Hisyam, 2015). This sacred forest is located at the point of Kaju Marangka'a, which is an area located at km 56 to 96 from the Bulang Highlands area towards Mount Lumut. This forest is considered a sacred and untouched forest (Interview with Apa Gona, a traditional elder of Ratuvoli, 18 June 2021).

The second type of forest is the forbidden forest (*pengale pomvalipu*). This forest is located not far from a residential village. In this forbidden forest, not everyone can access it. Only the traditional elders, healers (*tau valia*), and permitted people can enter this forest. However, the Tau Taa people around the forest will be allowed to enter in times of severe hunger when food supplies are lacking. When entering the forbidden forest, traditional elders and *tau valia* will generally "get rid of the sickness and disease" that local residents may be suffering from, and at the same time, they will take natural medicinal ingredients from the plants in the forest. Before entering the area, they will hold a special ritual (*kapongo*) to present *pue*. In addition to conservation, as in the previous sacred forest function, the forbidden forest is the main supplier of the raw materials needed for traditional medicine in the *mobolong* practice carried out by *tau valia* (Humaedi, 2012). These prohibited forest areas are generally located about 5 to 10 km from each village. Each *lipu* or settlement unit has its forbidden forest. The extent of this prohibited forest is generally measured by a stretch of one or two hills and bordered by a small stream (Interview with Apa Gona, a traditional elder of Ratuvoli, 18 June 2021).

Meanwhile, production forests (*pengale lipu*) are devoted to hunting animals or collecting forest products. This forest is generally located around *pasoli, opot,* and *lipu*. The boundaries between production forests and settlements are generally bordered by hills or rivers. In this place, every Tau Taa people freely hunt and gather food and earn livelihoods from collection and harvest of rattan, resin, rubber, and others. This type of forest is so vast that the outer side of each village is up to 5 to 10 kilometers away, or up to the outermost part of the forbidden forest (*pengale pomvalipu*) (Interview with Apa Gona, a traditional elder of Ratuvoli, 18 June 2021).

Second, the residences of community members are generally separated from one another. Such dwellings are called *pasolli*. The families decide the neighborhood where the individual lives due to the opening of the territory. They will look for places that are considered strategic, either for planting trees or hunting for forest products. Further, they will build simple stilt houses made of bamboo and wood in several places as temporary shelter.

Third, the hamlets (*opot*) are sited around a certain area that exceeds the number of 10 *pasoli*. The settlement unit will be called the *opot*, and the head of the *opot* will be appointed as leader. The appointed person is generally the person who is considered

the first to come and open up the area. *Opot* can be on the outskirts of the forest or in the forest, where *pasoli* convene. The existence of the *pasoli* will usually be bordered by *nahvu* (main groves) or other geographical traces, such as rivers, ravines, or mountain slopes.

Figure 4. Sketch of Forest Spatial Governance of The Tau Taa Vana Pra Community "Development and Industrialization" (Personal Observation, 2021).

Fourth, the village settlement unit (*opot*) will have a larger unit, namely *lipu* (at the village level). Each *lipu* may consist of three to five *opots* (hamlets). As the head of *lipu*, traditional elders coordinate with *opot* elders. The *lipu* do not cluster but spread according to geographical location. Further, the *lipu* in the Tau Taa Vana community does not deal with administrative issues. Nevertheless, these arrangements builds togetherness between the *opot* and *pasoli* residents, by conducting traditional rituals and participating in solving the ownership of *nahvu* (main plantation) and *totos* that the original owner previously abandoned. This is called a *gulir balik* mechanism. The *gulir*

balik mechanism means that people temporarily leave the grove in the production forest to open a new grove in another area. They will return to the garden they left behind at a certain period (about two years). Apart from restoring soil fertility, the aim is to expand arable land to prepare food availability" (Interview with Apa Ansari, an elder of *Opot* Lengkasa, 14 June 2021).

Fifth, after establishing settlement units (*pasoli*, *opot,* and *lipu*), the Tau Taa Vana community also has particular areas for plant cultivation (*nahvu*). There are two types of *nahvu*, annual groves (*manga nahvu*) and seasonal gardens (*totos*). Annual groves are generally located around the edges of production forests. They grow tubers, rice, vegetables, and others. The *nahvu* are routinely visited and users even build temporary houses on the *nahvu*. In addition to *nahvu*, they also clear forests to make *totos* (seasonal groves). These plantations use a "*gulir balik"* system, where the people plant something, leave it for a while, and return to the grove at a later date. By doing so, they are often accused of being shifting cultivators, specifically regarding their use of fires in clearing forests. In contrast, *totos* serve as long-term planting strategies to generate cash income for their livelihoods. In the *totos*, the Tau Taa people often plant clove and candlenut.

The governance of the five aspects of the environment and their corresponding settlements began to change with the arrival of government programs. Change accelerated in 1998 when transmigration areas were cleared and three settlement units were established. During the forest clearing phase, the Tau Taa retreated further into the forest. They left the forest of the Bulang highlands, sites of a long history of cultivation with all their old groves. At that time, they chose to move to Lengkasa and Ratuvoli to maintain their old traditions and livelihoods.

From 2009 to 2017, the forest environment of indigenous peoples was disturbed by gold and nickel mining activities (Figure 5). At that time, thousands of people began to dig the mountains, rivers, and even *gulir balik* groves (*totos*) were also cleared. Hence, most Tau Taa Vana people chose not to be involved in mining activities for its association with loss and erasure (Humaedi, 2014).

Figure 5. Involvement of Tau Taa People in Gold Mining (Humaedi, 2018)

The destruction of the Tau Taa Vana customary forest occurred throughout the region. The digging of holes resulting in standing water is associated with the increase of malaria cases. The indigenous peoples often clashed with the miners on how to dispose of the waste, treat the forest, and others. Many conflicts with miners have ensued, whereby the indigenous people have abandoned their old *totos*. They chose to have new *totos* in parts of the forest that were not slated for gold exploration (Interview with Apa Ansari, 18 June 2021).

In 2016, company surveyors in Morowali found nickel. They planned to develop a nickel supply area for a company in Morowali (Chandra, 2015). This news shocked the indigenous people of Tau Taa Vana because the nickel was found almost in all customary forest areas, including the sacred forest area in *Kaju Marangka'a* and its prohibited forests. The central government followed up the findings by allocating a budget to construct a direct trans road between Tojo Una-una – Toili – Bungku (Antara Sulteng, 2016).

The indigenous people of Tau Taa Vana objected first by approaching the village government. They disapproved of the mining activities that would destroy their customary forests. The transmigrant community also supported these objections in the three settlement units. Until mid-2021, the presence of nickel mining remained only as a threat of a plan, but no implementation activities had yet begun. Even so, the remnants of the trans-Central Sulawesi Road that cut across thousands of hectares of forest became a painful memory for the indigenous people of Tau Taa Vana. They also had to give up their *totos* for the sake of the road without any compensation whatsoever (Interview with Apa Ninjang, Vananga Bulang Indigenous Elder, June 16, 2021).

After the issue of gold and nickel mining subsided, the region was sited for major patchouli (*Pogostemon cablin* Benth) plantation expansion, and plans began in 2018 (Figure 6). Patchouli is a raw material plant capable of producing essential oils for medicines and cosmetics (Lampung AIAT, 2015). The enthusiasm for patchouli began with experience of a transmigrant who studied at patchouli farmers in nearby Poso. He then began cultivating the plant on his soybean fields and began to earn windfall profits that made others take notice. People began trying out patchouli, also replacing their soybean fields (Interview with Mr. Tholib, SP Transmigration Community Leader, 24 June 2021).

Figure 6. Tau Taa Community Patchouli Oil Farming and Refining (Private document of M. Alie Humaedi, June – July 2021)

By 2020, patchouli has been planted on thousands of hectares of land across the region, either in old groves, former soybean fields, or in new lands cleared from the forests of the Tau Taa Vana people. The transmigrants expanded areas to the Tau Taa Vana community areas (www.coaction.id). In this phase of patchouli cultivation, the custom of buying and selling *totos* land began to be recognized by the indigenous people of Tau Taa Vana. They also became involved in patchouli farming and started

clearing their remaining production forest (*pengale lipu*) into new areas for patchouli cultivation.

In this last phase, the indigenous people of Tau Taa Vana have similar opportunities as transmigrants. They cultivated patchouli with high productivity and generated economic benefits. With patchouli cultivation, the Tau Taa Vana community began to change socially in terms of their livelihood system, reshaping economic relations. They are familiar with practices of buying and selling land and also recognize the use of patchouli cultivation to meet socioeconomic needs. In terms of livelihood system, the indigenous people of Tau Taa Vana no longer used the forest as their main livelihood base, but began to switch over to patchouli land as the main source of their livelihoods.

Each Tau Taa Vana family can own patchouli land of 5 hectares to 15 hectares, depending on their ability to clear customary production forests (*pengale lipu*). Social and economic relations have been established between farmers, essential oil producers, distributors, and general traders. Some Tau Taa Vana people have been involved as producers and distributors of essential oils. With such changes, the Tau Taa Vana people then used production forests to become new lands for patchouli cultivation. Production forest depreciated substantially, by about 30 percent of the previous area (about 30,000 hectares). The trees in the cleared forest areas are then used as firewood to distill patchouli into essential oils (Interview with Mr. Hn, Staff of the District Forestry and Environment Service, 25 June 2021).

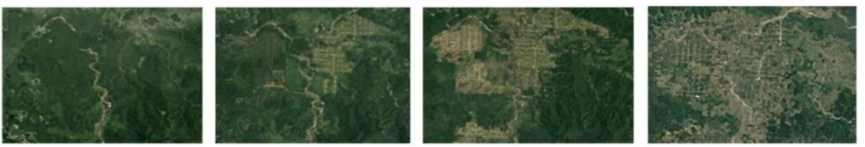

Figure 7. Illustration of Changes in Forest Environmental Governance Pre and Post Patchouli in the Bulang Highland (*Coaction Indonesia: Collaborate Advocate Breaking Barriers*, 2018)

Clearing production forests from a conservation perspective highlights the extent of this change as illustrated in Figure 7. In addition to changes in environmental management, the impact of gold and nickel mining, road clearing, and other interests leads to biodiversity loss. Tree stands, and nutrients have drastically declined. This situation impacts development and industrialization, making the forest a medium to fulfill the need for mineral resources, mining, and raw materials for other purposes.

3.3 Glorifying remaining forests: A myth-based forest conservation strategy

The significant environmental management changes of the Tau Taa Vana indigenous peoples' forests take place mostly in the residential areas (*pasoli, opot, lipu*) and early cultivation gardens and groves (*nahvu, totos*) and utilize production forests (*pengale lipu*). Meanwhile, sacred forests (*pengale pue*/*pengale Kapalli*) and forbidden forests (*pengale pomvalipu*) remain almost “untouched”. This continued protection highlights the potential of forest conservation in the Bulang Tojo Una-una Highlands Area. The sacred forest is guarded by cosmological beliefs related to the balance of the microcosm and macrocosm worlds.

The concept of balance that the Tau Taa Vana people believe in is the existence and function of three *tongkutua* (high mountains) located on earth, especially in the customary forest of Tau Taa Vana. *Tongkutua* is interpreted as a place in a physical sense, namely mountains and highlands, and represents their broader objective meaning and function. Space, in that sense, is also interpreted as *second nature*, where

the sacredness of something that is believed to be great has an influence on the occupants and those who live around it. In Levebre's understanding (Bourdieu, 1997), the second meaning of nature relates to the concept of the balance of the *tongkutua* space, pointing to the meaning of ritual functions and continued appreciation for such practices and biophysical spaces. The absence of these two practices in the meaning of this second space is often considered a source of imbalance. It can create havoc in the form of illness, disease, and other physical events such as volcanic eruptions, landslides, and major floods. In the belief of the Tau Taa Vana people, three *tongkutua* guard their lives, and all of them have a forest character. However, disaster will come to those who do not maintain the balance of the three (Humaedi, 2012).

The first *Tongkutua tananatua* or commonly called *Rapang Pue,* is the highest mountain in the Karundeng area. Geographically, it refers to *Kaju Marangka'a*. Based on their ancestral beliefs, this area is believed to be the origin of the first human offspring (*Tau*) in nature in the form of a wooden child (*watomoana*) born into the world. *Rapang Pue,* a place for *watomoana*, is located in the sacred forest (*pengale Kapalli* or *Pengale Pue*). Its power will spread to the forbidden forest area (*Pengale Pomvalipu*). In the sacred forest (*pengale Kapalli*), other than those who have the blessing as traditional elders (*tau ada*') and healers (*tau valia*), no one is allowed to enter and disturb the plant and environment. In this forest, the peak of *Rapang Pue* is located at its center and directs all humans to realize that their life is with God (*Pue*) and the universe. At this peak, *Pue* shows power to humans, that through a tree, he can give birth or create humans. The Tau Taa Vana people believe that humans who deny this power will be exposed to illness and disease, in addition to other calamities. Sickness and illness are caused by the rejection of *Pue* or disparaging the role of *Pue* in regulating nature and human life. The peak of *Rapang Pue* can be interpreted as the center of hope and spiritual expression of the ritual of the *halaik* belief and the healing ritual (*mobolong*) of Tau Taa Vana (Himmi et al., 2014).

The second *Tongkutua*, the Tau Taa people call *parang timbo*, is a term that denotes the quality of the lower peaks of the plains. The peak of the *parang timbo* is believed to control the balance of humans, nature, and God in the inner aspect. The inner aspect can be peace, comfort, discomfort, pain, and so on. The mental aspect can manifest into a physical aspect when slight discomforts can turn into prolonged illnesses. This *parang timbo*, *pengale pomvalipu,* or forbidden forest, is thus well guarded. Most of them are protected forest areas whose conservation and orders to protect them are in the name of customary law. People may enter the *parang timbo* area along the way to look for medicinal plants, but they are not allowed to look for other forest products. This is due to the belief that this type of forest is a source of disease, since it is devoted to removing or diverting disease in the *mobolong* ritual (Interview with Apa Gona, Ratuvoli Indigenous Elder, 14 June 2021).

Diseases transferred or *tau valia* can be entrusted to stones, wood, trees, spirits, demons, and other elements in the forest. Apart from being a source of disease, it is interpreted as a center for decomposition or healing. It is said so because the Tau Taa community believes the endemic plant has a medicinal function in this forbidden forest (*pengale pomvalipu*). *Pue* deliberately placed the decomposing medicinal plant in the forest to make people aware that *Pue* can inflict pain and disease alongside its antidote.

The third *tongkutua* is called *satimbang*. The peak of this highland is the lowest compared to the other two, although it is almost at the same level as *parang timbo*. The highland stretches from the Mpoa region to Ratuvoli. The Tau Taa people believe this area is an area of encounter between humans, and between humans and nature. Humans can live and carry out reproductive and socio-economic activities in this place.

Existing forests, commonly called Pengale Lipu or production forests, can also be entered and managed. Forest products, such as rattan, resin, and honey, can be used for *native* (main groves), *totos* (women's gardens), *yopo mangura* (back scrolling), and *tou* (yard). In this third environment, as long as the management is not excessive and does not disturb the protected forest area or sacred forest at the other two points above, it is still allowed to enter.

The relationship between humans, and between humans and natural surroundings are regulated in such a way by customary law. Still, they are forbidden to violate the basic principles (*katuntu*) directed by *Pue* through the dreams of the traditional leader (*tetua ada*') and the customary council (*tau boros*). The basic principle is that humans are part of nature, so they have to exhibit respect for themselves, towards other humans, and nature, truth, and justice. This principle is the basis for customary law, whether more severe forms of punishment are enacted (*sakumpuli*) or fines (*givu ada bayar*). Although the practice of *sakumpuli* is considered cruel (to the extreme of killing violators), this law is based on justice for victims who have been persecuted, both physically and psychologically (Tampubolon, 2006).

Besides being threatened with sanctions, the violator of customary law can experience physical disasters and illness. The violation means that there is an error when making a relationship between oneself and other humans or between humans and their natural environment (Foster, 1969; Tumanggor, 2008). The violation of customary law also means the annulment of the basic principles in the advice (*katuntu*) of the *Pue* for human kindness and nature. In other words, the violator challenges *Pue* to show his power. Illnesses suffered by the violator, and even its secondary impacts on community groups, are believed by the Tau Taa Vana people to be the result of opposition. Thus, implementing the traditional *sakumpuli* and *givu adat bayar* is one of the antidotes to the suffering of illness and disease that brings together God's principles and human interests. The paradox myth of sacred and evil forces was built to protect the sacred forest (*pengale pue*) and the forbidden forest (*pengale pomvalipu*) from foreigners and locals. The area around the forest is not suitable for settlement, especially for non-Tau Taa Vana community groups, because of the outbreaks of pestilence associated with such locations.

The mythology in three cosmological ties enables the indigenous Tau Taa Vana to be careful when managing sacred and forbidden forests. The clearing of production forests (*pengale pomvalipu*) for transmigration settlement units in 1996/1997, gold and nickel mining in 2009-2016, and the proliferation of patchouli cultivation from 2017 until the present are considered acceptable in the Tau Taa Vana community's conception as long as they do not violate the provisions (*katuntu*) stipulated by the Sacred *Pue,* which was inspired by the traditional elders and their customary council. The heaviest violation is when the government, companies, and communities had tampered the sacred forest (*pengale Kapalli*) and the forbidden forest (*pengale pomvalipu*) of Tau Taa Vana, which have many conceptions of religious myths (*transcendence*) and myths of fear (*satanic*).

In preserving the forest environment, these myths are strategic in protecting the environment and preserving the richness of its biodiversity. This myth is also an effective tool in control, specifically for outcomes of environmental management. Nevertheless, latent conflicts are experienced in social relations between the Tau Taa Vana people or between the Tau Taa people and transmigrant groups, between believers of local customs and those that do not. The conflicts largely occur as a result of newcomers clearing production forests for patchouli cultivation, external entrepreneurs arriving to mine gold and nickel, and the government supporting such

development initiatives. In the future, this situation will serve as a series of threats to sustainable environmental systems that will have far-reaching consequences on local communities and the environment.

4. CONCLUSION

With its rich diversity, changes in environmental management of Tau Taa Vana community in the interior of Tojo Una-Una, Central Sulawesi, are clear evidence that development and industrialization are having significant impacts on landscapes. At first, this forest area contained rich biodiversity. Such biodiversity is not antithetical to local practices, and as we have shown, helps to maintain forests and ecosystems. We have shown how in every behavior of their life, communities cannot escape the forest's values, which are tied to the three cosmological bonds underpinning their identity. While identity and forest use for medicinal and other uses help to sustain the forest, there have also been significant changes from development and livelihood pressures.

We described three phases of development reshaping the landscapes of the region. Development projects include transmigration, road construction to support the expansion of gold and nickel mining, and intensification of patchouli agriculture. In addition to the pressure from arriving transmigrant communities, Tau Taa Vana people have both retreated deeper into the forest or pursued livelihood practices that have been destructive to forests. The Tau Taa Vana eagerly pursued the potential lucrative incomes from patchouli cultivation. Patchouli cultivation changed livelihoods and land relations in the region, reshaping cultural practices and environmental management in production forests (*pengale lipu*) and in and around their settlement areas. Nevertheless, they continue to maintain sacred forests (*pengale Kapalli*) and protected forests (*pengale pomvalipu*).

The findings of this study show that Indigenous Peoples are facing significant pressures changing their livelihood and forest management practices. For this reason, development policies and programs must better understand their implications and seek to mitigate the various environmental, social, and cultural impacts on people's lives and their surrounding environments. That said, the cosmological elements associated with forest and the environment continue to serve as a powerful forest conservation strategy. Ties of landscape with identity are filled with transcendent cosmological values that protect the forest environment and create values and practices that not all existing forests can be used for economic purposes.

Author Contributions: All authors contributed equally as main contributors to this study. Muhammad Alie Humaedi, Ibnu Nadzir, Setiawan Khoirul Himmi, conducted field research, data collection and analysis, and wrote the first draft of the manuscript. Sri Astutik conducted field research, data collection and analysis. Adhis Tessa conducted data analysis and presentation, assisted in the literature review and establishing key references for analysis. Rosita Novi Andari conducted data analysis and presentation, and wrote, edited, and reviewed the manuscript. All authors read and approved the final manuscript.

Competing Interests: The authors declare no conflict of interest.

Acknowledgments: The authors acknowledge that the research project was funded by the Indonesian Institute of Sciences (LIPI).

REFERENCES

Adjie, M., & Prawira, F. (2020, May 16). KPK shows 'lack of willingness' to fight corruption in natural resources sector: Activists. *Jakarta Post*.

AntaraSulteng. (2016). *Akses Jalan Tojo Una Una-Morowali Utara Terbuka*. Antaranews. Accessed from https://sulteng.antaranews.com/berita/23415/akses-jalan-tojo-unauna-morowali-utara-terbuka

ARUPA. (2002). *Tangan-tangan negara menggengam hutan: Kajian pengelolaan hutan di Luar Jawa oleh PT Inhutani*. Tim Studi Arupa.

Astutik, Pretzsch, & Ndzifon Kimengsi. (2019). Asian Medicinal Plants' Production and Utilization Potentials: A Review. *Sustainability*, *11*(19), 5483. https://doi.org/10.3390/su11195483

Atkinson, J. M. (1989). Agama dan suku Wana di Sulawesi Tengah. In M. Dove (Ed.), *Peranan kebudayaan tradisional Indonesia dalam modernisasi* (pp. 13–27). Yayasan Obor Indonesia.

Azis, I., Surya, B., & Salim, A. (2018). Pengaruh pengembangan kawasan transmigrasi terhadap laju deforestasi hutan lindung: Studi kasus lokasi permukiman transmigrasi Mahalona. *Jurnal Ecosystem*, *2*(2), 1124–1135.

Bachriadi, D. (2017). *Siapa pemilik dan pengguna tanah? Akar-akar konflik agraria dan pelanggaran HAM pada pertambangan besar di Indonesia*. ARC.

Bourdieu, P. (1997). *The field of cultural production: essays on art and literature Pierre Bourdieu*. Columbia University Press.

BPK Yogyakarta. (2015). *Tambang di kawasan hutan lindung*. BPK Yogyakarta. Retrieved from https://yogyakarta.bpk.go.id/wp-content/uploads/2015/12/Tambang-di-Kawasan-Hutan-Lindung.pdf

BPS Kabupaten Tojo Una-Una. (2015). *Produksi hasil hutan menurut jenisnya di Kabupaten Tojo Una-Una, 2012–2015.* BPS Kabupaten Tojo Una-Una. Retrieved from https://yogyakarta.bpk.go.id/wp-content/uploads/2015/12/Tambang-di-Kawasan-Hutan-Lindung.pdf

Camang, N. (2008). *Tau Taa Wana Bulang: Bergerak untuk berdaya*. Yayasan Merah Putih (YMP) dan Regenskogsfondet Indonesia.

Capra, F. (1996). *The web of life: A new scientific understanding of living systems*. Doubleday.

Chandra, C. (2015). *Sulawesi alami krisis ruang, tambang mendominasi*. Mongabay. Accessed from https://www.mongabay.co.id/2015/07/16/sulawesi-alami-krisis-ruang-tambang-mendominasi/

Departemen Pariwisata dan Kebudayaan. (2008). *Peta pariwisata Sulawesi Tengah*. Departemen Pariwisata dan Kebudayaan.

Dinas Kehutanan Provinsi Sulawesi Tengah. (2017). *Laporan Hasil Hutan Kabupaten Tojo Una-una 2015-2017*. Dinas Kehutanan Provinsi Sulawesi Tengah.

Dove, M. (2018). *Peranan kebudayaan tradisional Indonesia dalam modernisasi*. Yayasan Obor Indonesia.

Forest Watch Indonesia/Global Forest Watch. (2002). *The state of the forest: Indonesia*. World Resources Institute.

Foster, G. M. (1969). *Applied anthropology*. Little Brow.

Harris, M. (1968). *The Rise of Cultural Theory*. Crowell.

Hidayat, H., Haba, J., & Siburian, R. (2006). *Politik ekologi: Pengelolaan taman nasional era Otda*. Yayasan Obor Indonesia.

Himmi, K. S., Humaedi, M. A., & Astutik, S. (2014). Ethnobiological study of the plants used in the healing practices of an indigenous people Tau Taa Wana in Central Sulawesi. *Procedia Environmental Sciences, 20,* 841–846. https://doi.org/10.1016/j.proenv.2014.03.102

Hisyam, M. (2015). Halaik the religion of Tau Taa Vana. *Jurnal Masyarakat Dan Budaya*, *17*(2), 153–170. https://doi.org/10.14203/jmb.v17i2.281

Humaedi, M. A. (2012). *Ekspedisi menuju Tuhan: Konsep sehat dan praktik pengobatan komunitas Adat Tau Taa Wana*. Valia Pustaka.

Humaedi, M. A. (2014). Tradisi pelestarian hutan masyarakat adat Tau Taa Vana di Tojo Una-Una Sulawesi Tengah. *Jurnal Penelitian Hutan Dan Konservasi Alam*, *11*(1), 91–111. https://doi.org/10.20886/jphka.2014.11.1.91-111

Humaedi, M. A. (2017). *Etnografi pengobatan: Praktik budaya peramuan dan sugesti komunitas adat Tau Taa Vana*. LKiS.

Human Right Watchs (HRW). (2013). *Sisi gelap pertumbuhan hijau: Dampak hak asasi manusia dari tata kelola yang lemah sektor kehutanan Indonesia*. HRW.

JKPP. (2015). *Potret kritis penguasaan ruang pulau Sulawesi*. JKPP. Accessed from https://jkpp.org/jkpp-dan-slpp-sulawesi-rilis-krisis-ruang-di-pulau-sulawesi/

Kementerian Kehutanan. (2012). *Statistik kehutanan Indonesia (Forestry Statistic of Indonesia)*. Direktorat Jenderal Planologi Kehutanan, Kementerian Kehutanan.

Kementerian PPN/Bappenas. (2016). *Kajian telaah kritis penetapan kawasan strategis dalam rencana pembangunan jangka menengah nasional (RPJMN) dan rencana tata ruang wilayah nasional (RTRWN).* Direktorat Tata Ruang dan Pertanahan Bappenas.

Keraf, S. (2010). *Etika Lingkungan Hidup*. Kompas.

Kleden, I. (1986). *Thick description: monografi kebudayaan*. LP3ES.

Lampung AIAT. (2015). *Budidaya tanaman nilam*. Lampung AIAT. Accessed from https://lampung.litbang.pertanian.go.id/eng/index.php/berita/4-info-aktual/632-budidaya-tanaman-nilam

Margono, B. A., Turubanova, S., Zhuravleva, I., Potapov, P., Tyukavina, A., Baccini, A., Goetz, S., & Hansen, M. C. (2012). Mapping and monitoring deforestation and forest degradation in Sumatra (Indonesia) using Landsat time series data sets from 1990 to 2010. *Environmental Research Letters*, *7*(3), 034010. https://doi.org/10.1088/1748-9326/7/3/034010

Meggers, B. J. (2012). *Amazonia: Mans and nature in a counterfeit paradise*. Aldine.

Naess, A. (1989). *Ecology, community and lifestyle*. Cambridge University Press.

Peters, W. C. (1987). *Exploration and mining geology (2nd Edition)*. Department of Mining and Geological Engineering-The University of Arizona & John Wiley & Sons.

Rochmyaningsih, D. (2020). Scientists in Indonesia fear political interference. *Science,* 367, 722-723. https://doi.org/10.1126/science.367.6479.722

Sajogyo Institute. (2019). *Menakar kebijakan reforma agraria dan perhutanan sosial: Laporan penelitian tiga kebijakan enam contoh kasus*. Sajogyo Institute. Accessed from https://sajogyo-institute.org/2019/10/

Schütte, S. A., & Syarif, L. O. (2020). *Pemberantasan korupsi di sektor kehutanan: Pelajaran dari kasus KPK*. Chr. Institut Michelsen (CMI) & KPK.

Social Department (2003). *Pengkajian calon lokasi permukiman komunitas adat terpencil (KAT) Suku Wana di lokasi Mpoa, Desa Bulan Jaya, Kecamatan Ampana Tete, Kabupaten Poso, Provinsi Sulawesi Tengah*. Dinas Kesejahteraan Sosial Sulawesi Tengah.

Spradley, J. P. (1998). *The ethnographic interview*. Holt & Winston.

Tampubolon, M. H. R. (2006). *Sanksi pidana adat Masyarakat Adat Tau Taa Wana dan kontribusinya dalam pembaharuan hukum pidana Indonesia*. Universitas Tadulako.

Tempo. (2013). *Bekas Bupati Buol Amran divonis 7,5 tahun penjara*. Tempo. Accessed from https://nasional.tempo.co/read/460607/bekas-bupati-buol-amran-divonis-75-tahun-penjara

Tumanggor, R. (2008). *Sistem kepercayaan dan pengobatan tradisional masyarakat Barus Sumatera Utara*. Gemilang.

Vermeulen, S., & Koziell I. (2002). *Integrating global and local biodiversity values: a review of biodiversity assessment*. International Institute for Environment and Development.

Yayasan Merah Putih. (2008). Hutan dalam pandangan Orang Wana. *Majalah Silo VI*, 6–14.