

## **BUKTI KORESPONDENSI**

**Judul Naskah** : Perception, attitude, and motive of local community towards forest conversion to plantation in Dharmasraya District, West Sumatra, Indonesia

**Penulis** : Kordiyana K. Rangga, Yonariza, Helvi Yanfika, Abdul Mutolib

**Nama Jurnal** : Biodiversitas

**No, Vol, dan Tahun** : 21 (10), 903-4910, 2020

### **DAFTAR ISI:**

<b>No</b>	<b>Langkah dan Tanggal</b>	<b>Hal</b>
1	Bukti Submit Awal (OJS), 9 Agustus 2020	2
2	Covering Letter, Reviewer dan Naskah Awal submit, 9 Agustus 2020	3
3	Bukti assignment from Editor dalam proses review, 9 September 2020	13
4	Naskah hasil editing (Double Blind Review) dari Editor	14
5	Bukti Hasil Review dari Reviewer 1 dan 2 (11 dan 15 September 2020)	22
6	Hasil Review dari Reviewer 1	23
7	Hasil Review dari Reviewer 2	31
8	Bukti Naskah diperbaiki Via OJS, (28 September 2020)	39
9	Naskah yang telah diperbaiki sesuai rekomendasi reviewer	40
10	Proofreading correction and Penerbitan Billing	48
11	Penerbitan Billing dan Copy Editing Naskah	49

## 1. Bukti Submit Awal (OJS), 9 Agustus 2020

← → ↻ smujo.id/biodiv/authorDashboard/submission/6572

Biodiversitas Journal of Biological Diversity Tasks 0 English View Site kordiyana

OJS OPEN JOURNAL SYSTEMS

Submissions

6572 / **Rangga et al.** / Perception, attitude, and motive of local community towards forest conversion to plantation in Dharmasraya D [Library](#)

Workflow Publication

Submission Review Copyediting Production

Submission Files [Search](#)

▶	27453-1	kordiyana, COVERING LETTER_Rangga et al_2020.docx	August 9, 2020	Article Text
▶	28926-1	nliza, Perception, attitude, and motive of local community towards forest conversion to plantation in Dharmasraya Regency, West Su.doc	September 7, 2020	Article Text

[Download All Files](#)

## 2. Covering Letter, Reviewer dan Naskah Awal submit, 9 Agustus 2020

### COVERING LETTER

Dear **Editor-in-Chief**,

I herewith enclosed a research article,

**Title:**

Perception, attitude, and motive of local community towards forest conversion to plantation in Dharmastraya Regency, West Sumatra

**Author(s) name:**

Kordiyana K Rangka, Yonariza, Abdul Mutolib

**Address**

(Fill in your institution's name and address, your personal cellular phone and email)

Kordiyana K Rangka (Study Program of Agricultural Extension, Faculty of Agriculture, University of Lampung. Jl. Sumantri Brojonegoro No 1 Rajabasa Bandar Lampung 35141, Lampung, Indonesia, Phone: +62 8127901014, email: [korrangka@yahoo.com](mailto:korrangka@yahoo.com))  
Yonariza (Department of Agribusiness, Faculty of Agriculture, University of Andalas. Kampus Limau Manis Pauh, Padang 25163, Sumatra Barat, Indonesia, email: [yonariza@gmail.com](mailto:yonariza@gmail.com))  
Abdul Mutolib (Study Program of Agricultural Extension, Faculty of Agriculture, University of Lampung. Jl. Sumantri Brojonegoro No 1 Rajabasa Bandar Lampung 35141, Lampung, Indonesia, Phone: +62 82386717542, email: [amutolib24@yahoo.com](mailto:amutolib24@yahoo.com))

**For possibility publication on the journal:**

(fill in *Biodiversitas* or *Nusantara Bioscience* or mention the others)

*Biodiversitas*

**Novelty:**

(state your claimed novelty of the findings versus current knowledge)

Several studies have shown that the local community can perform proper and sustainable forest management, but in this research it provides the opposite fact. Local communities play the biggest role in the conversion of forest functions into plantations.

**Statements:**

This manuscript has not been published and is not under consideration for publication to any other journal or any other type of publication (including web hosting) either by me or any of my co-authors.  
Author(s) has been read and agree to the Ethical Guidelines.

**List of five potential reviewers**

(Fill in names of five potential reviewers **that agree to review your manuscript** and their **email** addresses.

He/she should have Scopus ID and come from different institution with the authors; and from at least three different countries)

1. Dr. Achmad Faqih, M.Si. (Universitas Swadaya Gunung Jati), Scopus ID: 57201673140: , Email : [afaqih024@gmail.com](mailto:afaqih024@gmail.com)
2. Zuhud Rozaki, Ph.D (Universitas Muhammadiyah Yogyakarta, Indonesia), Scopus ID: 57192575625, Email: [zaki@umy.ac.id](mailto:zaki@umy.ac.id)
3. Dr. Kittisak Jermittiparsert (Chulalongkorn University, Thailand), Scopus ID: 55541914700, Email: [kittisak.j@chula.ac.th](mailto:kittisak.j@chula.ac.th)
4. Dr. Rili Windiasih, M.Si. (Universitas Jendral Soedirman), Scopus ID: 57205343271, Email : [windiasih.rili@gmail.com](mailto:windiasih.rili@gmail.com)
5. Bishnu Prasad Devkota, Ph.D. (Institute of Forestry, Tribhuvan University, Pokhara, Nepal), Scopus ID: 56973982400, Email : [bpdevkota@iofpc.edu](mailto:bpdevkota@iofpc.edu) / [bishnu.devkota@pc.tu.edu.np](mailto:bishnu.devkota@pc.tu.edu.np)

**Place and date:**

Bandar Lampung, 7 August 2020

**Sincerely yours,**

(fill in your name, no need scanned autograph)

Kordiyana K. Rangga

# Perception, attitude, and motive of local community towards forest conversion to plantation in Dharmasraya Regency, West Sumatra

KORDIYANA K RANGGA<sup>1,✉</sup>, YONARIZA<sup>2</sup>, ABDUL MUTOLIB<sup>1</sup>

<sup>1</sup>Study Program of Agricultural Extension, Faculty of Agriculture, University of Lampung. Jl. Sumantri Brojonegoro No 1 Rajabasa Bandar Lampung 35141, Lampung, Indonesia, ✉email: [korrangga@yahoo.com](mailto:korrangga@yahoo.com) and [amutolib24@yahoo.com](mailto:amutolib24@yahoo.com)

<sup>2</sup>Department of Agribusiness, Faculty of Agriculture, University of Andalas. Kampus Limau Manis Pauh, Padang 25163, Sumatra Barat, Indonesia

Manuscript received: DD MM 2016 (Date of abstract/manuscript submission). Revision accepted: ..... 2020.

**Abstract.** Forest conversion in Dharmasraya Regency massively occurred from 2000 to 2014. In 2000, forest area reached 86% of 33,550 ha, while the area of open land and plantation covered 3% and 10%, respectively, of the total area. In 2014, forest cover reduced to only 16% with an increase in plantation area (rubber and oil palm), covering 59% of the total area. This study was aimed to examine the perception, attitude, and motive of the local community regarding forest conversion to the plantation. This study was located in PFMU (Production Forest Management Unit) Dharmasraya West Sumatra, which included a production forest area of 33,550 ha. Nagari Bonjol was selected as the main research site with the consideration that forest belongs to a customary lawful community within the area. This study was conducted from February to August 2017 by applying qualitative experimental design with a case study approach. The type of data used consisted of primary and secondary data. A total of 40 households, both directly and indirectly related to forest clearing, was selected as respondents. Snowball sampling was applied to interview the key informants. Data were analyzed using the interactive model, which included data reduction, data presentation, also conclusion drawing and verification. The study result indicated that forest is owned by the local community based upon the customary law, and the state does not have the right to manage and claim forest ownership. In terms of the economic aspect, the community benefited greatly from wood availability in the forest as the source of income. According to the local community, the conversion of forests into plantation did not have a significant effect on the environment. In fact, the local community agreed that land-use change from forest to plantation will provide greater benefit than preserving the forest. The expansion of plantation was found to be the motive for land clearance by cutting trees to obtain ownership over the forest.

**Key words:** forest land-use change, motive, perception, PFMU Dharmasraya, plantation

**Abbreviations :** PFMU Dharmasraya: Production Forest Management Unit Dharmasraya, KAN : *Ketua Kerapatan Adat Nagari* (Assembly of *Adat Nagari*), NDVI: Normalized Difference Vegetation Index, HPH : *Hak Pengelolaan Hutan* (Forest Concession License), HGU: *Hak Guna Usaha* (land-use right to exploit), HTI: *Hutan Tanaman Industri* (Industrial Forest Plantation/IFP), GIS: geographic information system.

**Running title:** perception of local community on forest conversion

## INTRODUCTION

Indonesia has the third-largest tropical forest in the world and the first in Asia after Brazil and the Democratic Republic of the Congo (Andini 2017; Armida, Alisjahbana and Busch 2017; Juarez-Orozco, Siebe and Fernandez 2017). According to the Ministry of Environment in 2018, tropical forest and water conservation areas in Indonesia reached 125.9 million hectares. In terms of function, forest area in Indonesia is classified into three functions: Production Forest of 68.8 million hectares, Protection Forest of 29.7 million hectares, and Conservation Forest of 22.1 million hectares (Ministry of Forestry Republic Indonesia 2018). However, deforestation has threatened the forest existence in Indonesia (Tacconia, Rodriguesa and Maryudi 2009) and impact on climate change globally (Rahmat et al. 2019; Murniati and Mutolib 2020). The rate of deforestation in Indonesia reached 1.3 million per year between 2000 and 2012 (Wegscheider et al. 2018). The primary

factor causing forest deforestation includes the expansion of small-scale agriculture (Mutolib et al. 2017; Austin et al. 2019), oil palm plantation (Eldeeb et al. 2015, Vijay et al. 2016), illegal logging (Khalid et al. 2029), corruption (Eldeeb 2015; Pachmann 2018), granting of forest concession (Santika et al. 2017; Chen 2019), and human settlement (Nugroho et al. 2018; Husodo et al. 2019).

About 48 million people of Indonesia live around the forest area and highly depend on forest products (Mccarthy and Robinson 2016; Fisher et al 2018). Forest is inseparable from the community life for its function as the source of food, medicines, and income (Aju 2014). The relationship between forest and community in Indonesia is supported by the existence of customary law (Marta et al. 2019; Dasrizal et al. 2019; Irfani et al. 2019) that provides the opportunity for the local community to manage forest areas (Mutolib et al. 2020; Lestawi and Bunga 2020). Several studies have shown that the local community can perform proper and sustainable forest management (Handoko 2014; Matsvange et al. 2016; Poudyal et al. 2019).

Legal pluralism of forest ownership in Indonesia occurs due to forest claim between the state and local/customary lawful community (Mutolib et al. 2017). Forest is claimed as state-owned property, while it is also claimed as *ulayat*/customary forest by the indigenous community (Muur 2018). The Decision of the Constitutional Court No. 35/PUU-X/2020 reviewing the Law No. 41 in 1999 has removed customary forest from state forest (Subarudi 2014). Prior to The Decision of the Constitutional Court No. 35/PUU-X/2020, the customary forest is claimed as state forest. Thus local/customary communities must obtain a permit from the government to manage the forest. The government continues to reduce community activity around the forest. It has the potential to damage forest sustainability (Surati 2014; Purwawangsa 2017), even though several studies observed that the customary community could preserve the forest (Handoko 2014; Matsvange et al. 2016; Poudyal et al. 2019). Still, an in-depth study is necessary to examine facts regarding customary community and efforts to sustain forest area, whether the customary community can preserve the forest if they manage it themselves, and ensure that forest management by the local community will have an impact on forest sustainability.

One of the areas where customary law exists and develops within the community life is the area inhabited by Minangkabau ethnic in the West Sumatra Province. This province has an area of 42.2 thousand km<sup>2</sup>, and about 56.27% of the administrative area is state-owned forest. Forest area in West Sumatra consists of the area for conservation (806,939), protection (791,671 ha), and production (731,448 ha) (West Sumatra Forestry Service 2018). This study was conducted in Dharmasraya Regency with a total forest area of 53.594 ha (West Sumatra Forestry Service 2018), yet massive forest conversion continuously occurs. Deforestation and land-use change in Dharmasraya Regency is an interesting topic to investigate since it is believed that the local community is involved in forest conversion. This study was aimed to investigate the perception, attitude, and motive of the local community towards forest conversion to the plantation. The finding of this research is expected to provide new information regarding the motive and reason for community-related to the forest conversion process.

## MATERIALS AND METHODS

### Study area and time research

The study was carried out in Dharmasraya Regency which is geographically located at the southeast end of West Sumatra with geographical coordinates between 000 47' 7" - 010 41' 56" S and 1010 9' 21" – 1010 54' 27" E. In term of topography, Dharmasraya Regency is mostly flatland at an elevation of 82 – 5,525 meter above sea level. Specifically, the study site is under the area of Production Forest Management Unit (PFMU) Dharmasraya, which includes a total production forest area of 33,550 ha. PFMU Dharmasraya is administratively under the authority of Nagari Bonjol and Nagari Abai Siat in Koto Besar Subdistrict, and Nagari Sikabau and Nagari Sungai Dareh in Pulau Punjung Subdistrict. Forest in PFMU Dharmasraya is also an *ulayat* (customary forest) belongs to the local community living in the four Nagari. However, Nagari Bonjol was selected as the main focus in this study by taking into consideration that PFMU Dharmasraya legally owned by the local community of Nagari Bonjol.

The time and stage of the study were divided into two stages. The first stage of the study was a preliminary study aimed at identifying research sites and forest management problems. A preliminary study was conducted in January 2016. Data collection to answer problem formulation and research objective was done from February to August 2018.

### Methods and Source of Data

The study applied a qualitative experimental design with a case study approach. Format of qualitative study aims to describe, to summarize various conditions, situations, or phenomena of social reality, or study that collects and analyzes data in the form of words (oral and written) and human behavior without any attempts to quantify the data obtained (Afrizal 2015). This study used both primary and secondary data. Primary data were obtained through a household survey, interview with key informants, direct observation, and documentation. A total of 40 households in Nagari Bonjol, directly and indirectly, related to forest clearance, were selected as respondents. Informants in this study were determined using the method of snowball sampling. Secondary data were obtained from the literature study and documents from many institutions related to this study.

Through a non-ethnographic qualitative approach, the data collection technique was applied since the author did not participate in the social life of a group/community for data collection (Afrizal 2015). Key informants were the local community, company/permit holder, relevant institutions (government), and buyers who performed plantation farming in

PFMU Dharmasraya. Key informants in the local community included the customary/*ulayat* leader, leader of *Nagari*, *Ninik Mamak*, and Chairman of the Assembly of *Adat Nagari* (KAN, *Ketua Kerapatan Adat Nagari*) intending to collect information related to forest clearance viewed from the aspect of customary law.

The identification of forest cover changes was analyzed by satellite imagery. Map Obtained from the [earthexplorer.usgs.gov](http://earthexplorer.usgs.gov) website and downloaded by the data of the year that searched. Landsat map data processed using the NDVI (Normalized Difference Vegetation Index) method to obtain cover distribution in PFMU Dharmasraya.

### Data Analysis

Data in this study were analyzed using the ongoing approach, which was not performed after data were collected entirely, but following the problem formulation, before field observation. Data analysis in qualitative study was continuously done from the beginning of the proposal drafting process until study result writing (Afrizal 2015). Stages conducting during the activities of data collection and analysis in the qualitative study are inseparable; thus, it is simultaneously done. In this study, data analysis was applied using the interactive model included data reduction, data presentation, conclusion drawing and verification (Miles, Huberman and Saldana, 2014).

## RESULTS AND DISCUSSION

### History of Forest Management in Dharmasraya

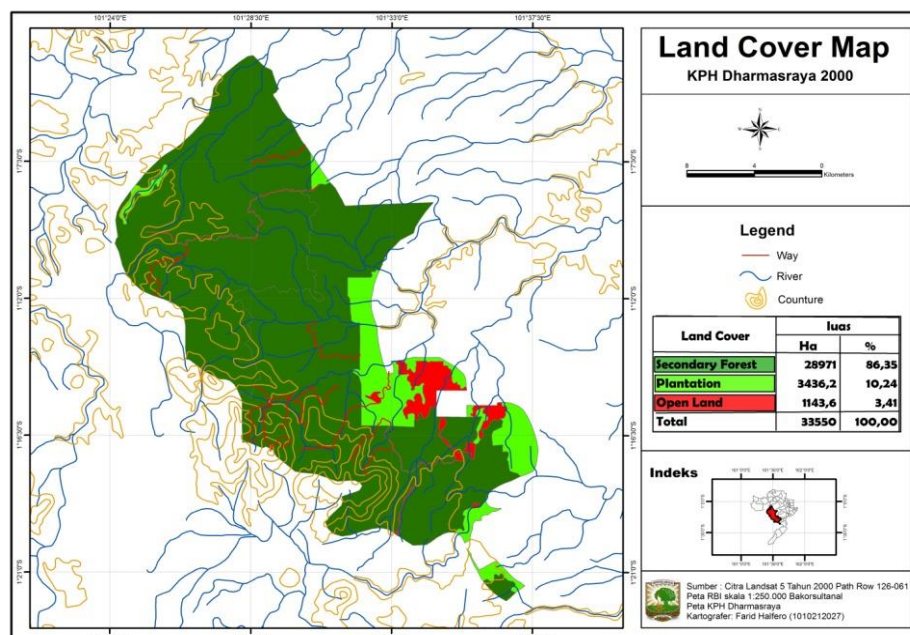
There is a long history regarding the establishment of PFMU Dharmasraya in 2013. In 1972, Forest Concession License (HPH, *Hak Pengelolaan Hutan*) for 30 years was granted to PT. Ragusa for forest area of 66,000 ha, which expired in 2002. In 1986 and 1998, PT. Incasi Raya and PT. Selago Makmur Plantation (SMP), respectively, obtained land-use right to exploit (HGU, *Hak Guna Usaha*) some of the forest areas to be further converted into oil palm plantation.

Following the expiration of HPH in 2002, land-use right was granted to PT. Inhutani, thus the forest was later functioned as the Industrial Forest Plantation (HTI, *Hutan Tanaman Industri*). PT. Inhutani IV was given a permit to manage forest area of 40.000 Ha for IFP. The IFP was developed to reduce illegal logging and forest encroachment done by the local community. However, PT. Inhutani IV, as the operator of forest management, was considered failed to manage the forest area, thus other companies, namely PT. Dara Silva Lestari (DSL) and PT. Bukit Raya Mudisa (BRM) was granted a forest concession license for some of the forest areas in 2009. The unclear forest management results in forest damage and conflict between stakeholders in claiming forest ownership (Sylviani and Hakim, 2014).

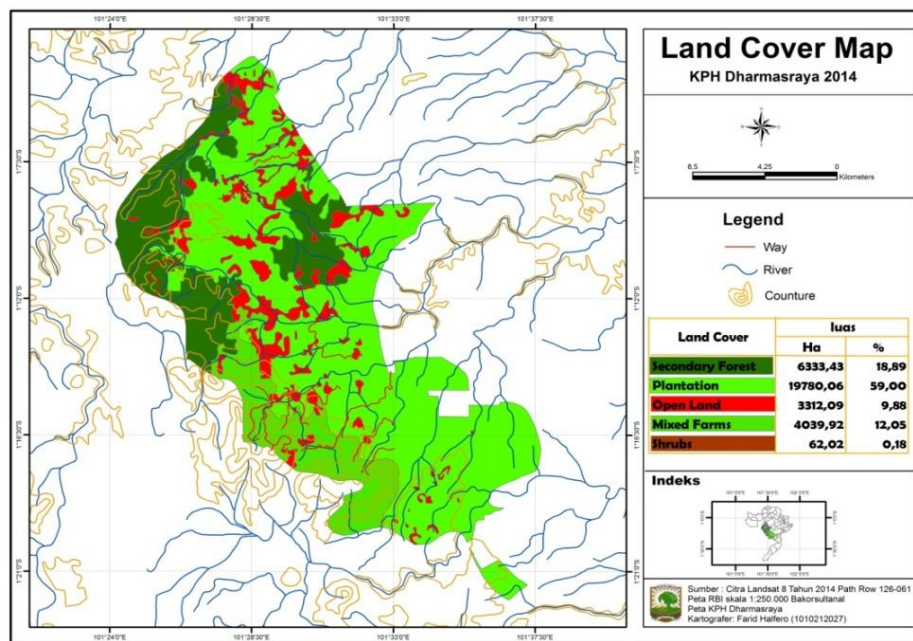
In 2013, Industrial Forest Plantation (IFP) of PT. Inhutani, DSL, and BRM were established as PFMU Dharmasraya by the Ministry of Environment. The total forest area managed by PFMU is approximately 33,550 ha. The PFMU does not have the function as a permit holder. It serves as a forest management operator, which is responsible for ensuring the forest is managed correctly according to its function.

### Forest Conversion to Plantation

Analysis result of geographic information system (GIS) analysis between 2000-2014 depicted rapid deforestation in PFMU Dharmasraya. In 2000, secondary forest in PFMU Dharmasraya reached 86% of the total area, while open land and plantation areas were only 3% and 10% of total area, respectively. However, at the end of 2014, forest cover significantly decreased to only 16% of the total area. Plantation (rubber and oil palm) experienced a significant increase from 10% in 2000 to 59% in 2014 (Figure 1 and 2, and Table 1).







**Figure 2.** Forest cover in PFMU Dharmasraya 2000

Forest conversion to the plantation in PFMU Dharmasraya was observed to be supported by the ease of access to the forest through the former HPH project road, increase in plantation commodity prices, population growth, land requirement for agriculture and plantation, and the high number of people who wanted to own plantation area, either the local community around Bonjol or those living outside the Dharmasraya Regency. Technological advances play a role in disseminating information about forest encroachment, which includes buying and selling forests (Yanfika et al. 2019; Listiana et al. 2019). The agricultural expansion was also considered as one of the factors causing deforestation (Dalla-Nora ET AL. 2014). In addition to those situations, forest conversion in PFMU Dharmasraya was also motivated by plantation expansion.

**Table 1.** Development of plantation in PFMU Dharmasraya in 2000-2014

Forest Cover	Percentage of total 32,749 ha (Year)			
	2000	2005	2011	2014
Secondary forest	86.35	71.81	40.01	18.89
Plantation	10.24	23.61	52.91	59.00
Open land/bushes	3.41	4.58	7.08	22.11
Total (100 Percent)	100.00	100.00	100.00	100.00

Source: Analysis of satellite image processing

### Perception and Attitude of Local Community towards Forest Conversion

Forest conversion in PFMU Dharmasraya is an interesting topic to investigate. An important aspect of forest conversion in PFMU Dharmasraya is the collective action of the local community to convert forest into the plantation. Based on the study result, all respondents (100%) perceived that the local/customary communities own forest. They claimed that the state does not have the right for forest management since the local community has been managing and controlling forests even before this state/country existed. The entire community (100%) rejected the regulation related to forest use under state law (Table 2).

The community perceived that forest provides an economic benefit (77.50%), direct health benefits (42.50%), environmental health benefits (60%), dan other forest uses (17.50%). According to the local community, the most significant benefit provided by forest is wood availability, which can be used as the source of income. Despite its economic benefit, the community thought that forest existence does not provide a significant contribution to the aspect of the economy (Table 2 No. 3). Forest cannot improve the community's economic standard of living. Hence, the impact of forest conversion in terms of economic aspect (source of income, employment, and food) was considered low by the local community (below 20%). The community believed that forest existence does not significantly contribute to the economy. Thus forest conversion to the plantation is the best option for forest management.

In terms of the environmental aspect, the conversion of forest into plantation did not significantly impact the environment. It was observed that the local community experienced climate change, such as a longer dry season, uncertain rainy season, decreasing water supply, and floods during the rainy season. However, they believed these events are not caused by forest conversion to plantation since the phenomena of environmental change is a common thing that occurs in most regions.

The local community agreed on the activity to convert forest into plantation because they considered that forest conversion would have a better impact on the economy compared to the activity of forest preservation. Only about 7.50% of the local community experienced the negative impact of forest conversion, but the positive impact gained from forest conversion was still considered higher. Positive impact mostly perceived by the local community due to forest conversion was the expansion of the plantation area and an increase in community income. The community agreed with the statement, "The best benefit provided by forest is obtained by converting it to the plantation." Forest conversion to plantation leads to a direct impact on the aspect of the economy. Forest conversion has opened farming opportunities and increased the community's economy in Nagari Bonjol and its surrounding area through rubber and oil palm plantation.

**Table 2.** Perception and Attitude of Local Community towards Forest Conversion to Plantation in Dharmasraya Regency

No	Statement	Response (%)	
		State	Custom
<b>1.</b>	<b><i>Ownership of forest</i></b>		
	Forest ownership in PFMU Dharmasraya	100.00	0.00
	PFMU Dharmasraya forest is owned by customary community	Yes (100.00)	
	Local/customary community is the most appropriate party to manage forest	Yes (100.00)	
	Those intend to manage forest must obtain permit from the government/state	No (100.00)	
<b>2.</b>	<b><i>Benefit of forest</i></b>	<b>Yes</b>	<b>No</b>
	a. Direct economic uses (Timber, mining, hunting)	77.50	22.50
	b. Direct health benefits (General welfare, medicine)	42.50	47.50
	c. Environmental health benefits (Cool shade, source of water, clear air, flood prevention)	60.00	40.00
	d. Other forest uses (Fish, forest gardens)	17.50	82.50
<b>3.</b>	<b><i>Perception of local community: impact of forest conversion to economic aspect</i></b>	<b>Yes</b>	<b>No</b>
	a. Deforestation decreases community income	12.50	87.50
	b. Deforestation eliminates source of job	7.50	92.50
	c. Deforestation eliminates source of food	17.50	82.50
<b>4.</b>	<b><i>Perception of local community: impact of forest conversion to environmental aspect</i></b>	<b>Yes</b>	<b>No</b>
	a. Deforestation causes micro climate (uncertain weather)	37.50	62.50
	b. Deforestation causes declining supply of clean water	32.50	67.50
	c. Deforestation causes drought in dry season	25.00	75.00
	d. Deforestation causes floods in rain season	57.50	42.50
<b>5.</b>	<b><i>Attitude in land clearance</i></b>	<b>Yes</b>	<b>No</b>
	Do you agree to clear forest for plantation?	100.00	0.00
	Felling hutan memberikan dampak negatif	92.50	7.50
	The greatest benefit of forest is obtained by preserving forest	0.00	100.00
	The greatest benefit of forest is obtained by converting forest to plantation	100.00	0.00

Source: Primary Data (2018).

### Motive for Forest Conversion

The primary motive for forest conversion was found to be forest clearing for agricultural and plantation purposes. Another motive underlined forest clearance was forest felling as a mark of ownership over the forest. Many performed land clearing only to show forest ownership. The cleared forest was left uncultivated since the purpose of forest clearance was to claim that forest belongs to those conducting forest clearing. The motive for clearing forest to obtain ownership over the forest includes: ensuring forest ownership to run farming business in the future, as a mark of ownership for any parties who want to use/buy the cleared forest, and obtaining compensation from the state or company if the forest is taken over. Forest clearance in PFMU Dharmasraya mostly done through fire since it is considered to be more effective and inexpensive. The activity of forest clearance by a forest fire is often found in PFMU Dharmasraya.

Another motive for forest conversion is illegal logging. Based upon the applicable customary law in PFMU Dharmasraya, illegal logging is not illegal. Anyone obtaining the permit from the leader of *ulayat* is allowed to take wood from PFMU Dharmasraya. The local community does not agree on the existence of the state law regarding forest ownership in PFMU Dharmasraya. It is an evidence of forum shopping in law pluralism where one party (the community) tends to choose and obey customary law to use the forest as it allows them to cut down trees and clear the forest. To the local community, customary laws are considered to provide more benefits compared to state law. According to the customary law, forest in PFMU Dharmasraya belongs to *ulayat* (communal land) of Nagari Bonjol. Thus anyone intends to perform logging, and clearing forest only needs to obtain a permit from the leader of *ulayat*.



In PFMU Dharmasraya, collecting wood in the forest is seized as an opportunity to build road access to the forest. Forest with better road access is more expensive than that with poor road access. This situation later triggers the community to collect wood in the forest, thus accelerating forest conversion in PFMU Dharmasraya.

## Conclusion

The local community believes that forest is owned by the customary community, not the state. Therefore, the state does not have the right to forest management since the local community has been managing the forest even before this state/country existed. The local community rejects the regulation stating those who want to utilize forests must obtain such permission from the government. The community perceived that forest provides an economic benefit (77.50%), direct health benefits (42.50%), environmental health benefits (60%), and other forest uses (17.50%). However, according to the local community, the most significant benefit provided by forest is wood availability. The community thought that forest existence does not provide a significant contribution to the aspect of the economy. Thus forest conversion to the plantation is the best option for forest management.

Conversion of the forest into plantation did not result in a significant impact to the environment. Although the local community experienced climate change, the local community still believed that climate change is not caused by forest conversion to the plantation. The local community agreed on the activity to convert forest into plantation because the local community considered that forest conversion would have a better impact on the economy compared to the activity of forest preservation. About 7.50% of the local community experienced the negative impact of forest conversion, but the positive impact gained from forest conversion was still considered higher. Positive impact mostly perceived by the local community due to forest conversion was the expansion of the plantation area and an increase in community income.

The primary motive was found to be forest clearing for agricultural and plantation purposes. Another motive underlined forest clearance was forest felling as a mark of ownership over the forest. The cleared forest was left uncultivated since the purpose of forest clearance was to claim that forest belongs to those conducting forest clearing.

## ACKNOWLEDGEMENTS

Acknowledgments are expressed in a brief; all sources of institutional, private and corporate financial support for the work must be fully acknowledged, and any potential conflicts of interest are noted.

## REFERENCES

- Afrizal. 2015. Metode Penelitian Kualitatif: Sebuah Upaya Mendukung Penggunaan Penelitian Kualitatif dalam Berbagai Disiplin Ilmu. Raja Grafindo Persada, Jakarta.
- Aju PC. 2014. The role of forestry in agriculture and food security. *American Journal of Research Communication* 2(6): 109-121
- Andini AR. 2017. Identitas dan kebijakan luar negeri: Komitmen Jepang terhadap penanganan illegal logging di Indonesia dalam kerangka *asia forest partnership* tahun 2002 – 2012. *Journal of International Relations* 3(1): 98-105.
- Armida S, Alisjahbana, Busch JM. 2017. Forestry, forest fires, and climate change in Indonesia. *Bulletin of Indonesian Economic Studies* 53(2): 111-136. DOI: 10.1080/00074918.2017.1365404
- Austin KG, Schwantes A, Gu Y, Kasibhatla PS. 2019. What causes deforestation in Indonesia?. *Environmental Research Letters* 14: 024007.
- Chen, B. Kennedy CM, Xu B. 2019. Effective moratoria on land acquisitions reduce tropical deforestation: evidence from Indonesia. *Environmental Research Letters* 14: 044009.
- Dalla-Nora EL, de Aguiar APD, Lapola DM, Woltjer G. 2014. Why have land use change models for the Amazon failed to capture the amount of deforestation over the last decade? *Land Use Policy* 39: 403–411. <http://doi.org/10.1016/j.landusepol.2014.02.004>.
- Dasrizal, Barlian E, Rezki A, Tutri R, Farida. 2019. The struggle of indigenous people: an overview recognition of customary forest in Minangkabau, Indonesia. *International Journal of Environmental Science and Development* 10(7): 2011-2015.
- Eldeeb O, Prochazka P, Maitah M. 2015. Causes for deforestation in Indonesia: Corruption and palm tree plantation. *Asian Social Science* 11 (27): 120-124.
- Fisher MR, Moeliono M, Mulyana A, Yuliani EL, Adriadi A, Kamaluddin, Judda J, Sahide M.A.K. 2018. Assessing the new social forestry project in Indonesia: recognition, livelihood and conservation?. *International Forestry Review* 20(3): 346-361.
- Handoko C. 2014. Some problems in maintaining sustainability of Indonesia's Forests: descriptive study. *Indonesian Journal of Forestry Research* 1(1): 33-46.
- Husodo T, Febrianto P, Megantara EN, Shanida SS, Pujiyanto MP. 2019. Diversity of mammals in forest patches of Cisokan, Cianjur, West Java, Indonesia. *Biodiversitas* 20: 1281-1288.

- Ifrani, Abby FH, Barkatullah AH, Nurhayati Y, Said MY. 2019. Forest Management Based on Local Culture of Dayak Kotabaru in the Perspective of Customary Law for a Sustainable Future and Prosperity of the Local Community. *Resources* 8: 78; doi:10.3390/resources8020078
- Juarez-Orozco SM, Siebe C, Fernandez DFY. 2017. Causes and effects of forest fires in tropical rainforests: A bibliometric approach. *Tropical Conservation Science* 10: 1–14.
- Kementerian Lingkungan Hidup dan Kehutanan Republik Indonesia. 2018. Status Hutan dan Kehutanan Indonesia 2018. Kementerian Lingkungan Hidup dan Kehutanan Republik Indonesia, Jakarta.
- Khalid F, Babar TM, Jamil A, Kamal H, Afzal T, et al. 2019. Multiple impacts of illegal logging: A key to deforestation over the globe. *Biomed J Sci & Tech Res* 20(5): 15430-15435.
- Lestawi IN, Bunga D. 2020. The Role of customary law in the forest preservation in Bali. *Journal of Landscape Ecology* 13 (1): 25-41.
- Listiana I, Efendi I, Mutolib A, Rahmat A. 2019. The behavior of extension agents in utilizing information and technology to improve the performance of extension agents in Lampung Province. *Journal of Physics: Conf. Series* 1155: 012004.
- Marta AD, Suwaryo U, Sulaeman A, Agustino L. 2019. Dilemma of customary land policy in Indonesia. **Masyarakat, Kebudayaan dan Politik** 32(2): 134-143.
- Matsvange D, Sagonda R, Kaundikiza M. 2016. The role of communities in sustainable land and forest management: The case of Nyanga, Zvimba and Guruve districts of Zimbabwe. *Jambá: Journal of Disaster Risk Studies* 8(3), a281.
- Mccarthy JF, Robinson, K.M. 2016. Land and Development in Indonesia: Searching for the People's Sovereignty. ISEAS – Yusof Ishak Institute: Singapore.
- Miles MB, Huberman AM, Saldana J. 2014. *Qualitative Data Analysis, A Methods Sourcebook*, Edition 3. USA: Sage Publications. Terjemahan Tjetjep Rohindi Rohidi, UI-Press.
- [Murniati K](#), [Mutolib A](#). 2020. The impact of climate change on the household food security of upland rice farmers in Sidomulyo, Lampung Province, Indonesia. *Biodiversitas* 21(8): 3487-3493.
- Mutolib A, Yonariza, Mahdi, Ismono H. 2017. Forest ownership conflict between a local community and the state: a case study in Dharmasraya, Indonesia. *Journal of Tropical Forest Science* 29(2): 163-171.
- Mutolib A, Yonariza, Rahmat A, Yanfika H. 2020. Competition among actors and challenges of production forest management in Dharmasraya, West Sumatera. *IOP Conf. Series: Earth and Environmental Science* 399 (2019) 012074
- Muur WFD. 2018. Forest conflicts and the informal nature of realizing indigenous land rights in Indonesia. *Citizenship Studies* 22(2): 160-174. DOI:10.1080/13621025.2018.1445495
- Nugroho HYSH, Veen AVD, Skidmore AK, Hussin YA. 2018. Expansion of traditional land-use and deforestation: a case study of an adat forest in the Kandilo Subwatershed, East Kalimantan, Indonesia. *J. For. Res.* 29(2): 495–513.
- Pachmann A. 2018. Corruption and deforestation in Indonesia. *Regional Formation and Development Studies* 2 (25): 57-64.
- Poudyal BH, Maraseni T, Cockfield G. 2019. Scientific Forest management practice in Nepal: critical reflections from stakeholders' perspectives. *Forests* 2020, 11, 27; doi:10.3390/f11010027.
- Purwawangsa H. 2017. Instrumen kebijakan untuk mengatasi konflik di kawasan hutan konservasi. *Risalah Kebijakan Pertanian dan Lingkungan* 4(1): 28-47.
- Rahmat A, Zaki MK, Effendi I, Mutolib A, Yanfika H, Listiana I. 2019. Effect of global climate change on air temperature and precipitation in six cities in Gifu Prefecture, Japan. *Journal of Physics: Conf. Series* 1155: 012070
- Santika T, Meijaard E, Budiharta S, Law EA, Kusworo A, Hutabarat JA, Indrawan TP, Struebig M, Raharjo S, Huda I, Sulhani, Ekaputri AD, Trison S, Stigner M, Wilson KA. 2017. Community forest management in Indonesia: Avoided deforestation in the context of anthropogenic and climate complexities. *Global Environmental Change* 46: 60–7161.
- Subarudi. 2014. Policy of customary forest management after Constitutional Justice Degree No. 35/PUU-X/2012: A Critical Review. *Jurnal Analisis Kebijakan Kehutanan* 11(3): 2007-224.
- Surati. 2014. Attitude and behavior analysis of communities toward Parung Panjang Research Forest. *Jurnal Penelitian Sosial dan Ekonomi Kehutanan* 11(4): 339 – 347.
- Sylviani, Hakim I. 2014. Analisis tenurial dalam pengembangan kesatuan pengelolaan hutan: Studi kasus KPH Gedong Wani, Provinsi Lampung. *Jurnal Penelitian Sosial Dan Ekonomi Kehutanan* 11(4): 309–322.
- Tacsonia L, Rodrigues RJ, Maryudi A. 2009. Law enforcement and deforestation: Lessons for Indonesia from Brazil. *Forest Policy and Economics* 108:101943.
- Vijay V, Pimm SL, Jenkins CN, Smith SJ. 2016. The Impacts of oil palm on recent deforestation and biodiversity loss. *PLoS ONE* 11(7): e0159668.
- Wegscheider S, Purwanto J, Margono BA, Nugroho S, Budiharto, Buchholz G, Sugardiman RA. 2018. Current achievements to reduce deforestation in Kalimantan. *Indonesian Journal of Geography* 50(2): 109 - 120. DOI: <http://dx.doi.org/10.22146/ijg.23680>

- 350 West Sumatra Forestry Service. 2018. Sekilas Hutan Sumbar. <https://dishut.sumbarprov.go.id/details/pages/1> [Accessed  
351 05 August 2020].
- 352 Yanfika H, Listiana I, Mutolib A, Rahmat A. 2019. Linkages between extension institutions and stakeholders in the  
353 development of sustainable fisheries in Lampung Province. Journal of Physics: Conf. Series 1155: 012014.

## SUBMISSION CHECKLIST

Ensure that the following items are present:

The first corresponding author must be accompanied with contact details:

**Give mark (X)**

• E-mail address	<b>X</b>
• Full postal address (incl street name and number (location), city, postal code, state/province, country)	<b>X</b>
• Phone and facsimile numbers (incl country phone code)	<b>X</b>

All necessary files have been uploaded, and contain:

• Keywords	<b>X</b>
• Running titles	<b>X</b>
• All figure captions	<b>X</b>
• All tables (incl title and note/description)	<b>X</b>

Further considerations

• Manuscript has been “spell & grammar-checked” Better, if it is revised by a professional science editor or a native English speaker	<b>X</b>
• References are in the correct format for this journal	<b>X</b>
• All references mentioned in the Reference list are cited in the text, and vice versa	<b>X</b>
• Colored figures are only used if the information in the text may be losing without those images	<b>X</b>
• Charts (graphs and diagrams) are drawn in black and white images; use shading to differentiate	<b>X</b>

### 3. Bukti First assignment from Editor untuk direview, 9 September 2020

← → ↻ smujo.id/biodiv/authorDashboard/submission/6572

Biodiversitas Journal of Biological Diversity Tasks 0 English View Site kordiyana

OJS  
OPEN JOURNAL SYSTEMS

Submissions

6572 / **Rangga et al.** / Perception, attitude, and motive of local community towards forest conversion to plantation in Dharmasraya D [Library](#)

Workflow Publication

Submission Review Copyediting Production

Submission Files [Search](#)

▶	27453-1	kordiyana, COVERING LETTER_Rangga et al_2020.docx	August 9, 2020	Article Text
▶	28926-1	nliza, Perception, attitude, and motive of local community towards forest conversion to plantation in Dharmasraya Regency, West Su.doc	September 7, 2020	Article Text

[Download All Files](#)



#### 4. Naskah hasil editing (Double Blind Review) dari Editor

## Perception, attitude, and motive of local community towards forest conversion to plantation in Dharmasraya Regency, West Sumatra

**Abstract.** Forest conversion in Dharmasraya Regency massively occurred from 2000 to 2014. In 2000, forest area reached 86% of 33,550 ha, while the area of open land and plantation covered 3% and 10%, respectively, of the total area. In 2014, forest cover reduced to only 16% with an increase in plantation area (rubber and oil palm), covering 59% of the total area. This study was aimed to examine the perception, attitude, and motive of the local community regarding forest conversion to the plantation. This study was located in PFMU (Production Forest Management Unit) Dharmasraya West Sumatra, which included a production forest area of 33,550 ha. Nagari Bonjol was selected as the main research site with the consideration that forest belongs to a customary lawful community within the area. This study was conducted from February to August 2017 by applying qualitative experimental design with a case study approach. The type of data used consisted of primary and secondary data. A total of 40 households, both directly and indirectly related to forest clearing, was selected as respondents. Snowball sampling was applied to interview the key informants. Data were analyzed using the interactive model, which included data reduction, data presentation, also conclusion drawing and verification. The study result indicated that forest is owned by the local community based upon the customary law, and the state does not have the right to manage and claim forest ownership. In terms of the economic aspect, the community benefited greatly from wood availability in the forest as the source of income. According to the local community, the conversion of forests into plantation did not have a significant effect on the environment. In fact, the local community agreed that land-use change from forest to plantation will provide greater benefit than preserving the forest. The expansion of plantation was found to be the motive for land clearance by cutting trees to obtain ownership over the forest.

**Keywords:** forest land-use change, motive, perception, PFMU Dharmasraya, plantation

**Abbreviations:** PFMU Dharmasraya: Production Forest Management Unit Dharmasraya, KAN : *Ketua Kerapatan Adat Nagari* (Assembly of *Adat Nagari*), NDVI: Normalized Difference Vegetation Index, HPH : *Hak Pengelolaan Hutan*(Forest Concession License), HGU: *Hak Guna Usaha*(land-use right to exploit), HTI: *Hutan Tanaman Industri*(Industrial Forest Plantation/IFP), GIS: geographic information system.

**Running title:** perception of local community on forest conversion

## INTRODUCTION

Indonesia has the third-largest tropical forest in the world and the first in Asia after Brazil and the Democratic Republic of the Congo (Andini 2017; Armida, Alisjahbana and Busch 2017; Juarez-Orozco, Siebe and Fernandez 2017). According to the Ministry of Environment in 2018, tropical forest and water conservation areas in Indonesia reached 125,9 million hectares. In terms of function, forest area in Indonesia is classified into three functions: Production Forest of 68.8 million hectares, Protection Forest of 29.7 million hectares, and Conservation Forest of 22.1 million hectares (Ministry of Forestry Republic Indonesia 2018). However, deforestation has threatened the forest existence in Indonesia (Tacconia, Rodriguesa and Maryudi 2009) and impact on climate change globally (Rahmat et al. 2019; Murniati and Mutolib 2020). The rate of deforestation in Indonesia reached 1.3 million per year between 2000 and 2012 (Wegscheider et al. 2018). The primary factor causing forest deforestation includes the expansion of

small-scale agriculture (Mutolib et al. 2017; Austin et al. 2019), oil palm plantation (Eldeeb et al. 2015, Vijay et al. 2016), illegal logging (Khalid et al. 2029), corruption (Eldeeb 2015; Pachmann 2018), granting of forest concession (Santika et al. 2017; Chen 2019), and human settlement (Nugroho et al. 2018; Husodo et al. 2019).

About 48 million people of Indonesia live around the forest area and highly depend on forest products (McCarthy and Robinson 2016; Fisher et al. 2018). Forest is inseparable from the community life for its function as the source of food, medicines, and income (Aju 2014). The relationship between forest and community in Indonesia is supported by the existence of customary law (Marta et al. 2019; Dasrizal et al. 2019; Irfani et al. 2019) that provides the opportunity for the local community to manage forest areas (Mutolib et al. 2020; Lestawi and Bunga 2020). Several studies have shown that the local community can perform proper and sustainable forest management (Handoko 2014; Matsvange et al. 2016; Poudyal et al. 2019).

Legal pluralism of forest ownership in Indonesia occurs due to forest claim between the state and local/customary lawful community (Mutolib et al. 2017). Forest is claimed as state-owned property, while it is also claimed as *ulayat*/customary forest by the indigenous community (Muur 2018). The Decision of the Constitutional Court No. 35/PUU-X/2020 reviewing the Law No. 41 in 1999 has removed customary forest from state forest (Subarudi 2014). Prior to The Decision of the Constitutional Court No. 35/PUU-X/2020, the customary forest is claimed as state forest. Thus local/customary communities must obtain a permit from the government to manage the forest. The government continues to reduce community activity around the forest. It has the potential to damage forest sustainability (Surati 2014; Purwawangsa 2017), even though several studies observed that the customary community could preserve the forest (Handoko 2014; Matsvange et al. 2016; Poudyal et al. 2019). Still, an in-depth study is necessary to examine facts regarding customary community and efforts to sustain forest area, whether the customary community can preserve the forest if they manage it themselves, and ensure that forest management by the local community will have an impact on forest sustainability.

One of the areas where customary law exists and develops within the community life is the area inhabited by Minangkabau ethnic in the West Sumatra Province. This province has an area of 42.2 thousand km<sup>2</sup>, and about 56.27% of the administrative area is state-owned forest. Forest area in West Sumatra consists of the area for conservation (806,939), protection (791,671 ha), and production (731,448 ha) (West Sumatra Forestry Service 2018). This study was conducted in Dharmasraya Regency with a total forest area of 53,594 ha (West Sumatra Forestry Service 2018), yet massive forest conversion continuously occurs. Deforestation and land-use change in Dharmasraya Regency is an interesting topic to investigate since it is believed that the local community is involved in forest conversion. This study was aimed to investigate the perception, attitude, and motive of the local community towards forest conversion to the plantation. The finding of this research is expected to provide new information regarding the motive and reason for community-related to the forest conversion process.

## MATERIALS AND METHODS

### Study area and time research

The study was carried out in Dharmasraya Regency which is geographically located at the southeast end of West Sumatra with geographical coordinates between 000 47' 7" - 010 41' 56" S and 1010 9' 21" - 1010 54' 27" E. In term of topography, Dharmasraya Regency is mostly flatland at an elevation of 82 - 5,525 meter above sea level. Specifically, the study site is under the area of Production Forest Management Unit (PFMU) Dharmasraya, which includes a total production forest area of 33,550 ha. PFMU Dharmasraya is administratively under the authority of Nagari Bonjol and Nagari Abai Siat in Koto Besar Subdistrict, and Nagari Sikabau and Nagari Sungai Dareh in Pulau Punjung Subdistrict. Forest in PFMU Dharmasraya is also an *ulayat* (customary forest) belongs to the local community living in the four Nagari. However, Nagari Bonjol was selected as the main focus in this study by taking into consideration that PFMU Dharmasraya legally owned by the local community of Nagari Bonjol.

The time and stage of the study were divided into two stages. The first stage of the study was a preliminary study aimed at identifying research sites and forest management problems. A preliminary study was conducted in January 2016. Data collection to answer problem formulation and research objective was done from February to August 2018.

### Methods and source of data

The study applied a qualitative experimental design with a case study approach. Format of qualitative study aims to describe, to summarize various conditions, situations, or phenomena of social reality, or study that collects and analyzes data in the form of words (oral and written) and human behavior without any attempts to quantify the data obtained (Afrizal 2015). This study used both primary and secondary data. Primary data were obtained through a household survey, interview with key informants, direct observation, and documentation. A total of 40 households in

Nagari Bonjol, directly and indirectly, related to forest clearance, were selected as respondents. Informants in this study were determined using the method of snowball sampling. Secondary data were obtained from the literature study and documents from many institutions related to this study.

Through a non-ethnographic qualitative approach, the data collection technique was applied since the author did not participate in the social life of a group/community for data collection (Afrizal 2015). Key informants were the local community, company/permit holder, relevant institutions (government), and buyers who performed plantation farming in PFMU Dharmasraya. Key informants in the local community included the customary/*ulayat* leader, leader of *Nagari*, *Ninik Mamak*, and Chairman of the Assembly of *Adat Nagari* (KAN, *Ketua Kerapatan Adat Nagari*) intending to collect information related to forest clearance viewed from the aspect of customary law.

The identification of forest cover changes was analyzed by satellite imagery. Map Obtained from the [earthexplorer.usgs.gov](http://earthexplorer.usgs.gov) website and downloaded by the data of the year that searched. Landsat map data processed using the NDVI (Normalized Difference Vegetation Index) method to obtain cover distribution in PFMU Dharmasraya.

### Data analysis

Data in this study were analyzed using the ongoing approach, which was not performed after data were collected entirely, but following the problem formulation, before field observation. Data analysis in qualitative study was continuously done from the beginning of the proposal drafting process until study result writing (Afrizal 2015). Stages conducting during the activities of data collection and analysis in the qualitative study are inseparable; thus, it is simultaneously done. In this study, data analysis was applied using the interactive model included data reduction, data presentation, conclusion drawing and verification (Miles, Huberman and Saldana 2014).

## RESULTS AND DISCUSSION

### History of forest management in Dharmasraya

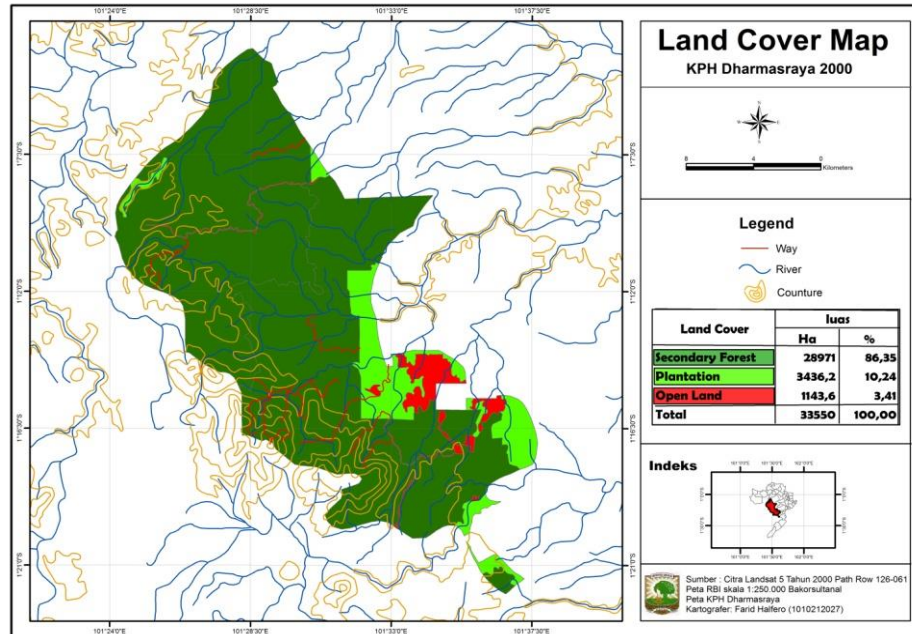
There is a long history regarding the establishment of PFMU Dharmasraya in 2013. In 1972, Forest Concession License (HPH, *Hak Pengelolaan Hutan*) for 30 years was granted to PT. Ragusa for forest area of 66,000 ha, which expired in 2002. In 1986 and 1998, PT. Incasi Raya and PT. Selago Makmur Plantation (SMP), respectively, obtained land-use right to exploit (HGU, *Hak Guna Usaha*) some of the forest areas to be further converted into oil palm plantation.

Following the expiration of HPH in 2002, land-use right was granted to PT. Inhutani, thus the forest was later functioned as the Industrial Forest Plantation (HTI, *Hutan Tanaman Industri*). PT. Inhutani IV was given a permit to manage forest area of 40.000 Ha for IFP. The IFP was developed to reduce illegal logging and forest encroachment done by the local community. However, PT. Inhutani IV, as the operator of forest management, was considered failed to manage the forest area, thus other companies, namely PT. Dara Silva Lestari (DSL) and PT. Bukit Raya Mudisa (BRM) was granted a forest concession license for some of the forest areas in 2009. The unclear forest management results in forest damage and conflict between stakeholders in claiming forest ownership (Sylviani and Hakim, 2014).

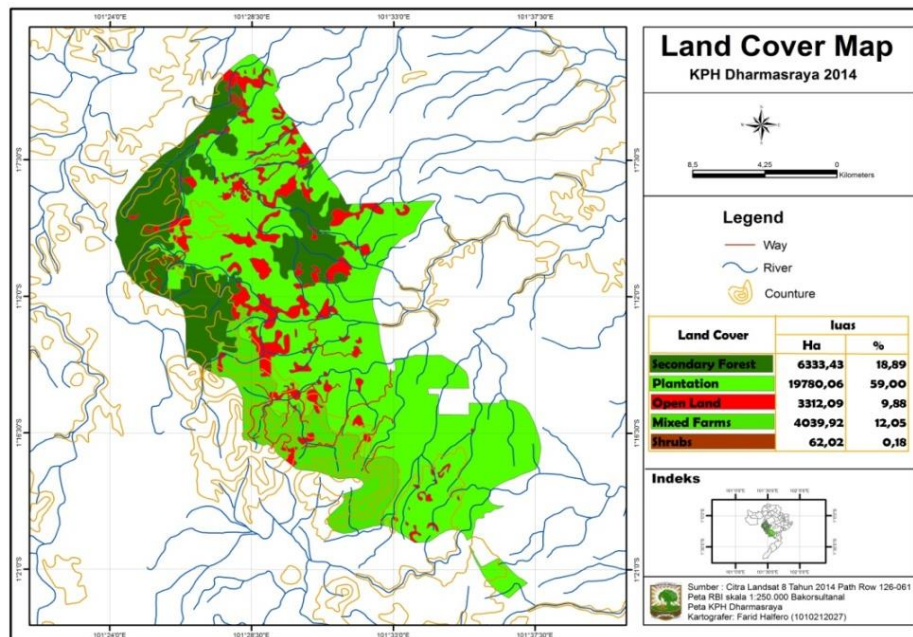
In 2013, Industrial Forest Plantation (IFP) of PT. Inhutani, DSL, and BRM were established as PFMU Dharmasraya by the Ministry of Environment. The total forest area managed by PFMU is approximately 33,550 ha. The PFMU does not have the function as a permit holder. It serves as a forest management operator, which is responsible for ensuring the forest is managed correctly according to its function.

### Forest conversion to plantation

Analysis result of geographic information system (GIS) analysis between 2000-2014 depicted rapid deforestation in PFMU Dharmasraya. In 2000, secondary forest in PFMU Dharmasraya reached 86% of the total area, while open land and plantation areas were only 3% and 10% of total area, respectively. However, at the end of 2014, forest cover significantly decreased to only 16% of the total area. Plantation (rubber and oil palm) experienced a significant increase from 10% in 2000 to 59% in 2014 (Figure 1 and 2, and Table 1).



**Figure 1.** Forest cover in PFMU Dharmasraya 2000



**Figure 2.** Forest cover in PFMU Dharmasraya 2000

Forest conversion to the plantation in PFMU Dharmasraya was observed to be supported by the ease of access to the forest through the former HPH project road, increase in plantation commodity prices, population growth, land requirement for agriculture and plantation, and the high number of people who wanted to own plantation area, either the local community around Bonjol or those living outside the Dharmasraya Regency. Technological advances play a role in disseminating information about forest encroachment, which includes buying and selling forests (Yanfika et al. 2019; Listiana et al. 2019). The agricultural expansion was also considered as one of the factors causing deforestation (Dalla-Nora ET AL. 2014). In addition to those situations, forest conversion in PFMU Dharmasraya was also motivated by plantation expansion.

**Table 1.** Development of plantation in PFMU Dharmasraya in 2000-2014

Forest cover	Percentage of total 32,749 ha (Year)			
	2000	2005	2011	2014
Secondary forest	86.35	71.81	40.01	18.89
Plantation	10.24	23.61	52.91	59.00
Open land/bushes	3.41	4.58	7.08	22.11
Total (100 Percent)	100.00	100.00	100.00	100.00

Source: Analysis of satellite image processing

### Perception and attitude of local community towards forest conversion

Forest conversion in PFMU Dharmasraya is an interesting topic to investigate. An important aspect of forest conversion in PFMU Dharmasraya is the collective action of the local community to convert forest into the plantation. Based on the study result, all respondents (100%) perceived that the local/customary communities own forest. They claimed that the state does not have the right for forest management since the local community has been managing and controlling forests even before this state/country existed. The entire community (100%) rejected the regulation related to forest use under state law (Table 2).

The community perceived that forest provides an economic benefit (77.50%), direct health benefits (42.50%), environmental health benefits (60%), dan other forest uses (17.50%). According to the local community, the most significant benefit provided by forest is wood availability, which can be used as the source of income. Despite its economic benefit, the community thought that forest existence does not provide a significant contribution to the aspect of the economy (Table 2 No. 3). Forest cannot improve the community's economic standard of living. Hence, the impact of forest conversion in terms of economic aspect (source of income, employment, and food) was considered low by the local community (below 20%). The community believed that forest existence does not significantly contribute to the economy. Thus forest conversion to the plantation is the best option for forest management.

In terms of the environmental aspect, the conversion of forest into plantation did not significantly impact the environment. It was observed that the local community experienced climate change, such as a longer dry season, uncertain rainy season, decreasing water supply, and floods during the rainy season. However, they believed these events are not caused by forest conversion to plantation since the phenomena of environmental change is a common thing that occurs in most regions.

The local community agreed on the activity to convert forest into plantation because they considered that forest conversion would have a better impact on the economy compared to the activity of forest preservation. Only about 7.50% of the local community experienced the negative impact of forest conversion, but the positive impact gained from forest conversion was still considered higher. Positive impact mostly perceived by the local community due to forest conversion was the expansion of the plantation area and an increase in community income. The community agreed with the statement, "The best benefit provided by forest is obtained by converting it to the plantation." Forest conversion to plantation leads to a direct impact on the aspect of the economy. Forest conversion has opened farming opportunities and increased the community's economy in Nagari Bonjol and its surrounding area through rubber and oil palm plantation.

**Table 2.** Perception and attitude of local community towards forest conversion to plantation in Dharmasraya Regency

No	Statement	Response (%)	
		State	Custom
<b>6. Ownership of forest</b>			
	Forest ownership in PFMU Dharmasraya	100.00	0.00
	PFMU Dharmasraya forest is owned by customary community	Yes (100.00)	
	Local/customary community is the most appropriate party to manage forest	Yes (100.00)	
	Those intend to manage forest must obtain permit from the government/state	No (100.00)	
<b>7. Benefit of forest</b>		<b>Yes</b>	<b>No</b>
e.	Direct economic uses (Timber, mining, hunting)	77.50	22.50
f.	Direct health benefits (General welfare, medicine)	42.50	47.50
g.	Environmental health benefits (Cool shade, source of water, clear air, flood prevention)	60.00	40.00
h.	Other forest uses (Fish, forest gardens)	17.50	82.50
<b>8. Perception of local community: impact of forest conversion to economic aspect</b>		<b>Yes</b>	<b>No</b>
d.	Deforestation decreases community income	12.50	87.50



e. Deforestation eliminates source of job	7.50	92.50
f. Deforestation eliminates source of food	17.50	82.50
<b>9. Perception of local community: impact of forest conversion to environmental aspect</b>	<b>Yes</b>	<b>No</b>
e. Deforestation causes micro climate (uncertain weather)	37.50	62.50
f. Deforestation causes declining supply of clean water	32.50	67.50
g. Deforestation causes drought in dry season	25.00	75.00
h. Deforestation causes floods in rain season	57.50	42.50
<b>10. Attitude in land clearance</b>	<b>Yes</b>	<b>No</b>
Do you agree to clear forest for plantation?	100.00	0.00
Felling hutan memberikan dampak negatif	92.50	7.50
The greatest benefit of forest is obtained by preserving forest	0.00	100.00
The greatest benefit of forest is obtained by converting forest to plantation	100.00	0.00

Source: Primary Data (2018)

### Motive for forest conversion

The primary motive for forest conversion was found to be forest clearing for agricultural and plantation purposes. Another motive underlined forest clearance was forest felling as a mark of ownership over the forest. Many performed land clearing only to show forest ownership. The cleared forest was left uncultivated since the purpose of forest clearance was to claim that forest belongs to those conducting forest clearing. The motive for clearing forest to obtain ownership over the forest includes: ensuring forest ownership to run farming business in the future, as a mark of ownership for any parties who want to use/buy the cleared forest, and obtaining compensation from the state or company if the forest is taken over. Forest clearance in PFMU Dharmasraya mostly done through fire since it is considered to be more effective and inexpensive. The activity of forest clearance by a forest fire is often found in PFMU Dharmasraya.

Another motive for forest conversion is illegal logging. Based upon the applicable customary law in PFMU Dharmasraya, illegal logging is not illegal. Anyone obtaining the permit from the leader of *ulayat* is allowed to take wood from PFMU Dharmasraya. The local community does not agree on the existence of the state law regarding forest ownership in PFMU Dharmasraya. It is an evidence of forum shopping in law pluralism where one party (the community) tends to choose and obey customary law to use the forest as it allows them to cut down trees and clear the forest. To the local community, customary laws are considered to provide more benefits compared to state law. According to the customary law, forest in PFMU Dharmasraya belongs to *ulayat* (communal land) of Nagari Bonjol. Thus anyone intends to perform logging, and clearing forest only needs to obtain a permit from the leader of *ulayat*.

In PFMU Dharmasraya, collecting wood in the forest is seized as an opportunity to build road access to the forest. Forest with better road access is more expensive than that with poor road access. This situation later triggers the community to collect wood in the forest, thus accelerating forest conversion in PFMU Dharmasraya.

In conclusion, the local community believes that forest is owned by the customary community, not the state. Therefore, the state does not have the right to forest management since the local community has been managing the forest even before this state/country existed. The local community rejects the regulation stating those who want to utilize forests must obtain such permission from the government. The community perceived that forest provides an economic benefit (77.50%), direct health benefits (42.50%), environmental health benefits (60%), and other forest uses (17.50%). However, according to the local community, the most significant benefit provided by forest is wood availability. The community thought that forest existence does not provide a significant contribution to the aspect of the economy. Thus forest conversion to the plantation is the best option for forest management.

Conversion of the forest into plantation did not result in a significant impact to the environment. Although the local community experienced climate change, the local community still believed that climate change is not caused by forest conversion to the plantation. The local community agreed on the activity to convert forest into plantation because the local community considered that forest conversion would have a better impact on the economy compared to the activity of forest preservation. About 7.50% of the local community experienced the negative impact of forest conversion, but the positive impact gained from forest conversion was still considered higher. Positive impact mostly perceived by the local community due to forest conversion was the expansion of the plantation area and an increase in community income.

The primary motive was found to be forest clearing for agricultural and plantation purposes. Another motive underlined forest clearance was forest felling as a mark of ownership over the forest. The cleared forest was left uncultivated since the purpose of forest clearance was to claim that forest belongs to those conducting forest clearing.

## ACKNOWLEDGEMENTS

Acknowledgments are expressed in a brief; all sources of institutional, private and corporate financial support for the work must be fully acknowledged, and any potential conflicts of interest are noted.

## REFERENCES

- Afrizal. 2015. Metode Penelitian Kualitatif: Sebuah Upaya Mendukung Penggunaan Penelitian Kualitatif dalam Berbagai Disiplin Ilmu. Raja Grafindo Persada, Jakarta.
- Aju PC. 2014. The role of forestry in agriculture and food security. *American Journal of Research Communication* 2(6): 109-121
- Andini AR. 2017. Identitas dan kebijakan luar negeri: Komitmen Jepang terhadap penanganan illegal logging di Indonesia dalam kerangka *asia forest partnership* tahun 2002 – 2012. *Journal of International Relations* 3(1): 98-105.
- Armida S, Alisjahbana, Busch JM. 2017. Forestry, forest fires, and climate change in Indonesia. *Bulletin of Indonesian Economic Studies* 53(2): 111-136. DOI:10.1080/00074918.2017.1365404
- Austin KG, Schwantes A, Gu Y, Kasibhatla PS. 2019. What causes deforestation in Indonesia?. *Environmental Research Letters* 14: 024007.
- Chen, B. Kennedy CM, Xu B. 2019. Effective moratoria on land acquisitions reduce tropical deforestation: evidence from Indonesia. *Environmental Research Letters* 14: 044009.
- Dalla-Nora EL, de Aguiar APD, Lapola DM, Woltjer G. 2014. Why have land use change models for the Amazon failed to capture the amount of deforestation over the last decade? *Land Use Policy* 39: 403–411. <http://doi.org/10.1016/j.landusepol.2014.02.004>.
- Dasrizal, Barlian E, Rezki A, Tutri R, Farida. 2019. The struggle of indigenous people: an overview recognition of customary forest in Minangkabau, Indonesia. *International Journal of Environmental Science and Development* 10(7): 2011-2015.
- Eldeeb O, Prochazka P, Maitah M. 2015. Causes for deforestation in Indonesia: Corruption and palm tree plantation. *Asian Social Science* 11 (27): 120-124.
- Fisher MR, Moeliono M, Mulyana A, Yuliani EL, Adriadi A, Kamaluddin, Judda J, Sahide M.A.K. 2018. Assessing the new social forestry project in Indonesia: recognition, livelihood and conservation?. *International Forestry Review* 20(3): 346-361.
- Handoko C. 2014. Some problems in maintaining sustainability of Indonesia's Forests: descriptive study. *Indonesian Journal of Forestry Research* 1(1): 33-46.
- Husodo T, Febrianto P, Megantara EN, Shanida SS, Pujianto MP. 2019. Diversity of mammals in forest patches of Cisokan, Cianjur, West Java, Indonesia. *Biodiversitas* 20: 1281-1288.
- Ifrani, Abby FH, Barkatullah AH, Nurhayati Y, Said MY. 2019. Forest Management Based on Local Culture of Dayak Kotabaru in the Perspective of Customary Law for a Sustainable Future and Prosperity of the Local Community. *Resources* 8: 78; doi:10.3390/resources8020078
- Juarez-Orozco SM, Siebe C, Fernandez DFY. 2017. Causes and effects of forest fires in tropical rainforests: A bibliometric approach. *Tropical Conservation Science* 10: 1–14.
- Kementerian Lingkungan Hidup dan Kehutanan Republik Indonesia. 2018. Status Hutan dan Kehutanan Indonesia 2018. Kementerian Lingkungan Hidup dan Kehutanan Republik Indonesia, Jakarta.
- Khalid F, Babar TM, Jamil A, Kamal H, Afzal T, et al. 2019. Multiple impacts of illegal logging: A key to deforestation over the globe. *Biomed J Sci & Tech Res* 20(5): 15430-15435.
- Lestawi IN, Bunga D. 2020. The Role of customary law in the forest preservation in Bali. *Journal of Landscape Ecology* 13 (1): 25-41.
- Listiana I, Efendi I, Mutolib A, Rahmat A. 2019. The behavior of extension agents in utilizing information and technology to improve the performance of extension agents in Lampung Province. *Journal of Physics: Conf. Series* 1155: 012004.
- Marta AD, Suwaryo U, Sulaeman A, Agustino L. 2019. Dilemma of customary land policy in Indonesia. *Masyarakat, Kebudayaan dan Politik* 32(2): 134-143.
- Matsvange D, Sagonda R, Kaundikiza M. 2016. The role of communities in sustainable land and forest management: The case of Nyanga, Zvimba and Guruve districts of Zimbabwe. *Jambá: Journal of Disaster Risk Studies* 8(3), a281.
- Mccarthy JF, Robinson, K.M. 2016. Land and Development in Indonesia: Searching for the People's Sovereignty. ISEAS – Yusof Ishak Institute: Singapore.
- Miles MB, Huberman AM, Saldana J. 2014. *Qualitative Data Analysis, A Methods Sourcebook*, Edition 3. USA: Sage Publications. Terjemahan Tjetjep Rohindi Rohidi, UI-Press.
- Murniati K, Mutolib A. 2020. The impact of climate change on the household food security of upland rice farmers in Sidomulyo, Lampung Province, Indonesia. *Biodiversitas* 21(8): 3487-3493.
- Mutolib A, Yonariza, Mahdi, Ismono H. 2017. Forest ownership conflict between a local community and the state: a case study in Dharmasraya, Indonesia. *Journal of Tropical Forest Science* 29(2): 163-171.
- Mutolib A, Yonariza, Rahmat A, Yanfika H. 2020. Competition among actors and challenges of production forest management in Dharmasraya, West Sumatera. *IOP Conf. Series: Earth and Environmental Science* 399 (2019) 012074
- Muur WFD. 2018. Forest conflicts and the informal nature of realizing indigenous land rights in Indonesia. *Citizenship Studies* 22(2): 160-174. DOI:10.1080/13621025.2018.1445495
- Nugroho HYSH, Veen AVD, Skidmore AK, Hussin YA. 2018. Expansion of traditional land-use and deforestation: a case study of an adat forest in the Kandilo Subwatershed, East Kalimantan, Indonesia. *J. For. Res.* 29(2): 495–513.
- Pachmann A. 2018. Corruption and deforestation in Indonesia. *Regional Formation and Development Studies* 2 (25): 57-64.
- Poudyal BH, Maraseni T, Cockfield G. 2019. Scientific Forest management practice in Nepal: critical reflections from stakeholders' perspectives. *Forests* 2020, 11, 27; doi:10.3390/f11010027.
- Purwawangsa H. 2017. Instrumen kebijakan untuk mengatasi konflik di kawasan hutan konservasi. *Risalah Kebijakan Pertanian dan Lingkungan* 4(1): 28-47.
- Rahmat A, Zaki MK, Effendi I, Mutolib A, Yanfika H, Listiana I. 2019. Effect of global climate change on air temperature and precipitation in six cities in Gifu Prefecture, Japan. *Journal of Physics: Conf. Series* 1155: 012070



- Santika T, Meijaard E, Budiharta S, Law EA, Kusworo A, Hutabarat JA, Indrawan TP, Struebig M, Raharjo S, Huda I, Sulhani, Ekaputri AD, Trison S, Stigner M, Wilson KA. 2017. Community forest management in Indonesia: Avoided deforestation in the context of anthropogenic and climate complexities. *Global Environmental Change* 46: 60–7161.
- Subarudi. 2014. Policy of customary forest management after Constitutional Justice Degree No. 35/PUU-X/2012: A Critical Review. *Jurnal Analisis Kebijakan Kehutanan* 11(3): 2007-224.
- Surati. 2014. Attitude and behavior analysis of communities toward Parung Panjang Research Forest. *Jurnal Penelitian Sosial dan Ekonomi Kehutanan* 11(4): 339 – 347.
- Sylviani, Hakim I. 2014. Analisis tenurial dalam pengembangan kesatuan pengelolaan hutan: Studi kasus KPH Gedong Wani, Provinsi Lampung. *Jurnal Penelitian Sosial Dan Ekonomi Kehutanan* 11(4): 309–322.
- Tacconia L, Rodriguesa RJ, Maryudi A. 2009. Law enforcement and deforestation: Lessons for Indonesia from Brazil. *Forest Policy and Economics* 108:101943.
- Vijay V, Pimm SL, Jenkins CN, Smith SJ. 2016. The Impacts of oil palm on recent deforestation and biodiversity loss. *PLoS ONE* 11(7): e0159668.
- Wegscheider S, Purwanto J, Margono BA, Nugroho S, Budiharto, Buchholz G, Sugardiman RA. 2018. Current achievements to reduce deforestation in Kalimantan. *Indonesian Journal of Geography* 50(2): 109 - 120. DOI: <http://dx.doi.org/10.22146/ijg.23680>
- West Sumatra Forestry Service. 2018. Sekilas Hutan Sumbar. <https://dishut.sumbarprov.go.id/details/pages/1> [Accessed 05 August 2020].
- Yanfika H, Listiana I, Mutolib A, Rahmat A. 2019. Linkages between extension institutions and stakeholders in the development of sustainable fisheries in Lampung Province. *Journal of Physics: Conf. Series* 1155: 012014.

## 5. Bukti Hasil Review dari Reviewer 1 dan 2 (11 dan 15 September 2020)

Biodiversitas Journal of Biological Diversity Tasks 0 English View Site kordiyana

<a href="#">[biodiv] Editor Decision</a>	2020-09-23 01:31 PM
<a href="#">[biodiv] Editor Decision</a>	2020-09-30 04:00 PM
<a href="#">[biodiv] Editor Decision</a>	2020-09-30 04:02 PM

**Reviewer's Attachments** Search

 29208-1	, 6572-Article Text-28927-1-4-20200907 (1).doc	September 11, 2020
 29368-1	, 6572-Article Text-28927-1-4-20200907 REVIEW ARTIKEL.doc	September 15, 2020

## 6. Hasil Review dari Reviewer 1

### Perception, attitude, and motive of local community towards forest conversion to plantation in Dharmasraya Regency, West Sumatra

**Abstract.** Forest conversion in Dharmasraya Regency massively occurred from 2000 to 2014. In 2000, forest area reached 86% of 33,550 ha, while the area of open land and plantation covered 3% and 10%, respectively, of the total area. In 2014, forest cover reduced to only 16% with an increase in plantation area (rubber and oil palm), covering 59% of the total area. This study was aimed to examine the perception, attitude, and motive of the local community regarding forest conversion to the plantation. This study was located in PFMU (Production Forest Management Unit) Dharmasraya West Sumatra, which included a production forest area of 33,550 ha. Nagari Bonjol was selected as the main research site with the consideration that forest belongs to a customary lawful community within the area. This study was conducted from February to August 2017 by applying qualitative experimental design with a case study approach. The type of data used consisted of primary and secondary data. A total of 40 households, both directly and indirectly related to forest clearing, was selected as respondents. Snowball sampling was applied to interview the key informants. Data were analyzed using the interactive model, which included data reduction, data presentation, also conclusion drawing and verification. The study result indicated that forest is owned by the local community based upon the customary law, and the state does not have the right to manage and claim forest ownership. In terms of the economic aspect, the community benefited greatly from wood availability in the forest as the source of income. According to the local community, the conversion of forests into plantation did not have a significant effect on the environment. In fact, the local community agreed that land-use change from forest to plantation will provide greater benefit than preserving the forest. The expansion of plantation was found to be the motive for land clearance by cutting trees to obtain ownership over the forest.

**Keywords:** forest land-use change, motive, perception, PFMU Dharmasraya, plantation

**Abbreviations:** PFMU Dharmasraya: Production Forest Management Unit Dharmasraya, KAN : *Ketua Kerapatan Adat Nagari* (Assembly of *Adat Nagari*), NDVI: Normalized Difference Vegetation Index, HPH : *Hak Pengelolaan Hutan*(Forest Concession License), HGU: *Hak Guna Usaha*(land-use right to exploit), HTI: *Hutan Tanaman Industri*(Industrial Forest Plantation/IFP), GIS: geographic information system.

**Running title:** perception of local community on forest conversion

## INTRODUCTION

Indonesia has the third-largest tropical forest in the world and the first in Asia after Brazil and the Democratic Republic of the Congo (Andini 2017; Armida, Alisjahbana and Busch 2017; Juarez-Orozco, Siebe and Fernandez 2017). According to the Ministry of Environment in 2018, tropical forest and water conservation areas in Indonesia reached 125,9 million hectares. In terms of function, forest area in Indonesia is classified into three functions: Production Forest of 68.8 million hectares, Protection Forest of 29.7 million hectares, and Conservation Forest of 22.1 million hectares (Ministry of Forestry Republic Indonesia 2018). However, deforestation has threatened the forest existence in Indonesia (Tacconia, Rodrigues and Maryudi 2009) and impact on climate change globally (Rahmat et al. 2019; Murniati and Mutolib 2020). The rate of deforestation in Indonesia reached 1.3 million per year between 2000 and 2012 (Wegscheider et al. 2018). The primary factor causing forest deforestation includes the expansion of small-scale agriculture (Mutolib et al. 2017; Austin et al. 2019), oil palm plantation (Eldeeb et al. 2015, Vijay et al.



2016), illegal logging (Khalid et al. 2029), corruption (Eldeeb 2015; Pachmann 2018), granting of forest concession (Santika et al. 2017; Chen 2019), and human settlement (Nugroho et al. 2018; Husodo et al. 2019).

About 48 million people of Indonesia live around the forest area and highly depend on forest products (McCarthy and Robinson 2016; Fisher et al 2018). Forest is inseparable from the community life for its function as the source of food, medicines, and income (Aju 2014). The relationship between forest and community in Indonesia is supported by the existence of customary law (Marta et al. 2019; Dasrizal et al. 2019; Irfani et al. 2019) that provides the opportunity for the local community to manage forest areas (Mutolib et al. 2020; Lestawi and Bunga 2020). Several studies have shown that the local community can perform proper and sustainable forest management (Handoko 2014; Matsvange et al. 2016; Poudyal et al. 2019).

Legal pluralism of forest ownership in Indonesia occurs due to forest claim between the state and local/customary lawful community (Mutolib et al. 2017). Forest is claimed as state-owned property, while it is also claimed as *ulayat*/customary forest by the indigenous community (Muur 2018). The Decision of the Constitutional Court No. 35/PUU-X/2020 reviewing the Law No. 41 in 1999 has removed customary forest from state forest (Subarudi 2014). Prior to The Decision of the Constitutional Court No. 35/PUU-X/2020, the customary forest is claimed as state forest. Thus local/customary communities must obtain a permit from the government to manage the forest. The government continues to reduce community activity around the forest. It has the potential to damage forest sustainability (Surati 2014; Purwawangsa 2017), even though several studies observed that the customary community could preserve the forest (Handoko 2014; Matsvange et al. 2016; Poudyal et al. 2019). Still, an in-depth study is necessary to examine facts regarding customary community and efforts to sustain forest area, whether the customary community can preserve the forest if they manage it themselves, and ensure that forest management by the local community will have an impact on forest sustainability.

One of the areas where customary law exists and develops within the community life is the area inhabited by Minangkabau ethnic in the West Sumatra Province. This province has an area of 42.2 thousand km<sup>2</sup>, and about 56.27% of the administrative area is state-owned forest. Forest area in West Sumatra consists of the area for conservation (806,939), protection (791,671 ha), and production (731,448 ha) (West Sumatra Forestry Service 2018). This study was conducted in Dharmasraya Regency with a total forest area of 53,594 ha (West Sumatra Forestry Service 2018), yet massive forest conversion continuously occurs. Deforestation and land-use change in Dharmasraya Regency is an interesting topic to investigate since it is believed that the local community is involved in forest conversion. This study was aimed to investigate the perception, attitude, and motive of the local community towards forest conversion to the plantation. The finding of this research is expected to provide new information regarding the motive and reason for community-related to the forest conversion process.

## MATERIALS AND METHODS

### Study area and time research

The study was carried out in Dharmasraya Regency which is geographically located at the southeast end of West Sumatra with geographical coordinates between 000 47' 7" - 010 41' 56" S and 1010 9' 21" - 1010 54' 27" E. In term of topography, Dharmasraya Regency is mostly flatland at an elevation of 82 – 5,525 meter above sea level. Specifically, the study site is under the area of Production Forest Management Unit (PFMU) Dharmasraya, which includes a total production forest area of 33,550 ha. PFMU Dharmasraya is administratively under the authority of Nagari Bonjol and Nagari Abai Siat in Koto Besar Subdistrict, and Nagari Sikabau and Nagari Sungai Dareh in Pulau Punjung Subdistrict. Forest in PFMU Dharmasraya is also an *ulayat* (customary forest) belongs to the local community living in the four Nagari. However, Nagari Bonjol was selected as the main focus in this study by taking into consideration that PFMU Dharmasraya legally owned by the local community of Nagari Bonjol.

The time and stage of the study were divided into two stages. The first stage of the study was a preliminary study aimed at identifying research sites and forest management problems. A preliminary study was conducted in January 2016. Data collection to answer problem formulation and research objective was done from February to August 2018.

### Methods and source of data

The study applied a qualitative experimental design with a case study approach. Format of qualitative study aims to describe, to summarize various conditions, situations, or phenomena of social reality, or study that collects and analyzes data in the form of words (oral and written) and human behavior without any attempts to quantify the data obtained (Afriзал 2015). This study used both primary and secondary data. Primary data were obtained through a household survey, interview with key informants, direct observation, and documentation. A total of 40 households in Nagari Bonjol, directly and indirectly, related to forest clearance, were selected as respondents. Informants in this

study were determined using the method of snowball sampling. Secondary data were obtained from the literature study and documents from many institutions related to this study.

Through a non-ethnographic qualitative approach, the data collection technique was applied since the author did not participate in the social life of a group/community for data collection (Afrizal 2015). Key informants were the local community, company/permit holder, relevant institutions (government), and buyers who performed plantation farming in PFMU Dharmasraya. Key informants in the local community included the customary/*ulayat* leader, leader of *Nagari*, *Ninik Mamak*, and Chairman of the Assembly of *Adat Nagari* (KAN, *Ketua Kerapatan Adat Nagari*) intending to collect information related to forest clearance viewed from the aspect of customary law.

The identification of forest cover changes was analyzed by satellite imagery. Map Obtained from the [earthexplorer.usgs.gov](http://earthexplorer.usgs.gov) website and downloaded by the data of the year that searched. Landsat map data processed using the NDVI (Normalized Difference Vegetation Index) method to obtain cover distribution in PFMU Dharmasraya.

### **Data analysis**

Data in this study were analyzed using the ongoing approach, which was not performed after data were collected entirely, but following the problem formulation, before field observation. Data analysis in qualitative study was continuously done from the beginning of the proposal drafting process until study result writing (Afrizal 2015). Stages conducting during the activities of data collection and analysis in the qualitative study are inseparable; thus, it is simultaneously done. In this study, data analysis was applied using the interactive model included data reduction, data presentation, conclusion drawing and verification (Miles, Huberman and Saldana 2014).

## **RESULTS AND DISCUSSION**

### **History of forest management in Dharmasraya**

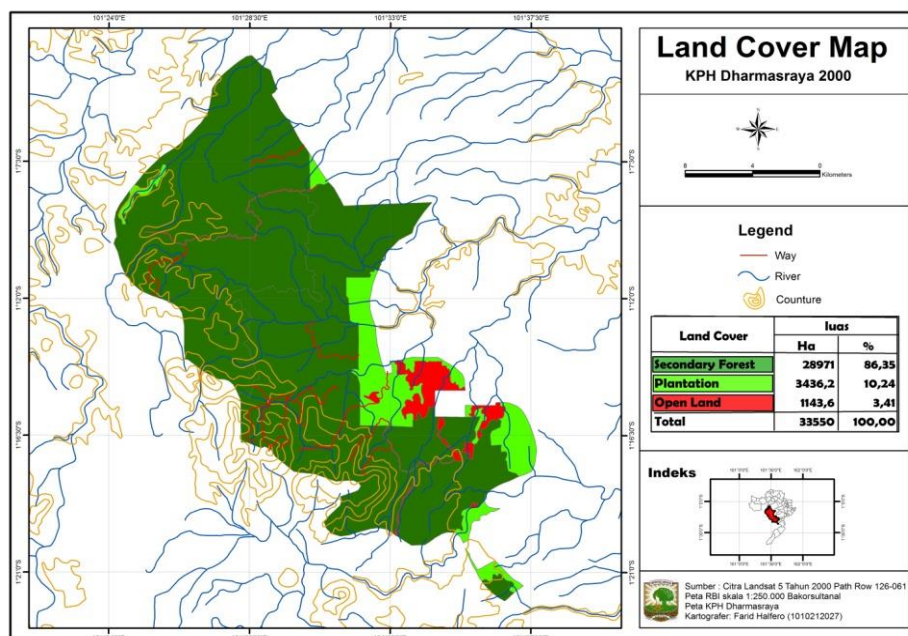
There is a long history regarding the establishment of PFMU Dharmasraya in 2013. In 1972, Forest Concession License (HPH, *Hak Pengelolaan Hutan*) for 30 years was granted to PT. Ragusa for forest area of 66,000 ha, which expired in 2002. In 1986 and 1998, PT. Incasi Raya and PT. Selago Makmur Plantation (SMP), respectively, obtained land-use right to exploit (HGU, *Hak Guna Usaha*) some of the forest areas to be further converted into oil palm plantation.

Following the expiration of HPH in 2002, land-use right was granted to PT. Inhutani, thus the forest was later functioned as the Industrial Forest Plantation (HTI, *Hutan Tanaman Industri*). PT. Inhutani IV was given a permit to manage forest area of 40.000 Ha for IFP. The IFP was developed to reduce illegal logging and forest encroachment done by the local community. However, PT. Inhutani IV, as the operator of forest management, was considered failed to manage the forest area, thus other companies, namely PT. Dara Silva Lestari (DSL) and PT. Bukit Raya Mudisa (BRM) was granted a forest concession license for some of the forest areas in 2009. The unclear forest management results in forest damage and conflict between stakeholders in claiming forest ownership (Sylviani and Hakim, 2014).

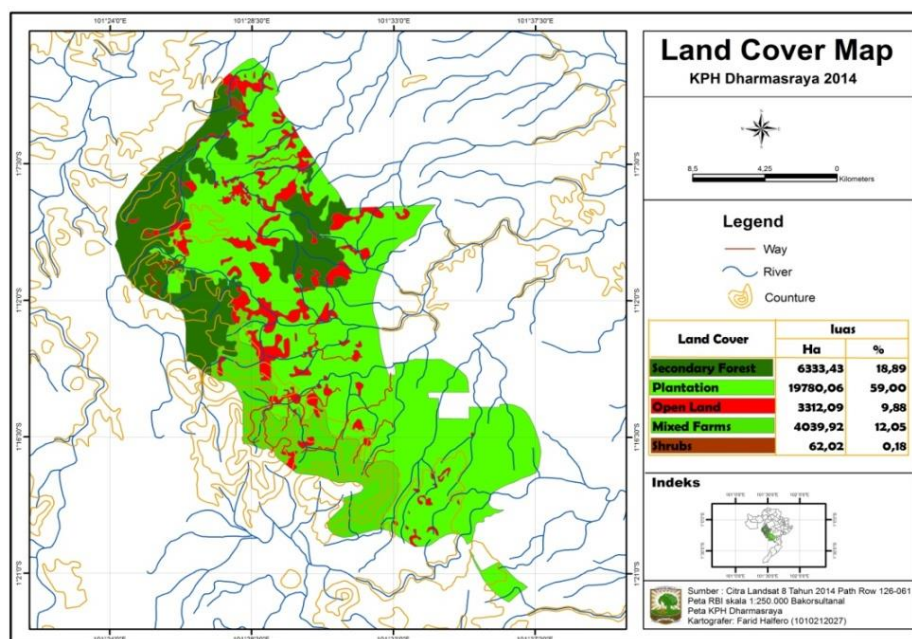
In 2013, Industrial Forest Plantation (IFP) of PT. Inhutani, DSL, and BRM were established as PFMU Dharmasraya by the Ministry of Environment. The total forest area managed by PFMU is approximately 33,550 ha. The PFMU does not have the function as a permit holder. It serves as a forest management operator, which is responsible for ensuring the forest is managed correctly according to its function.

### **Forest conversion to plantation**

Analysis result of geographic information system (GIS) analysis between 2000-2014 depicted rapid deforestation in PFMU Dharmasraya. In 2000, secondary forest in PFMU Dharmasraya reached 86% of the total area, while open land and plantation areas were only 3% and 10% of total area, respectively. However, at the end of 2014, forest cover significantly decreased to only 16% of the total area. Plantation (rubber and oil palm) experienced a significant increase from 10% in 2000 to 59% in 2014 (Figure 1 and 2, and Table 1).



**Figure 1.** Forest cover in PFMU Dharmasraya 2000



**Figure 2.** Forest cover in PFMU Dharmasraya 2000

Forest conversion to the plantation in PFMU Dharmasraya was observed to be supported by the ease of access to the forest through the former HPH project road, increase in plantation commodity prices, population growth, land requirement for agriculture and plantation, and the high number of people who wanted to own plantation area, either the local community around Bonjol or those living outside the Dharmasraya Regency. Technological advances play a role in disseminating information about forest encroachment, which includes buying and selling forests (Yanfika et al. 2019; Listiana et al. 2019). The agricultural expansion was also considered as one of the factors causing deforestation (Dalla-Nora ET AL. 2014). In addition to those situations, forest conversion in PFMU Dharmasraya was also motivated by plantation expansion.

**Table 1.** Development of plantation in PFMU Dharmasraya in 2000-2014

Forest cover	Percentage of total 32,749 ha (Year)			
	2000	2005	2011	2014
Secondary forest	86.35	71.81	40.01	18.89
Plantation	10.24	23.61	52.91	59.00
Open land/bushes	3.41	4.58	7.08	22.11
Total (100 Percent)	100.00	100.00	100.00	100.00

Source: Analysis of satellite image processing

### Perception and attitude of local community towards forest conversion

Forest conversion in PFMU Dharmasraya is an interesting topic to investigate. An important aspect of forest conversion in PFMU Dharmasraya is the collective action of the local community to convert forest into the plantation. Based on the study result, all respondents (100%) perceived that the local/customary communities own forest. They claimed that the state does not have the right for forest management since the local community has been managing and controlling forests even before this state/country existed. The entire community (100%) rejected the regulation related to forest use under state law (Table 2).

The community perceived that forest provides an economic benefit (77.50%), direct health benefits (42.50%), environmental health benefits (60%), dan other forest uses (17.50%). According to the local community, the most significant benefit provided by forest is wood availability, which can be used as the source of income. Despite its economic benefit, the community thought that forest existence does not provide a significant contribution to the aspect of the economy (Table 2 No. 3). Forest cannot improve the community's economic standard of living. Hence, the impact of forest conversion in terms of economic aspect (the lost of source of income, employment, and food) was considered low by the local community (below 20%). The community believed that forest existence does not significantly contribute to the economy. Thus forest conversion to the plantation is the best option for forest management.

In terms of the environmental aspect, the conversion of forest into plantation did not significantly impact the environment. It was observed that the local community experienced climate change, such as a longer dry season, uncertain rainy season, decreasing water supply, and floods during the rainy season. However, they believed these events are not caused by forest conversion to plantation since the phenomena of environmental change is a common thing that occurs in most regions.

The local community agreed on the activity to convert forest into plantation because they considered that forest conversion would have a better impact on the economy compared to the activity of forest preservation. Only about 7.50% of the local community experienced the negative impact of forest conversion, but the positive impact gained from forest conversion was still considered higher. Positive impact mostly perceived by the local community due to forest conversion was the expansion of the plantation area and an increase in community income. The community agreed with the statement, "The best benefit provided by forest is obtained by convert the forest to the plantation." Forest conversion to plantation leads to a direct impact on the aspect of the economy and opened farming opportunities and increased the community's economy in Nagari Bonjol and its surrounding area through rubber and oil palm plantation.

**Table 2.** Perception and attitude of local community towards forest conversion to plantation in Dharmasraya Regency

No	Statement	Response (%)	
		State	Custom
<b>11. Ownership of forest</b>			
	Forest ownership in PFMU Dharmasraya	100.00	0.00
	PFMU Dharmasraya forest is owned by customary community	Yes (100.00)	
	Local/customary community is the most appropriate party to manage forest	Yes (100.00)	
	Those intend to manage forest must obtain permit from the government/state	No (100.00)	
<b>12. Benefit of forest</b>		<b>Yes</b>	<b>No</b>
i.	Direct economic uses (Timber, mining, hunting)	77.50	22.50
j.	Direct health benefits (General welfare, medicine)	42.50	47.50
k.	Environmental health benefits (Cool shade, source of water, clear air, flood prevention)	60.00	40.00
l.	Other forest uses (Fish, forest gardens)	17.50	82.50
<b>13. Perception of local community: impact of forest conversion to economic aspect</b>		<b>Yes</b>	<b>No</b>

g. Deforestation decreases community income	12.50	87.50
h. Deforestation eliminates source of job	7.50	92.50
i. Deforestation eliminates source of food	17.50	82.50
<b>14. Perception of local community: impact of forest conversion to environmental aspect</b>	<b>Yes</b>	<b>No</b>
i. Deforestation causes micro climate (uncertain weather)	37.50	62.50
j. Deforestation causes declining supply of clean water	32.50	67.50
k. Deforestation causes drought in dry season	25.00	75.00
l. Deforestation causes floods in rain season	57.50	42.50
<b>15. Attitude in land clearance</b>	<b>Yes</b>	<b>No</b>
Do you agree to clear forest for plantation?	100.00	0.00
Felling hutan memberikan dampak negatif	92.50	7.50
The greatest benefit of forest is obtained by preserving forest	0.00	100.00
The greatest benefit of forest is obtained by converting forest to plantation	100.00	0.00

Source: Primary Data (2018)

### Motive for forest conversion

The primary motive for forest conversion was found to be forest clearing for agricultural and plantation purposes. Another motive underlined forest clearance was forest felling as a mark of ownership over the forest.. The cleared forest was left uncultivated since the purpose of forest clearance was to claim that forest belongs to those conducting forest clearing. The motive for clearing forest to obtain ownership over the forest includes: ensuring forest ownership to run farming business in the future, as a mark of ownership for any parties who want to use/buy the cleared forest, and obtaining compensation from the state or company if the forest is taken over. Forest clearance in PFMU Dharmasraya mostly done through fire because be more effective and inexpensive..

Another motive for forest conversion is illegal logging. Based upon the applicable customary law in PFMU Dharmasraya, illegal logging is not illegal (by local law and local perspective). Anyone obtaining the permit from the leader of *ulayat* is allowed to take wood from PFMU Dharmasraya. The local community does not agree on the existence of the state law regarding forest ownership in PFMU Dharmasraya. It is an evidence of forum shopping in law pluralism where one party (the community) tends to choose and obey customary law to use the forest as it allows them to cut down trees and clear the forest. To the local community, customary laws are considered to provide more benefits compared to state law. According to the customary law, forest in PFMU Dharmasraya belongs to *ulayat* (communal land) of Nagari Bonjol. Thus anyone intends to perform logging, and clearing forest only needs to obtain a permit from the leader of *ulayat*.

In PFMU Dharmasraya, collecting wood in the forest is seized as an opportunity to build road access to the forest. Forest with better road access is more expensive than that with poor road access. This situation later triggers the community to collect wood in the forest, thus accelerating forest conversion in PFMU Dharmasraya.

In conclusion, the local community believes that forest is owned by the customary community, not the state. Therefore, the state does not have the right to forest management since the local community has been managing the forest even before this state/country existed. The local community rejects the regulation stating those who want to utilize forests must obtain such permission from the government. The community perceived that forest provides an economic benefit (77.50%), direct health benefits (42.50%), environmental health benefits (60%), and other forest uses (17.50%). However, according to the local community, the most significant benefit provided by forest is wood availability. The community thought that forest existence does not provide a significant contribution to the aspect of the economy. Thus forest conversion to the plantation is the best option for forest management.

Conversion of the forest into plantation did not result in a significant impact to the environment. Although the local community experienced climate change, the local community still believed that climate change is not caused by forest conversion to the plantation. The local community agreed on the activity to convert forest into plantation because the local community considered that forest conversion would have a better impact on the economy compared to the activity of forest preservation. About 7.50% of the local community experienced the negative impact of forest conversion, but the positive impact gained from forest conversion was still considered higher. Positive impact mostly perceived by the local community due to forest conversion was the expansion of the plantation area and an increase in community income.

The primary motive was found to be forest clearing for agricultural and plantation purposes. Another motive underlined forest clearance was forest felling as a mark of ownership over the forest. The cleared forest was left uncultivated since the purpose of forest clearance was to claim that forest belongs to those conducting forest clearing.

## ACKNOWLEDGEMENTS

Acknowledgments are expressed in a brief; all sources of institutional, private and corporate financial support for the work must be fully acknowledged, and any potential conflicts of interest are noted.

## REFERENCES

- Afrizal. 2015. Metode Penelitian Kualitatif: Sebuah Upaya Mendukung Penggunaan Penelitian Kualitatif dalam Berbagai Disiplin Ilmu. Raja Grafindo Persada, Jakarta.
- Aju PC. 2014. The role of forestry in agriculture and food security. *American Journal of Research Communication* 2(6): 109-121
- Andini AR. 2017. Identitas dan kebijakan luar negeri: Komitmen Jepang terhadap penanganan illegal logging di Indonesia dalam kerangka *asia forest partnership* tahun 2002 – 2012. *Journal of International Relations* 3(1): 98-105.
- Armida S, Alisjahbana, Busch JM. 2017. Forestry, forest fires, and climate change in Indonesia. *Bulletin of Indonesian Economic Studies* 53(2): 111-136. DOI:10.1080/00074918.2017.1365404
- Austin KG, Schwantes A, Gu Y, Kasibhatla PS. 2019. What causes deforestation in Indonesia?. *Environmental Research Letters* 14: 024007.
- Chen, B. Kennedy CM, Xu B. 2019. Effective moratoria on land acquisitions reduce tropical deforestation: evidence from Indonesia. *Environmental Research Letters* 14: 044009.
- Dalla-Nora EL, de Aguiar APD, Lapola DM, Woltjer G. 2014. Why have land use change models for the Amazon failed to capture the amount of deforestation over the last decade? *Land Use Policy* 39: 403–411. <http://doi.org/10.1016/j.landusepol.2014.02.004>.
- Dasrizal, Barlian E, Rezki A, Tutri R, Farida. 2019. The struggle of indigenous people: an overview recognition of customary forest in Minangkabau, Indonesia. *International Journal of Environmental Science and Development* 10(7): 2011-2015.
- Eldeeb O, Prochazka P, Maitah M. 2015. Causes for deforestation in Indonesia: Corruption and palm tree plantation. *Asian Social Science* 11 (27): 120-124.
- Fisher MR, Moeliono M, Mulyana A, Yuliani EL, Adriadi A, Kamaluddin, Judda J, Sahide M.A.K. 2018. Assessing the new social forestry project in Indonesia: recognition, livelihood and conservation?. *International Forestry Review* 20(3): 346-361.
- Handoko C. 2014. Some problems in maintaining sustainability of Indonesia's Forests: descriptive study. *Indonesian Journal of Forestry Research* 1(1): 33-46.
- Husodo T, Febrianto P, Megantara EN, Shanida SS, Pujianto MP. 2019. Diversity of mammals in forest patches of Cisokan, Cianjur, West Java, Indonesia. *Biodiversitas* 20: 1281-1288.
- Ifrani, Abby FH, Barkatullah AH, Nurhayati Y, Said MY. 2019. Forest Management Based on Local Culture of Dayak Kotabaru in the Perspective of Customary Law for a Sustainable Future and Prosperity of the Local Community. *Resources* 8: 78; doi:10.3390/resources8020078
- Juarez-Orozco SM, Siebe C, Fernandez DFY. 2017. Causes and effects of forest fires in tropical rainforests: A bibliometric approach. *Tropical Conservation Science* 10: 1–14.
- Kementerian Lingkungan Hidup dan Kehutanan Republik Indonesia. 2018. Status Hutan dan Kehutanan Indonesia 2018. Kementerian Lingkungan Hidup dan Kehutanan Republik Indonesia, Jakarta.
- Khalid F, Babar TM, Jamil A, Kamal H, Afzal T, et al. 2019. Multiple impacts of illegal logging: A key to deforestation over the globe. *Biomed J Sci & Tech Res* 20(5): 15430-15435.
- Lestawi IN, Bunga D. 2020. The Role of customary law in the forest preservation in Bali. *Journal of Landscape Ecology* 13 (1): 25-41.
- Listiana I, Efendi I, Mutolib A, Rahmat A. 2019. The behavior of extension agents in utilizing information and technology to improve the performance of extension agents in Lampung Province. *Journal of Physics: Conf. Series* 1155: 012004.
- Marta AD, Suwaryo U, Sulaeman A, Agustino L. 2019. Dilemma of customary land policy in Indonesia. *Masyarakat, Kebudayaan dan Politik* 32(2): 134-143.
- Matsvange D, Sagonda R, Kaundikiza M. 2016. The role of communities in sustainable land and forest management: The case of Nyanga, Zvimba and Guruvu districts of Zimbabwe. *Jambá: Journal of Disaster Risk Studies* 8(3), a281.
- Mccarthy JF, Robinson, K.M. 2016. Land and Development in Indonesia: Searching for the People's Sovereignty. ISEAS – Yusof Ishak Institute: Singapore.
- Miles MB, Huberman AM, Saldana J. 2014. *Qualitative Data Analysis, A Methods Sourcebook*, Edition 3. USA: Sage Publications. Terjemahan Tjetjep Rohindi Rohidi, UI-Press.
- Murniati K, Mutolib A. 2020. The impact of climate change on the household food security of upland rice farmers in Sidomulyo, Lampung Province, Indonesia. *Biodiversitas* 21(8): 3487-3493.
- Mutolib A, Yonariza, Mahdi, Ismono H. 2017. Forest ownership conflict between a local community and the state: a case study in Dharmasraya, Indonesia. *Journal of Tropical Forest Science* 29(2): 163-171.
- Mutolib A, Yonariza, Rahmat A, Yanfika H. 2020. Competition among actors and challenges of production forest management in Dharmasraya, West Sumatera. *IOP Conf. Series: Earth and Environmental Science* 399 (2019) 012074
- Muur WFD. 2018. Forest conflicts and the informal nature of realizing indigenous land rights in Indonesia. *Citizenship Studies* 22(2): 160-174. DOI:10.1080/13621025.2018.1445495
- Nugroho HYSH, Veen AVD, Skidmore AK, Hussin YA. 2018. Expansion of traditional land-use and deforestation: a case study of an adat forest in the Kandilo Subwatershed, East Kalimantan, Indonesia. *J. For. Res.* 29(2): 495–513.
- Pachmann A. 2018. Corruption and deforestation in Indonesia. *Regional Formation and Development Studies* 2 (25): 57-64.
- Poudyal BH, Maraseni T, Cockfield G. 2019. Scientific Forest management practice in Nepal: critical reflections from stakeholders' perspectives. *Forests* 2020, 11, 27; doi:10.3390/f11010027.
- Purwawangsa H. 2017. Instrumen kebijakan untuk mengatasi konflik di kawasan hutan konservasi. *Risalah Kebijakan Pertanian dan Lingkungan* 4(1): 28-47.
- Rahmat A, Zaki MK, Effendi I, Mutolib A, Yanfika H, Listiana I. 2019. Effect of global climate change on air temperature and precipitation in six cities in Gifu Prefecture, Japan. *Journal of Physics: Conf. Series* 1155: 012070



- Santika T, Meijaard E, Budiharta S, Law EA, Kusworo A, Hutabarat JA, Indrawan TP, Struebig M, Raharjo S, Huda I, Sulhani, Ekaputri AD, Trison S, Stigner M, Wilson KA. 2017. Community forest management in Indonesia: Avoided deforestation in the context of anthropogenic and climate complexities. *Global Environmental Change* 46: 60–7161.
- Subarudi. 2014. Policy of customary forest management after Constitutional Justice Degree No. 35/PUU-X/2012: A Critical Review. *Jurnal Analisis Kebijakan Kehutanan* 11(3): 2007-224.
- Surati. 2014. Attitude and behavior analysis of communities toward Parung Panjang Research Forest. *Jurnal Penelitian Sosial dan Ekonomi Kehutanan* 11(4): 339 – 347.
- Sylviani, Hakim I. 2014. Analisis tenurial dalam pengembangan kesatuan pengelolaan hutan: Studi kasus KPH Gedong Wani, Provinsi Lampung. *Jurnal Penelitian Sosial Dan Ekonomi Kehutanan* 11(4): 309–322.
- Tacconia L, Rodriguesa RJ, Maryudi A. 2009. Law enforcement and deforestation: Lessons for Indonesia from Brazil. *Forest Policy and Economics* 108:101943.
- Vijay V, Pimm SL, Jenkins CN, Smith SJ. 2016. The Impacts of oil palm on recent deforestation and biodiversity loss. *PLoS ONE* 11(7): e0159668.
- Wegscheider S, Purwanto J, Margono BA, Nugroho S, Budiharto, Buchholz G, Sugardiman RA. 2018. Current achievements to reduce deforestation in Kalimantan. *Indonesian Journal of Geography* 50(2): 109 - 120. DOI: <http://dx.doi.org/10.22146/ijg.23680>
- West Sumatra Forestry Service. 2018. Sekilas Hutan Sumbar. <https://dishut.sumbarprov.go.id/details/pages/1> [Accessed 05 August 2020].
- Yanfika H, Listiana I, Mutolib A, Rahmat A. 2019. Linkages between extension institutions and stakeholders in the development of sustainable fisheries in Lampung Province. *Journal of Physics: Conf. Series* 1155: 012014.

## 7. Hasil Review dari Reviewer 2

### Perception, attitude, and motive of local community towards forest conversion to plantation in Dharmasraya Regency, West Sumatra

**Abstract.** Forest conversion in Dharmasraya Regency massively occurred from 2000 to 2014. In 2000, forest area reached 86% of 33,550 ha, while the area of open land and plantation covered 3% and 10%, respectively, of the total area. In 2014, forest cover reduced to only 16% with an increase in plantation area (rubber and oil palm), covering 59% of the total area. This study was aimed to examine the perception, attitude, and motive of the local community regarding forest conversion to the plantation. This study was located in PFMU (Production Forest Management Unit) Dharmasraya West Sumatra, which included a production forest area of 33,550 ha. Nagari Bonjol was selected as the main research site with the consideration that forest belongs to a customary lawful community within the area. This study was conducted from February to August 2017 by applying qualitative experimental design with a case study approach. The type of data used consisted of primary and secondary data. A total of 40 households, both directly and indirectly related to forest clearing, was selected as respondents. Snowball sampling was applied to interview the key informants. Data were analyzed using the interactive model, which included data reduction, data presentation, also conclusion drawing and verification. The study result indicated that forest is owned by the local community based upon the customary law, and the state does not have the right to manage and claim forest ownership. In terms of the economic aspect, the community benefited greatly from wood availability in the forest as the source of income. According to the local community, the conversion of forests into plantation did not have a significant effect on the environment. In fact, the local community agreed that land-use change from forest to plantation will provide greater benefit than preserving the forest. The expansion of plantation was found to be the motive for land clearance by cutting trees to obtain ownership over the forest.

**Keywords:** forest land-use change, motive, perception, PFMU Dharmasraya, plantation

**Abbreviations:** PFMU Dharmasraya: Production Forest Management Unit Dharmasraya, KAN : *Ketua Kerapatan Adat Nagari* (Assembly of *Adat Nagari*), NDVI: Normalized Difference Vegetation Index, HPH : *Hak Pengelolaan Hutan*(Forest Concession License), HGU: *Hak Guna Usaha*(land-use right to exploit), HTI: *Hutan Tanaman Industri*(Industrial Forest Plantation/IFP), GIS: geographic information system.

**Running title:** perception of local community on forest conversion

## INTRODUCTION

Indonesia has the third-largest tropical forest in the world and the first in Asia after Brazil and the Democratic Republic of the Congo (Andini 2017; Armida, Alisjahbana and Busch 2017; Juarez-Orozco, Siebe and Fernandez 2017). According to the Ministry of Environment in 2018, tropical forest and water conservation areas in Indonesia reached 125,9 million hectares. In terms of function, forest area in Indonesia is classified into three functions: Production Forest of 68.8 million hectares, Protection Forest of 29.7 million hectares, and Conservation Forest of 22.1 million hectares (Ministry of Forestry Republic Indonesia 2018). However, deforestation has threatened the forest existence in Indonesia (Tacconia, Rodrigues and Maryudi 2009) and impact on climate change globally (Rahmat et al. 2019; Murniati and Mutolib 2020). The rate of deforestation in Indonesia reached 1.3 million per year between 2000 and 2012 (Wegscheider et al. 2018). The primary factor causing forest deforestation includes the expansion of small-scale agriculture (Mutolib et al. 2017; Austin et al. 2019), oil palm plantation (Eldeeb et al. 2015, Vijay et al.

2016), illegal logging (Khalid et al. 2029), corruption (Eldeeb 2015; Pachmann 2018), granting of forest concession (Santika et al. 2017; Chen 2019), and human settlement (Nugroho et al. 2018; Husodo et al. 2019).

About 48 million people of Indonesia live around the forest area and highly depend on forest products (McCarthy and Robinson 2016; Fisher et al 2018). Forest is inseparable from the community life for its function as the source of food, medicines, and income (Aju 2014). The relationship between forest and community in Indonesia is supported by the existence of customary law (Marta et al. 2019; Dasrizal et al. 2019; Irfani et al. 2019) that provides the opportunity for the local community to manage forest areas (Mutolib et al. 2020; Lestawi and Bunga 2020). Several studies have shown that the local community can perform proper and sustainable forest management (Handoko 2014; Matsvange et al. 2016; Poudyal et al. 2019).

Legal pluralism of forest ownership in Indonesia occurs due to forest claim between the state and local/customary lawful community (Mutolib et al. 2017). Forest is claimed as state-owned property, while it is also claimed as *ulayat*/customary forest by the indigenous community (Muur 2018). The Decision of the Constitutional Court No. 35/PUU-X/2020 reviewing the Law No. 41 in 1999 has removed customary forest from state forest (Subarudi 2014). Prior to The Decision of the Constitutional Court No. 35/PUU-X/2020, the customary forest is claimed as state forest. Thus local/customary communities must obtain a permit from the government to manage the forest. The government continues to reduce community activity around the forest. It has the potential to damage forest sustainability (Surati 2014; Purwawangsa 2017), even though several studies observed that the customary community could preserve the forest (Handoko 2014; Matsvange et al. 2016; Poudyal et al. 2019). Still, an in-depth study is necessary to examine facts regarding customary community and efforts to sustain forest area, whether the customary community can preserve the forest if they manage it themselves, and ensure that forest management by the local community will have an impact on forest sustainability.

One of the areas where customary law exists and develops within the community life is the area inhabited by Minangkabau ethnic in the West Sumatra Province. This province has an area of 42.2 thousand km<sup>2</sup>, and about 56.27% of the administrative area is state-owned forest. Forest area in West Sumatra consists of the area for conservation (806,939), protection (791,671 ha), and production (731,448 ha) (West Sumatra Forestry Service 2018). This study was conducted in Dharmasraya Regency with a total forest area of 53,594 ha (West Sumatra Forestry Service 2018), yet massive forest conversion continuously occurs. Deforestation and land-use change in Dharmasraya Regency is an interesting topic to investigate since it is believed that the local community is involved in forest conversion. This study was aimed to investigate the perception, attitude, and motive of the local community towards forest conversion to the plantation. The finding of this research is expected to provide new information regarding the motive and reason for community-related to the forest conversion process.

## MATERIALS AND METHODS

### Study area and time research

The study was carried out in Dharmasraya Regency which is geographically located at the southeast end of West Sumatra with geographical coordinates between 000 47' 7" - 010 41' 56" S and 1010 9' 21" - 1010 54' 27" E. In term of topography, Dharmasraya Regency is mostly flatland at an elevation of 82 - 5,525 meter above sea level. Specifically, the study site is under the area of Production Forest Management Unit (PFMU) Dharmasraya, which includes a total production forest area of 33,550 ha. PFMU Dharmasraya is administratively under the authority of Nagari Bonjol and Nagari Abai Siat in Koto Besar Subdistrict, and Nagari Sikabau and Nagari Sungai Dareh in Pulau Punjung Subdistrict. Forest in PFMU Dharmasraya is also an *ulayat* (customary forest) belongs to the local community living in the four Nagari. However, Nagari Bonjol was selected as the main focus in this study by taking into consideration that PFMU Dharmasraya legally owned by the local community of Nagari Bonjol.

The time and stage of the study were divided into two stages. The first stage of the study was a preliminary study aimed at identifying research sites and forest management problems. A preliminary study was conducted in January 2016. Data collection to answer problem formulation and research objective was done from February to August 2018.

### Methods and source of data

The study applied a qualitative experimental design with a case study approach. Format of qualitative study aims to describe, to summarize various conditions, situations, or phenomena of social reality, or study that collects and analyzes data in the form of words (oral and written) and human behavior without any attempts to quantify the data obtained (Afriзал 2015). This study used both primary and secondary data. Primary data were obtained through a household survey, interview with key informants, direct observation, and documentation. A total of 40 households in Nagari Bonjol, directly and indirectly, related to forest clearance, were selected as respondents. Informants in this

study were determined using the method of snowball sampling. Secondary data were obtained from the literature study and documents from many institutions related to this study.

Through a non-ethnographic qualitative approach, the data collection technique was applied since the author did not participate in the social life of a group/community for data collection (Afrizal 2015). Key informants were the local community, company/permit holder, relevant institutions (government), and buyers who performed plantation farming in PFMU Dharmasraya. Key informants in the local community included the customary/*ulayat* leader, leader of *Nagari*, *Ninik Mamak*, and Chairman of the Assembly of *Adat Nagari* (KAN, *Ketua Kerapatan Adat Nagari*) intending to collect information related to forest clearance viewed from the aspect of customary law.

The identification of forest cover changes was analyzed by satellite imagery. Map Obtained from the [earthexplorer.usgs.gov](http://earthexplorer.usgs.gov) website and downloaded by the data of the year that searched. Landsat map data processed using the NDVI (Normalized Difference Vegetation Index) method to obtain cover distribution in PFMU Dharmasraya.

### Data analysis

Data in this study were analyzed using the ongoing approach, which was not performed after data were collected entirely, but following the problem formulation, before field observation. Data analysis in qualitative study was continuously done from the beginning of the proposal drafting process until study result writing (Afrizal 2015). Stages conducting during the activities of data collection and analysis in the qualitative study are inseparable; thus, it is simultaneously done. In this study, data analysis was applied using the interactive model included data reduction, data presentation, conclusion drawing and verification (Miles, Huberman and Saldana 2014).

## RESULTS AND DISCUSSION

### History of forest management in Dharmasraya

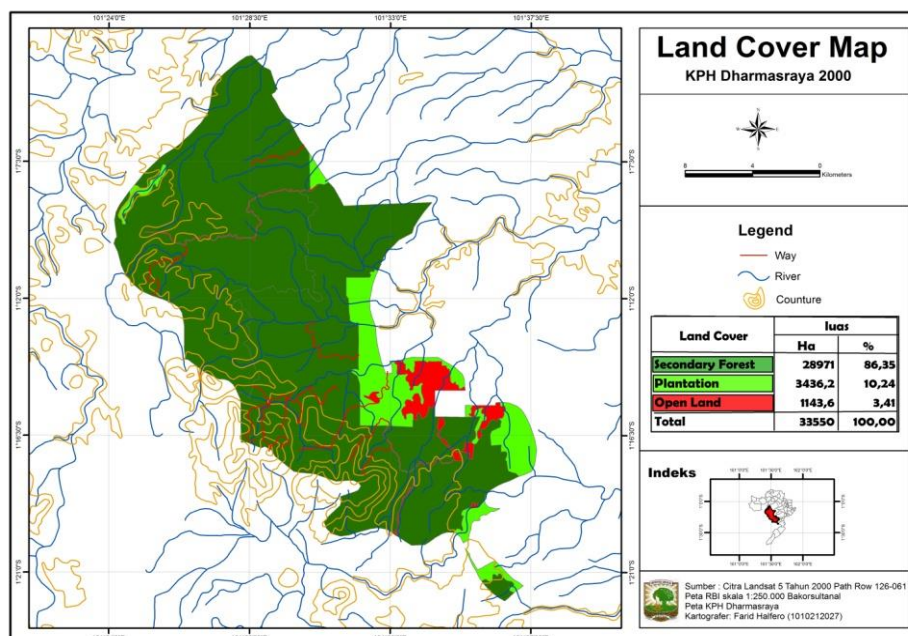
There is a long history regarding the establishment of PFMU Dharmasraya in 2013. In 1972, Forest Concession License (HPH, *Hak Pengelolaan Hutan*) for 30 years was granted to PT. Ragusa for forest area of 66,000 ha, which expired in 2002. In 1986 and 1998, PT. Incasi Raya and PT. Selago Makmur Plantation (SMP), respectively, obtained land-use right to exploit (HGU, *Hak Guna Usaha*) some of the forest areas to be further converted into oil palm plantation.

Following the expiration of HPH in 2002, land-use right was granted to PT. Inhutani, thus the forest was later functioned as the Industrial Forest Plantation (HTI, *Hutan Tanaman Industri*). PT. Inhutani IV was given a permit to manage forest area of 40.000 Ha for IFP. The IFP was developed to reduce illegal logging and forest encroachment done by the local community. However, PT. Inhutani IV, as the operator of forest management, was considered failed to manage the forest area, thus other companies, namely PT. Dara Silva Lestari (DSL) and PT. Bukit Raya Mudisa (BRM) was granted a forest concession license for some of the forest areas in 2009. The unclear forest management results in forest damage and conflict between stakeholders in claiming forest ownership (Sylviani and Hakim, 2014).

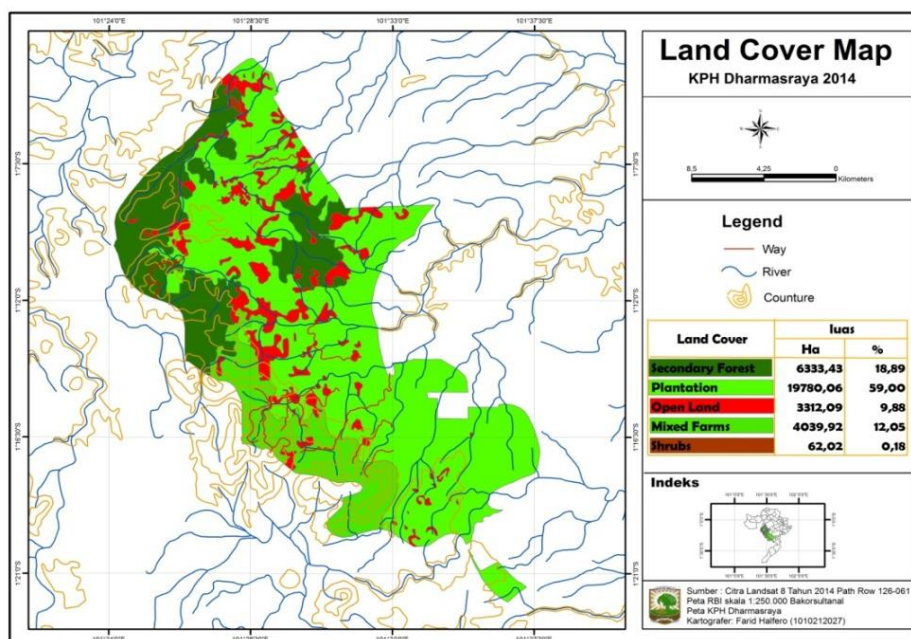
In 2013, Industrial Forest Plantation (IFP) of PT. Inhutani, DSL, and BRM were established as PFMU Dharmasraya by the Ministry of Environment. The total forest area managed by PFMU is approximately 33,550 ha. The PFMU does not have the function as a permit holder. It serves as a forest management operator, which is responsible for ensuring the forest is managed correctly according to its function.

### Forest conversion to plantation

Analysis result of geographic information system (GIS) analysis between 2000-2014 depicted rapid deforestation in PFMU Dharmasraya. In 2000, secondary forest in PFMU Dharmasraya reached 86% of the total area, while open land and plantation areas were only 3% and 10% of total area, respectively. However, at the end of 2014, forest cover significantly decreased to only 16% of the total area. Plantation (rubber and oil palm) experienced a significant increase from 10% in 2000 to 59% in 2014 (Figure 1 and 2, and Table 1).



**Figure 1.** Forest cover in PFMU Dharmasraya 2000



**Figure 2.** Forest cover in PFMU Dharmasraya 2000

Forest conversion to the plantation in PFMU Dharmasraya was observed to be supported by the ease of access to the forest through the former HPH project road, increase in plantation commodity prices, population growth, land requirement for agriculture and plantation, and the high number of people who wanted to own plantation area, either the local community around Bonjol or those living outside the Dharmasraya Regency. Technological advances play a role in disseminating information about forest encroachment, which includes buying and selling forests (Yanfika et al. 2019; Listiana et al. 2019). The agricultural expansion was also considered as one of the factors causing deforestation (Dalla-Nora ET AL. 2014). In addition to those situations, forest conversion in PFMU Dharmasraya was also motivated by plantation expansion.

**Table 1.** Development of plantation in PFMU Dharmasraya in 2000-2014

Forest cover	Percentage of total 32,749 ha (Year)			
	2000	2005	2011	2014
Secondary forest	86.35	71.81	40.01	18.89
Plantation	10.24	23.61	52.91	59.00
Open land/bushes	3.41	4.58	7.08	22.11
Total (100 Percent)	100.00	100.00	100.00	100.00

Source: Analysis of satellite image processing

### Perception and attitude of local community towards forest conversion

Forest conversion in PFMU Dharmasraya is an interesting topic to investigate. An important aspect of forest conversion in PFMU Dharmasraya is the collective action of the local community to convert forest into the plantation. Based on the study result, all respondents (100%) perceived that the local/customary communities own forest. They claimed that the state does not have the right for forest management since the local community has been managing and controlling forests even before this state/country existed. The entire community (100%) rejected the regulation related to forest use under state law (Table 2).

The community perceived that forest provides an economic benefit (77.50%), direct health benefits (42.50%), environmental health benefits (60%), dan other forest uses (17.50%). According to the local community, the most significant benefit provided by forest is wood availability, which can be used as the source of income. Despite its economic benefit, the community thought that forest existence does not provide a significant contribution to the aspect of the economy (Table 2 No. 3). Forest cannot improve the community's economic standard of living. Hence, the impact of forest conversion in terms of economic aspect (source of income, employment, and food) was considered low by the local community (below 20%). The community believed that forest existence does not significantly contribute to the economy. Thus forest conversion to the plantation is the best option for forest management.

In terms of the environmental aspect, the conversion of forest into plantation did not significantly impact the environment. It was observed that the local community experienced climate change, such as a longer dry season, uncertain rainy season, decreasing water supply, and floods during the rainy season. However, they believed these events are not caused by forest conversion to plantation since the phenomena of environmental change is a common thing that occurs in most regions.

The local community agreed on the activity to convert forest into plantation because they considered that forest conversion would have a better impact on the economy compared to the activity of forest preservation. Only about 7.50% of the local community experienced the negative impact of forest conversion, but the positive impact gained from forest conversion was still considered higher. Positive impact mostly perceived by the local community due to forest conversion was the expansion of the plantation area and an increase in community income. The community agreed with the statement, "The best benefit provided by forest is obtained by converting it to the plantation." Forest conversion to plantation leads to a direct impact on the aspect of the economy. Forest conversion has opened farming opportunities and increased the community's economy in Nagari Bonjol and its surrounding area through rubber and oil palm plantation.

**Table 2.** Perception and attitude of local community towards forest conversion to plantation in Dharmasraya Regency

No	Statement	Response (%)	
		State	Custom
<b>16. Ownership of forest</b>			
	Forest ownership in PFMU Dharmasraya	100.00	0.00
	PFMU Dharmasraya forest is owned by customary community	Yes (100.00)	
	Local/customary community is the most appropriate party to manage forest	Yes (100.00)	
	Those intend to manage forest must obtain permit from the government/state	No (100.00)	
<b>17. Benefit of forest</b>		<b>Yes</b>	<b>No</b>
m.	Direct economic uses (Timber, mining, hunting)	77.50	22.50
n.	Direct health benefits (General welfare, medicine)	42.50	47.50
o.	Environmental health benefits (Cool shade, source of water, clear air, flood prevention)	60.00	40.00
p.	Other forest uses (Fish, forest gardens)	17.50	82.50
<b>18. Perception of local community: impact of forest conversion to economic aspect</b>		<b>Yes</b>	<b>No</b>
j.	Deforestation decreases community income	12.50	87.50



k. Deforestation eliminates source of job	7.50	92.50
l. Deforestation eliminates source of food	17.50	82.50
<b>19. Perception of local community: impact of forest conversion to environmental aspect</b>	<b>Yes</b>	<b>No</b>
m. Deforestation causes micro climate (uncertain weather)	37.50	62.50
n. Deforestation causes declining supply of clean water	32.50	67.50
o. Deforestation causes drought in dry season	25.00	75.00
p. Deforestation causes floods in rain season	57.50	42.50
<b>20. Attitude in land clearance</b>	<b>Yes</b>	<b>No</b>
Do you agree to clear forest for plantation?	100.00	0.00
Felling hutan memberikan dampak negatif	92.50	7.50
The greatest benefit of forest is obtained by preserving forest	0.00	100.00
The greatest benefit of forest is obtained by converting forest to plantation	100.00	0.00

Source: Primary Data (2018)

### Motive for forest conversion

The primary motive for forest conversion was found to be forest clearing for agricultural and plantation purposes. Another motive underlined forest clearance was forest felling as a mark of ownership over the forest. Many performed land clearing only to show forest ownership. The cleared forest was left uncultivated since the purpose of forest clearance was to claim that forest belongs to those conducting forest clearing. The motive for clearing forest to obtain ownership over the forest includes: ensuring forest ownership to run farming business in the future, as a mark of ownership for any parties who want to use/buy the cleared forest, and obtaining compensation from the state or company if the forest is taken over. Forest clearance in PFMU Dharmasraya mostly done through fire since it is considered to be more effective and inexpensive. The activity of forest clearance by a forest fire is often found in PFMU Dharmasraya.

Another motive for forest conversion is illegal logging. Based upon the applicable customary law in PFMU Dharmasraya, illegal logging is not illegal. Anyone obtaining the permit from the leader of *ulayat* is allowed to take wood from PFMU Dharmasraya. The local community does not agree on the existence of the state law regarding forest ownership in PFMU Dharmasraya. It is an evidence of forum shopping in law pluralism where one party (the community) tends to choose and obey customary law to use the forest as it allows them to cut down trees and clear the forest. To the local community, customary laws are considered to provide more benefits compared to state law. According to the customary law, forest in PFMU Dharmasraya belongs to *ulayat* (communal land) of Nagari Bonjol. Thus anyone intends to perform logging, and clearing forest only needs to obtain a permit from the leader of *ulayat*.

In PFMU Dharmasraya, collecting wood in the forest is seized as an opportunity to build road access to the forest. Forest with better road access is more expensive than that with poor road access. This situation later triggers the community to collect wood in the forest, thus accelerating forest conversion in PFMU Dharmasraya.

In conclusion, the local community believes that forest is owned by the customary community, not the state. Therefore, the state does not have the right to forest management since the local community has been managing the forest even before this state/country existed. The local community rejects the regulation stating those who want to utilize forests must obtain such permission from the government. The community perceived that forest provides an economic benefit (77.50%), direct health benefits (42.50%), environmental health benefits (60%), and other forest uses (17.50%). However, according to the local community, the most significant benefit provided by forest is wood availability. The community thought that forest existence does not provide a significant contribution to the aspect of the economy. Thus forest conversion to the plantation is the best option for forest management.

Conversion of the forest into plantation did not result in a significant impact to the environment. Although the local community experienced climate change, the local community still believed that climate change is not caused by forest conversion to the plantation. The local community agreed on the activity to convert forest into plantation because the local community considered that forest conversion would have a better impact on the economy compared to the activity of forest preservation. About 7.50% of the local community experienced the negative impact of forest conversion, but the positive impact gained from forest conversion was still considered higher. Positive impact mostly perceived by the local community due to forest conversion was the expansion of the plantation area and an increase in community income.

The primary motive was found to be forest clearing for agricultural and plantation purposes. Another motive underlined forest clearance was forest felling as a mark of ownership over the forest. The cleared forest was left uncultivated since the purpose of forest clearance was to claim that forest belongs to those conducting forest clearing.



## ACKNOWLEDGEMENTS

Acknowledgments are expressed in a brief; all sources of institutional, private and corporate financial support for the work must be fully acknowledged, and any potential conflicts of interest are noted.

## REFERENCES

- Afrizal. 2015. Metode Penelitian Kualitatif: Sebuah Upaya Mendukung Penggunaan Penelitian Kualitatif dalam Berbagai Disiplin Ilmu. Raja Grafindo Persada, Jakarta.
- Aju PC. 2014. The role of forestry in agriculture and food security. *American Journal of Research Communication* 2(6): 109-121
- Andini AR. 2017. Identitas dan kebijakan luar negeri: Komitmen Jepang terhadap penanganan illegal logging di Indonesia dalam kerangka *asia forest partnership* tahun 2002 – 2012. *Journal of International Relations* 3(1): 98-105.
- Armida S, Alisjahbana, Busch JM. 2017. Forestry, forest fires, and climate change in Indonesia. *Bulletin of Indonesian Economic Studies* 53(2): 111-136. DOI:10.1080/00074918.2017.1365404
- Austin KG, Schwantes A, Gu Y, Kasibhatla PS. 2019. What causes deforestation in Indonesia?. *Environmental Research Letters* 14: 024007.
- Chen, B. Kennedy CM, Xu B. 2019. Effective moratoria on land acquisitions reduce tropical deforestation: evidence from Indonesia. *Environmental Research Letters* 14: 044009.
- Dalla-Nora EL, de Aguiar APD, Lapola DM, Woltjer G. 2014. Why have land use change models for the Amazon failed to capture the amount of deforestation over the last decade? *Land Use Policy* 39: 403–411. <http://doi.org/10.1016/j.landusepol.2014.02.004>.
- Dasrizal, Barlian E, Rezki A, Tutri R, Farida. 2019. The struggle of indigenous people: an overview recognition of customary forest in Minangkabau, Indonesia. *International Journal of Environmental Science and Development* 10(7): 2011-2015.
- Eldeeb O, Prochazka P, Maitah M. 2015. Causes for deforestation in Indonesia: Corruption and palm tree plantation. *Asian Social Science* 11 (27): 120-124.
- Fisher MR, Moeliono M, Mulyana A, Yuliani EL, Adriadi A, Kamaluddin, Judda J, Sahide M.A.K. 2018. Assessing the new social forestry project in Indonesia: recognition, livelihood and conservation?. *International Forestry Review* 20(3): 346-361.
- Handoko C. 2014. Some problems in maintaining sustainability of Indonesia's Forests: descriptive study. *Indonesian Journal of Forestry Research* 1(1): 33-46.
- Husodo T, Febrianto P, Megantara EN, Shanida SS, Pujianto MP. 2019. Diversity of mammals in forest patches of Cisokan, Cianjur, West Java, Indonesia. *Biodiversitas* 20: 1281-1288.
- Ifrani, Abby FH, Barkatullah AH, Nurhayati Y, Said MY. 2019. Forest Management Based on Local Culture of Dayak Kotabaru in the Perspective of Customary Law for a Sustainable Future and Prosperity of the Local Community. *Resources* 8: 78; doi:10.3390/resources8020078
- Juarez-Orozco SM, Siebe C, Fernandez DFY. 2017. Causes and effects of forest fires in tropical rainforests: A bibliometric approach. *Tropical Conservation Science* 10: 1–14.
- Kementerian Lingkungan Hidup dan Kehutanan Republik Indonesia. 2018. Status Hutan dan Kehutanan Indonesia 2018. Kementerian Lingkungan Hidup dan Kehutanan Republik Indonesia, Jakarta.
- Khalid F, Babar TM, Jamil A, Kamal H, Afzal T, et al. 2019. Multiple impacts of illegal logging: A key to deforestation over the globe. *Biomed J Sci & Tech Res* 20(5): 15430-15435.
- Lestawi IN, Bunga D. 2020. The Role of customary law in the forest preservation in Bali. *Journal of Landscape Ecology* 13 (1): 25-41.
- Listiana I, Efendi I, Mutolib A, Rahmat A. 2019. The behavior of extension agents in utilizing information and technology to improve the performance of extension agents in Lampung Province. *Journal of Physics: Conf. Series* 1155: 012004.
- Marta AD, Suwaryo U, Sulaeman A, Agustino L. 2019. Dilemma of customary land policy in Indonesia. *Masyarakat, Kebudayaan dan Politik* 32(2): 134-143.
- Matsvange D, Sagonda R, Kaundikiza M. 2016. The role of communities in sustainable land and forest management: The case of Nyanga, Zvimba and Guruvu districts of Zimbabwe. *Jambá: Journal of Disaster Risk Studies* 8(3), a281.
- Mccarthy JF, Robinson, K.M. 2016. Land and Development in Indonesia: Searching for the People's Sovereignty. ISEAS – Yusof Ishak Institute: Singapore.
- Miles MB, Huberman AM, Saldana J. 2014. *Qualitative Data Analysis, A Methods Sourcebook*, Edition 3. USA: Sage Publications. Terjemahan Tjetjep Rohindi Rohidi, UI-Press.
- Murniati K, Mutolib A. 2020. The impact of climate change on the household food security of upland rice farmers in Sidomulyo, Lampung Province, Indonesia. *Biodiversitas* 21(8): 3487-3493.
- Mutolib A, Yonariza, Mahdi, Ismono H. 2017. Forest ownership conflict between a local community and the state: a case study in Dharmasraya, Indonesia. *Journal of Tropical Forest Science* 29(2): 163-171.
- Mutolib A, Yonariza, Rahmat A, Yanfika H. 2020. Competition among actors and challenges of production forest management in Dharmasraya, West Sumatera. *IOP Conf. Series: Earth and Environmental Science* 399 (2019) 012074
- Muur WFD. 2018. Forest conflicts and the informal nature of realizing indigenous land rights in Indonesia. *Citizenship Studies* 22(2): 160-174. DOI:10.1080/13621025.2018.1445495
- Nugroho HYSH, Veen AVD, Skidmore AK, Hussin YA. 2018. Expansion of traditional land-use and deforestation: a case study of an adat forest in the Kandilo Subwatershed, East Kalimantan, Indonesia. *J. For. Res.* 29(2): 495–513.
- Pachmann A. 2018. Corruption and deforestation in Indonesia. *Regional Formation and Development Studies* 2 (25): 57-64.
- Poudyal BH, Maraseni T, Cockfield G. 2019. Scientific Forest management practice in Nepal: critical reflections from stakeholders' perspectives. *Forests* 2020, 11, 27; doi:10.3390/f11010027.
- Purwawangsa H. 2017. Instrumen kebijakan untuk mengatasi konflik di kawasan hutan konservasi. *Risalah Kebijakan Pertanian dan Lingkungan* 4(1): 28-47.
- Rahmat A, Zaki MK, Effendi I, Mutolib A, Yanfika H, Listiana I. 2019. Effect of global climate change on air temperature and precipitation in six cities in Gifu Prefecture, Japan. *Journal of Physics: Conf. Series* 1155: 012070

- Santika T, Meijaard E, Budiharta S, Law EA, Kusworo A, Hutabarat JA, Indrawan TP, Struebig M, Raharjo S, Huda I, Sulhani, Ekaputri AD, Trison S, Stigner M, Wilson KA. 2017. Community forest management in Indonesia: Avoided deforestation in the context of anthropogenic and climate complexities. *Global Environmental Change* 46: 60–7161.
- Subarudi. 2014. Policy of customary forest management after Constitutional Justice Degree No. 35/PUU-X/2012: A Critical Review. *Jurnal Analisis Kebijakan Kehutanan* 11(3): 2007-224.
- Surati. 2014. Attitude and behavior analysis of communities toward Parung Panjang Research Forest. *Jurnal Penelitian Sosial dan Ekonomi Kehutanan* 11(4): 339 – 347.
- Sylviani, Hakim I. 2014. Analisis tenurial dalam pengembangan kesatuan pengelolaan hutan: Studi kasus KPH Gedong Wani, Provinsi Lampung. *Jurnal Penelitian Sosial Dan Ekonomi Kehutanan* 11(4): 309–322.
- Tacconia L, Rodriguesa RJ, Maryudi A. 2009. Law enforcement and deforestation: Lessons for Indonesia from Brazil. *Forest Policy and Economics* 108:101943.
- Vijay V, Pimm SL, Jenkins CN, Smith SJ. 2016. The Impacts of oil palm on recent deforestation and biodiversity loss. *PLoS ONE* 11(7): e0159668.
- Wegscheider S, Purwanto J, Margono BA, Nugroho S, Budiharto, Buchholz G, Sugardiman RA. 2018. Current achievements to reduce deforestation in Kalimantan. *Indonesian Journal of Geography* 50(2): 109 - 120. DOI: <http://dx.doi.org/10.22146/ijg.23680>
- West Sumatra Forestry Service. 2018. Sekilas Hutan Sumbar. <https://dishut.sumbarprov.go.id/details/pages/1> [Accessed 05 August 2020].
- Yanfika H, Listiana I, Mutolib A, Rahmat A. 2019. Linkages between extension institutions and stakeholders in the development of sustainable fisheries in Lampung Province. *Journal of Physics: Conf. Series* 1155: 012014.

## 8. Bukti Naskah diperbaiki Via OJS, (28 September 2020)

← → ↻ smujo.id/biodiv/authorDashboard/submission/6572

Biodiversitas Journal of Biological Diversity Tasks 0 English View Site kordiyana

29368-1	6572-Article Text-28927-1-4-20200907 REVIEW ARTIKEL.doc	September 15, 2020
---------	---------------------------------------------------------	--------------------

Revisions

Search Upload File

▶ 29972-1	Article Text, Rangga_Manuscript_Revised 28 Sept 2020.docx	September 28, 2020	Article Text
-----------	-----------------------------------------------------------	--------------------	--------------

Review Discussions

Add discussion

Name	From	Last Reply	Replies	Closed
------	------	------------	---------	--------

## 9. Naskah yang telah diperbaiki sesuai rekomendasi reviewer

# Perception, attitude, and motive of local community towards forest conversion to plantation in Dharmasraya Regency, West Sumatra

**Abstract.** Forest conversion in Dharmasraya Regency massively occurred from 2000 to 2014. In 2000, forest area reached 86% of 33,550 ha. In 2014, forest cover reduced to only 16% with an increase in plantation area (rubber and oil palm), covering 59% of the total area. This study was aimed to examine the perception, attitude, and motive of the local community regarding forest conversion to the plantation. This study was located in PFMU (Production Forest Management Unit) Dharmasraya West Sumatra, which included a production forest area. This study was conducted from February to August 2018 with a case study approach. A total of 40 households, was selected as respondents. Snowball sampling was applied to interview the key informants. Data were analyzed using the interactive model, which included data reduction, data presentation, also conclusion drawing and verification. The study result indicated that forest is owned by the local community based upon the customary law, and the state does not have the right to manage and claim forest ownership. In terms of the economic aspect, the community benefited greatly from wood availability in the forest as the source of income. According to the local community, the conversion of forests into plantation did not have a significant effect on the environment. In fact, the local community agreed that land-use change from forest to plantation will provide greater benefit than preserving the forest. The expansion of plantation was found to be the motive for land clearance by cutting trees to obtain ownership over the forest.

**Keywords:** forest land-use change, motive, perception, PFMU Dharmasraya, plantation

**Abbreviations:** PFMU Dharmasraya: Production Forest Management Unit Dharmasraya, KAN : *Ketua Kerapatan Adat Nagari* (Assembly of *Adat Nagari*), NDVI: Normalized Difference Vegetation Index, HPH : *Hak Pengelolaan Hutan* (Forest Concession License), HGU: *Hak Guna Usaha*(land-use right to exploit), HTI: *Hutan Tanaman Industri*(Industrial Forest Plantation/IFP), GIS: geographic information system.

**Running title:** perception of local community on forest conversion

## INTRODUCTION

Indonesia has the third-largest tropical forest globally and the first in Asia after Brazil and the Democratic Republic of the Congo (Andini 2017; Armida, Alisjahbana and Busch 2017; Juarez-Orozco, Siebe and Fernandez 2017). According to the Ministry of Environment, in 2018, Indonesia's tropical forest and water conservation areas reached 125,9 million hectares. In terms of function, Indonesia's forest area is classified into three functions: Production Forest of 68.8 million hectares, Protection Forest of 29.7 million hectares, and Conservation Forest of 22.1 million hectares (Ministry of Forestry Republic Indonesia 2018). However, deforestation has threatened Indonesia's forest existence (Tacconia, Rodriguesa and Maryudi 2009) and impact on climate change globally (Rahmat et al. 2019; Murniati and Mutolib 2020). Indonesia's rate of deforestation reached 1.3 million per year between 2000 and 2012 (Wegscheider et al. 2018). The primary factor causing forest deforestation includes the expansion of small-scale agriculture (Mutolib et al. 2017; Austin et al. 2019), oil palm plantation (Eldeeb et al. 2015, Vijay et al. 2016), illegal logging (Khalid et al. 2029), corruption (Eldeeb 2015; Pachmann 2018), granting of forest concession (Santika et al. 2017; Chen 2019), and human settlement (Nugroho et al. 2018; Husodo et al. 2019).

About 48 million people of Indonesia live around the forest area and highly depend on forest products(Mccarthy and Robinson 2016; Fisher et al. 2018). Forest is inseparable from the community life for its function as the source of

food, medicines, and income (Aju 2014). The relationship between forest and community in Indonesia is supported by the existence of customary law (Marta et al. 2019; Dasrizal et al. 2019; Irfani et al. 2019) that provides the opportunity for the local community to manage forest areas (Mutolib et al. 2020; Lestawi and Bunga 2020). Several studies have shown that the local community can perform proper and sustainable forest management (Handoko 2014; Matsvange et al. 2016; Poudyal et al. 2019).

Legal pluralism of forest ownership in Indonesia occurs due to forest claims between the state and local/customary lawful communities (Mutolib et al. 2017). Forest is claimed as state-owned property, while it is also claimed as *ulayat*/customary forest by the indigenous community (Muur 2018). The Decision of the Constitutional Court No. 35/PUU-X/2020 reviewing Law No. 41 in 1999 has removed customary forest from state forest (Subarudi 2014). Before The Decision of the Constitutional Court No. 35/PUU-X/2020, the customary forest is claimed as state forest. Thus local/customary communities must obtain a permit from the government to manage the forest. The government continues to reduce community activity around the forest. It can damage forest sustainability (Surati 2014; Purwawangsa 2017), even though several studies observed that the customary community could preserve the forest (Handoko 2014; Matsvange et al. 2016; Poudyal et al. 2019). Still, an in-depth study is necessary to examine facts regarding customary community and efforts to sustain forest area, whether the customary community can preserve the forest if they manage it themselves, and ensure that forest management by the local community will have an impact on forest sustainability.

One of the areas where customary law exists and develops within the community life is the area inhabited by Minangkabau ethnic in the West Sumatra Province. This province has an area of 42.2 thousand km<sup>2</sup>, and about 56.27% of the administrative area is state-owned forest. The Forest area in West Sumatra consists of the area for conservation (806,939), protection (791,671 ha), and production (731,448 ha) (West Sumatra Forestry Service 2018). This study was conducted in Dharmasraya Regency with a total forest area of 53,594 ha (West Sumatra Forestry Service 2018), yet massive forest conversion continuously occurs. Deforestation and land-use change in Dharmasraya Regency is an interesting topic to investigate since it is believed that the local community is involved in forest conversion. If local communities are involved in deforestation, this is an interesting finding on local communities' role in forest management in Indonesia. This study aimed to investigate the local community's perception, attitude, and motive towards forest conversion to the plantation. The finding of this research is expected to provide new information regarding the motive and reason for community-related to the forest conversion process.

## MATERIALS AND METHODS

### Study area and time research

The study was carried out in the Dharmasraya Regency, which is geographically located at the southeast end of West Sumatra with geographical coordinates between 000 47' 7" - 010 41' 56" S and 1010 9' 21" – 1010 54' 27" E. Dharmasraya Regency is mostly flatland in term of topography at an elevation of 82 – 5,525 meter above sea level. Specifically, the study site is under the area of Production Forest Management Unit (PFMU) Dharmasraya, which includes a total production forest area of 33,550 ha. PFMU Dharmasraya is administratively under Nagari Bonjol and Nagari Abai Siat in Koto Besar Subdistrict, and Nagari Sikabau and Nagari Sungai Dareh in Pulau Punjung Subdistrict. Forest in PFMU Dharmasraya is also an *ulayat* (customary forest) belongs to the local community living in the four Nagari. However, Nagari Bonjol was selected as the main focus in this study by taking into consideration that PFMU Dharmasraya is legally (adat law) owned by the local community of Nagari Bonjol. The area of customary forest owned by the local community in Nagari Bonjol is estimated to be between 66,000 and 100,000 ha covering the concession area of PT Ragusa (66,000) and others (Mutolib et al. 2016).

The time and stage of the study were divided into two stages. The first stage of the study was a preliminary study to identify research sites and forest management problems. A preliminary study was conducted in January 2016. Data collection to answer the research objective was done from February to August 2018.

### Methods and source of data

The study applied a qualitative experimental design with a case study approach. Format of qualitative study aims to describe, to summarize various conditions, situations, or phenomena of social reality, or study that collects and analyzes data in the form of words (oral and written) and human behavior without any attempts to quantify the data obtained (Afriзал 2015). This study used both primary and secondary data. Primary data were obtained through a household survey, interview with key informants, direct observation, and documentation. A total of 40 households in Nagari Bonjol, directly and indirectly, related to forest clearance, were selected as respondents. Jumlah responden merupakan 10% dari total populasi. In qualitative research, the level of research validity is obtained based on data

information, not based on the number of respondents. Informants in this study were determined using the method of snowball sampling. Secondary data were obtained from the literature study and documents from many institutions related to this study.

Through a non-ethnographic qualitative approach, the data collection technique was applied since the author did not participate in the social life of a group/community for data collection (Afrizal 2015). Key informants were the local community, company/permit holder, relevant institutions (government), and buyers who performed plantation farming in PFMU Dharmasraya. Key informants in the local community included the customary/*ulayat* leader, leader of *Nagari*, *Ninik Mamak*, and Chairman of the Assembly of *Adat Nagari* (KAN, *Ketua Kerapatan Adat Nagari*) intending to collect information related to forest clearance viewed from the aspect of customary law.

The identification of forest cover changes was analyzed by satellite imagery. Map Obtained from the [earthexplorer.usgs.gov](http://earthexplorer.usgs.gov) website and downloaded by the data of the year that searched. Landsat map data processed using the NDVI (Normalized Difference Vegetation Index) method to obtain cover distribution in PFMU Dharmasraya.

### Data analysis

Data in this study were analyzed using the ongoing approach, which was not performed after data were collected entirely, but following the problem formulation, before field observation. Data analysis in qualitative study was continuously done from the beginning of the proposal drafting process until study result writing (Afrizal 2015). Stages conducting during the data collection and analysis activities in the qualitative study are inseparable; thus, it is simultaneously done. Data analysis was applied using the interactive model in this study, including data reduction, data presentation, conclusion drawing, and verification (Miles, Huberman and Saldana 2014).

The identification of forest cover changes was analyzed by satellite imagery. Map Obtained from the [earthexplorer.usgs.gov](http://earthexplorer.usgs.gov) website and downloaded by the data of the year that searched. Landsat map data processed using the NDVI method to obtain cover distribution in PFMU Dharmasraya. NDVI results were corrected by natural composite bands (bands 4-3-2). This merger aims to facilitate the analysis of NDVI data processing from Landsat imagery. NDVI calculations are  $(NIR - Red)/(NIR + Red)$ . Image processing using Arc GIS 10.3. Calculation of the area of land use data using the raster calculator tools—threshold values adjusted to the actual state of the original composite band results.

## RESULTS AND DISCUSSION

### History of forest management in Dharmasraya

In 1972, Forest Concession License (HPH, Hak Pengelolaan Hutan) for 30 years was granted to PT. Ragusa for forest area of 66,000 ha, which expired in 2002. In 1986 and 1998, PT Incasi Raya and PT. Selago Makmur Plantation (SMP), respectively, obtained land-use right to exploit (HGU, Hak Guna Usaha) some of the forest areas to be further converted into oil palm plantation. During this period, local communities had a weak position, even though they refused to recognize forests claimed as state forests. After the reformation, local communities reclaimed the forests that were taken by the state and companies.

Following the expiration of HPH in 2002, land-use right was granted to PT Inhutani, thus the forest has later functioned as the Industrial Forest Plantation (HTI, Hutan Tanaman Industri). PT Inhutani IV was given a permit to manage a forest area of 40,000 Ha for IFP. The IFP was developed to reduce illegal logging and forest encroachment done by the local community. However, PT Inhutani IV, as the operator of forest management, was considered failed to manage the forest area. Thus other companies, namely PT Dara Silva Lestari (DSL) and PT Bukit Raya Mudisa (BRM) was granted a forest concession license for some of the forest areas in 2009. The unclear forest management results in forest damage and conflict between stakeholders claiming forest ownership (Sylviani and Hakim, 2014).

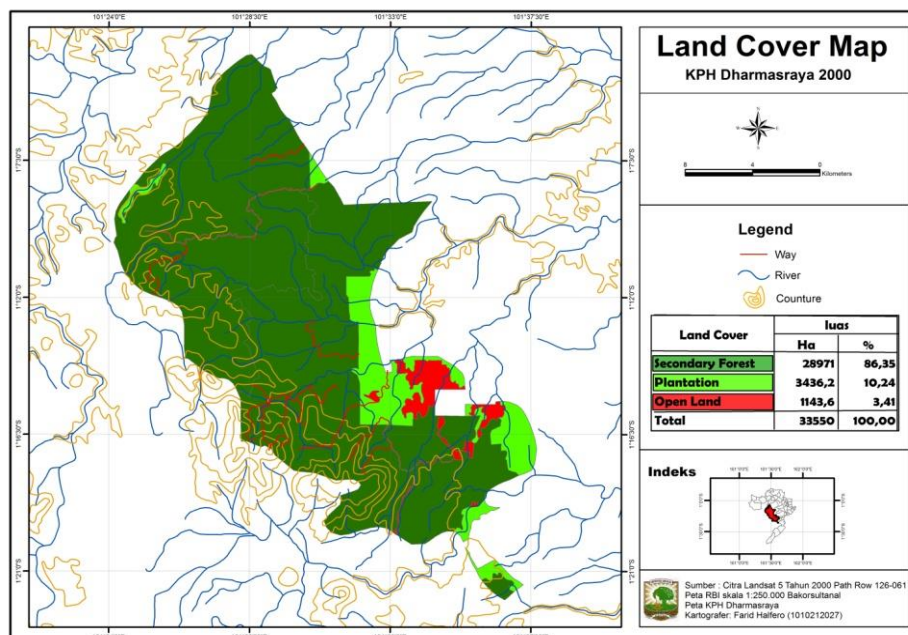
In 2013, the Industrial Forest Plantation (IFP) of PT Inhutani, DSL, and BRM were established as PFMU Dharmasraya by the Ministry of Environment. The total forest area managed by PFMU is approximately 33,550 ha. The PFMU does not have the function as a permit holder. It serves as a forest management operator responsible for ensuring the forest is managed correctly according to its function.

### Forest conversion to plantation

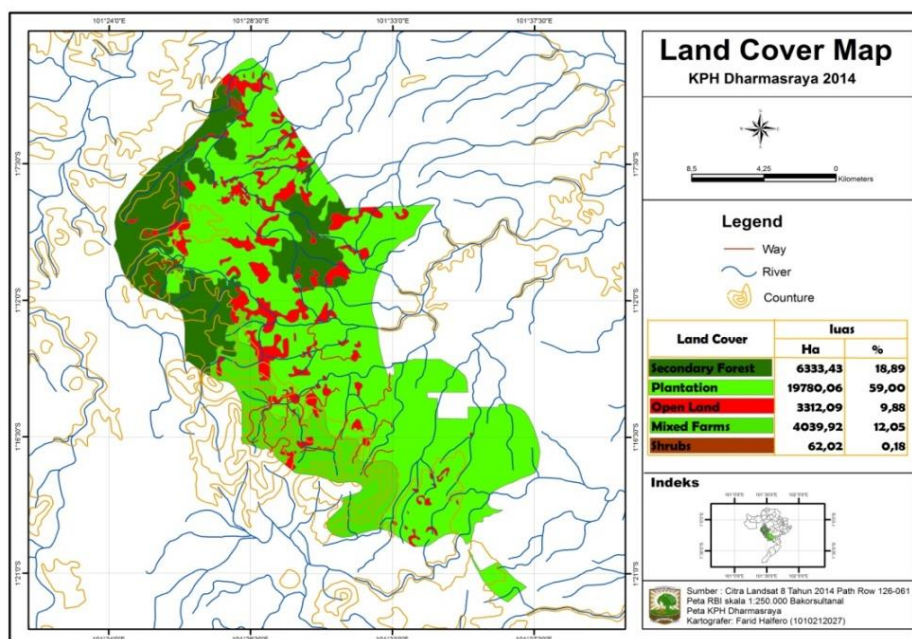
Analysis result of geographic information system (GIS) analysis between 2000-2014 depicted rapid deforestation in PFMU Dharmasraya. In 2000, secondary forest in PFMU Dharmasraya reached 86% of the total area, while open land and plantation areas were only 3% and 10% of the total area. However, at the end of 2014, forest cover



significantly decreased to only 16% of the total area. Plantation (rubber and oil palm) experienced a significant increase from 10% in 2000 to 59% in 2014 (Figure 1 and 2, and Table 1).



**Figure 1.** Forest cover in PFMU Dharmasraya 2000



**Figure 2.** Forest cover in PFMU Dharmasraya 2000

Forest conversion to the plantation in PFMU Dharmasraya was supported by the ease of access to the forest through the former HPH project road. The former HPH road was built by the company to transport the wood from the forest. High plantation commodity prices, population growth, land requirement for agriculture and plantation, and the high number of people who wanted to own plantation area, either the local community around Bonjol or those living outside the Dharmasraya Regency. Technological advances play a role in disseminating information about forest



encroachment, including buying and selling forests (Yanfika et al. 2019; Listiana et al. 2019). Agricultural expansion was also considered one of the factors causing deforestation (Dalla-Nora et al. 2014). In addition to those situations, forest conversion in PFMU Dharmasraya was also motivated by plantation expansion. At the same time, PFMU Dharmasraya as the operator of forest area management, did not make any efforts to prevent the deforestation because the claim of the forest as customary land is powerful compared to claims of the forest as property owned by the state

**Table 1.** Development of plantation in PFMU Dharmasraya in 2000-2014

Forest cover	Percentage of total 32,749 ha (Year)			
	2000	2005	2011	2014
Secondary forest	86.35	71.81	40.01	18.89
Plantation	10.24	23.61	52.91	59.00
Open land/bushes	3.41	4.58	7.08	22.11
Total (100 Percent)	100.00	100.00	100.00	100.00

Source: Analysis of satellite image processing

### Perception and attitude of local community towards forest conversion

Forest conversion in PFMU Dharmasraya is an interesting topic to investigate. An important aspect of forest conversion in PFMU Dharmasraya is the local community's collective action to convert forest into the plantation. Based on the study result, all respondents (100%) perceived that the local/customary communities own forest. They claimed that the state does not have the right for forest management since the local community has managed and controlled forests even before this state/country existed. The entire community (100%) rejected the regulation related to forest use under state law (Table 2). The forest recognition as the customary property is higher than the state because the local people had lived in forest areas even before the state was founded.

The community perceived that forest provides an economic benefit (77.50%), direct health benefits (42.50%), environmental health benefits (60%), dan other forest uses (17.50%). According to the local community, the most significant benefit of the forest is wood availability, which can be used as the source of income. Despite its economic benefit, the community thought that forest existence does not significantly contribute to the economy (Table 2 No. 3). Forest cannot improve the community's economic standard of living. Hence, the impact of forest conversion in terms of economic aspect (the loss of the source of income, employment, and food) was considered low by the local community (below 20%). The community believed that forest existence does not significantly contribute to the economy. Thus forest conversion to the plantation is the best option for forest management.

In terms of the environmental aspect, the conversion of forest into plantation did not significantly impact the environment. It was observed that the local community experienced climate change, such as a longer dry season, uncertain rainy season, decreasing water supply, and floods during the rainy season. However, they believed these events are not caused by forest conversion to plantation since environmental change is a common thing that occurs in most regions.

The local community agreed on the activity to convert forest into plantation because they considered that forest conversion would have a better impact on the economy than forest preservation. Only about 7.50% of the local community experienced the negative impact of forest conversion, but forest conversion's positive impact was still considered higher. The positive impact mostly perceived by the local community due to forest conversion was the expansion of the plantation area and an increase in community income. The community agreed with the statement, "The best benefit provided by forest is obtained by converting the forest to the plantation". Forest conversion to plantation leads to a direct impact on the economy's aspect and opened farming opportunities and increased the community's economy in Nagari Bonjol and its surrounding area through rubber and oil palm plantation.

**Table 2.** Perception and attitude of local community towards forest conversion to plantation in Dharmasraya Regency

No	Statement	Response (%)	
<b>21. Ownership of forest</b>		<b>State</b>	<b>Custom</b>
	Forest ownership in PFMU Dharmasraya	100.00	0.00
	PFMU Dharmasraya forest is owned by customary community	Yes (100.00)	
	Local/customary community is the most appropriate party to manage forest	Yes (100.00)	
	Those intend to manage forest must obtain permit from the government/state	No (100.00)	
<b>22. Benefit of forest</b>		<b>Yes</b>	<b>No</b>
	q. Direct economic uses (Timber, mining, hunting)	77.50	22.50

r.	Direct health benefits (General welfare, medicine)	42.50	47.50
s.	Environmental health benefits (Cool shade, source of water, clear air, flood prevention)	60.00	40.00
t.	Other forest uses (Fish, forest gardens)	17.50	82.50
<b>23.</b>	<b><i>Perception of local community: impact of forest conversion to economic aspect</i></b>	<b>Yes</b>	<b>No</b>
m.	Deforestation decreases community income	12.50	87.50
n.	Deforestation eliminates source of job	7.50	92.50
o.	Deforestation eliminates source of food	17.50	82.50
<b>24.</b>	<b><i>Perception of local community: impact of forest conversion to environmental aspect</i></b>	<b>Yes</b>	<b>No</b>
q.	Deforestation causes micro climate (uncertain weather)	37.50	62.50
r.	Deforestation causes declining supply of clean water	32.50	67.50
s.	Deforestation causes drought in dry season	25.00	75.00
t.	Deforestation causes floods in rain season	57.50	42.50
<b>25.</b>	<b><i>Attitude in land clearance</i></b>	<b>Yes</b>	<b>No</b>
	Do you agree to clear forest for plantation?	100.00	0.00
	Felling hutan memberikan dampak negatif	92.50	7.50
	The greatest benefit of forest is obtained by preserving forest	0.00	100.00
	The greatest benefit of forest is obtained by converting forest to plantation	100.00	0.00

Source: Primary Data (2018)

### Motive for forest conversion

The primary motive for forest conversion was found to be forest clearing for agricultural and plantation purposes. Another motive underlined forest clearance was forest felling as a mark of ownership over the forest. The cleared forest was left uncultivated since the purpose of forest clearance was to claim that the forest belongs to those conducting forest clearing. The motive for clearing forest to obtain ownership over the forest includes: ensuring forest ownership to run farming business in the future, as a mark of ownership for any parties who want to use/buy the cleared forest, and obtaining compensation from the state or company if the forest is taken over. Forest clearance in PFMU Dharmasraya mostly done through fire because be more effective and inexpensive.

Another motive for forest conversion is illegal logging. Based on the applicable customary law in PFMU Dharmasraya, illegal logging is illegal (by local law and local perspective). Anyone obtaining the permit from the leader of ulayat is allowed to take wood from PFMU Dharmasraya. The local community does not agree on the state law regarding forest ownership in PFMU Dharmasraya. It is an evidence of forum shopping in law pluralism where one party (the community) tends to choose and obey customary law to use the forest as it allows them to cut down trees and clear the forest. To the local community, customary laws are considered to provide more benefits compared to state law. According to the customary law, the forest in PFMU Dharmasraya belongs to ulayat (communal land) of Nagari Bonjol. Thus anyone intends to perform logging and clearing forest only needs to obtain a permit from the leader of ulayat.

In PFMU Dharmasraya, collecting wood in the forest is seized as an opportunity to build road access to the forest. Forest with better road access is more expensive than that with poor road access. This situation later triggers the community to collect wood in the forest, thus accelerating forest conversion in PFMU Dharmasraya.

In conclusion, the local community believes that the forest is owned by the customary community, not the state. Therefore, the state does not have the right to forest management since the local community had managed the forest even before this state/country existed. The local community rejects the regulation stating those who want to utilize forests must obtain such permission from the government. The community perceived that forest provides an economic benefit (77.50%), direct health benefits (42.50%), environmental health benefits (60%), and other forest uses (17.50%). However, according to the local community, the most significant benefit provided by forest is wood availability. The community thought that forest existence does not provide a significant contribution to the aspect of the economy. Thus forest conversion to the plantation is the best option for forest management.

Conversion of the forest into plantation did not result in a significant impact to the environment. Although the local community experienced climate change, the local community still believed that climate change is not caused by forest conversion to the plantation. The local community agreed on the activity to convert forest into plantation because the local community considered that forest conversion would have a better impact on the economy than forest preservation. About 7.50% of the local community experienced the negative impact of forest conversion, but forest conversion's positive impact was still considered higher. The positive impact mostly perceived by the local community due to forest conversion was the expansion of the plantation area and an increase in community income.

The primary motive was found to be forest clearing for agricultural and plantation purposes. Another motive underlined forest clearance was forest felling as a mark of ownership over the forest. The cleared forest was left uncultivated since the purpose of forest clearance was to claim that the forest belongs to those conducting forest clearing. The findings of this study provide a new perspective on local communities and forests. The local community

has the opportunity to be the party who can protect the forest and vice versa. For this reason, reasonable efforts and regulations are needed to empower local communities to conserve forests. However, the case in Dharmasraya cannot be generalized to all local communities in Indonesia in forest management.

## ACKNOWLEDGEMENTS

The authors would like to thank PFMU Dharmasraya, Department of Agriculture and Forestry, Dharmasraya Regency, Apparatus of Nagari Bonjol Koto Besar District, Traditional leaders, community leaders and all parties who helped and supported this research.

## REFERENCES

- Afrizal. 2015. Metode Penelitian Kualitatif: Sebuah Upaya Mendukung Penggunaan Penelitian Kualitatif dalam Berbagai Disiplin Ilmu. Raja Grafindo Persada, Jakarta.
- Aju PC. 2014. The role of forestry in agriculture and food security. *American Journal of Research Communication* 2(6): 109-121
- Andini AR. 2017. Identitas dan kebijakan luar negeri: Komitmen Jepang terhadap penanganan illegal logging di Indonesia dalam kerangka *asia forest partnership* tahun 2002 – 2012. *Journal of International Relations* 3(1): 98-105.
- Armida S, Alisjahbana, Busch JM. 2017. Forestry, forest fires, and climate change in Indonesia. *Bulletin of Indonesian Economic Studies* 53(2): 111-136. DOI:10.1080/00074918.2017.1365404
- Austin KG, Schwantes A, Gu Y, Kasibhatla PS. 2019. What causes deforestation in Indonesia?. *Environmental Research Letters* 14: 024007.
- Chen, B. Kennedy CM, Xu B. 2019. Effective moratoria on land acquisitions reduce tropical deforestation: evidence from Indonesia. *Environmental Research Letters* 14: 044009.
- Dalla-Nora EL, de Aguiar APD, Lapola DM, Woltjer G. 2014. Why have land use change models for the Amazon failed to capture the amount of deforestation over the last decade? *Land Use Policy* 39: 403–411. <http://doi.org/10.1016/j.landusepol.2014.02.004>.
- Dasrizal, Barlian E, Rezki A, Tutri R, Farida. 2019. The struggle of indigenous people: an overview recognition of customary forest in Minangkabau, Indonesia. *International Journal of Environmental Science and Development* 10(7): 2011-2015.
- Eldeeb O, Prochazka P, Maitah M. 2015. Causes for deforestation in Indonesia: Corruption and palm tree plantation. *Asian Social Science* 11 (27): 120-124.
- Fisher MR, Moeliono M, Mulyana A, Yuliani EL, Adriadi A, Kamaluddin, Judda J, Sahide M.A.K. 2018. Assessing the new social forestry project in Indonesia: recognition, livelihood and conservation?. *International Forestry Review* 20(3): 346-361.
- Handoko C. 2014. Some problems in maintaining sustainability of Indonesia's Forests: descriptive study. *Indonesian Journal of Forestry Research* 1(1): 33-46.
- Husodo T, Febrianto P, Megantara EN, Shanida SS, Pujianto MP. 2019. Diversity of mammals in forest patches of Cisokan, Cianjur, West Java, Indonesia. *Biodiversitas* 20: 1281-1288.
- Ifrani, Abby FH, Barkatullah AH, Nurhayati Y, Said MY. 2019. Forest Management Based on Local Culture of Dayak Kotabaru in the Perspective of Customary Law for a Sustainable Future and Prosperity of the Local Community. *Resources* 8: 78; doi:10.3390/resources8020078
- Juarez-Orozco SM, Siebe C, Fernandez DFY. 2017. Causes and effects of forest fires in tropical rainforests: A bibliometric approach. *Tropical Conservation Science* 10: 1–14.
- Kementerian Lingkungan Hidup dan Kehutanan Republik Indonesia. 2018. Status Hutan dan Kehutanan Indonesia 2018. Kementerian Lingkungan Hidup dan Kehutanan Republik Indonesia, Jakarta.
- Khalid F, Babar TM, Jamil A, Kamal H, Afzal T, et al. 2019. Multiple impacts of illegal logging: A key to deforestation over the globe. *Biomed J Sci & Tech Res* 20(5): 15430-15435.
- Lestawi IN, Bunga D. 2020. The Role of customary law in the forest preservation in Bali. *Journal of Landscape Ecology* 13 (1): 25-41.
- Listiana I, Efendi I, Mutolib A, Rahmat A. 2019. The behavior of extension agents in utilizing information and technology to improve the performance of extension agents in Lampung Province. *Journal of Physics: Conf. Series* 1155: 012004.
- Marta AD, Suwaryo U, Sulaeman A, Agustino L. 2019. Dilemma of customary land policy in Indonesia. **Masyarakat, Kebudayaan dan Politik** 32(2): 134-143.
- Matsvange D, Sagonda R, Kaundikiza M. 2016. The role of communities in sustainable land and forest management: The case of Nyanga, Zvimba and Guruve districts of Zimbabwe. *Jambá: Journal of Disaster Risk Studies* 8(3), a281.
- Mccarthy JF, Robinson, K.M. 2016. Land and Development in Indonesia: Searching for the People's Sovereignty. ISEAS – Yusof Ishak Institute: Singapore.
- Miles MB, Huberman AM, Saldana J. 2014. *Qualitative Data Analysis, A Methods Sourcebook*, Edition 3. USA: Sage Publications. Terjemahan Tjetjep Rohindi Rohidi, UI-Press.
- Murniati K, Mutolib A. 2020. The impact of climate change on the household food security of upland rice farmers in Sidomulyo, Lampung Province, Indonesia. *Biodiversitas* 21(8): 3487-3493.
- Mutolib A, Yonariza, Mahdi, Ismono H. 2016. Gender inequality and the oppression of women within minangkabau matrilineal society: A Case study of the management of ulayat forest land in nagari bonjol, dharmasraya district, west sumatra province, Indonesia. *Asian Women* 32(3): 23-49.
- Mutolib A, Yonariza, Mahdi, Ismono H. 2017. Forest ownership conflict between a local community and the state: a case study in Dharmasraya, Indonesia. *Journal of Tropical Forest Science* 29(2): 163-171.
- Mutolib A, Yonariza, Rahmat A, Yanfika H. 2020. Competition among actors and challenges of production forest management in Dharmasraya, West Sumatera. *IOP Conf. Series: Earth and Environmental Science* 399 (2019) 012074

- Muur WFD. 2018. Forest conflicts and the informal nature of realizing indigenous land rights in Indonesia. *Citizenship Studies* 22(2): 160-174. DOI:10.1080/13621025.2018.1445495
- Nugroho HYSH, Veen AVD, Skidmore AK, Hussin YA. 2018. Expansion of traditional land-use and deforestation: a case study of an adat forest in the Kandilo Subwatershed, East Kalimantan, Indonesia. *J. For. Res.* 29(2): 495–513.
- Pachmann A. 2018. Corruption and deforestation in Indonesia. *Regional Formation and Development Studies* 2 (25): 57-64.
- Poudyal BH, Maraseni T, Cockfield G. 2019. Scientific Forest management practice in Nepal: critical reflections from stakeholders' perspectives. *Forests* 2020, 11, 27; doi:10.3390/f11010027.
- Purwawangsa H. 2017. Instrumen kebijakan untuk mengatasi konflik di kawasan hutan konservasi. *Risalah Kebijakan Pertanian dan Lingkungan* 4(1): 28-47.
- Rahmat A, Zaki MK, Effendi I, Mutolib A, Yanfika H, Listiana I. 2019. Effect of global climate change on air temperature and precipitation in six cities in Gifu Prefecture, Japan. *Journal of Physics: Conf. Series* 1155: 012070
- Santika T, Meijaard E, Budiharta S, Law EA, Kusworo A, Hutabarat JA, Indrawan TP, Struebig M, Raharjo S, Huda I, Sulhani, Ekaputri AD, Trison S, Stigner M, Wilson KA. 2017. Community forest management in Indonesia: Avoided deforestation in the context of anthropogenic and climate complexities. *Global Environmental Change* 46: 60–7161.
- Subarudi. 2014. Policy of customary forest management after Constitutional Justice Degree No. 35/PUU-X/2012: A Critical Review. *Jurnal Analisis Kebijakan Kehutanan* 11(3): 2007-224.
- Surati. 2014. Attitude and behavior analysis of communities toward Parung Panjang Research Forest. *Jurnal Penelitian Sosial dan Ekonomi Kehutanan* 11(4): 339 – 347.
- Sylviani, Hakim I. 2014. Analisis tenurial dalam pengembangan kesatuan pengelolaan hutan: Studi kasus KPH Gedong Wani, Provinsi Lampung. *Jurnal Penelitian Sosial Dan Ekonomi Kehutanan* 11(4): 309–322.
- Tacconia L, Rodrigues RJ, Maryudi A. 2009. Law enforcement and deforestation: Lessons for Indonesia from Brazil. *Forest Policy and Economics* 108:101943.
- Vijay V, Pimm SL, Jenkins CN, Smith SJ. 2016. The Impacts of oil palm on recent deforestation and biodiversity loss. *PLoS ONE* 11(7): e0159668.
- Wegscheider S, Purwanto J, Margono BA, Nugroho S, Budiharto, Buchholz G, Sugardiman RA. 2018. Current achievements to reduce deforestation in Kalimantan. *Indonesian Journal of Geography* 50(2): 109 - 120. DOI: <http://dx.doi.org/10.22146/ijg.23680>
- West Sumatra Forestry Service. 2018. Sekilas Hutan Sumbar. <https://dishut.sumbarprov.go.id/details/pages/1> [Accessed 05 August 2020].
- Yanfika H, Listiana I, Mutolib A, Rahmat A. 2019. Linkages between extension institutions and stakeholders in the development of sustainable fisheries in Lampung Province. *Journal of Physics: Conf. Series* 1155: 012014.

## 10. Proofreading correction and Penerbitan Billing

The screenshot shows the author dashboard for submission 6572. The top navigation bar includes the journal name, a 'Tasks' button with a notification icon, and user information. The main content area displays a list of discussions under the heading 'Review Discussions'. Two discussions are visible: 'Uncorrected proof' and 'BILLING'. Each discussion entry includes the name of the participant, the date and time of the last reply, the number of replies, and a 'Closed' checkbox.

Name	From	Last Reply	Replies	Closed
<a href="#">Uncorrected proof</a>	editors 2020-09-29 01:17 AM	kordiyana 2020-09-29 10:15 AM	1	<input type="checkbox"/>
<a href="#">BILLING</a>	dewinurpratiwi 2020-09-29 02:51 AM	kordiyana 2020-09-30 04:07 AM	1	<input type="checkbox"/>

The screenshot shows a detailed view of the 'Uncorrected proof' discussion. It includes a list of participants and a list of messages. The participants are Smujo Editors (editors), DEWI NUR PRATIWI (dewinurpratiwi), and kordiyanaangga (kordiyana). The messages section shows two messages: one from the editors dated 2020-09-29 01:17 AM, and another from kordiyana dated 2020-09-29 10:15 AM.

**Participants**

- Smujo Editors (editors)
- DEWI NUR PRATIWI (dewinurpratiwi)
- kordiyanaangga (kordiyana)

**Messages**

Note	From
Dear Author(s),  Pls, find attached file for an uncorrected proof (Copyedited file). The revised manuscript is awaited. Do not worry about layout changes due to revision; our staff will fix it again. Note: Kindly use track change when you make improvements.  <a href="#">editors, forest conversion =Rangga.doc</a>	editors 2020-09-29 01:17 AM
Dear Editor of <i>Biodiversitas, Journal of Biological Diversity</i>  We hereby attach the final manuscript to publication. There are several revision	kordiyana 2020-09-29 10:15

## 11. Penerbitan Billing dan Copy Editing Naskah

**BILLING**

**Participants**

Smujo Editors (editors)

DEWI NUR PRATIWI (dewinurpratiwi)

kordiyana rangga (kordiyana)

**Messages**

Note	From
Dear Author(s),	dewinurpratiwi
Kindly find attached an invoice for the publication of your manuscript.	2020-09-29 02:51 AM
<a href="#">dewinurpratiwi, 2659.KORDIYANA K. RANGGA.pdf</a>	
► Bukti. Pembayaran untuk publikasi jurnal	kordiyana
<a href="#">kordiyana, CamScanner 09-30-2020 11.01.18_1.pdf</a>	2020-09-30 04:07 AM

[Add Message](#)

**Publication**

**Submission** **Review** **Copyediting** **Production**

**Copyediting Discussions** [Add discussion](#)

Name	From	Last Reply	Replies	Closed
No Items				

**Copyedited** [Search](#)

30095-1	editors, D211057-forest conversion =Rangga=rev-28.edited.doc	September 30, 2020	Article Text
---------	--------------------------------------------------------------	--------------------	--------------