

PERFORMANCE ANALYSIS OF PRODUCTION FOREST MANAGEMENT UNIT (PFMU) OF DHARMASRAYA DISTRICT, WEST SUMATRA PROVINCE

Mahdi¹, Yonariza¹, Yuerlita¹, *Yurike², Yudha Saktian Syafruddin³

¹Department of Agribusiness, Universitas Andalas, Indonesia

²Postgraduate, Universitas Andalas, Indonesia

³Department of Geography, STIKIP PGRI Sumatera Barat, Indonesia

Email: ryurike@yahoo.com

*Corresponding Author, Received: March 10, 2020, Revised: March 23, 2020, Accepted: May 10, 2020

ABSTRACT: The Production Forest Management Unit (PFMU) in Dharmasraya is the operational implementing organization of the Forest Service in the field and carries out forest management up to the site level (block / footprint). However, the successful management of the PFMU Dharmasraya cannot be separated from the dynamics of existing problems, such as conflicts between the government and the community around the forest area, the high level of occupation of the forest area by the community and claims of customary rights to the forest area, completion of the boundary process, the lack of good human resources quantity and quality and still weak security guarantees of investing in the PFMU area. The purpose of this study is to analyze the development performance of the Dharmasraya PFMU in the management and implementation of forestry programs at the site level. This study uses criteria and indicators from Forest Watch Indonesia version 2.0. The results showed the value of the development / development PFMU Dharmasraya index was at a moderate level with a value of 2.08. This means that as a forest manager at the site level, PFMU Dharmasraya is quite ready in realizing its functions and duties. Some criteria that need to be considered for improvement are organizational capacity, conflict resolution, investment mechanisms, and stability of the forest management unit area to be strengthened to ensure operation at the site level.

Keywords: *Forest Management Unit, Performance Evaluation, Production Forest, Sustainable Development*



This work is licensed under the Creative Commons Attribution-ShareAlike 4.0 International License

1. INTRODUCTION

Deforestation in the tropics is widely recognized as an issue of global concern because the supply and growth of tropical forests are increasingly worrying [1] [2]. The rate of forest destruction according to FWI reached 1.5 million hectares from 2000 - 2009 [3], while other reports are much higher, stating that forest cover in Indonesia lost by 15.79 million ha in 2000 to 2012 [4].

The main causes of forest degradation are encroachment [5] [6], illegal logging, increasing demand for fuelwood and unplanned development activities [5]. Forests are encroached on by individuals, groups of individuals and institutions [7]. Forest Watch Indonesia added that deforestation and degradation are caused by timber extraction, infrastructure development and agricultural expansion [3]. One way to overcome the ongoing degradation and deforestation in Indonesia, the government formed the Forest Management Unit (KPH).

Production Forest Management Unit (PFMU) was formed based on The Minister of Forestry

Decree No. SK.695/Menhut-II/2013, 21 October 2013 concerning the Establishment of a Dharmasraya Model PFMU located in the Dharmasraya District with an area of 33,550 Ha [8]. The Governor of West Sumatra followed up the establishment of the Unit VIII PFMU Dharmasraya Unit VIII organization located in the Dareh River, Pulau Punjung Subdistrict, Dharmasraya Regency, through the Governor of West Sumatra Regulation No. 75/2017 concerning the Establishment of the Organization and Work Procedures of the Forestry Service Unit of West Sumatra Province, as amended the last time by the Governor of West Sumatra Regulation No. 108 of 2017. PFMU plays an important role in ensuring sustainable forest management [9].

In its management, the Dharmasraya PFMU is confronted with various dynamics of problems such as the high level of occupation of the forest area by the community and customary rights claims. Since 2000, local people have gradually converted forests to oil palm and rubber plantations. According to Government Regulation No. P.35/Menhut-II/2007, conversion of forest land to rubber plantations is

still permitted because rubber plants can be categorized as forest plants. But the problem is that people not only plant forest commodities such as rubber but also plant non-forest commodities, namely oil palm. In addition, the high level of land buying and selling carried out by customary authorities in this area adds to the complexity of the management of the Dharmastraya PFMU area.

The oil palm plantations that exist today are almost all former production forest areas. The expansion of oil palm plantations takes place through various mechanisms that change the relationship of tenure and changes in land use. Aside from being driven by regulations and markets, the expansion of oil palm plantations is also carried out in various ways at the micro level involving people who still have a close relationship [10]. De jure (legality) seems to be able to maintain state forests with a large area, but in fact de facto the opposite [11]. In fact the state forest area is decreasing every year [3]. Therefore, after about 6 years of the Dharmastraya PFMU journey, research is needed to analyze the performance/assess the success of the Dharmastraya PFMU program as a forest management unit at the site level.

2. METHOD

This research was conducted in the Dharmastraya PFMU Area, Dharmastraya Regency, West Sumatra. Figure 1. shows the location of the study. A qualitative method with a descriptive approach was used in this study. Data is collected through field observations, in-depth interviews with key informants, document studies and data collection from agencies related to research. In-depth interviews in a structured manner were conducted to find out various things regarding the performance indicators of FMU management according to the framework set by Forest Watch Indonesia (FWI). The 9 criteria examined included area stability, forest governance, implementation of forest management within the scope of PFMU, management plans, organizational capacity, government relations and regulations, rights and access mechanisms for indigenous peoples, investment mechanisms, and conflict resolution [12].

The Criteria & Indicators Analysis version 2.0 is an analytical framework formed by a team of experts from Forest Watch Indonesia. The assessment framework related to FMU management performance is made in the form of an assessment matrix by setting out a number of criteria and indicators. These criteria and indicators are formed based on the scope of functions and main tasks of the FMU in accordance with the law. It is hoped that this analysis will produce a gap study on important indicators that should be applied or fulfilled by the

Dharmastraya Production Forest Management Unit in the management of forest resources.

The assessment matrix in this component consists of 9 criteria, 28 indicators and 62 quality elements. Based on field findings, data processing is carried out by tabulating and analyzing data, then the final results are displayed in the form of an index where the index is obtained from the average of the total value of all units which is then divided by the number of data units. The assessment index is categorized into three groups namely High, Medium, and Low [12].

Table 1. Categorization Index of FMU Development Performance Assessment

Index Value	Category
1–1.66	Low
1.67–2.33	Moderate
2.34–3.00	High

3. RESULTS AND DISCUSSION

The average value of the index based on the results of assessments that have been made from nine criteria, namely 2.08. This value lies in the moderate group, meaning that the PFMU Dharmastraya is quite ready in forest management and carrying out its functions. The results of the Dharmastraya PFMU assessment can be seen in Figure 1.

Area stability

Legal certainty about the existence of forest areas is something that is very important [13]. This is the first step in protecting the potential of forest resources and their ecosystems and is an effort to prevent the development and increasing demands of the community for land use and forest area needs. Basically, the FMU working area in West Sumatra has been determined by the central government and the boundary is implemented by the Provincial government.

The forest boundary is the authority of the Technical Implementation Unit of the Ministry of Environment and Forestry, namely the Forest Area Consolidation Center. However, the boundary arrangement in the PFMU management area is the authority and duty of the Dharmastraya PFMU to do the boundary demarcation of plots and blocks based on the division of plots and blocks that have been made before then mapping.

The boundaries of the forest area in the form of functional boundaries and outer boundaries in the Regency area, in general, have not been demarcated so that no forest areas have been confirmed yet, only the IUPHHK-HA working area has a forest area boundary. Therefore, this must be considered and become a priority of the Ministry of Forestry in the

context of establishing forest areas.

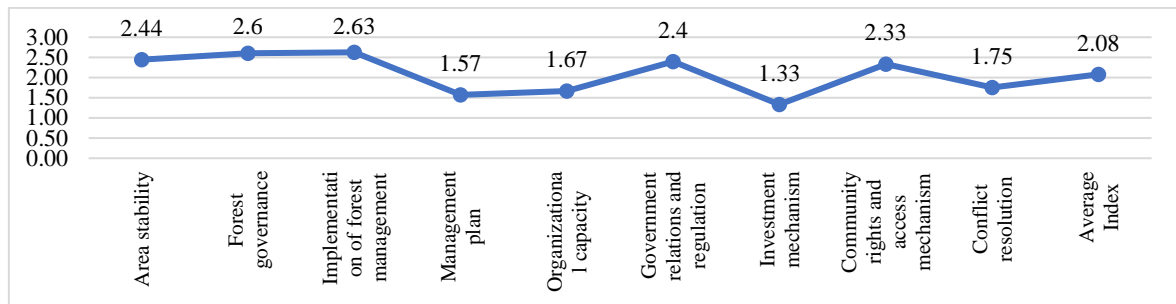


Fig. 1 Index Value for Performance Evaluation of PFMU Dharmastraya

The boundary demarcation of the Dharmastraya PFMU Area is very necessary because the community considers the forest area to be their customary land which is a treasure that is always maintained. For the Dharmastraya people, this land is a land that has been passed on from generation to generation based on *ranji* or tribes. Customary land ownership is not done by correspondence or written but based on natural boundaries with other people's land, hills, rivers and others [14]. Most people do not know the forest boundary. For them, the area is already considered a customary land and for the Dharmastraya community the forest boundary is a community plantation [15]. For this reason, there is a need to clarify the management of forest boundaries to minimize forest encroachment. At least for migrants who want to clear land, knowing that the land is a state forest area that cannot be used without the permission of the government.

Forest governance

Based on Minister Regulation No. 3/2008 concerning Amendment to Government Regulation No. 6/2007 concerning Forest Management and Preparation of Forest Management Plans and Forest Utilization, forest management activities are started by carrying out forest management activities. Forest management or forest management consists of inventory, boundary management, division of plots and blocks. Inventories are currently being carried out and become an annual program. Whereas the division of the PFMU area block aims for management interests at the site level in accordance with the function of the area, biophysical conditions, natural resource content, socioeconomic and community culture, and use of the area.

Table 2. Distribution of Block Area by Function of Forest Zone in the Dharmastraya Model PFMU Region

No	Unit	Area by Forest Function (Ha)		Area (Ha)	(%)	Utilization Instructions
		Permanent Production Forest	Limited Production Forest			
1	Protection	0	669	669	2.0	Prevention and protection from natural disasters, Climate regulation, Air quality preservation Protection of water flow and flooding, biodiversity
2	Utilization	14,185	11,184	25,369	76.1	Utilization cooperation (Forestry Partnership)
3	Empowerment	3,503	3,788	7,291	21.9	Social Forests, Specific Areas and FMU business development
Total		17,688	15,641	33,329	100	

Based on Table 2 it can be seen that in the Dharmastraya PFMU it consists of 3 blocks including:

1. Protection Blocks for the benefit of water and soil conservation, protection of river borders, germplasm, water systems, lakes and beaches and ecosystem conservation. The administrative block of protection is located in Pulau Punjung

District, Dharmastraya Regency covering an area of 669 ha.

2. Utilization Block is an area that is used as a place for forest utilization, which includes a block for the utilization of forest area, a block for the utilization and collection of timber or non-timber forest products, a block for the utilization of environmental services. The administrative utilization block is located in

Koto Besar Subdistrict, Dharmasraya Regency covering an area of 25,369 ha.

3. Empowerment Block is an area that has been or will be undertaken community empowerment efforts (Community Forest, Village Forest, Community Forest Plantation) based on the potential that has been obtained through the forest structuring process. The government administration empowerment block is located in Pulau Punjung Subdistrict, Koto Besar and Asam Jujuhan for 7,291 ha.

Forest Management Implementation and Management Plan in Dharmasraya's PFMU Scope

The Dharmasraya PFMU area has undergone several management changes. Administratively this land is a state forest, which had previously been granted a concession permit by the government to the Ragusa HPH area of $\pm 66,000$ ha in 1972. In 2002 the Ragusa HPH license expired, a portion of this HPH area of $\pm 32,450$ ha became a production forest that could be converted and had been converted. the HGU was granted to oil palm plantation companies namely PT SMP, PT Incasi Raya, and PT AWB, a multinational private company [16].

The rest will be HTI (Industrial Forestry) of PT. Inhutani, PT. DS, and PT. BRM (PT BRM unit is located in South Solok Regency, part of the utilization area is in Dharmasraya Regency, so PT MRB's whereabouts are not monitored.). Then in 2013, the HTI was determined as the PFMU Model Dharmasraya covering an area of $\pm 33,550$ ha. However, the two forest management operators of the former HPH (forest management rights) PT Ragusa failed, resulting in the destruction of the forest area. Forest destruction continues to the present time, so that it presents a challenge for the FMU to manage it.

In preventing further deforestation and degradation of the Dharmasraya PFMU, it is set forth in the Long-Term Management Plan (RPJP) of the Dharmasraya PFMU Forest Management Implementation program which includes:

- a. Utilization of forest products, both timber, non-timber and environmental services that are undertaken by themselves and are carried out by business permit holders in the management area of the Dharmasraya PFMU.
- b. Empowering communities around the Dharmasraya PFMU forest to find out the extent of the program activities carried out.
- c. Forest and land rehabilitation in forest areas that are experiencing serious disturbance to restore their functions.
- d. Forest protection in the form of activities that are directly or indirectly related to efforts to

prevent, restore and maintain forest areas in order to remain sustainable.

- e. Production of forest products to determine the amount of production produced, harvesting techniques used and where products are marketed.

Customary institutions can also play a role in implementing joint forest management to create sustainable forest areas. At the moment the information dissemination regarding the Dharmasraya PFMU management plan is not yet known by the public. For this reason, it is necessary to first socialize all levels of society regarding the management plan to be carried out by PFMU Dharmasraya so that the Dharmasraya PFMU can be sustainable. FMU management will continue if all parties are involved in a series of FMU management plans.

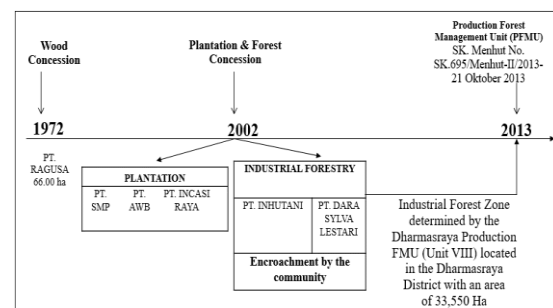


Fig 2. Change in Management of Forest Area

Organizational capacity

Institution is a dynamic identity, which develops as needed. FMU institutions are closely related to regional development and also affect the access and achievement of FMUs that are independent in managing forest areas. The PFMU regional technical implementation unit in West Sumatra is currently stipulated by the Governor of West Sumatra Regulation No.75/2017 concerning the Establishment of the Organization and Work Procedure of the West Sumatra Provincial Forestry Technical Implementation Unit, where the KPHP is one of the Regional Technical Implementation Units of the Provincial Forestry Service West Sumatra. Administratively and technically operational responsibility to the Head of the West Sumatra Province Forestry Service. The main principle in the working relationship between the FMU and the West Sumatra Provincial Forestry Service with other work units is to place the FMU as a management function of the forest management unit while the West Sumatra Provincial Forestry Service carries out the coordination, synchronization and integration functions.

The PFMU Dharmasraya organization is still very simple, the Head of the FMU is only echelon III level b so it is not comparable between the

obstacles that will be faced in the field with the number of existing human resources. In addition, the amount of human resources to synchronize management objectives with the objectives of other stakeholders is not sufficient. Therefore, to realize sustainable FMU management, creative, skilled and experienced human resources are needed. But in reality, at present, the availability of human resources is still very limited in carrying out KPH institutions both in quantity and quality.

Government relations and regulations

Based on Law No. 23 of 2014 concerning Regional Government, the authority for forest management and management rests with the Provincial Government. Therefore, PFMU Dharmastraya Unit VIII is a Technical Implementation Unit formed by the West Sumatra Provincial Forestry Service and carries out certain supporting technical activities and operational techniques, especially in the forestry sector. In this work relationship arrangement, KPH will play a role in the management function, while the West Sumatra Provincial Forestry Office plays a role in coordination, synchronization and integration. The Dharmastraya PFMU planning document has been integrated with regional management plan documents such as the Regional Medium-Term Management Plan.

The position of the PFMU region in the Regional Spatial and Development Perspective can be seen in several perspectives. First is the status of the area in the Dharmastraya Regency Regional Spatial Plan, second in the direction of the development of the Dharmastraya Regency Long-Term Management Plan, the status and direction of the West Sumatra Provincial Forestry Plan. All these directions consistently show that the FMU area is in the status of a production forest and the direction of utilization is a large-scale forestry business. However, as will be explained in the previous section there are problems at the site level, so the function of the area and direction of use are not in line.

Investment mechanisms

Forests have various benefits for human life, both direct and indirect benefits. These benefits include being a rich source of biodiversity and natural plasma [17], absorbing carbon dioxide and producing oxygen [4]; protecting the soil from erosion and regulating water systems [18], producing forest products for community, industrial and export purposes; source of livelihood for part of the community (socio-economic) [19].

Thus, forestry is not only related to the economic economy of wood, but also further

reaches a variety of diverse economic, social and cultural systems, which is also the potential to develop various fields of science and technology [20]. It is well known that the value of production forest areas must always increase so that the existence of production forest areas can be accounted for nationally, regionally and locally [21].

Seeing from the fact that the socio-cultural and economic potential of the people that exist in the PFMU working area that influence each other and are interconnected in supporting the utilization of forest land area. Moreover, the very strategic demographic position facilitates access to forest areas so that it is excellent and the attraction of investing both legally and illegally. This area is easy to reach and therefore has lower investment costs. As a result, forest areas are already largely controlled by third parties. Existing investment activities tend to be unsustainable. Migrants from outside Dharmastraya tend to buy land from customary authorities and plant oil palms. Strong land tenure can realize the long-term benefits of forests compared to the short-term benefits of land conversion. However, stronger ownership rights can also increase incentives to invest in productive activities such as food crops [22] [23].

Considering that the KPHP Long-Term Management Plan was only approved in 2019, the KPHP Dharmastraya has no business plan documents and no investment activities in sustainable forest management. This must be addressed as soon as possible so that conversion of forests to plantations does not continue to occur. Production forests are the most severely affected by deforestation and need serious rehabilitation efforts [24]. Seeing this investment is needed for forest restoration, it is very necessary coordination between agencies with various relevant stakeholders.

Rights and access mechanisms for indigenous/ local communities

More than 1.6 billion people depend on forests for food, water, fuel, medicines, traditional culture and livelihoods [25]. Widespread facts from all over the world show that greater local community participation in resource management institutions, for example, has the autonomy to make local regulations, demonstrating positive impacts on livelihoods and biodiversity [26]. However, this does not apply in Dharmastraya. Indigenous peoples' resistance to land is demonstrated by land acquisition, but the community's land use patterns trigger deforestation. Encroachment by local communities, and turned into plantations led to forest degradation and deforestation [27].

For this reason, the management, in this case PFMU Dharmasraya, needs to foster the community so that they can work for sustainable use of forests by increasing the institutional capacity of the community. So that the forest area can be managed while simultaneously providing forest products and services to the community. In the long-term Management Plan of the Dharmasraya KPHP it is stated in general about the right of community access in the form of developing social forestry patterns in the form of Village Forests, Community Plantation Forests, Community Forests, and Forestry Partnerships.

Based on Minister of Forestry Regulation No. P.39/Menhut-II/2013 dated 16 July 2013 concerning Empowerment of Local Communities through Forestry Partnerships, FMUs are required to carry out community empowerment around the area through the Forestry Partnership covering the following activities:

- a) Identification and Inventory of communities encroaching and gardening in the area in order to establish partnerships with KPHP.
- b) Socialization of the Minister of Environment and Forestry Regulation regarding community empowerment through forestry partnerships
- c) Formation and Strengthening of Community Plantation Forest Institutions, Community Forests and Partnerships.
- d) Socialization of Law No. 18.2013 concerning Prevention and Eradication of Forest Damage to the community.
- e) Facilitating partnerships in forest management and business permits for the utilization of timber forest products of community plantations and business permits for the use of community forests.
- f) Facilitation of Training, Comparative Study and Development of Human Resources

In addition, it is necessary to change the perspective in institutional formation which has so far been characterized by "state property" towards "communal property". This means that it has changed from a legal claim by the state to a joint claim between the government and local communities with binding social rules and norms.

Conflict resolution

Indonesia's forest areas certainly cannot be separated from the various dynamics of conflict. A safe and conflict-free forest area has been pursued with the issuance of Forestry Law No. 5/1967 which was later renewed into Forestry Law No. 41/1999 as well as various other laws and regulations that support forest conservation efforts. However, this does not mean that the problem is over; in fact, conflicts over rights to forest areas have only increased due to weak institutional issues and the

relationship between the central government and regional governments.

Inadequate access to and wishes of the community in existing programs often becomes a source of rejection and conflict. So that the forest and land rehabilitation program carried out becomes less efficient and effective in dealing with forest damage in the Dharmasraya PFMU area. The close relationship between the Dharmasraya community and its surroundings with forest resources has created a system or form of forest ownership in this region. Under this system, ownership of forest areas by a tribe will be passed down from generation to generation concerned. This land is de facto recognized as Malay tribal land.

De jure the government holds the rights and control over forest resources by granting management permits to Industrial Forestry. But de facto, on the other hand, the community also demands and claims their customary rights. The success of the community in reoccupying their communal land does not mean that they can manage the forest land in the right way. Indigenous peoples have also carried out activities that may be unusual, namely selling their customary land in their territories. Through granting permits for land clearing in areas that are physically customary forests. In this case *Datuak* has full power, the nephew cannot forbid *Datuak* from selling land. This means that indigenous peoples have facilitated forest encroachers from outside Dharmasraya with the ability to issue rights. So that migrants feel safer with the land they have.

This means that the recognition of customary land does not guarantee the welfare of indigenous peoples when communal land rules lie with those who cannot maintain communal land. While in other areas indigenous peoples maintain the preservation of forests and prevent outside disturbance [28]. However, this does not apply in Dharmasraya. Indigenous peoples' resistance to land is demonstrated by land acquisition, but the community's land use patterns trigger deforestation. Encroachment by local communities, and turned into plantations causes forest degradation and deforestation. For this reason, the KPH Dharmasraya in handling conflict is trying to use a discussion approach, because if it is violent it will trigger a prolonged conflict.

4. CONCLUSIONS

Analysis of the performance evaluation of PFMU Dharmasraya in the implementation and management of forests shows an average index value of 2.08 out of the nine criteria assessed in the medium category. This means that PFMU Dharmasraya is quite ready in forest management at

the site level. The criteria that need to be further considered to be strengthened so that the operationalization of PFMU can be sustained is to increase organizational capacity that has been weak, conflict management, clear investment mechanisms and the stability of forest areas.

5. REFERENCES

- [1] LEEC Paper DP 93-01. London Environmental Economics Centre, 1993.
- [2] Brown K and Pearce D W. The Causes of Deforestation: The Economic and Statistical Analysis of Factors Giving Rise to The Loss of Tropical Forests. London: UCL Press, pp. 217-225. 1994
- [3] Forest Watch Indonesia (FWI). Potret Keadaan Hutan Indonesia Periode Tahun 2000-2009. The Asian Foundation. Bogor, 2011.
- [4] Hansen M C. High Resolution Global Maps of 21st Century Forest Cover Change. *Science*, 342(6160), 2013.
- [5] Rasheed S. Participatory Forestry as a Strategy for Reforestation in Bangladesh. *GeoJournal*, 3(1), pp. 39-44. 1995
- [6] Kamal A., Kamaluddin M and Ullah M. Land Policies, Land Management and Land Degradation in The Hindu Kush-Himalayas. Bangladesh study report. MFS Case Study Series International Center for Integrated Mountain Development, 99(1), 1999.
- [7] Contreras and Hermosilla A. The Underlying Causes of Forest Decline. Occasional Paper No. 30. Indonesia: Center for International Forestry Research, 2000.
- [8] RPHJP KPHP Model Dharmastraya Unit VIII Tahun 2019-2028. Rencana Pengelolaan Hutan Jangka Panjang Kesatuan Pengelolaan Hutan Produksi Model Dharmastraya (Unit VIII) Pada Uptd Kesatuan Pengelolaan Hutan Produksi Dharmastraya Unit VIII Provinsi Sumatera Barat Tahun 2019-2028, 2019.
- [9] Natural Resources Development Center (NRDC). Konsep dan Kebijakan Pengelolaan Hutan Produksi Lestari dan Implementasinya. Jakarta: Program Terrestrial The Nature Conservancy Indonesia, 2013.
- [10] Bawa K S and Dayanandan S. Causes of Tropical Deforestation and Institutional Constraints to Conservation. In: Goldsmith, F.B. (ed.). *Tropical rain forest: a widerperspective*. London: Chapman and Hall, 1998.
- [11] Kementerian Kehutanan. Rencana Kehutanan Tingkat Nasional (RKTN) Tahun 2011-2030. 2011. Peraturan Menteri Kehutanan Republik Indonesia Nomor: P.49/Menhut-II/2011. Jakarta: Direktorat Perencanaan Kawasan Hutan, 2011.
- [12] Forest Watch Indonesia (FWI). Panduan Penilaian Kinerja Pembangunan dan Pelaksanaan Pengelolaan Hutan di Wilayah KPH. Bogor: Forest Watch Indonesia, 2018.
- [13] Komisi Nasional Hak Asasi Manusia Republik Indonesia. Inkuiri Nasional Komisi Nasional Hak Asasi Manusia: Hak Masyarakat Hukum Adat Atas Wilayahnya di Kawasan Hutan. Tim Inkuiri Nasional Komnas HA, 2016.
- [14] Benda-Beckmann. Relative Publics and Property Rights. A Cross Cultural Perspective. In Charles G. and Gail D., editor. *Property and Values. Alternatives to Public and Private Ownership*. Washington, D.C: Island Press, pp. 151-173. 2000
- [15] Yurike, Yonariza, Rebecca E., Syafruddin K and Rudi F. Deforestation in Dharmastraya District, West Sumatra, Indonesia: A Causal Loop Diagrams (CLD) Model. *Asian Journal of Scientific Research*, 11, pp/ 117-184. 2017
- [16] Yurike, Yonariza, Rudi F and Syafruddin K. Land Use Changes in Dharmastraya District, West Sumatra, Indonesia. *Pertanika Journals tropical Agricultural Science*, 41(3), pp. 1111-1124. 2018
- [17] Haddock J., Tzanopoulos J., Mitchley J and Fraser R. A Method for Evaluating Alternative Landscape Management Scenarios in Relation to The Biodiversity Conservation of Habitats. *Ecological Economics*, 61(2-3), pp. 277-283. 2007
- [18] *Food and Agriculture Organization*. Global Forest Resource Assesment 2010. Main Report. Rome: FAO, 2010.
- [19] Fuhrer E. Forest Functions, Ecosystem Stability and Management. *Forest Ecology and Management*, 131(15), pp. 29-38. 2000
- [20] Suharjito D., Leti S, Suyanto dan Utami S R. *Aspek Sosial Ekonomi dan Budaya Agroforestri*. Bogor, Indonesia: World Agroforestry Centre (ICRAF), 2003.
- [21] Boer R. Sustainable Forest Management in Relation to REDD+. Centre for Climate Risk and Opportunity Management in Southeast Asia and Pacific. Bogor Agriculture University, 2012.
- [22] Grimm M and Klasen S. Migration Pressure, Tenure Security, And Agricultural Intensification: Evidence from Indonesia. *Land Economics*, 91(3), pp. 411-434. 2015
- [23] Lawry S., Samii C, Hall R., Leopold A., Hornby D and Mtero F. The Impact Of Land Property Rights Interventions On Investment And Agricultural Productivity In Developing Countries: A Systematic Review. *Journal of Development Effectiveness*, 9(1), pp. 61-81. 2006

- [24] Pirard R., Fishman A., Gnych S, Obidzinski K and Pacheco P. Deforestation-Free Commitments: The Challenge Of Implementation – An Application To Indonesia. Working Paper 181. Bogor, Indonesia: CIFOR, 2015.
- [25] New York Declaration on Forests Action Statements and Action Plans. Climate Summit 2014. New York, 2014.
- [26] Ostrom E and Nagendra H. Insights on Linking Forests, Trees, And People from The Air, on The Ground, and in The Laboratory. *Proceedings of The National Academy of Sciences*, 103(51), pp. 19224-19231. 2006
- [27] Yurike, Yonariza, Rudi F and Syafruddin K. Land Grabbing and Deforestation: Community Perception on Forest Land Ownership in Dharmastraya District, West Sumatra, Indonesia. Conference Paper No. 58: RCSD Chiang Mai University, 2015.
- [28] Porter-Bolland L., Ellis E A., Guariguata M R., Ruiz-Mallen I., Yankelevich S N and Garcia V R. Community Managed Forests and Forest Protected Areas: An Assessment of Their Conservation Effectiveness Across The Tropics. *For. Ecol. Manag.*, 268, pp. 6-17. 2012