

Towards Inclusive Indonesian Forestry: An Overview of a Spatial Planning and Agrarian Perspective

Ernan Rustiadi, Thomas Oni Veriasa*

Center for Regional Systems Analysis Planning and Development, CRESTPENT/P4W IPB University,
Bogor, Indonesia 16127

Received March 15, 2021/Accepted March 23, 2022

Abstract

Forest area is the largest and most important part of the territory of the Republic of Indonesia but still faces many challenges, including deforestation, forest fires, peat swamp degradation and poverty of local communities due to horizontal and vertical forestry conflicts. This paper focuses on the analysis of forestry development based on spatial planning and agrarian perspective by conveying various facts. A single and centralistic authority over forest areas does not provide an effective basis for sustainable resource governance. There is a dualism of spatial and agrarian planning system namely between forest areas and non-forest areas. It should be integrated by mainstreaming inclusive collaborative management. We recommend promoting forest areas' arrangement under the control of an integrated spatial planning system for the people's greatest possible prosperity, including forestry management principles and objectives. Rationalisation of forest allocation (spatial pattern plan), which the optimum forest allocation must be viewed from the perspective of the overall spatial balance (both forest and non-forest areas, and between protected and cultivated areas) to provide land for food production, social welfare and environmental functions. Forestry implementation needs to consider the principles of economies of scale and prioritise benefits for local communities living bordering forests areas, especially for food cultivation areas. The government should commit to allocating at least 15 million ha inclusively by prioritising landless farmers and smallholder farmers. Increasing community participation in forest area utilisation and functions is pursued through increasing forest access for the community (social forestry and other schemes) without neglecting conservation functions.

Keywords: forestry governance, inclusive collaborative management, integrated spatial planning, forestry rationalisation, social forestry

**Correspondence author, email: thomasveriasa@apps.ipb.ac.id*

Introduction

In many countries, forest management has succeeded but faces many challenges due to various conflict and requires high transaction costs (Ostrom, 2003), including conflicts between parties over forest utilisation (Schlager & Ostrom, 1992). According to Hardin (1968), the "tragedy of the commons" occurs due to overexploitation and continuous extraction and resources mismanagement. The overexploitation has led to deforestation, habitat and biodiversity loss by the large scale of agriculture expansion and illegal logging (Deakin et al., 2010; Austin et al., 2019); land-use change for developmental interests both legal and illegal (Dauvergne, 1993; Meehan & Tacconi, 2017); decrease in the number of species (Geldmann et al., 2019); issues of water quality and quantity, air pollution, and climate change (Foley et al., 2011; Combes et al., 2016).

An example of Indonesia's common dilemma can be seen from the increasing number of anthropogenic disasters that cause material and immaterial losses. The National Disaster Management Authority (BNPB) states that throughout 2017 there were 2,862 disasters which were 89.9% dominated by floods, tornadoes, and landslides. The number of disasters has increased six times since 2003 (BNPB, 2018). From

January to February 2019, the disaster had reached 709 events that resulted in 130 people died and disappeared, 396,000 people displaced and affected, and 8,200 houses damaged. In this case, people died and disappeared mostly due to flooding (BNPB, 2019). Besides, during 2015, forest fires in Indonesia burned more than 2.6 million ha; the economic loss due to the forest fires is estimated to exceed the USD16 billion, with more than 100,000 premature deaths (Edwards et al., 2020).

Issues related to natural disasters (floods and landslides), forest fires, and climate change impact the natural carrying capacity that has been exceeded due to over-claims in the name of development. Development is often seen as a "recipe" for solving problems in society, particularly by exploiting natural resources for economic purposes. Natural resource-based economic development that does not pay attention to environmental aspects will eventually harm the environment due to its limited carrying capacity (Fauzi & Octavianus, 2014).

The forestry sector had contributed to national economic growth (inherited the Dutch colonial forestry system) during the President Suharto regime order (1967–1997), as did the mining and plantation sectors. However, since the 1990s, the

growth rate is average of the five-year economy of the forestry subsector only ranges from -0.2% to 0.4% year⁻¹, in line with the shrinking availability of primary forest resources and the increasingly limited exploitation of natural forests (BPS, 2015).

Rahma et al. (2019) showed that higher economic growth did not imply a higher index of sustainable development and vice versa. The combination of the attention from economic, social and environmental aspects provides a balanced perspective that contributes to sustainability. They used a time-series data (2013–2017) in 33 provinces in Indonesia to develop a regional development sustainability index constructed from economic growth rates, open unemployment rates, poverty rate, human development index, Gini index, and environmental quality index.

On the other hand, Indonesia is experiencing a deficit food self-sufficiency issue due to food land adequacy and categorized as one of the world's lowest per capita food land area (GCDL, 2021). This condition has continued to decline in the last 50 years (Figure 1). At the same time, Indonesia covers 2% of the world's forest area, and the top ten countries with the largest forest (FAO & UNEP, 2020), and forest area management is not yet optimal, especially the non-forested area within the official forest area. Figure 2 shows that in areas with forest area functions, there are 34.54 million ha the non-forested area (MoEF, 2018a).

A growing human population, while land resources are

limited, requires the ability to adapt land use as rationally as possible, sustainable production technologies and be able to meet the various needs of communities while at the same time protecting vulnerable ecosystems and genetic diversity (Rustiadi et al., 2011). Rationalisation of forest areas and agrarian reform is needed to increase food land adequacy, provide access to landless/smallholders farmers and contribute to poverty reduction of local communities.

This paper focuses on the analysis of forestry development based on the perspective of spatial planning and agrarian. We hypothesize that over-claimed forest management has failed to achieve community empowerment and inclusive sustainable distribution of benefits. This paper aims to convey various facts that in many regions, production-oriented forest management systems are no longer relevant. It is necessary to transform forest management towards a social and environmental direction and support local communities. The tragedy of the commons in forest resources should be overcome by mainstreaming inclusive collaborative management.

Indonesian Forestry Paradox

Forest area is the largest and most important part of the territory of the Republic of Indonesia. Of the total land area of Indonesia, around 120.6 million ha (63%) are forest areas divided into 3 (three) forest functions, namely production forest (68.8 million ha), protected forest (29.7 million ha)

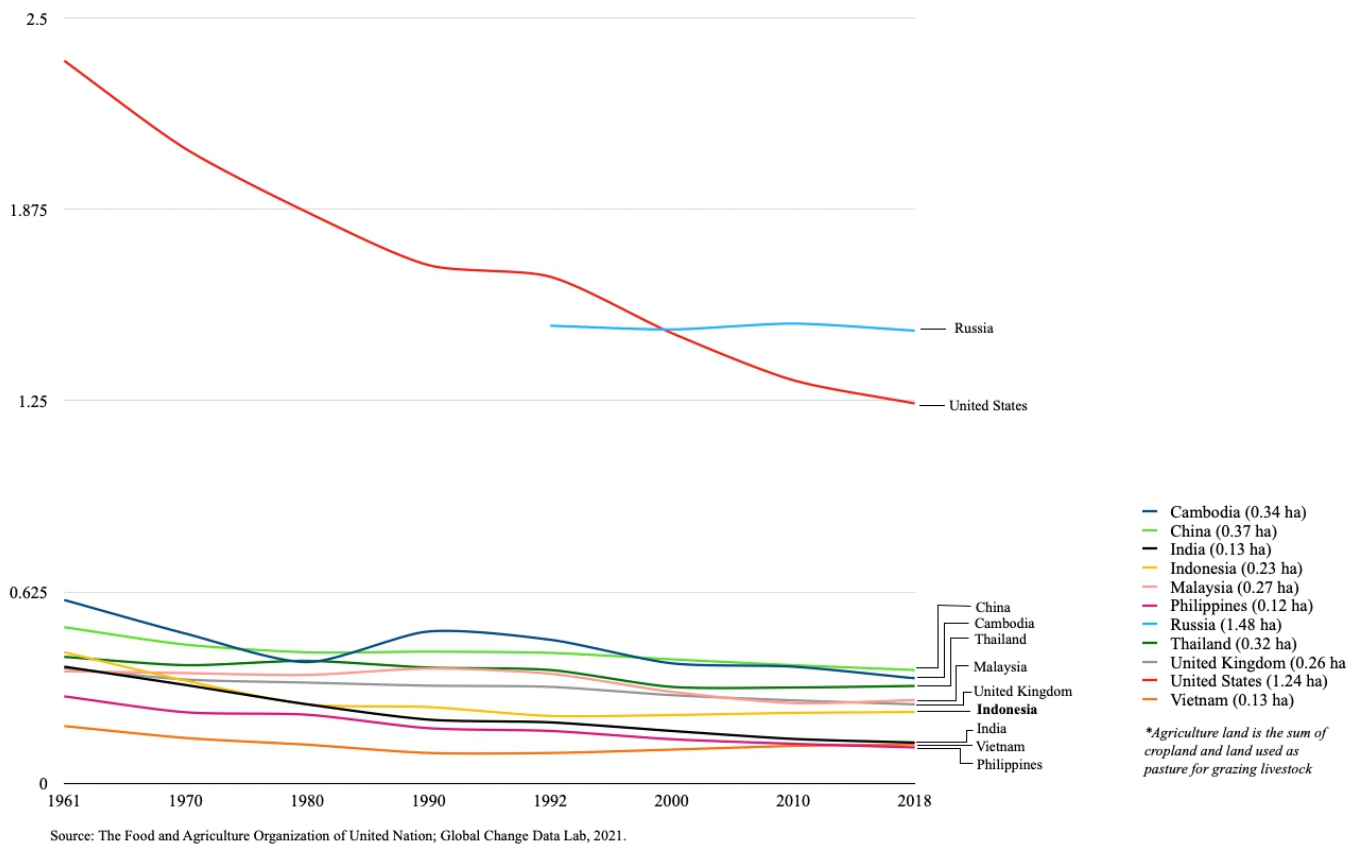


Figure 1 The comparison of agricultural land per capita in the world.

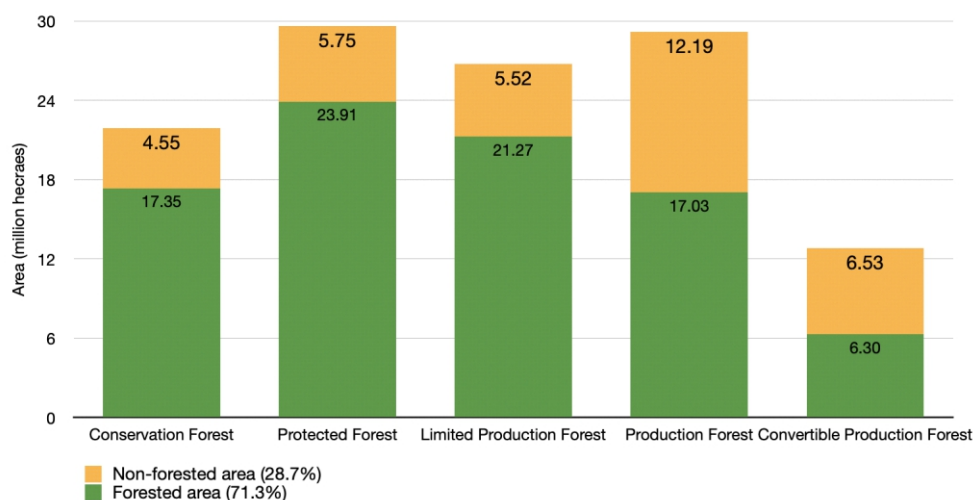


Figure 2 The forested area and the non-forested area within the forest area based on its functions.

and conservation forest (22.1 million ha) (MoEF, 2020).

Besides the vital function of forests, Indonesia still faces many challenges, including deforestation, forest fires, and peat swamp degradation. FAO (2021) states that Indonesia's forests' average reduction is 0.52% year⁻¹ (1997–2017). There has been a decrease in forest area by 4.76 million ha between 2009 and 2018 (MoEF, 2019). Changes in forest land cover were contributed significantly by the increase of primary forest by 3.94 million ha and reduced the secondary forest by 9.06 million ha (Table 1).

Deforestation in the secondary forest has occurred within forest areas as well as non-forest areas (*areal penggunaan lainnya*, APL). APL is not a formal forest area, but in some parts, it is still forest (MoEF, 2018b). Reduction of forest area is driven by activities aimed at economic growth, such as an expansion of oil palm plantations, mining, timber extraction, and many of the same activities resulting in deforestation and contribute to Indonesia's carbon emissions (Enrici & Hubacek, 2016). In contrast, the contribution of the forestry sub-sector gross domestic product (GDP) in 2019 was only 0.66% of the total national GDP (Table 2), steadily decreasing since 2016, namely 0.71% (BPS, 2020).

Furthermore, the analysis of household activities in forestry sector, as well as households living in and bordering forest area in 2013 (BPS, 2015) found several findings, namely: 1) the largest group of households living around the forest access the forest land for cultivating rice crops; 2) villagers around the forest area are characterized by high level of poverty rate and disadvantage villagers; and 3) in contrast to the relatively small economic contribution of the forestry sector to the national gross domestic product, land in forest area play an important role in providing local communities to meet their basic needs and income through agroforestry activities (food production, timber, etc.), various forms of environmental services (clean water, pollinators, etc.). This fact shows the urgency for forestry authorities to further enhance the inclusive socio-economic and environmental functions of forest areas for the community.

Fauzi and Oxtavianus (2014) stated that this condition was 'trapped progress'. GDP, which comes from the depletion of natural resources (forest), must be paid with high social and environmental costs. Large-scale forestry corporation practices in accessing forest area need to be reviewed for their economic efficiency as well as their social benefits compared to smallholders systems and community forestry.

Forestry, Spatial, and Tenurial Conflicts

Forestry conflicts occur horizontally and vertically. Horizontal conflicts are conflicts between forestry authorities and various other state institutions. Meanwhile, vertical conflicts occur between state institution, forestry corporations, and local communities. In term of horizontal conflict, Sumardjono et al. (2011), in their study on review of Indonesian laws related to natural resource management, indicate four main issues on natural resources governance system, namely: 1) inconsistency of various laws related to control, utilisation and use of natural resources; 2) disagreement among government agencies; 3) inconsistency among national sectoral law and government regulation on natural resources management, and 4) inconsistency of nomenclature. The study conducted a comparison of 12 laws related to natural resources, which examined seven criteria, namely: 1) orientation; 2) ideology; 3) autonomy policy, legal vision on pluralism and its implementation; 4) protection of human rights (HAM) (gender, recognition of indigenous peoples (MHA), dispute resolution; 5) governance (participation, transparency, and accountability); 6) the relationship between people and natural resources (rights or permits); and 7) the relationship between the state and natural resources.

Table 3 presents and describes the detail findings on fragmentation and incoherencies on national natural resources governance. Among all state institutions, the Ministry of Environment and Forestry (LHK) holds the largest authority in governing natural resources which cover

Table 1 Forest cover changes for the period 2009–2018

Land cover	2009 (million hectares) ¹		2018 (million hectares) ²		Change (million hectares)	
	Forest area	APL ³	Forest area	APL ³	Forest area	APL ³
Primary forest	41.26	5.16	45.20	1.44	3.94	-3.72
Secondary forest	45.55	3.20	36.49	5.19	-9.06	1.99
Plantations forest	2.82	1.63	4.03	1.21	1.21	-0.42
Non-forest & aquatic	41.05	52.61	40.20	59.52	-0.85	6.91
Total	130.68	62.60	125.92	67.36	-4.76	4.76

¹ Calculation using forest area data in 2011; ² Calculation using forest area data in 2018; ³ Other land-use area
 Source: MoEF (2019).

Table 2 Indonesia's GDP at current prices based on sector in 2019

No	Sector/business field	GDP (Billion IDR)	Contribution per sector (quarterly average %)
1	Agriculture	2,013,626.9	13.26
	– Agriculture, livestock, hunting and agricultural services	1,489,522.7	9.41
	– Forestry and logging	104,122	0.66
	– Fishing	419,982.2	2.65
2	Mining and excavation	1,149,913.5	7.26
3	Processing industry	3,119,617.3	19.70
4	Electricity and gas supply	185,115.3	1.17
5	Water supply, waste management, waste, and recycling	10,736.3	0.07
6	Construction	1,701,741.2	10.75
7	Wholesale and retail trade; car and motorcycle repair	2,060,772.6	13.01
8	Transportation and warehousing	881,662.6	5.57
9	Accommodation; food and drink	440,267.7	2.78
10	Information and communication	626,424.7	3.96
11	Financial services and insurance	671,356	4.24
12	Real estate	439,367.1	2.77
13	Corporate services	304,285.5	1.92
14	Government administration, defence, and mandatory social security	572,456.9	3.62
15	Education services	522,745.5	3.30
16	Health services and social activities	174,801.7	1.10
17	Other services	308,839.6	1.95
	Total	15,183,730.4	100.00

Source: BPS (2020)

63% of total land area, both in term of regulating tenure right and in term of use rights. All institutional disagreement occur mostly not in term of formal objectives (normative interest) as stated in sectoral national law, but most of disagreement among sectors occur due to “ego-subjective interest”. Almost all sectoral institutions have “ego-subjective interest” to increase their authority in governing rights over forest land. In many cases, these sectoral conflicts driven by their own interest instead of public interest. Therefore, there are many conflicts between government and private sector versus local communities.

Issues mentioned above certainly have implications for the implementation of regulations at the grassroots level. The situation is increasingly complex due to poor forest governance associated with forestry planning and policies and programs (Santosa et al., 2013). It is essential to shift governance strategy to improve community well-being, promote sustainable forest management, and reduce environmental conflicts (Erbaugh, 2019).

In the spatial aspect, the land use planning process is essential for determining forest land suitability with utilisation, protection, and conservation (Meehan & Tacconi,

Table 3 Political landscape of government institutions in spatial planning and agrarian policy in Indonesia

Institution	Sector fields of authority	Regulation /national law	Interest	
			Objectives (normative interest)	The ego-subjective interest
LHK	Forestry	41/1999	a) adequate and proportional forest area; b) optimal forest function (conservation, protection, production) for environmental, social, cultural & economic benefits, in a sustainable balance; c) carrying capacity of the watershed; d) community empowerment and participatory, justice and environmentally friendly manner; e) sustainable, equitable distribution of benefits	Exclusive management and governance authority of the state forest area
	Environment	32/2009	a) protect the area of the Republic of Indonesia from pollution and environmental damage; b) guarantee the safety, health, and life of humans; c) continuity of living things and ecosystem sustainability; etc.	Authority for planning and controlling the area of management of natural resources, environment and its territory
PUPR	Public work (infrastructure) and housing	04/1992 26/2007 02/2012	Safety, comfortable, productive, sustainable national space	National and regional infrastructure development; exclusive authority on national strategic project's infrastructure development
ATR	National land agency (BPN)	5/1960 26/2007 02/2012	a) regulate and administer the allocation, use, supply and maintenance of earth, water and space; b) determine & regulate legal relations between people and legal actions - for the greatest prosperity of the people; etc.	Maintain centralistic authority over land use rights arrangements; wider authority on spatial planning system
	Spatial planning			
	Land agrarian affair			
PPN/Bappenas	Development planning	25/2004	a) coordination among development actors; b) integration, synchronisation, and synergy between regions, between spaces, between time, between government functions and between the central and regional governments; c) consistency of planning, budgeting, implementation and supervision; Etc.	National planning, controlling sectoral planning and budgeting authority
Kementan	Agriculture	41/2009 39/2014 19/2019 22/2019	National food security; food self-sufficiency and food sovereignty; protection and empowerment of farmer/peasant.	Extensification of agricultural area; protection of prime agricultural land from land conversion; wider authority on regulating agricultural land; relaxation of environmental regulations
PEMDA	Local government	23/2014	Land development	Wider local government authorities in natural resource management (rights/permits); increase regional income (PAD)
ESDM		4/2009	a) economic growth; b) development of energy and mineral resources as national foreign exchange.	Legal right access to natural forest area and sea shore; investment legal certainty, exclusive rights to mining areas for the long term; relaxation of environmental regulations

Note: LHK = The Ministry Environment and Forestry; ATR = The Ministry of Agrarian Affairs and Spatial Planning; PPN/Bappenas = The Ministry of National Development Planning/National Development Planning Agency; PUPR = The Ministry of Public Works and Housing; ESDM = The Ministry of Energy and Mineral Resources; PEMDA = Regency/provincial Government; Kementan = The Ministry of Agriculture.

2017) to ensure forest land carrying capacity. However, the forestry and spatial planning issues are still the main problems and complex (Brockhaus et al., 2012), caused by historical land use, competing political, bureaucratic overlaps (Ardiansyah et al., 2015; Sahide & Giessen, 2015), financial and corruption (Meehan & Tacconi, 2017).

Tacconi et al. (2019) states, that during the New Order era, between the 1970s–1990s, Indonesian forests were controlled by commercial logging companies, and from the early 1990s, industrial tree plantation began expanding land in the Indonesian forest areas. From 1980 to 2018, the palm oil industry expanded impressively from 294.6 thousand to

14.3 million ha (Ditjenbun, 2019). Tacconi et al. (2019) claimed that this trend became another major driver of “legal” deforestation, facilitated by government policies and the development of decentralised authority over plantation licensing to the regions. But this claim is debatable, considering the lack of the capacity of the Ministry of Environment and Forestry on rehabilitating unproductive forest area since they has no significant evidences indicating success story on forest rehabilitation.

The disagreement and conflicts among sectoral authorities cause overlapping spatial arrangement and permits. The Corruption Eradication Commission (KPK) reported overlapping APL permits for oil palm plantations (HGU) with other types of forestry utilization permits in 2016. The overlap of APL permits is 534,000 ha with timber forest product collection business permits (IUPHHK) and plantation forests industry (HTI). Around 349,000 ha overlap with a the natural forest IUPHHK business permit, and 801,000 thousand ha of HGU are located in domes of peatland (KPK, 2016). Furthermore, *Konsorsium Pembaruan Agraria* (KPA) reported that throughout 2019, agrarian conflicts occurred on a land area of 734,293.4 ha, with the largest conflict area occurring in the forestry sector (274,317.3 ha), of which 95% involved companies holding industrial plantation forest (HTI) conflict with the local people (KPA, 2019).

Agrarian Reforms and Social Forestry Contexts

Currently, there are a difference of forest definition between international and national, such as FAO (2000), defines forest as a land area of more than 0.5 ha with a tree canopy cover of more than 10% and a tree height of more than 5 m (or potentially reaching a height of 5 m). According to National Law 41/99, the Government of Indonesia defines forest (forest cover) shall be an integral a unit of ecosystem in the form of lands containing biological resources dominated by tree in their natural environment. Furthermore, it is distinguished from the notion of forest (forest cover), forest area is a certain area which is designated and or stipulated by government to be preserved as permanent forest. These definitions of forest are often not used properly, so that it becomes one of the main problems in spatial planning and forestry in Indonesia (Romijn et al., 2013).

The legal access granting system in Indonesia is still dominated by granting access rights to large-scale corporations (Figure 3). Large-scale corporations manage 92.52% or 31,383,853 ha, while the remaining 7.48% or 2,537,164 ha are managed by local communities (MoEF, 2019). Currently, many local communities do not have legal access to state forest areas. The concept of state forest area is relatively new that came along with the colonial period of the government of Dutch East Indies and then the Republic of

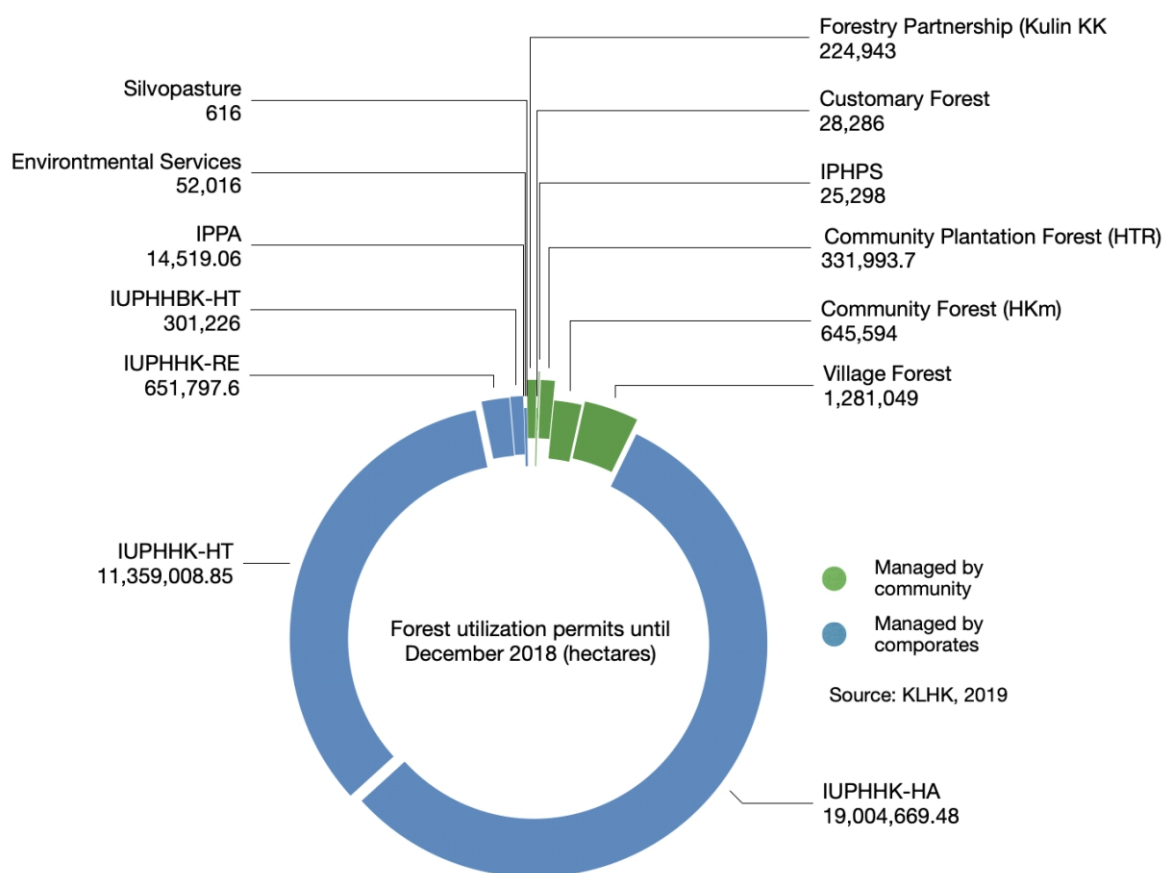


Figure 3 Forest utilisation and type of permits until December 2018 (in hectares).

Indonesia. Indigenous settlements have existed since before the two regimes. Persistence villages categorized as being “inside” forest areas have always been the subject of long debate. In fact, there are 25,863 villages categorized as located around forest areas, with a population of 9.2 million households, of which 1.7 million households are classified as poor (MoEF, 2020). In addition, approximately 5,575,214 households rely on lands in state forest areas for several main activities: rice cultivation, forestry plants, forest plant nurseries, animal/plant breeding, wildlife capture, and forest product collection (BPS, 2019).

The government's initiative in creating a more inclusive forest land tenure system is carried out through the agrarian reform program, namely the agrarian reform object land (*tanah objek reformasi agraria*, TORA) and social forestry program (Figure 4). The agrarian reform target is 9 million ha, and the social forestry program target is 12.7 million ha (Resosudarmo et al., 2019). Of the agrarian reform target, 4.1 million ha are de-allocated forest areas (TORA program). Figure 5 shows an explanation of the TORA program and de-allocated forest areas.

Furthermore, to support the social forestry agenda, a national policy has been issued through the Regulation of the Minister of Environment and Forestry (PermenLHK) of the Republic of Indonesia Number 83 of 2016 concerning social forestry. Government claimed that one of the considerations for the issuance of social forestry policy is to reduce poverty, unemployment and unequal management/utilisation of forest areas through efforts to provide legal access to local communities in managing forest areas (MoEF, 2016).

However in the period 2007–2014 (7 years), progress in social forestry only reached 455,846 ha. When social forestry became President Joko Widodo's national agenda, the area of social forestry continued to increase to 2,777,204 ha managed by 857,819 households in 2020 (MoEF, 2020). This achievement is still quite far from the target set and is still very small compared to large-scale corporations' allocation (Figure 6).

Although the social forestry scheme provides opportunities to address inequality of community participation, land tenure, poverty reduction, and reduce environmental conflicts (Asmin et al., 2019; Erbaugh, 2019;

Rakatama & Pandit, 2020), several studies show the challenges faced in its implementation. Rakatama & Pandit (2020) states that institutional challenges are related to ineffective forest management and high transaction costs in implementing social forestry due to several problems, namely: 1) less effective centralized state control through various administrative procedures and bureaucratic designs; 2) differences in understanding and stakeholder interests in social forestry; 3) unfair distribution of rights and responsibilities over forests leading to unfair compensation issues among stakeholders.

Bong et al. (2019) state that social forestry scheme as a strategic step to legalise community use and claims over forests, but it is not necessarily a long-term solution. Except for customary forest, social forestry is bound by rules such as time limits, land zoning rules that bind management and utilisation objectives. Although customary forest (*hutan adat*) is the only social forestry scheme in Indonesia that provides management and ownership rights, the process for full recognition has been slow (Figure 6).

Furthermore, Wong et al. (2020) indicate that the private sector as the desired new actor in social forestry, which is expanding and wrapped up in agrarian reform, is feared to use most of its power in taking advantage of economic exploitation of land and forests.

Practically, the speed at which permits distribution has not been matched by equal attention to supporting their implementation. Apart from the limited post-licensing activities, and the lag time for implementation, the risk of improper forest management is potentially detrimental (Resosudarmo et al., 2019). Thus, some deviations can occur between social forestry's formal goals and performances (Rakatama & Pandit, 2020)

The Urgency of Rationalisation of Forest Governance

As officially adopted by the National Forestry Plan (*Rencana Kehutanan Tingkat Nasional*, RKTN) for the period 2011–2030 (MoEF, 2019), we propose some fundamental forestry governance changes (Table 4). First, the focus of forest governance must shift from activities that

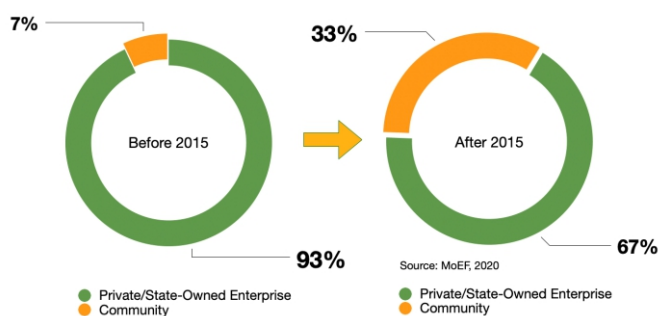


Figure 4 Utilisation of forest areas by communities before 2015 and targets the future.

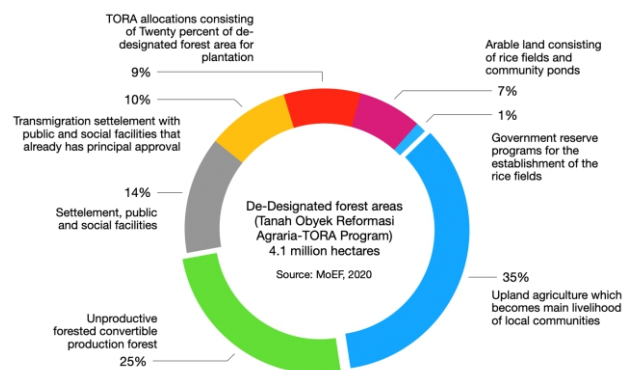


Figure 5 Percentage of indicative size and land type allocated to the TORA program.

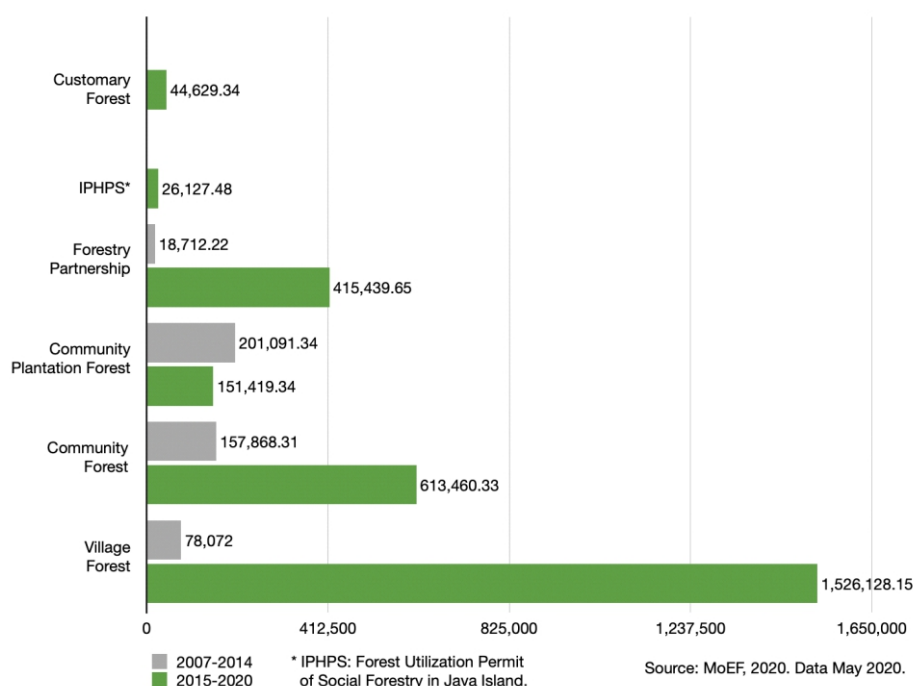


Figure 6 Progress of social forestry licensing areas and access by communities (in hectare).

Table 4 Transforming of forestry governance

Aspects	Past and existing regulations	Future regulatory directions
Governance focus	Production, conservation/ protection	Conservation/protection, social welfare
Main objects of governance	State forest	State forest and private forest- <i>hutan hak hak</i> (individual, community and customary forests)
Main actors of forestry management	Government and large-scale business	Government, regency government, village government, local community/customary, individual and business entity
The basis of criteria of performance appraisal	Several partial criteria, national standards (static) and physical indicators	A functional system, multi standard based on forest/area typology, functional dynamic, physical and functional indicators
Government roles	Regulator and implementer	Regulator, facilitation function, forest management control, monitoring and evaluation
Forestry governance units;	The vertical functional unit and watershed	Functional units, forest area management units (KPH mainstreaming), ecological areas (watersheds, peat hydrological areas-KHG, Karst geological ecosystem, etc.)
Governance instruments	Zoning, sanctions, permits	Zoning, sanctions, permits, fees, incentives/disincentives, various rights of access (bundle of rights)

prioritize production and conservation to conservation, conservation and social welfare activities. The object of regulation and management that has been in state forest areas must shift to a broader scope, namely state forest areas as well as individual, community and customary rights forests. The

main actors in forest management must change from the dominance of two parties (central government and large-scale corporations) to a more diverse spectrum of management types, namely the central government, regional governments, village governments, local communities,

traditional groups, individuals/smallholders, and private sectors.

Performance appraisal should shift from partial performance indicators based on rigid national standards and physical indicators to a functional, multi standard system assessment based on forest typology, dynamics, and a combination of physical and functional indicators. The government's central role shifts a regulator and activities to a regulator, facilitator, controller, and monitoring and evaluation. Forest management units turn from vertical and watershed-based units to functional units-based, forest management units (KPH), various ecological area systems, namely watersheds (DAS), peat hydrological units (KHG), areas karst landscape (KBAK), etc. Governance instruments are not limited to zoning systems, sanctions, and permits but also incentive/disincentive systems, taxes, and various bundles of rights.

Indonesia's forestry planning system inherits the domination of "rational planning" school of thought, which is adapted from "scientific/academic" approaches (Allmendinger, 2002). Vandergeest and Peluso (2011) terms it as "scientific forestry", a legal demarcation of political forests, which provides the legal basis for forestry authority claims to exclusively control over forests required for scientific forestry practices. Several other schools of thought simultaneously influence the forestry planning system in Indonesia, including socialism planning (giving great power to the state); capitalism planning (privatisation of forest governance by giving concessions to large corporates and capital owners); and green planning (environmental objectives, including the adoption of the concept of national parks). This influence, especially in Southeast Asia, dates back to colonial forestry, which adopted the basic professional forestry model in Germany and France (Peluso & Vandergeest, 2020). After that, Indonesia's forestry politics was more influenced by international forest regimes (Peluso & Vandergeest, 2011; Sahide et al., 2016) in new global networks or empire of forestry. A new "empire of forestry" organised a single model to legitimise professional forestry as a development effort based on state accumulation (Vandergeest & Peluso, 2006).

This paper has presented the findings that single and superior authority over forest areas does not guarantee that forests are managed effectively and sustainably. The vast forest area with forest cover is evidence of over-claims and the low capacity of state institutions to manage 120 million ha of complex geophysical and socio-cultural forest areas. Based on Table 4, forestry management's complexity needs to be addressed by rationalising forest governance system and formulating forest management plans and forest utilisation to increase forest management effectiveness and solution of various national interests such as food security, poverty reduction and local people empowerment. In this case, Indonesia's forestry governance system's reorientation includes resolving agrarian-forestry problems by encouraging collaborative planning and advocacy planning approaches.

Indonesia's spatial planning and natural resource tenure systems are under fragmented authority in various ministries and government agencies, each of which has a legal umbrella that is not entirely coherent (Sumardjono et al., 2011). For this reason, devolution and integration of regulations are required. Furthermore, the dualism of the spatial planning system

between forest areas and non-forest areas needs to be harmonized and integrated under one legal umbrella. On the other hand, the spatial planning system must accommodate the diversity of natural resource characteristics and the diversity of cultural and institutional systems based on local and contextual needs at the regional or local community level (Vandergeest & Peluso, 2006), including proportional market mechanisms.

Conclusion

The Ministry of Environment and Forestry holds the most significant authority in governing natural resources, both in terms of regulating tenure rights (agrarian system) and in terms of use rights/land use (spatial planning system). Findings have proven that a single and superior authority over forest areas does not provide effective and sustainable forest governance. Meanwhile, the implementation of spatial planning and the management of natural resources, forests and the environment is fragmented in sectoral and regional agencies, each of which has a different umbrella of laws and regulations. Therefore, it causes forestry conflicts horizontally (forestry authority with other state institutions) and vertically (forestry authority with forestry corporations or/and local communities).

The school of thought and basic philosophies of future forest governance must be more open to collaborative and advocacy approaches (for marginalized communities). This approach will give the community around the forest more opportunities to become the primary beneficiary of the existence of the forest. More inclusive forest management is needed to open up diversity in applying institutional systems based on local and contextual needs at the regional or local community level. Rationalisation of forest areas is required by considering the principles of rationalizing the proportion of forest and non-forest land designated as forest areas and rationalising the control/authority of forest in forest areas. Strengthening the implementation of spatial planning across sectors and regions is needed for governing public goods (food security, security, public infrastructure, etc.); externalities (disaster, environment, etc.); resource distribution problems (equity, poverty); and to overcome the market failure.

Recommendation

We recommend several strategic matters in transforming Indonesia's forest governance. *First*, promoting forest areas' arrangement under the control of an integrated spatial planning system for the people's greatest possible prosperity, including forestry management principles and objectives. Rationalisation of forest allocation (spatial pattern plan), which the optimum forest allocation must be viewed from the perspective of the overall spatial balance (both forest and non-forest areas, and between protected and cultivated areas) to provide land for food production, greatest social welfare and environmental functions. Enrichment of the spatial planning system approach on natural resources (including forestry) management is needed, particularly through collaborative planning. In the context of forest area management, a collaboration with the community, including recognising

customary forests, is expected to be promoted as the mainstreams' forestry governance system.

Second, forestry implementation needs to consider the principles of economies of scale and prioritize benefits for local communities living bordering forests areas especially for food cultivation areas and basic livelihood needs. The government should commit to allocating at least 15 million ha inclusively by prioritising landless farmers and smallholder farmers. Increasing community participation in forest area utilisation and functions is pursued through increasing forest access for the community (social forestry and other schemes) without neglecting conservation functions. Increasing community participation and building collaboration in forest area management with the community will help resolve forest area conflicts in Indonesia and create diverse and sustainable forest area management institutions (institutional sustainability) at the micro and macro levels.

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