

The Prevention of Peatland Fires in Indonesia: 'Law in Action' to Implement the ASEAN Haze Treaty

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Abstract

Signed in 2002, the ASEAN Haze Treaty is expected to reduce transboundary haze pollution and improve regional environmental governance. Indonesia plays a vital role in the implementation of the Treaty's goals. It has the largest forest and peatland area in Southeast Asia. Yet, its repeated forest and land fires had often caused transboundary pollution. Since 2016 the Indonesian Government has improved its national laws and strengthened institutional aspects of peatland protection. The peatland ecosystem is essential because it is prone to burning. Unfortunately, few studies describe how these policy changes have impacted fire prevention in degraded peatland ecosystems. This article scrutinizes the political factors behind the legal and institutional changes in Indonesia's peatland governance during 2016-2020. The theory of legal culture becomes the primary reference in this regard. This article then identifies six predominant factors in peatland law improvement: strong leadership, improved coordination at the national and sub-national levels, making operational directives, establishing a specialized Government institution dealing with peatland restoration, law enforcement, and the strength of civil society in doing public oversight.

Keywords: ASEAN Haze Treaty; Forest and land fire; Indonesian Peatland; Peatland Restoration; Transboundary Haze

Introduction

Nearly two decades ago, an effort to improve environmental governance in Southeast Asia was carried out through the ASEAN Agreement on Transboundary Haze Pollution, or often referred to as the ASEAN Haze Treaty. Signed in 2002, the treaty aims to prevent and monitor transboundary haze pollution that occurs due to land and forest fires. Air pollution due to the haze has been a thorny environmental problem for decades in the region. The ASEAN Haze Treaty, thus, is expected to provide a solution.

Indonesia plays an important role in the implementation of the goals of the ASEAN Haze Treaty. Not only because it has the largest forest area in Southeast Asia but also due to the repeated forest and land fires that had blamed the country for being the cause of the transboundary haze disaster. The most significant criticism addressed to Indonesia occurred in 2015-2016 when forest and land fires burned some 2.6 million hectares of the country's land, and around 800 thousand hectares of those burned lands were peatland (Chamorro,

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Minnemeyer, & Sargent, 2017). This figure is lower than the incidence of fires in 1997-1998 that burned some 8 million hectares of land, but the regional impact was similar (Glover & Jessup, 2006).

The year 2016 was a significant turning point for Indonesia to prevent and control forest and land fires. Institutional improvements were carried out in various ways under the leadership of President Joko Widodo. The result is a decrease in forest and land fires in the period 2016 to 2020. If in 2016 the fires scorched 2.6 million hectares of forest and land, in the following years, that number decreased significantly (figure 1). In 2019, however, there was an increase where 1.6 million hectares of forest and land were burned. The effects of climate and weather were likely to be important determinants of the spread of fires in that year (Ministry for the Environment and Forestry, 2020). NASA and the European Union's Climate Monitoring Service state that 2019 was the second warmest year in the human history (Kann, 2020). Forest fires during the year were also occurring in Australian and American continents. The fires that hit Indonesia were much smaller than those that occurred on the two continents. The fires in Australia, for example, burned 12.6 million hectares, and in the Amazon, there were 7.1 million hectares of forest burning (Gan, Choo, Leng, & Sharif, 2020).

Indonesia's peatland fires are critical to the occurrence of transboundary haze in Southeast Asia. Part of this is due to the characteristics of the peatlands, which, if they burn, will be more difficult to extinguish (Hergoualc'h, et al., 2018). Another part is because the distribution of Indonesia's peatlands is found in areas close to neighboring countries, particularly Malaysia and Singapore (Wahyunto & Suryadiputra, 2008). Thus, it is important to ensure that the prevention of peatland fires in Indonesia runs well.

Article 9 of the ASEAN Haze Treaty obliges signed countries to prevent and control forest and land fires that can cause transboundary haze pollution. The obligations include zero burning policies, fire management and fire-fighting actions, supervision of areas prone to fire, and public awareness. The Indonesian Government's policy to prevent fires in damaged and burnt peat ecosystems is the main themes discussed in this article. In particular, the observations were made on the efforts carried out from 2016 to 2020. This observation time was chosen because there was very little literature related to the implementation of the treaty to discuss legal developments in Indonesia. In general, studies, especially in the field of law and policy, have been carried out to explain the situation before 2016 (Heilmann, 2015; Lee, et al., 2016; Nurhidayah & Lipman, 2017; Santosa & Putra, 2016; Varkkey, 2017). As previously stated, many legal and institutional changes occurred in Indonesia in 2016-2020.

This article is divided into five parts. Following this introductory section, a review of peatland fires and their relation to the ASEAN Haze Treaty will be discussed. After that, the research methodology that underlies the data exposure in this article is explained. The following section discusses findings that are divided into three subsections, each of which describes the latest laws and policies on peatland restoration in Indonesia, the implementation and achievement of peat rewetting and zero burning policies in peatland restoration targeted areas. Then, an analysis identifying politico-legal factors behind the success of reducing peatland fire. Last, the author presents conclusions and recommendations.

Peatland Fire and Indonesia's Obligation to the ASEAN Haze Treaty

Global peatlands are equivalent to 3% of Earth's land cover. Peatlands are found in 180 countries covering 400 million hectares (Clarke & Rieley, 2010). About 60% of tropical peatlands are in Southeast Asia, covering an area of 25 million hectares (ASEAN Environment Division, 2016). Indonesia has around 13 million hectares of peatland, making it the country with the largest tropical peatlands after Brazil.

One of the functions of the peatland ecosystem is its ability to store carbon. Indonesia's peatlands store 46 Gt of carbon or 8-14% of the world's carbon stock. Peatlands also serve local communities by serving as water storage and providers of some endemic plants and animals. In short, peatlands provide food, energy, building materials, livestock bedding, and environmental services (Biancalani & Avagyan, 2014). However, irresponsible management of peatlands had been carried out by draining and burning. The conversion of peatlands made a change from a carbon reservoir to a source of greenhouse gas (GHG) emissions (Syahza, et al., 2020).

The forest and land fires that hit Indonesia in 2015 burned around 2.6 million hectares of land, and around 800 thousand of the burned land was peatland. The World Bank report states that the economic losses caused by the fires reached USD 16.1 million, equivalent to 1.9% of Indonesia's GDP. Meanwhile, other losses cannot be calculated in terms of health and education. Greenhouse gas emissions from burning peatlands are also enormous. Quoting data from the Global Fire Emission Database, the World Bank states that fires in Indonesia contributed around 1,750 million metric tons of carbon dioxide equivalent (mtCO_{2e}) to global emissions in the same year (Glauber, Moyer, Magda, Adriani, & Gunawan, 2016).

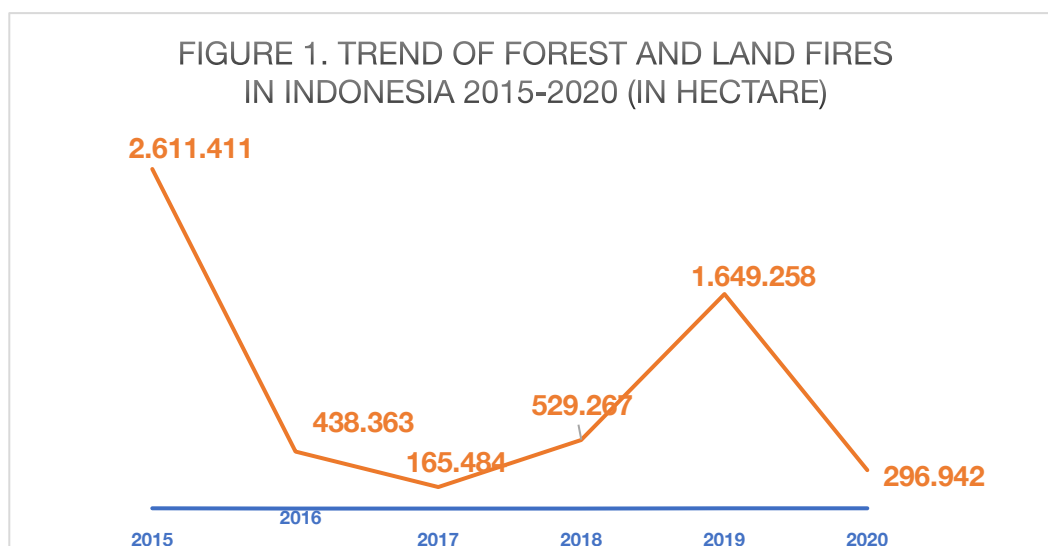
The peat fires in Indonesia in 2015 prevented the country from implementing the ASEAN Haze Treaty immediately. Indonesia has ratified the treaty through Law 26/2014. Criticism was aimed at Indonesia for this late response. However, in 2016, the Government of Indonesia stated its commitment to eradicate haze by, among other things, implementing a peatland restoration policy. President Joko Widodo also established an *ad hoc* organization, the Peatland Restoration Agency, which is mandated to undertake coordination and facilitation in the restoration of Indonesia's seven major peat provinces.

Two years after the peatland policy was launched, there was a significant reduction in peat fires. The Ministry for the Environment and Forestry claimed this as a significant achievement in reducing fires and haze since 2015. As mentioned earlier, the forest and land burned in 2015 were 2.6 million hectares. However, in 2016 fires occurred in forests and land covering an area of 430 thousand hectares, then to only 165 thousand hectares in 2017 and 529 thousand hectares in 2018. Despite the increase in 2019, the Indonesian authorities believe that this happened more due to natural factors. It has been explained that 2019 was a very hot year that sparked fires in various parts of the world. In 2020, Indonesia again recorded an achievement in suppressing forest and land fires with a total burned area of 296 thousand hectares.

The ASEAN Haze Treaty stipulates obligations to state parties to mitigate and prevent forest and land fires that can cause transnational haze pollution. Article 9 of the treaty states that the obligations include developing and implementing laws and policies and monitoring

the potential for fires. It is also required to increase community participation, including indigenous peoples, and to conduct broader public education and awareness building.

Analysis tends to be skeptical to the implementation of the treaty. A point of skepticism is related to the approach of handling environmental problems which prioritizes the use of persuasion rather than coercion. This approach is often referred to as the ASEAN Way in the contexts of environmental protection. However, the author believes domestic politics is also an essential factor in this regard. The year 2022 will come to mark two decades of the ASEAN Haze Treaty. For Indonesia, it will also mark eight years of adoption of this regional treaty into the national legal system. Studying how Indonesia prevents a recurrence of this transboundary haze disaster has rarely been done in previous studies. Several studies highlighting Indonesia's role in the ASEAN Haze Treaty were conducted before 2016 (Heilmann, 2015; Lee, et al., 2016). However, the incidence of forest and land fires in the country has decreased significantly since 2016. This article, therefore, fills this gap by explaining the efforts that the Indonesian Government has made through legal and institutional measures to prevent forest fires and land, especially in the peat ecosystem.



(Source: Ministry for the Environment and Forestry, 2021).

Methods

This research uses a socio-legal approach where legal and social science analysis is combined to explain the problems of law implementation related to fire prevention on peatlands in Indonesia. The legal research is conducted to analyze changes, continuity, and consistency of legal norms that underlie peatland restoration policies in Indonesian national law. Meanwhile, anthropological research that includes participant observation and actors' point of view methods is used to explain political factors that influence the effectiveness of the law.

The theory of legal culture becomes the basic framework in this analysis, particularly to describe the point of view and choice of actions of policy implementers. In a classic book published in 1975, entitled *The Legal System: A Social Science Perspective*, Friedman defines legal culture as "values, ideas, and attitudes that a society has with respect to its law." Friedman

further divides the legal culture into an internal legal culture and external legal culture. This research focuses merely on the internal legal culture that describes the law-makers and implementers' values and attitudes. It does not explore the external legal culture as can be seen in the general public's values and attitudes towards law and legal actors (Michaels, 2012).

This research is participatory in nature, where the author was involved in the activities that were observed. The observation was carried out mainly on legal and policy development from 2016 to 2020. At the end of 2020, Law on Job Creation was enacted. It has changed many legal provisions in Environmental Protection and Management Law (EPM Law) as well as Forestry Law. This article, however, provides only some preliminary thoughts on the impact of this Law on peatland fire prevention policy. Thus, further research is recommended to scrutinize this problem.

Milestones in Peatland Protection Law

The policy for protecting peatland ecosystems in Indonesia was first established in 1990 and marked by the issuance of a Presidential Decree on the management of protected areas (*Keppres* 32 of 1990) which stated that the peatland was one of the protected ecosystems. According to this Regulation, peatland protection was intended to control the hydrological aspect of the peatland, including preventing flooding.

The 1990 Peatland Regulation did not place fire and drought as a threat to the peat ecosystem. Forest and land fires in Indonesia were still under control during this year. As stated in the previous section, the greatest forest and land fires in Indonesia occurred in 1997-1998, which burned around eight million hectares.

The Government of Indonesia only made few peatland policies in the period 1990-2014. After 1990, provisions for peatland protection emerged in spatial planning laws. Spatial Planning Law No. 26/2007 and Government Regulation No. 26/2008 on National Spatial Planning include peatlands as national protected areas. The Government Regulation states that protected peatlands must have a peat layer of 3 meters or more and are located upstream of rivers or swamps.

Regulations related to peatlands in Indonesia are also part of environmental protection in general. Environmental Protection and Management (EPM) Law requires the central and local governments to have an Environmental Protection and Management Plan (*Rencana Perlindungan dan Pengelolaan Lingkungan Hidup, RPPLH*), including plans related to peatland ecosystems protection. In addition, the EPM Law also states that the maintenance of the peatland ecosystem is part of natural resource conservation.

In the plantation sector, the Minister of Agriculture has issued a regulation related to the use of peatlands for oil palm plantations. This regulation is known as Ministerial Regulation of Agriculture No. 14 the year 2009 on Procedures on Peatland Ecosystem Use for Palm Oil Cultivation.

Attention to the peatland ecosystem then resurfaced in 2011-2014 by enacting a Presidential Instruction (*Instruksi Presiden, Inpres*) to temporarily suspend the issuance of new permits for natural forests and peatlands (Presidential Instruction No. 10 the Year 2011). This

instruction produces an indicative map of the licensing moratorium zones, which is revised every two years. The most recent indicative map was published in 2019 (*Inpres* No. 5/2019). In 2012, the Ministry for Environment released the National Strategy for Sustainable Management of Peatlands. Then, provisions related to the protection of the peatland ecosystem are also found in Soil and Water Conservation Law (Law 37/2014) and Government Regulation on Swamps (the 2013 Swamps Regulation). However, more detailed arrangements regarding the peatland ecosystem are contained in Government Regulation Number 71 of 2014 concerning the Protection and Management of Peatland Ecosystems (thereafter the 2014 Peatland Regulation).

Unfortunately, until 2016 many of these regulations had yet to be implemented. The legal provisions in the 2014 Peatland Regulation, for example, were still a lot on paper. The devastating forest and land fires in 2015, as explained by the data and their impact in the previous section, prompted the Government of Indonesia to protect their peatland more seriously. The Ministry for the Environment and Forestry said it as corrective actions in protecting peatland (Ministry for the Environment and Forestry Republic of Indonesia, 2019). The year 2016 was an important milestone in these actions.

In 2016, the 2014 Peatland Regulation was amended by Government Regulation 57/2016 (thereafter the 2016 Peatland Regulation). This new regulation concerning the protection and management of peatland ecosystems has been an important legal source in understanding the direction of peatland protection policies in Indonesia. In this regard, the policies for protecting and managing the peatland ecosystem include planning, utilization, control, maintenance, supervision, and administrative law enforcement. The following subsection will briefly describe the main points of the six ministerial regulations by referring to the 2016 Peatland Regulation.

Planning and Utilization of Peatland

Peatland protection and management planning are carried out through an inventory of the peatland, assigning functions, and formulating and stipulating a Peatland Ecosystem Protection and Management Plan (*Rencana Perlindungan dan Pengelolaan Ekosistem Gambut, RPPEG*). Detailed arrangements regarding this plan can be found in the Minister for the Environment and Forestry Regulation Number 14 of 2017 (the 2017 MoEF Regulation) concerning the inventory and determination of the function of the peatland ecosystem. In addition, there is also a Decree of the Minister for the Environment and Forestry Number 129 of 2017 regarding the map of the National Peat Hydrological Unit (*Kesatuan Hidrologis Gambut-KHG* in Bahasa Indonesia) (the 2017 MoEF Decree No. 129), and a Ministerial Decree Number 130 of 2017 concerning the stipulation of the National Peatland Ecosystem Function Map (the 2017 MoEF Decree No. 130).

The inventory activities are carried out based on satellite imagery, aerial photographs, and field surveys. This checking activity refers to the indicative map of the distribution of the peatland ecosystem that was determined in 2014. The results of this inventory are the basis for the government to determine the Peat Hydrological Unit (PHU) map as legalized by the 2017 MoEF Decree No. 129.

The Peat Hydrological Unit or often abbreviated as PHU is the locus of peatland protection and management activities implemented. It is defined as a peat ecosystem located between two rivers, between a river and the sea, or a peat ecosystem in a swamp. The Ministry for the Environment and Forestry has designated 865 PHU with an area of 24.7 million hectares. This area is spread across four major islands, namely Sumatra Island (207 PHUs, 9.6 million hectares); Kalimantan Island (190 PHUs, 8.4 million hectares); Sulawesi Island (3 PHUs, 63,290 hectares), and Papua Island (465 PHUs, 6.6 million hectares). The largest distribution of peat ecosystems are in Sumatra, Kalimantan, and Papua. As noted in the introduction, the peat-rich locations in Sumatra and Kalimantan are in close proximity to neighboring countries, particularly Singapore and Malaysia.

The PHU is an ecosystem landscape dominated by peatlands. However, with a landscape approach, lands that are no longer peat can be included in a PHU. From the PHUs area of 24.7 million hectares, for example, the peatland recorded by the Ministry for the Agriculture in 2019 shows an area of 13.43 million hectares.

The PHU map is the basis for determining the function of the peat ecosystem. The 2016 Peatland Regulation states two main functions of the peat ecosystem: protection and cultivation functions. The 2017 MoEF No. 130 states that there are 12.4 million hectares of peat ecosystem with protection functions and 12.3 million hectares for cultivation functions.

As its name implies, the protection function necessitates careful and limited use, such as for environmental services and research. This function is mainly assigned to the peat domes and the surrounding area. Likewise, peat with a depth of more than three meters, or areas of peat that have specific germplasm, protected species, and areas previously designated as protected and conservation areas, are also enacted as protected functions. In addition, this protection function is also applied to areas that have been designated as moratorium areas for licensing. As mentioned earlier, since 2011, the Indonesian Government has issued a moratorium on the issuance of new permits for natural forests and peatlands. This policy is updated periodically. The last update one is Presidential Instruction Number 5 the Year 2019 which stipulates that areas that are the objects of moratorium have been designated as protection functions for the peat ecosystem; thus, no utilization permit shall be granted within such areas.

Meanwhile, the peat ecosystem with a cultivated function is allowed to be utilized. However, such utilization has to consider the groundwater level in the peatland and keeps the sediments from being exposed to the pyrite in the peatland that is used. The utilization of peat ecosystems conforms to national and subnational Protection and Use Plans (*Rencana Perlindungan dan Pengelolaan Ekosistem Gambut, RPPEG*). This *RPPEG* is prepared based on a map of the function of the peat ecosystem. The *RPPEG* includes national, provincial, and district/municipality spatial planning.

The Peatland Damage Control

The damage control of the peatland ecosystem is carried out through prevention, mitigation, and restoration efforts. Several regulations outline the Government of Indonesia's policies on

controlling peatland damage. Besides the 2016 Peatland Regulation, there are also regulations from the Minister for the Environment and Forestry regarding the measurement of peatland groundwater level, implementing peat ecosystem restoration, and handling burned land within concession areas.

The Indonesian Government has set standards and criteria for the peatland ecosystem damage. For a protected function of peatlands, for example, the criteria include the artificial drainage, exposure of pyrite and or quartz sediment beneath the peat layer, and decreased area and volume of land covers. Meanwhile, the damage to the peat ecosystem, which functions for the cultivation, occurs when the criteria for the groundwater level in the peatland are more than 0.4 meters below the peat surface, at a predetermined compliance point. In addition, a peat damage in areas with a cultivation function also occurs when the pyrite and or quartz sediments are exposed under the peat layer.

The prevention of the peat ecosystem damage includes the establishment of operational regulations, development of early detection systems, strengthening government institutions and community resilience, and increasing legal awareness of the community. In addition, it is also carried out to secure areas prone to fire or burn scars. The 2018 Peatland Regulation stipulates several restrictions to effectively prevent the peatland damage. These include a ban on clearing peatlands, making drainage channels that result in peat draining, burning peat and allowing fires, and prohibiting actions that impact the fulfillment of the standard criteria for peat damage as previously explained.

The responsibility for undertaking the legal provisions regarding the prevention of peat damage is put under the domain of the government. Meanwhile, the management of the peat damage is borne by permit holders. These countermeasures are carried out, among others, through fire suppression, isolating areas that have been exposed to pyrite sediments, or constructing water-control structures or structures. The permit holders are obliged to handle the damage within a maximum period of 24 hours after the damage is found. If this obligation is not complied with, the Government will assign a third party to recover the damage. The costs will be borne by the permit holders. This is a kind of payments for environmental losses and is determined based on an agreement between the government and the permit holders.

The responsibility for restoring damaged peat ecosystems is divided according to the land tenure. In the concession area, the responsibility lies with the permit holder. In areas controlled by a local community, the restoration is carried out by the community, including the customary law-based communities. The responsibility for restoring damaged peatlands within conservation areas rest with the national government while the regional government is responsible if the damage of peatland ecosystem occurs outside forest areas without any license (Safitri, 2018).

The recovery of degraded peatlands is carried out either by natural succession, rehabilitation, restoration, or other methods determined later according to developments in science and technology. Regarding to the restoration, it is stated in the 2016 Peatland Regulation that the implementation is carried out through the arrangement of water management at the site level, the development of peat rewetting infrastructure, and the utilization of peat according to local wisdoms.

If a permit holder knows that a damage of peatlands under his/her concession occurs but he/she does not take recovery measures within 30 days after it is firstly known, the government will assign a third party to carry out recovery, and the costs are borne by the person in charge of the business activity. In particular, with regard to restoring the damage to the peat ecosystem due to peat fires, Article 31B of the 2016 Peatland Regulation states that the government takes actions to save and temporarily take over areas that have been burned. This takeover aims at carrying out a verification process, where the results of such verification can allow the government to decide either to return the management of the area to the permit holder or to reduce his/her concession or even to revoke the permit altogether.

The Preservation of Peat Ecosystem

The maintenance of peatlands is carried out by reserving and preserving the functions of their ecosystem. Reservation here means the determination of peatland that cannot be managed within a certain period of time. The 2016 Peatland Regulation stipulates four types of those reserved peat ecosystems. First, the peatland with protective function that covers less than 30% of the total PHU area. The second reserve area is applied if 50% of the peat ecosystem with cultivation functions has been used for activities that have exceeded the standard criteria for the peat damage. Third, reserves are also applied for the peatland, which is the object of the moratorium policy. Finally, the reserve is carried out for the peat ecosystem with a predetermined cultivation function to be converted into protected peat. The preservation of the function of the peat ecosystem is more directed towards controlling the impacts of climate change.

Government Supervision and Law Enforcement

The Ministry for the Environment and Forestry and local governments have supervised the compliance of permit holders with their obligations concerning the peatland protection. For this purpose, an environmental supervisor is appointed. These officials have to monitor and investigate suspected violations and stop certain violations that may cause peat destruction.

The law enforcement in terms of protecting peatland mostly employs administrative law enforcement. Violations to laws and regulations, such as land clearing, burning, and construction of drainage channels that cause peat dryness, are subject to administrative sanctions, which include a written warning, coercion, permit suspension and permit revocation. Specifically on coercion, in this regard the government may impose measures such as a temporary suspension of activities, a removal of activity facilities, a closure of drainage channels, dismantling and confiscation of goods or tools that have caused and used for violations, and a temporary suspension of activities. If this coercion is not undertaken by the person in charge of the business/activity in concerned the government will suspend the environmental permit. In the case that the permit suspension is not practical, the government will then revoke the environmental permit.

Since the 2016 Peatland Regulation strictly stipulates the obligations of the permit holders and the administrative law enforcement for their violations, the regulation has been criticized by private sectors. From the beginning, objections were raised against the enactment of this regulation claiming that such regulation would hinder investment (Fernandez, 2017; Muhanda, 2017; Widyastuti, 2021). In addition, the main concern for forestry and plantation companies operating on peatland areas at that time was not only related to the provisions on new obligations to protect peatland and to ensure the wise use of it but also to the certainty of the continuation of their concessions on peatland. The question was that whether or not the provisions regarding the determination of the protection function of the peat ecosystem would make business activities impossible.

This concern has been anticipated by the 2016 Peatland Regulation by stipulating several transitional provisions. The 2014 Peatland Regulation, as amended by the 2016 Peatland Regulation, stated that a utilization permits on peatland within protected areas that had been granted before the enactment of the 2014 Peatland Regulation would remain valid until the permit's expiry date. In general, the average forestry permit lasts for 60 years and can be extended for up to 35 years. A plantation permit is granted to a company for 35 years and can be extended for another 25 years period. Meanwhile in the 2016 Peatland Regulation, it stipulates that for a permit granted before the enactment of the 2016 Peatland Regulation but it has not yet in operation, it remains valid. However, once a company as a permit holder undertakes its activities in protected areas, it must maintain the hydrological function of the peat. If this obligation is neglected for two years, the government has the authority to revoke the permit.

The Peatland Restoration Policy and Its Implementation

The highlight of the corrective policy to protect the post-2016 peatland ecosystem is preventing peatland damage and restoration of the degraded peatland. The introductory section of this article has stated that the 2015 forest and land fires also scorched around 800 thousand hectares of peatland. However, the damage did not only occur due to fire. Land clearing and land conversion were also other causes. The Indonesian Government has found that around two million hectares of peat ecosystems are degraded and have to be restored.

In January 2016 a Presidential Regulation No. 1/2016 on Peatland Restoration Agency (*Badan Restorasi Gambut, BRG*) (thereafter the 2016 Presidential Regulation) was issued. This regulation puts forward a direction for a 5-year peat restoration policy (2016-2020) and provides tasks that had to be undertaken by a newly established Peatland Restoration Agency for coordinating and facilitating this restoration. This section describes key provisions of peatland restoration policies and their implementation during the last five years.

Approaches of the Peatland Restoration

As previously mentioned, the Peatland Restoration Agency (*BRG*) that now becomes the Peatland and Mangrove Restoration Agency (*BRGM*), was given mandates to undertake

coordination and facilitation of peat restoration in seven provinces. They were: Riau, Jambi, South Sumatra, West Kalimantan, Central Kalimantan, South Kalimantan, and Papua. The *BRG* had also special functions to coordinate and strengthen policies for implementing peat restoration, planning, controlling, collaborating in implementing peat restoration and mapping the PHUs and zoning of protection and cultivation functions. In addition to these, the *BRG* undertook activities for rewetting peatland and managing ex-burned peatlands. This agency conducted programs to build public awareness toward the ecological functions of peatlands through socialization and public educational campaigns on peatland restoration. It also provided technical assistance to concessionaires in the construction, operation, and maintenance of infrastructure on their concession lands.

The area targeted for peatland restoration of *BRG* was 2.67 million hectares. An area of 1.7 million hectares was located in forestry and plantation concessions, and about 900 thousand hectares were situated within local community's land or forest/land areas without permits. The peatland restoration carried out directly by the *BRG* and its partners was located outside the concession areas. Meanwhile, the restoration in a concession area is carried out by the permit holders. The government plays the role of monitoring, supervision, and law enforcement. This role is shared by the Ministry for the Environment and Forestry, the Ministry for the Agriculture, and local governments.

Peatland restoration in 2016 to 2020 was carried out through three approaches, namely rewetting, revegetation and livelihood revitalization. In the rewetting activities, they were conducted through building canal blocks, canal stockpiling, and constructing drilling wells. Revegetation activities were carried out by planting burnt peatlands with endemic or suitable plants on peatlands. Peatland restoration also had to ensure the enhancement of local communities' welfare. Therefore, livelihood revitalization activities would empower the community to develop small and medium enterprises based on land, water, and environmental services.

As (Ward, et al., 2020) observed, local communities play a central role in peatland restoration. The *BRG* has put community participation as the key indicator of a successful peatland restoration program. For this reason, the Peat Care Village Program (*Desa Peduli Gambut, DPG*) had been developed to strengthen village institutions and community participation in supporting the restoration. Through the *DPG* Program, community education is carried out to protect peat and to avoid farming practices involving peat burning. The *BRG* also provided educational programs to support the company in restoring its concessional area.

Peatland Fire Prevention 2016-2020

The *BRG* has ended its term of office since 2020. In fact, President Joko Widodo has extended the Agency's duties and added a new task to accelerate mangrove rehabilitation. On 22 December 2020, the *BRG* changed its name into the Peatland and Mangrove Restoration Agency (*Badan Restorasi Gambut dan Mangrove/BRGM*).

During the five years of carrying out its duties, the *BRG* reported several achievements. Initial efforts of peatland rewetting had been carried out in an area of 835,288 hectares. The area that had been intervened was 94% of the target area for peat restoration, outside

commercial concessions. For areas under concessions, restoration was carried out by companies with a supervision from the Ministry for Environment and Forestry and the Ministry for the Agriculture. The BRG provided technical assistance to 186 plantation companies with a peat area of 538,439 hectares (Badan Restorasi Gambut dan Mangrove, 2020).

Assistance and strengthening of village institutions has been carried out in 640 Peat Care Villages. The peatland situated within village areas is estimated around 4.6 million hectares where 1.4 million hectares of them have been included in the peat restoration target. Moreover, economic empowerment was also carried out involving 2,295 community groups. The BRG also educated agricultural without burning to local communities, with more than 1000 farmers involvement. The Peat Farmers Field School has been an important learning center for this activity. Many farmers after the program have started to transform peat burning to non-burning technology.

Besides that, the BRG also facilitated the formation of peat community paralegals. The aim was to create legal literacy among local communities, and if there is a legal issue related to peatland faced by community members, the paralegals would provide legal assistance to them. Indeed, the Farmer Field Schools and paralegals are two sides of the coin that support each other in protecting the community. With this school, people are expected to change their behavior in utilizing peatlands.

Law and Institutional Factors for the Effective Prevention of Peatland Fires

Several factors have influenced the reduction in forest and land fires in Indonesia since 2015. First, the solid and consistent leadership from President Joko Widodo has provided a significant political support for the central and local governments' efforts to contain and prevent fires. The political will has become the predominant factor in this reform. Santosa and Putra (2016) in their research observe the weakness of peatland governance before 2016 by stating that Indonesia needs leaders who "have integrity and the courage to make radical changes to achieve comprehensive governance reform". They argue that "[p]olitical support is essential for these leaders to execute their roadmap for comprehensive reform" (Santosa & Putra, 2016). In post-2016, such leadership exists and has managed to provide directives of the peatland law and institutional reform.

The second factor is related to the integrated coordination in preventing forest and land fires. Coordination meetings for forest and land fires are held regularly, chaired by President and senior ministers. At the provincial level, similar coordination is carried out through the Forest and Land Fire Prevention Task Force, in which the governor serves as its chair.

The third factor is more comprehensive legal and policy instruments. As explained in the previous sections, several peat protection regulations were made in the 2014-2020 period. The Presidential Instruction on suspending the issuance of permits in natural forests and peatlands, and a moratorium on permits for oil palm plantations, for example, aims to improve peat governance. Fourth, a particular institution, the BRG, was formed to coordinate peat restoration as a measure to prevent peat fires.

The strength of civil society is the fifth determining factor for this success. Legal advocacy, including in the judicial process, encourages law enforcement in forest and land fire

cases. Finally, the law enforcement has started to be stricter than ever. The Ministry for the Environment and Forestry states that in 2017, there were 510 companies subjected to administrative sanctions. Then, from 2015 to 2019, the ministry reported nine tort cases with final verdicts in which most of them punish companies for paying compensation and restoring the environment due to the fires occurred within their concessions (Syarifah, et al., 2020).

Although much progress was achieved in preventing peatland fire, many obstacles remain to be overcome. The issue of peatland map accuracy and overlapping hinders the implementation of proper peat restoration. Indonesia has been pursuing a one map policy to solve the map problems. Different laws and regulations are also on the agenda for further harmonization. This may include the Omnibus Law on Job Creation which was enacted in the end of 2020. In the context of the peatland ecosystem protection and law enforcement of the forest fires, this law opens up various legal interpretations related to strict liability, a procedure which helps the law enforcement officers, including the Ministry for the Environment and Forestry, to punish companies committing forest fires without necessary to prove their fault. Several researchers view that the strict liability has been removed by the Omnibus Law because it omits the phrase "without previously proving the types of faults" from Article 88 of Environmental Protection and Management Law (Muamar & Utari, 2020; Putra & Prasetyo, 2020). But, in its Elucidation, Law on Job Creation clarifies that the strict liability principle is still applicable. Hence, how such omission would affect the enforcement of strict liability in the peatland fire cases in the future will be subject to further research.

Furthermore, peatland restoration is an extended effort that requires consistent political will. This is increasingly seen with the Presidential Regulation Number 120 of 2020, which extends the working period of the *BRG* until 2024 while adding new tasks to this institution to accelerate mangrove rehabilitation. However, the success of restoring peatlands, and therefore preventing fires in peatlands, does not depend solely on the existence of government institutions and regulatory instruments. As many actors with various and contested interests take part on peatland, making peat governance a shared responsibility of all parties is an influential agenda. Hybrid peatland governance, which is an effort to build governance that involves many actors, including concessionaires, communities, government, universities, and environmental activists has been introduced (Astuti, 2020). The biggest challenge for peatland restoration in the future is to make that hybrid governance exist and work. There is room for this in the Peat Hydrological Unit landscape. Designing hybrid governance in one PHU will be an essential task for the newborn BRGM.

Conclusions

The prevention of peatland damage and the restoration of the degraded peatland ecosystems are two corrective policy agendas undertaken by Indonesia since 2016. These efforts are made through the issuance of operational regulations to implement environmental Law and government regulations related to the peat ecosystem's protection and management. It took 16 years to improve and strengthen laws and policies on peatland protection after being published for the first time in 1990. The devastating fires in 2015 were the main trigger for reforms in peat governance.

By ratifying the ASEAN Agreement on Transboundary Haze Pollution, Indonesia is committing to a regional obligation to prevent forest and land fires. The domestic political factors also determine the success of reducing cross-border haze. Indonesia is an example that shows how national politics is the primary determinant of improving existing peat governance. There have been six factors that play a role in this improvement. They are leadership, improved coordination at the national and regional levels, more operational legal instruments, a specialized agency dealing with peatland restoration, law enforcement, and the civil society's role of enhancing public oversight. Although not completely perfect, these consistent efforts to make legal and institutional improvements have shown considerable results. The incidence of forest and land fires has decreased since 2016. Although there was an increase in 2019, it is confirmed that it was due to global climate factors within ongoing efforts to restore the peat ecosystem. In order to move forward, Indonesia needs to maintain these six assets plus concrete efforts to build the right institutions at the PHU landscape level to facilitate coordination, collaboration, and collective action of various stakeholders.

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