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# POLICIES FOR OVERCOMING FOREST AND LAND FIRES ON PEATLANDS FROM THE PERSPECTIVE OF INTER-ORGANIZATIONAL NETWORKS IN INDONESIA

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## Abstract

Peatland management policies in Indonesia have long been carried out by local communities in various regions wisely and local policies that preserve nature. However, along with the rapid population growth followed by an increase in the need for land and other natural resources, the opening and management of peatlands in Indonesia are currently being carried out extensively and continuously so that many peatlands are presently being converted into other uses such as settlements and land use. oil palm plantations. The use of peatlands is very closely related to government policies in restoring timber forests, transmigration and human settlements, and expanding agricultural land. The usual practice is deforestation, followed by constructing canals or drainage channels to exacerbate the water trapped in the peatlands. The current method of conversion and use of peatlands has more economic value. It is often carried out offensively without considering peat's hydrological and ecological possibilities. The results showed that forest and land fires in Indonesia were more common in community plantations, and the rest happened in company plantations. Implementation of inter-organizational networks in forest and land fire control in Indonesia in the form of standards and objectives, resource policies, inter-organizational communication, and disposition (characteristics of implementing agencies). This research recommends controlling forest and land fires in Indonesia, from prevention and extinguishing to post-fire recovery. The local Government massively socializes land clearing by burning to clear land without burning, as well as providing facilities and infrastructure for prevention, control, and prevention. Repair after forest and land fires.

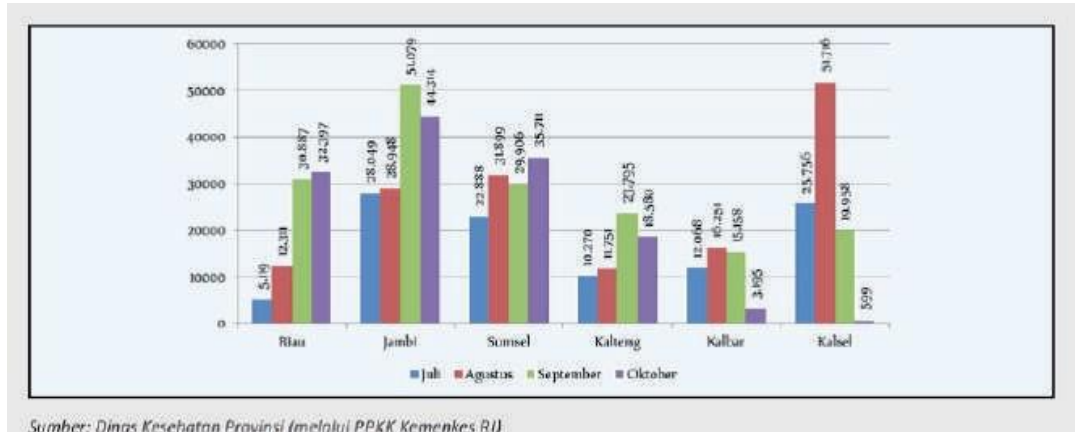
**Keywords:** Peatland, Policy implementation, inter-organizational network, forest, and land fires

## Introduction

The impact of forest fires is enormous, especially in the health sector. HAZE originates from large-scale forest and land fires and is characterized by high particulate matter concentrations. The impact of smoke and its constituents on the environment can vary, ranging from local, i.e., blocking the view, to possibly global climate warming. These impacts are primarily the result of primary chemical products and secondary emissions from combustion.

The WHO regional meeting on the impact of haze caused by air pollution on health in Kuala Lumpur in 1998 concluded that the main constituent of smoke that adversely affects health is delicate particulate matter. Based on an extensive literature review related to the impact of air pollution on health, the threshold concentration of PM10 (particles measuring 10 microns in diameter or less) studied in Brunei Darussalam, Indonesia, Malaysia, and Singapore during the 1997 and 1998 haze events was associated with: an increase in the daily mortality rate, an increase in patients hospitalized, an increase in visits to the emergency department, an increase in symptoms of respiratory disease, worsening of asthma and a decrease in lung function. This impact was examined from elderly patients, young patients, and patients with respiratory and cardiovascular disease history. While the main cardiopulmonary problems caused by biomass-burning smoke (Tan et al., 2000) are: Decreased lung function, Decreased respiratory rate, Respiratory discomfort, Emphysema, Asthma, Allergies, Bronchitis, Angina, Infarction, myocardial or heart attack, and Pneumonia

WC (2000), Forest fires in Indonesia have caused high levels of air pollution, as stated in the WHO guidelines. Chemical pollutants such as SO<sub>2</sub>, NO<sub>x</sub>, O<sub>3</sub>, CO, and particulate matter harm human health. Air quality data (PSI - pollutant standards index) obtained by several agencies during peak haze periods show that in areas located close to burned areas, air pollution levels increase 4–8 times higher than values that could have a significant impact on health. The graph below shows the number of cases of ARI smoke in the provinces of Riau, Jambi, South Sumatra, Central Kalimantan, and West Kalimantan, July-October 2015



This peatland in Indonesia, like Riau Province, approximately 2.30 hectares has been degraded. Even so, the local community can still use some of the peatlands. Most of them use the land as a place for the cultivation of plantation crops, such as the cultivation of oil palm, pineapple, and rubber, which have good yields when sold. Not only that, but they also use it for the cultivation of plants or food crops such as corn, sweet potatoes, and others. Even so, many peatlands have yet to be used by the community, even though the land is auspicious if used as agricultural land (Ratmini, 2012).

Using peatlands will undoubtedly affect the decline of the original biodiversity in the area. The value of biodiversity services is as a protector of the balance of the hydrological cycle as well as water management, the guardian of soil fertility, the marine environment through the supply of nutrients from forest litter, preventing erosion, abrasion, and also controlling the microclimate. The description above identifies problems related to policies for overcoming forest and land fires on peatlands in the perspective of inter-organizational networks in Indonesia, causing: (1). Forest fires in Indonesia continue to occur yearly. (2). Weak coordination between forest and land fire management organizations. (3). Indonesia has a large number of hotspots and hotspots of forest fires. (4). The large number of inhabitants of Indonesia who suffer from respiratory infections (ISPA) in children under five and non-toddlers due to forest fires.

## Methods

This research was conducted in Indonesia. In this research, the first thing to do is to identify the factors causing forest and land fires: (a). The role of the community, Government, and stakeholders or companies in understanding peat areas and overcoming forest and land fires (b) and implementing forest and land fire control policies through organizational networks to implement disaster management by the Indonesian Government.

The data collection methods used or used in this research are interviews and direct surveys of the field. The population in this study is government and community groups. Researchers will perform data reduction, explain the results, and draw conclusions using the triangulation method.

## Results and Discussion

After the 2015 forest and land fires incident, the inventory results found that almost all or around 23.96 million ha of peatlands were damaged with light, medium, heavy, and very heavy levels, thus requiring restoration priorities (KLHK, 2018). Therefore, by 2020 the Government is targeting the restoration of a peat ecosystem covering an area of 2,492,527 hectares. This includes 684,638 ha located in the Peat Ecosystem Protection

Function (FLEG), and 1,410,943 ha in the Peat Ecosystem Cultivation Function (FBEG), of which 396,943 hectares are located in the area. Community cultivation or in FBEG (KLHK, 2018).

The revision of PP 71 of 2014 to PP 57 of 2016 was carried out by looking at the development of the use of peat ecosystems in the field, which corporations dominantly control, especially those using concession land as Industrial Plantation Forests (HTI), Forest Concession Rights (HPH), oil palm plantations and mining. In addition, policy revisions were also carried out because PP 71/2014 overlaps with Ministry of Agriculture Regulation No. 14 of 2009, which emphasizes peat exploitation (Suastha, 2016).

Through this policy revision, Industrial Plantation Forest (HTI) companies and oil palm plantation companies that have already cleared deep peatlands are required to carry out restoration, starting with preparing a Peat Ecosystem Restoration Plan (KLHK, 2018). Furthermore, policy PP 71/2014, in conjunction with PP57/2016, was also issued to meet the need for environmental law enforcement to protect the peat ecosystem, which is very vulnerable to forest and land fires. In PP 71/2014, in conjunction with PP57/2016, it is explained that the protection and management of the peat ecosystem is a systematic and integrated effort made to preserve the function of the peat ecosystem and prevent damage to the peat ecosystem. PP 71/2014, in conjunction with PP57/2016 regarding peat, also contains elements of the 6 P values: Planning, Utilization, Control, Maintenance, Supervision, and Law Enforcement (Afni, 2021).

Damage to the peat ecosystem can occur in peat ecosystems with a protection function and in peat ecosystems with a cultivation function. Therefore PP 57/2016 contains significant policy corrections, especially on prevention methods (Article 22 A), application of standard damage criteria (KBK) both in protection and cultivation functions (Article 23), Application of licensing (Article 24 and Article 25), and Prohibition (Article 26). Table 1 shows the derivative policies or regulations to strengthen PP 57/2016 issued by the Minister of LHK RI.

**Table 1:** Technical Guidelines as a Derivative of the 2016 PP57 Policy

<b>Derivatives of PP 57/2016 Policy</b>	
P.14 year 2017	Procedure for inventorying and determining peat ecosystem functions (Scale 1:50,000)
P.15 year 2017	The procedure for measuring the groundwater level at the point of arrangement of the peat ecosystem
P.16 year 2017	Technical guidelines for restoring peat ecosystem functions
P. 17 year 2017	Industrial plantation forest development
Sk.129 year 2017	Determination of the national peat hydrological unit map
SK.130 year 2017	Determination of the National Peat Ecosystem Function Map
P.10 year 2019	Determination, Determination and Management of Peat Dome Peaks based on KHG.

Source: Ministry of LHK RI

The crucial policy through PP 71/2014, in conjunction with PP57/2016, is the article that regulates recovery. Article 31 B emphasizes that there is burning peat in business and activity licensing, and the Government takes action to save and temporarily take over the burned area. Temporary expropriation of ex-fired areas is carried out for verification by the Minister. Then it is emphasized in article 44 that permit holders who use peat ecosystems and violate the provisions will be subject to administrative sanctions in the form of government coercion, as referred to in article 40 paragraph (3) of PP 71/2014.

The implications of these policies on the protection of peat ecosystems can be seen in the increasing compliance of concession permit holders who include peat ecosystem restoration in their Annual Work Plan

(RKT) documents and the development of infrastructure for peat ecosystem protection (Afni, 2021). Table 2 contains data on the restoration of peat ecosystems in concession lands until December 2019.

Various policies in Indonesia do not directly affect the use of peat for protected functions, especially in concession areas. However, even the release of forest and peat areas for concessions continued to occur and reached its peak in 2013-2014, reaching 3.2 million ha (Nugraha, 2019). The number is estimated to be more expansive when coupled with the use of peatlands by community groups independently. The clearing of peatlands then triggered large-scale forest and land fires in 2015, which reached 2.6 million ha. This repeats the incident in previous years, especially in 1997, where forest and land fires devoured up to 11 million ha of forest area, thus becoming the cause of a national haze disaster. Therefore, the Indonesian Government must have a real political will to deal with the problem of burning/forest fires in Indonesia. The determination should be in the form of real action in the field, not just an action due to "international pressure" so that it seems to be "forced" and only formal. As we currently see, the perpetrators of problematic arson are free from legal bondage due to unequal perceptions in the field. Between related agencies and smoke is always a problem every year.

**Table 2:** Peat Ecosystem Recovery in Concession Land as of December 2019

	Industrial forest	Oil palm plantation	Total
Number of companies	68	212	280
Recovery area	2.226.779,94 ha	1.247.907,78 ha	3.474.687,72
TMAT setup point	5.668 unit	5.022 unit	10.690 unit
Rainfall station	265 unit	527 unit	792 unit
Canal blocking is built	8.180 unit	19.709 unit	27/889 unit
Vegetation rehabilitation	4.438,70 ha	-	4.438,70 ha
Natural success	306.112 ha	-	306.112 ha

Source: Ministry of LHK RI

The restoration of damage to the peat ecosystem on community land is carried out through the development of the Community Self-Reliance Program, one of which is through the Desa Mandiri Cares for Peat as an integrated program with community involvement as the leading actor. In the context of sustainable development, this program views the community as no longer merely the object or target of the program but must be involved in integrated policy implementation. Sustainable peatland management aims to restore water and vegetation and increase community income (Rewetting, Revegetation, and Improving local communities' livelihood). The concept of integrating restoration of water governance and revegetation in peat ecosystems at a depth of 0-1 meters can be done with plasticulture (KPI, 2020); at a peat depth of 1-3 meters, land management using water conservation techniques or water management (Napitupulu & Mudiantoro, 2015), and building firebreaks on community land (Akbar, 2017); while at a peat depth of >3 meters it can be done using agroforestry techniques (Tribus, 2019), both on community plantations, dry land or dryland agriculture, and forests. Table 3 shows the implementation of peat ecosystem restoration policies in community areas through the Desa Mandiri Cares for Peat program for the 2015-2020 period.

**Table 3:** Peatland Ecosystem Restoration Through the Community Empowerment Program 'Desa Mandiri Cares for Peat' for the 2015-2020 Period

Province	Output	Wetted Area (Ha)
Aceh	197 canal blocking	2.951
Riau	83 canal blocking	1.115
Sumatera Utara	111 canal blocking	1.814
Sumatera Barat	26 canal blocking	442
Jambi	49 canal blocking	686
Kalimantan Barat	36 canal blocking	496
Kalimantan Timur	-	2.176
Kalimantan Tengah	663 canal blocking	36.298,7

Source: Ministry of LHK RI, 2020

Environmental restoration and economic recovery through the peat independent village program have focused on the former million-hectare Peatland Project (PLG) area, with the involvement of academics. KLHK cooperates with seven local universities, namely Syiah Kuala University, North Sumatra University, Andalas University, Riau University, Jambi University, Tanjungpura University, and Mulawarwan University. By involving 121 facilitators by reaching 24 districts (F. Adji et al., 2020).

Community involvement in restoring peat ecosystems is also synchronized with other government work programs such as Social Forestry. Providing access to the community through Social Forestry has undergone a change in orientation from, by, and for the people (KLHK, 2018). From the beginning of timber management to forest landscape management, or from the beginning of conventional forestry development oriented to wood extraction, to the era of post-timber forestry (Agung Nugraha, 2021) With five schemes, namely Village Forest, Community Forest, Community Plantation Forest, Customary Forest, and Forestry Partnership, the allocation of land ownership for community groups has reached 4.42 million ha, with a total of 6,798 SK Permits/rights for approximately 895,800 families (Afni, 2021). This figure roughly increased community ownership of forest land to 13-16%, an increase compared to before 2015, which was only 4% (Danu Damarjati, 2017). The figure is believed to continue to rise in line with the social forestry target of 12.7 million ha. It is estimated that the number of 'fairness' fulfilling the mandate of the 1945 Constitution will reach the level of 30-35% for small groups of people at the end of the government period. This program is a symbol of the state's presence in forest communities (Marroli, 2017) and impacts people's income (Susilo & Nairobi, 2019), thus affecting the fair use of natural resources, including the sustainable use of peatlands.

Community involvement makes policy implementation more effective (Wayne Parsons, 2001). In this case, peat protection will be carried out collectively based on policy corrections made by the Government. In addition, the Peat Care Village program carries out integrated community empowerment by increasing financial capital, physical capital, human capital, and institutional and natural resource management (Belinda & Puspitasari, 2021). The Government, through the Ministry of Environment and Forestry, also provides another stimulus in the form of Social Forestry Development Assistance (Bang Pesona) which aims to improve the business capabilities of recipients.

The results showed that the network was defined by the exchange relationships formed between government groups and other organizations. The network analysis in this study focuses on the structure of the relationship between all groups and institutions. It is also a way to measure their collaborative abilities (Milward & Provan, 1998). To act effectively in times of disaster, networks require the sharing and effective use of information, which means collecting, compiling, analyzing, and disseminating it immediately and in a helpful form (Weber et al., 2005). Once an effective disaster management network is established in all sectors, response and

recovery tasks will be much more efficient and effective because it can increase the number of resources needed to deal with various problems related to emergency management (Kapucu, 2007). How local Government interacts with other organizations or stakeholders can be examined from an inter-organizational, citizen-to-organizational, and organization-to-citizen perspective (Bevaola, 2012).

The research results related to Inter-Organization Networks in Local Governments in Controlling Land and Forest Fires in Indonesia are the four indicators: Organizational Structure, Organizational Coordination, Program Consistency, Planning, and Operational Procedures. The research results using these four indicators show that the inter-organizational network in the Indonesian Government has yet to be successfully implemented, causing an increase in the number of hotspots in 2020.

Based on the condition of the organizational structure above, it can be seen that between the theories used by the researcher, namely Steve Leach (2010) and those in the field, it has not been able to be shown thoroughly to the Indonesian Government in preventing and controlling forest and land fires at this time. Therefore, although included in the category of Indonesian Government is an organization in a traditional context, meeting the criteria or indicators of the organizational structure presented by Leach (2010) has not been able to be realized, which results in many problems of forest and land control and prevention.

The coordination that takes place in the context of government bureaucratic relations is characterized by: (1) hierarchical coordination, namely vertical coordination between leaders and members, and (2) functional coordination; coordination carried out by one official to another official or an agency with other agencies, which tasks are interrelated based on organizational functions with a tendency to hierarchical coordination. Furthermore, when viewed in terms of actors and the position of the coordinating parties, the type of coordination that takes place can be categorized into three types, namely: (a) Functional Coordination (horizontal/diagonal): between two or more Agencies that have related programs; (b) Institutional Coordination, against several Agencies that handle a particular business concerned; and (c) Territorial Coordination, towards two or more regions with specific programs.

Based on Government Regulation Number 4 of 2001 concerning Control of Environmental Damage and Pollution Related to Forest and or Land Fires, there is an inter-organizational network of each role in efforts to control forest and land fires, namely:

1. people are prohibited from burning forests and land (article 11), and everyone is obliged to prevent environmental damage and pollution of the environment related to forest and land fires (article 12).
2. Business Person in Charge, Every person in charge of a business whose business can have a major and significant impact on environmental damage and pollution related to forest and land fires is obligated to prevent forest and land fires at their business location (article 13). They must have adequate facilities and infrastructure to prevent forest and land fires at their business locations (article 14, paragraph 1). The prevention facilities and infrastructure referred to are (article 14 paragraph 2): early detection system to determine the occurrence of forest and or land fires, forest and or land fire prevention tools, standard operating procedures for preventing and overcoming the occurrence of forest and or land fires, organizational apparatus which is responsible for preventing and overcoming the occurrence of forest and or land fires, training on forest and or land fire prevention regularly. In addition, the person in charge of the business is obliged to carry out monitoring to prevent forest and land fires at their business locations and report the results periodically, at least once every six months, equipped with remote sensing data from the satellite to the Governor/Regent/Waikota with a copy to the specialized agency and agency. Responsible (article 15).
3. At the Central level, the Minister in charge of forestry (Minister of Forestry) coordinates the extinguishing of forest and land fires across provinces and national borders (article 23). In carrying out the responsibility for coordinating forest and land fire fighting across provinces and across national borders, the Minister of Forestry coordinates 1) the provision of means of extinguishing forest and land fires, 2) developing human resources for fighting forest and land fires, and 3) implementation of international cooperation to extinguish forest and land fires (article 24). Suppose it is related to the implementation of regional autonomy. In that case, the forest area, which is the responsibility of the Ministry of Forestry (main level), is a conservation area, while protecting forests and production forests are the responsibility of the Forestry Service. Meanwhile, in the context of controlling environmental damage and pollution related to forest and land fires, the agency responsible for controlling environmental impacts (Ministry of the Environment) develops human resource capabilities in the environmental impact evaluation and preparation of strategies for environmental impact recovery. Related to forest and land fires (article 25) and is responsible for coordinating the mitigation of

environmental impacts and restoration of environmental impacts related to forest and land fires that occur across provincial and national borders (article 26).

4. At the provincial level, the Governor is responsible for controlling environmental damage and pollution related to forest and land fires whose impacts are across districts/cities (article 27). Suppose forest and land fires occur across districts/cities. In that case, the Governor is obliged to coordinate the prevention of forest and land fires across districts/cities (article 28 paragraph 1) and may request assistance from the nearest Governor and the Central Government (article 28 paragraph 1). 2). In coordinating the prevention of forest and land fires across districts/cities, the Governor may establish or appoint an authorized agency in the field of controlling forest and land fires in his/her area (Article 29, paragraph 1). In contrast, the authorized agency appointed by the Governor in the field of forest and land fire control in their area they are obliged to carry out an inventory of businesses and or activities that have the potential to cause environmental damage and pollution to carry out an inventory and evaluation of environmental impacts, to formulate strategies, plans and costs for the restoration of environmental impacts as an effort to control environmental damage and pollution related to environmental impacts. Forest and land fires whose impacts are across districts/cities (article 29, paragraph 2).

5. At the Regency/City level, the Regent/Mayor is responsible for controlling environmental damage and pollution related to forest and land fires in their area (Article 30). The Regent/Mayor must take action if a forest and land fire occurs. (Article 31, paragraph 1): 1) overcoming forest and land fires, 2) examining the health of the community in their area experiencing the impact of forest and or land fires through existing health service facilities, 3) measuring the impact, 4) announcing to the public about the impact measurement and necessary steps to reduce impacts related to forest and land fires. In dealing with forest and land fires, the Regent/Mayor may request assistance from the nearest Regent/Mayor (article 32). Meanwhile, in the case of dealing with forest and land fires, the Regent/Mayor may establish or appoint an authorized agency in the field of forest fire control. Furthermore, land in their area (article 33 paragraph 1) and the competent authority (appointed by the regent/mayor) in controlling forest and land fires in their area are obliged to carry out an inventory of businesses and or activities that have the potential to cause environmental damage and pollution, carry out inventory and evaluation of environmental impacts, preparation of strategies, plans, and costs for recovering environmental impacts as an effort to control environmental damage and pollution related to forest and land fires (article 33 paragraph 2).

6. Community Culture, Elucidation of Article 17 of Government Regulation No. 4 of 2001 concerning Control of Environmental Damage and Pollution related to Forest and Land Fires states that "land fire management does not apply to indigenous or traditional communities who clear land for fields and land. His garden unless the land fire reaches outside his field and garden area. The burning was done intentionally in order to prepare fields and gardens." According to Sardjono (2004), local traditional communities, namely people who have been hereditary in or around the forest, whether currently or not residing in a traditional village, still have and practice institutions (Sardjono, 2004). organization, structure, and norms) of traditional customs and technology in daily life (including managing forest resources as the primary source of life and livelihood in addition to traditional farming and plantation activities). In general, this group is an indigenous people who are relatively homogeneous (from one ethnicity and have close kinship relations), their location of residence is remote or isolated (especially from development activities), and therefore physical facilities and other social infrastructure are left behind (including education and health). , and the pattern and orientation of life are simple (some groups are still closed to foreigners).

Traditional communities still apply traditional systems in preparing their land. They are one of the sources of livelihood to meet the needs of daily life, so in their farming system, they only use relatively small land (subsystem-type cultivation). Usually, each family head can only clear an average of 1 ha/year of forest for farming. Traditional communities are also believed to have wisdom in managing forest resources, including using fire in the preparation and use of land for fields or gardens. Traditional wisdom (including environmental wisdom) is cultural knowledge possessed by a particular community, including several cultural knowledge relating to sustainable natural resource management (Zakaria 1994 in Sardjono 2004). The knowledge referred to is a traditional environmental image based on a religious system, which has a magical cosmic pattern and views humans as part of the natural environment, where there are spirits in charge of maintaining their balance. Therefore, to avoid disasters or calamities threatening their lives, humans must maintain their relationship with the universe, including using it wisely and responsibly.

## Conclusion

policies for overcoming forest and land fires on peatlands from the perspective of inter-organizational networks in Indonesia still need to be improved. This is because Regulations related to technical guidelines for handling / controlling forest and land fires have yet to be fully implemented. In implementing policies from the perspective of inter-organizational networks, it is essential to understand that controlling forest and land fires is not enough to use jargon, especially those that only satisfy a few parties, but must be implemented if you want a better environment and good government credibility. Responsible.

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