THE IMPLEMENTATION OF FOREST AND LAND FIRE MANAGEMENT POLICY IN INDONESIA DURING THE COVID-19 PANDEMIC

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THE IMPLEMENTATION OF FOREST AND LAND FIRE MANAGEMENT POLICY IN INDONESIA DURING THE COVID-19 PANDEMIC. The coronavirus outbreak (COVID-19) has raised questions about changes in subsequent environmental effects, mainly forest and land fires. This paper evaluates the implementation of land and forest fire management policies in Indonesia during the COVID-19 pandemic, particularly in 2020. A qualitative approach was conducted in policy implementation analysis based on George Edward III's theory by looking at bureaucratic structure, resources, communication, and disposition factors. The research focused on the operational work of the Forest and Land Fire Brigade, known as Manggala Agni, in Indonesia. The results showed that the collaborative work of Manggala Agni and the other forest and land fire task forces successfully reduced the hotspots; hence there was a significant decrease in the burned area. It is also inseparable from climatic factors. During this period there was no haze disaster although the task of controlling forest and land fires still encountered several obstacles during the pandemic. This is because of training, technology transfer, budget support, and synergy between stakeholders and Manggala Agni's team members, so a significant reduction in forest and land fires during 2020 can be achieved.

Keywords: Covid-19 Pandemic, forest and land fire, Manggala Agni, hotspot

IMPLEMENTASI KEBIJAKAN PENGENDALIAN KEBAKARAN HUTAN DAN LAHAN DI INDONESIA PADA MASA PANDEMI COVID-19. Pandemi Covid-19 menimbulkan berbagai pertanyaan terkait perubahan lingkungan, khususnya dalam pengelolaan kebakaran hutan dan lahan. Tulisan ini mempelajari penerapan kebijakan pengelolaan kebakaran hutan dan lahan di Indoesia pada masa pandemic COVID-19, khususnya pada tahun 2020. Pendekatan kualitatif dilakukan untuk menganalisa penerapan kebijakan tersebut berdasarkan teori George Edward III, dengan menekankan kepada struktur birokrasi, sumber daya, komunikasi, dan disposisi dalam kaitannya dengan operasional kerja Manggala Agni Indonesia. Hasil penelitian menunjukkan bahwa pada masa pandemi, kerja kolaboratif antara Manggala Agni dan satuan tugas kebakaran hutan dan lahan lainnya telah berhasil menekan jumlah titik api, sehingga terjadi penurunan luas kebakaran secara signifikan. Hal ini juga tidak terlepas dari faktor iklim. Selama kurun waktu tersebut tidak terjadi bencana asap, walaupun tugas pengendalian kebakaran hutan dan lahan masih menemui beberapa kendala selama masa pandemi. Hal ini disebabkan oleh adanya pelatihan, alih tekhnologi, dukungan anggaran, serta sinergisitas antar anggota satgas pengendalian kebakaran hutan dan lahan, sehingga pengurangan kebakaran lahan dan hutan di Indonesia selama tahun 2020 dapat dicapai.

Kata kunci: Pandemi Covid-19, kebakaran hutan dan lahan, Manggala Agni, titik api

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I. INTRODUCTION

The coronavirus outbreak (COVID-19) has raised questions about changes in subsequent environmental effects in many countries including Indonesia, especially on the incidence of forest and land fires. Since March 17, 2020, the Government of Indonesia has imposed a Covid-19 emergency response status, and the Indonesian President Joko Widodo announced the Covid-19 Corona pandemic as a national disaster through Presidential Decree number 12 of 2020. The pandemic has changed people's lives in almost all aspects, including social life. In a pandemic situation, the government policies focus on the principal matters (i.e., the spread of COVID-19) and most importantly to suppress the spread of the virus and ensure the system optimally agrees to deliver policies from top to bottom at the site level (Aram Dani & Yogi, 2020).

During the pandemic, essential issues recur as natural phenomena in Indonesia, such as forest and land fires (Purnomo et al., 2017). One of the factors causing forest and land fires to continue is the expansion of oil palm plantations areas which is increasingly putting pressure on the environment and having an impact on the local and national economy (Purnomo et al., 2018). The national forest and land fire disasters affected material and immaterial losses (Ayu et al., 2020). Efforts to control forest and land fires have been set as one of the work priorities of the Indonesian Government during the pandemic to prevent multiple disasters of forest and land fires as well as corona diseases simultaneously (Humas KLHK, 2020). Forest fires are also still a threat due to the impact of extreme climate change (Harrison et al., 2020).

The Ministry of Environment and Forestry (MOEF), Republic of Indonesia, was mandated to combat forest and land fires, including efforts to prevent, suppress, and handle post-forest fires. For the implementation of fieldwork, MOEF formed the forest and land fire brigade known as MA in 2003 to prevent and suppress forest and land fires. This task force has significant challenges in conducting its duties (Yungan & Saharjo, 2014). Furthermore, in 2020, the MA still faces many obstacles to controlling forest and land fires. For example, the lockdown policy during Covid-19 impacts the activities in forestry. Therefore, the Government's priority shifts between overcoming the pandemic and preventing forest and land fires (Amador et al., 2020).

On January 28, 2020, President Joko Widodo signed Presidential Instruction No. 3/2020 concerning Forest and Land Fire Management, addressed to 28 leaders of Ministries/ Institutions, including governors, regents, and mayors. This policy has strengthened the fieldwork operations regulated by the Minister of Environment and Forestry Regulation No. 32 of 2016 on Forest and Land Fire Control. Efforts made under this policy include planning, prevention, mitigation, law enforcement, preparedness, and handling of post-fire activities.

Indonesia has had many policies to control forest and land fires over the last three decades (Zulkifli et al., 2021). During the pandemic, MoEF has prepared several procedures to implement MA's tasks in combating forest and land fires. The Ministry issued Circular Letter No. 6 of 2020 concerning Safety for Covid-19 Prevention. The Letter is a binding material that becomes the instruments of policy and information from the Minister containing both regeling and beschikking, and the legal standing of the letter could be equated with discretion.

In Article 1 Paragraph 9 of Law Number 30 of 2014 concerning Government Administration, discretion is defined as decisions and actions that are determined or carried out by government officials to overcome incomplete or unclear problems in statutory regulations. Meanwhile, it is stated that public policy responds to any political action taken by the Government at all levels in addressing a problem in its political context or environment. One of the inputs that play a significant role in public administration is

the implementation of public policies to solve complex environmental issues such as forest and land fire control finding the most effective policy implementation (Carmenta et al., 2017). The purpose of this paper is to evaluate: first, the implementation of forest and land fire control policies during the covid-19 pandemic, and second, the supporting and inhibiting factors for implementing forest and land fire control policies during the covid-19 pandemic, especially in Indonesia's MA operating areas (central, regional, and operational area).

II. MATERIAL AND METHOD

A. Research Area

The Indonesian government has prioritized forest and land fire control during the Covid-19 pandemic. Forest and land wildfires could become worse during the pandemic. Several vulnerable areas in Sumatera and Kalimantan are the major concern as most of the area is peat ecosystem, which is very difficult to stop when burning. The work of controlling forest and land fires has been regulated in Presidential Instruction Number 3 of 2020 concerning Forest and Land Fires Management and the Ministry of Environment and Forestry Regulation Number 32 of 2016 concerning Forest and Land Fires Control. Therefore, it is necessary to conduct a critical review in this article that refers to the issuance of Circular Letter No. 6/Menlhk-Setjen/Roum/Set.1/4/2020 concerning the Continuity of Efforts to Prevent the Spread of COVID-19 in the internal work within the MOEF.

B. Participants

Data for this study were collected from various correspondents which have mandate in land and fire control at the national, regional and operational levels. These included the Director of Forest and Land Fire Control of the MOEF, the Head of the Climate Change Control and Forest and Land Fire for Sumatera, Kalimantan, and Sulawesi regions, as well as all the Heads of Manggala Agni operational area in Indonesia, 34 members.

C. Data Collection Procedure

The in-depth online interviews were conducted with all correspondents to get primary data during the pandemic. The online interview is an accurate and valid method for obtaining data in social research (Sidauruk, 2013). Apart from the interview, the observation and documentation were collected to support the analysis (Nugroho, 2014).

D. Data Analysis Process

Miles and Huberman (1984) in Sugiyono (2015) suggested that qualitative data analysis were conducted interactively and it should be continued to completion until the data is saturated. Data analysis includes summary key findings, data display, short description, conclusion, and recommendation of the forest and land fire implementation policies during the pandemic. This study deploys a qualitative approach to examine the implementation of forest and land fire control policies during the Covid-19 pandemic, with the scope of work of the ranks of the Manggala Agni organization, where Manggala Agni has been under the Ministry of Environment and Forestry, with the Directorate of Forest and Land Fire Control, Directorate General of Climate Change Control since 2015.

Further, the analysis of public policy implementation refers to the theory of George C. Edward III. According to Edward (1980), the factors that influence the success or failure of policy implementation include bureaucratic structure, resources, communication, and disposition (Nugroho, 2009). In this case, Minister of Environment and Forestry Regulation No. P.32/MenLHK/Setjen/Kum.1/3/2016 concerning Forest and Land Fire Control was examined by applying Edward III's parameters to validate its sufficiency.

III. RESULTS AND DISCUSSION

A. The Indonesian Policies on Forest and Land Fires Control

Large-scale forest and land fires have occurred since the Indonesian industrialization era 1982/1983. (Saharjo, 2016) reported that human actions caused the most forest and land fires. This condition is inseparable from population growth that demands massive land clearing and the widespread behaviour of people who use fires in land clearing. Since 2015, the Indonesian Government has focussed on every occurrence of forest and land fires. This is a moment of changing the paradigm to control the fires seriously. The policies implemented include the protection of the Peat Hydrological Unit (PHU), strengthening the supervision of concession areas, law enforcement, work integration between the central government and local governments, and strengthening the role of leaders in each government organization and stakeholders so that forest and land fires are no longer run independently (Table 1). Various corrective actions regarding regulations or rules (corrective policy) for forest and land fire control in Indonesia have shown results with the controlled number of hotspots and burned areas (Zulkifli et al., 2019).

B. Indonesian Forest and Land Fire During Pandemic

World Health Organization (WHO) announced the Covid-19 pandemic on March 11, 2020; it was first officially announced by President Joko Widodo as a National disaster on March 2, 2020. At the peak of the hot summer in 2020, the President reiterated that anticipating forest and land fires must remain a priority during a pandemic. Moreover, 99 % of the causes of forest and land fires are human-made (Saharjo, 2016). Since the beginning of the year, the control of forest and land fires has been strengthened with Presidential Instruction No 3 of 2020. After issuing Presidential Decree No.12 of 2020 concerning the Determination of the Non-Natural Disaster of the Corona Virus Disease 2019 (Covid-19) as a national disaster.

Table 1. Corrective policies of forest and land fire control in Indonesia

Regulation	Implication Policy
President Instruction Number 3/2020 concerning forest and land fires management, in lieu of President Instruction Number 11/2015 concerning in increasing forest and land fire control.	Strengthening efforts to prevent, extinguish, and programmes post forest and land fires. This President Instruction mandates 28 Ministries/Agencies including Governors, Regents, and Mayors.
Revision of Government Regulation No. 71/2014 to Government Regulation No. 57/2016 on protection and management of peat ecosystems.	
Derivative policy: P.14/2017 concerning procedures for Inventory and Determination of Function of the Peat (Scale 1: 50,000) P.15/2017 concerning procedures for measuring the groundwater level at the point of structuring the peat ecosystem. P.16/2017 concerning technical guidelines for restoring the function of the peat ecosystem. P.17/2017 amendments to P.12/2015 concerning the development of industrial forests plantation. SK. 129/2017 concerning the establishment of a map of the national peat hydrological unit. SK. 130/2017 concerning the establishment of the national peat ecosystem function map. P.10/2019 concerning the designation, establishment and management of peat dome peak based on peat hydrological unit.	

Table 1. Continued

Regulation	Implication Policy
Revision of Government Regulation No. 71/2014 to Government Regulation No. 57/2016 on protection and management of peat ecosystem.	All parties, especially concession holders, are obliged to maintain the Peat Hydrological Unit.
Derivative policy: P.14/2017 concerning procedures for inventory and determination of the function of the peat (Scale 1: 50,000) P.15/2017 concerning procedures for measuring the groundwater level at the point of structuring the peat ecosystem. P.16/2017 concerning technical guidelines for restoring the function of the peat ecosystem. P.17/2017 on Industrial Plantation Forest Development amendments to P.12/2015 concerning the Development of Industrial Plantation Forests. Ministerial Decree No 129/2017 – Determination of National Peat Hydrological Units Map Ministerial Decree No. 130/MENLHK/SETJEN/PKL.0/2/2017 about the Establishment of the National Peatland Ecosystem Function Map.	It contains six Ps, namely *perencanaan* (planning), *pemanfaatan* (utilization), *pengendalian* (control), pemeliharaan (maintenance), *pengawasan* (supervision), and *penegakan hukum* (law enforcement). The concession permits holders is obliged to protect the KHG, which will be seen in the Business Work Plan (RKU). For concessions that do not prepare an RKU in accordance with the KHG protection provisions, the permit will be evaluated. Permit holders must obey the use of their area by protecting the peat dome tops and are obliged to protect their area from the threat of forest and land fires. If they are not guarded, they will be subject to administrative, civil and criminal sanctions. This sort of thing had never been arranged beforehand.
Minister of Environment and Forestry No. P.32/MenLHK/Setjen/Kum.1/3/2016 about Forest and Land Fire Control.	Regulating the forest and land fires control operation includes planning prevention, post-fire prevention, work coordination, and alert status. This policy provides the paradigm shift on forest and land fire control in which from suppression to prevention of the forest and land fire.

Source: modified from various sources

Indonesian President then issued Presidential Decree No. 3/2020 on the forest and land fires managements a working guideline for Ministries/ Institutions and Local Governments for quick, precise, focused, integrated, and synergistic steps in dealing with the spread of the virus. The main implication of this policy is that the forest and land fire task force consists of the central and local governments and must share their concentrations for handling the spread of the Covid-19 virus. The implementation of forest and land fire control work during 2020 was carried out while still implementing the Covid-19 health protocol.

The highest number of hotspots is still dominated by forest and land fire-prone provinces such as West Kalimantan, East Kalimantan, and Riau. Several provinces need attention for potential forest and land fires during the pandemic, including Aceh, East Nusa Tenggara, and South Sulawesi. Compared with the number of hotspots in Indonesia in 2019 and 2020, the work of the forest and land fires task force is relatively successful in forcing down the hotspots during the pandemic. More specifically, the decline of the hotspots was also supported by La Nina climatic factors across the continent and restriction policies caused

by the Covid-19 pandemic (Gonzalves et al., 2020), which provided limited access for illegal immigrants logging.

However, it should be noticed that the fire challenges in 2020 are very tough. Since it could be one of the hottest years in history, the global warming trend is taking place dramatically (NASA, 2021). Therefore, it is understandable that if there is no policy and field intervention like Manggala Agni and the task force team, the threat of forest and land fires would be even more significant. Consequently, in 2020, when several other countries experienced fire disasters, Indonesia avoided meeting forest and land disasters during the Covid-19 pandemic. Based on the Terra/Aqua (NASA) satellite with a confident level of ≥80% from January 1 to December 17, the number of hotspots in 2019 (before pandemic) was 29,306 hotspots. Meanwhile, in 2020 (during the pandemic), there were 2,545 hotspots. In this circumstance, it means that during the Covid-19 pandemic, Indonesia succeeded in reducing the number of hotspots by 26,761 points or 91.32% (Table 2).

In 2019, the total forest and land fires area was 1,649,258 ha , while the total area of forest and land fires in 2020 decreased to 296,942 ha (Table 3). Overall, there was a significant decrease of 1,352,316 ha during the Covid-19 pandemic. However, there was a greater forest and land fires area at seven provinces as recorded in 2020. Seven provinces includes Aceh, Bengkulu, Central Java, Riau Islands, West Papua, North Sumatera, and Yogyakarta. The other 27 provinces remain lower during the pandemic in 2020. Significant forest and land fires reduction was recorded in the Provinces of Banga Belitung, Gorontalo, Jambi, West Kalimantan, South Kalimantan, Central Kalimantan, East Kalimantan, North Kalimantan, Lampung, Riau, South Sulawesi, South Sumatera, and other provinces as shown in Table 3.

Meanwhile, Table 4 indicates mineral lands that still dominate the total area of forest and land fires. The largest peatland burned in 2020 occurred in Riau Province, covering about 11,587 ha. The forest and land fires in 2020 is lesser than those of burnt area in 2019, which was about 90,550 ha. Moreover, the figure is less than those of 2015, about 183,808.59 ha. The specific illustration of each area can be seen in Table 4.

Table 2. Indonesian hotspots from 1 January 2019 to 17 December 2020

Province	Hotspot Terra/Aqua (NASA) Confidence Level >80 %	
	2019	2020
North Sumatera	49	44
Riau	2,915	327
Jambi	3,701	10
South Sulawesi	3,872	19
West Kalimantan	4,028	251
Central Kalimantan	7,469	122
South Kalimantan	906	31
East Kalimantan	970	91
North Kalimantan	177	44
Papua	683	237
Total of potential provinces	24,770	1,176
Total of Indonesia	29,306	2,545

Source: Directorate of PKHL MOEF, 2020

Table 3. Recapitulation of forest and land fires area (ha) by provinces in Indonesia 2015-2020

No	Provinces	2015	2016	2017	2018	2019	2020
1.	Aceh	913.27	9,158.45	3,865.16	1,284.70	730	1,078
2.	Bali	373.46	-	370.80	1,013.76	373	29
3.	Bangka Belitung	19,770.81	-	-	2,055.67	4,778	576
4.	Banten	250.02	-	-	-	9	2
5.	Bengkulu	931.76	100,39	131.04	8.82	11	221
6.	Jakarta	-	-	-	-	-	-
7.	Gorontalo	5,225.89	737.91	-	158.65	1,909	80
8.	Jambi	115,634.34	8,281.25	109.17	1,577.75	56,593	1,002
9.	West Java	2,886.03	-	648.11	4,104.51	9,552	2,344
10.	Central Java	2,471.70	-	6,028.48	331.67	4,782	7,516
11.	East Java	7,966.79	-	5,116.43	8,886.39	23,655	19,148
12.	West Kalimantan	93,515.80	9,174.19	7,467.33	68,422.03	151,919	7,646
13.	South Kalimantan	196,516.77	2,331.96	8,290.34	98,637.99	137,848	4,017
14.	Central Kalimantan	583,833.44	6,148.42	1,743.82	47,432.57	317,749	7,681
15.	East Kalimantan	69,352.96	43,136.78	676.38	27,893.20	68,524	5,221
16.	North Kalimantan	14,506.2	2,107.21	82.22	627.71	8,559	1,721
17.	Riau islands	-	67.36	19.61	320.96	6,134	8,805
18	Lampung	71,326.49	3,201.24	6,177.79	15,156.22	35,546	1,358
19.	Maluku	43,281.45	7,834.54	3,918.12	14,906.44	27,211	20,270
20.	North Maluku	13,261.10	103.11	31.10	69.54	2,781	59
21.	West Nusa Tenggara	2,565.71	706.07	33,120.81	14.461.38	60,234	29,157
22.	East Nusa Tenggara	85,430.89	8,968.09	38,326.09	57,428.79	136,920	114,719
23.	Papua	350,005.30	186,571.60	28,767.38	88,626.84	108,110	28,277
24.	West Papua	7,964.41	542.09	1,156.03	509.50	1,533	5,716
25.	Riau	183,808.59	85,219.51	6,866.09	37,236.27	90,550	15,442
26.	West Sulawesi	4,989.38	4,133.98	188.13	978.38	3,029	569
27.	South Sulawesi	10,074.32	438.40	1,035.51	1,741.27	15,697	1,902
28.	Central Sulawesi	31,679.88	11,744.40	1,310.19	4,147.28	11,551	2,555
29.	Southeast Sulawesi	31,763.54	72.42	3,313.69	8,594.67	16,929	3,206
30.	North Sulawesi	4,861.31	2,240.47	103.04	326.39	4,574	177
31.	West Sumatera	3.940.14	2,629.82	2,227.43	2,421.90	2,133	1,573
32.	South Sumatera	646,298.80	8,784.91	3,625.66	16,226.60	336,798	950
33.	North Sumatera	6,010.92	33,028.62	767.98	3,678.79	2,514	3,744
34.	Yogyakarta	-	-	-	-	23	181
Total		2,611,411.44	438,363.19	165,483.92	529,266.64	1,649,258	296,942

Remarks: Forest and land fires coverage was determined based on Citra description Satellite 8 OLI/TIRS analysis, which had been overlayed with hotspots distribution and hotspot ground-check report as well as extinguished fires by Manggala Agni. Source: Sipongi.menlhk.go.id

Table 4. Comparison of burnt area in Indonesia of 2019 and 2020

No.	Provinces	Recapitulations in 2019 (ha)	Forest and Land fire coverage (ha) 2020		Remarks	
			Mineral lands	Peatlands	Amount	
1.	Aceh	730	885	193	1,078	Up
2.	Bengkulu	11	193	-	193	Up
3.	Jambi	56,593	943	7	950	Down
4.	Bangka Belitung	4,778	350	226	576	Down
5.	Riau islands	6,134	8,798	7	8,805	Up
6.	Lampung	35,546	1,024	-	1.024	Down
7.	Riau	90,550	3,855	11,587	15,442	Down
8.	West Sumatera	2,133	925	473	1,398	Down
9.	South Sumatera	336,798	433	517	950	Down
10.	North Sumatera	2,514	2,827	897	3,724	Up
11.	Banten	9	2	-	2	Down
12.	West Jawa	9,552	2,344	-	2,344	Down
13.	Central Jawa	4,782	7,516	-	7,516	Up
14.	East Jawa	23,655	19,148	-	19,148	Down
15.	Yogyakarta	23	181	-	181	Up
16.	Bali	373	29	-	29	Down
17.	West Nusa Tenggara	60,234	29,069	-	29,069	Down
18.	East Nusa Tenggara	136,920	114,701	-	114,701	Down
19.	West Kalimantan	151,919	5,735	1,360	7,095	Down
20.	South Kalimantan	137,848	3,972	39	4,011	Down
21.	Central Kalimantan	317,749	4,475	1,520	5,995	Down
22.	East Kalimantan	68,524	5,084	137	5,221	Down
23.	North Kalimantan	8,559	1,721	-	1,721	Down
24.	Gorontalo	1,909	80	-	80	Down
25.	West Sulawesi	3,029	568	-	568	Down
26.	South Sulawesi	15,697	1,839	-	1,839	Down
27.	Central Sulawesi	11,551	2,394	-	2,394	Down
28.	Southeast Sulawesi	16,929	2,959	-	2,959	Down
29.	North Sulawesi	4,574	177	-	177	Down
30.	Molluca	27,211	19,709	-	19,709	Down
31.	North Molluca	2,781	59	-	59	Down
32.	Papua	108,110	27,853	398	28,251	Down
33.	West Papua	1,533	3,182	2,534	5,716	Up
34.	DKI Jakarta	-	-	-	-	-
Total		1,649,258	273,028	19,894	292,922	

Source: Dit PKHL KLHK, 2020

C. Implementation of Forest and Land Fire Control Policies During the Pandemic

The implementation of the forest and land fire control policy at the Ministry of Environment and Forestry is conducted with reference to the Presidential Instruction 3/2020 concerning forest and land fires and Forestry and Environment Minister Regulation No. 32/2016 on forest and land fire control. During the Covid-19 pandemic, the implementation of fieldwork for the Manggala Agni Brigade refers to Circular Letter (SE) No. 6/Menlhk-Setjen/Roum/Set.1/4/2020 concerning the continuity efforts to prevent the spread of COVID-19 internally within the Ministry of Environment and Forestry. Manggala Agni and the forest and forestry task forces team continue to conduct integrated and independent patrols for preventive purposes. In 2020, the integrated team was assigned to patrol 267 fire posts which are considerably prone to forest and land fires in Sumatera, Kalimantan, and

Table 5. Integrated forest and land fire patrols team in 2020

Province	Fire posts	Village coverage
North Sumatera	25	74
Riau	34	64
Jambi	29	158
South Sumatera	50	149
West Kalimantan	31	128
Central Kalimantan	27	81
South Kalimantan	21	100
East Kalimantan	14	32
North Sulawesi	3	3
South Sulawesi	15	15
Central Sulawesi	2	2
Southeast Sulawesi	14	14

Source: Dit PKHL KLHK, 2020

Sulawesi, covering up 822 villages. Meanwhile, independent patrols were also conducted in 776 villages categorized as the prone area to forest and land fires in Indonesia (Table 5).

The Ministry of Environment and Forestry applies some strategies to strengthen the prevention policies, including implementing early Weather Modification Technology (TMC) by involving cross-agency cooperation, including the Indonesian Air Force, Agency for the Assessment and Application of Technology (BPPT), National Disaster Management Agency (BNPB), and the private sector. TMC is intended to wet peat, canals, and reservoirs, so that forest and land fires will not broadly spread during the pandemic. TMC is implemented in the three most vulnerable provinces and based on the recommendation of the Agency for Meteorological, Climatological and Geophysics (BMKG), namely in Riau, South Sumatera, and Jambi. TMC was conducted in 176 sorties, with the total salt sown reaching 168,250 kg.

In addition to TMC, ground and air blackouts, some efforts to control forest and land fires during a pandemic are also carried out by monitoring hotspots, conducting hotspot ground checks, and following up the hotspot information system satellites, as well as following-up information reported by communities. All information was extracted from sipongi.menlhk.go.id website. Meanwhile, post-forest and land fire activities are conducted by law enforcement and post-forest and land fire restoration activities. To control forest and land fires during the pandemic, the Fire Care Community or MPA-Paralegal's legal awareness activities are part of the permanent solution to controlling forest and land fires. Activities have been carried out in 12 provinces in Indonesia from August to November 2020 (Table 6). In general, throughout 2020, it was well known that all areas carrying out MPA-Paralegal activities did not experience forest and land fires or were known as 'zero hotspots'.

MPA-Paralegal is a collaborative work between people with legal awareness and the forest and land fire task force consisting of *Manggala Agni* of MOEF, BNPB, Army, Police, Local Government, and other parties to prevent forest and land fires. There are two main activities, namely preparation and field operational activities. Preparatory activities in the form of debriefing for MPA-Paralegal personnel were carried out using the e-learning method funded by MOEF (BP2SDM, Directorate of PKHL, and PPIKHL office). Meanwhile, field operations are funded from the BNPB Ready-to-Use Fund (DSP). The MPA-Paralegal activities include forming groups, providing field activities through e-learning (material on forest and land fire policies and law enforcement, atmosphere development,

Table 6. Target locations to support the Fire Care Community (MPA) - Paralegal support for permanent solutions to forest and land fire control

No.	Province	Districts	Sub-districts	Villages
1.	Riau	Pelalawan	Ukui	Lubuk Kembang Bunga
2.	Riau	Indragiri Hulu	Kuala Cenaku	Pulau Gelang
3.	Riau	Siak	Pusako	Dosan
4.	Riau	Bengkalis	Rupat	Tanjung Medang
5.	Riau	Bengkalis	Rupat	Pergam
6.	Jambi	Tanjung Jabung Timur	Dendang	Catur Rahayu
7.	Jambi	Muaro Jambi	Berbak	Rantau Rasau
8.	South Sumatera	Musi Banyuasin	Banyuasin II	Tanah Pilih
9.	South Sumatera	OKI	Pangkalan Lampam	Riding
10.	West Kalimantan	Kubu Raya	Rasau Jaya	Rasau Jaya Umum
11.	Central Kalimantan	Pulang Pisau	Jabiren Raya	Tumbang Nusa
12.	West Java	Majalengka	Argapura	Bantaragung

Source: Ditjen PPI KLHK, 2020

disaster management, and evacuation, legal understanding, forest and land fire control, conservation partnership assistance), and field operations. Efforts to extinguish forest and land fires during the pandemic were also assisted by air blackout activities or water booming carried out in the five most vulnerable provinces, namely Riau, South Sumatra, West Kalimantan, South Kalimantan, and Central Kalimantan. The total water spilled during water bombing for blackout activities is around 164,077,000 liters.

1. Bureaucracy Structure

The bureaucracy structure includes two aspects: the structure of the bureaucracy itself and its mechanism. In this case, the former relates to the organization of the Forest and Land Fire Control institution, and the latter refers to the working operational system of Forest and Fire Control. More specifically, the organizational structure of Forest and Land Fire Control during the pandemic has not been changed, either at the primary level or in the Technical Implementation Unit within the MOEF. In this case, acting as the supervisor of MA is under the Directorate General of Climate Change Control. At the same time, the highest leadership of MA Center is held by the Director of Forest and Land Fire Control. Both sections are responsible for the operation conducted by the Regional of MA. However, The Director-General of Climate Change Control will give reports on the results of operational work in this bureaucratic structure to the Minister as the highest leader of the Ministry.

Because the Land and Forest Fire Control working areas include all the regions of Indonesia, there are five MA Regional working areas under sub-ordinate, namely the Sumatera Regional PPIKHL Center, the Java, Bali and Nusa Tenggara PPIKHL Centers, the Kalimantan PPIKHL Office, the Sulawesi Regional PPIKHL Center, and the Maluku Papua Regional PPIKHL Office. Thirty-four Heads of Operation manage those regional working areas (henceforth: *Kadaops*) throughout Indonesia, and they are in charge of facilitating regional capacity building in preventing and overcoming forest and land fires in the working areas. At the same time, some of the *Kadaops* are appointed as Provincial Coordinators of MA, whose responsibility is to coordinate all *Kadaops*. In addition, they supervised MA Operational Areas (Daops), led by operational leaders as their representatives in the field, and took the lead of the team members of MA Operation Areas.

Implementing tasks following the division of authority and work responsibilities for forest and land fire control during the Covid-19 pandemic impacts the distribution of the focus

of attention of all task force members, but this does not reduce the implementation of Land Fire Control. Cooperation and coordination between task forces have been strengthened with the MPA Paralegal and TMC programs in vulnerable provinces, recognized as one of Forest & Land Fire Control's solutions at the site level that were effective during the Covid 19 pandemic.

The Standard Operating Procedure for controlling forest and land fires during the pandemic also applies to MA by implementing health protocols including washing hands with soap, using masks, maintaining distance, avoiding crowds, and limiting mobility and interaction. Consequently, during the pandemic at the regional level bureaucratic structure, the crowd level, and the picket squad were reduced.

At the Daops Level, the MA teams that usually picket the office were two teams with 30 people before the pandemic. The outbreaking time is significantly reduced to one squad of 15 people. Similarly, the situation is also valid for MA at the Pondok Kerja as the lowest level, in which the member of the team decreased simultaneously. Initially, the number of office pick-up teams was a sub-team consisting of 7-8 people, but it was reduced to one sub-team with only 3-4 members. The pandemic also influences the field work stations activities, in which the health protocols become a priority for the MA. For example, in condition of emergency alert and forest fire response, members of the MA Daops and Workhouses, who do not have office duty should be ready to be summoned for gathering and carrying out their responsibilities and functions both in the office and in the field by applying the health protocols. Indeed, the team's structure must follow the health protocol of COVID-19. In line with this, the information given by participants indicates that most of them (88.3%) are capable of adapting to this working situation, followed by 8.8 % of participants declaring that it is fair to it.

Regarding workability according to the organizational structure of the forest and land fire control during the pandemic, from 34 *Kadaops* MA throughout Indonesia, 15 people (44%) said they were pretty capable, 12 people (35.5%) said they were good, three people (8.8%) said it was perfect, three people (8.8%) said it was not enough. One person (2.9%) said it was not there.

2. Resources

According to Edward III (Budiningsih, 2017), resources are related to all sources that can be used to support the successful implementation of policies, including human resources, budget, and facilities. Although budgeting shift occurs as a result of the pandemic, the implementation of forest and land fire control policies remains one of the budget priorities sourced from MOEF State Budget and supported by the National Disaster Management Agency' Ready-to-Use Fund source. To control forest and land fires effectively and efficiently during the pandemic, optimizing the source of funds is conducted by carrying out forest and land fire control activities on the site levels. Table 7 indicates the specific steps regarding the policy.

The total number of Manggala Agni resources under the Directorate General of Climate Change is 34 Daops with 125 squads and 1,875 personnel. Meanwhile, the total human resources of Manggala Agni in seven prone provinces are 27 Daops and 1,515 personnel (Table 8).

Forest and land fire control activities are also assisted by Brigdalkarhut, who control forest fires, especially in conservation areas. There are 37 units of the brigade, scattered in the UPT Balai KSDA and Balai National Park, under the Directorate General of KSDAE. Since the 2015-2019 period, KLHK has also facilitated the formation of Brigdalkarhut in KPHP/KPHL, the Regional Government UPT, totaling 61 units Brigdalkarhut KPHP/KPHL. Infrastructure is prioritized in areas prone to forest and land fires, such as Riau, Jambi, South Sumatra and all regions of Kalimantan (Table 9).

The thirty-four heads of the Indonesian MA operational area (*Kadaops*)

Table 7. Forest and land fire control activities in Indonesia during the Covid-19 Pandemic

No.	Activity
1.	Implementing independent patrols and integrating patrols applies health protocols following established village targets
2.	Improving pre-emptive and preventive efforts among parties in forest and land fires control who care about fire and people with legal awareness
3.	Utilizing weather modification technology to reduce the risk of drought on peatlands
4.	Altering forest and land fire control task force command post
5.	Campaigning/raising awareness of forest and land fires prevention more intensively through various information media
6.	Implementing ground/air extinguishing of forest and land fires as early as possible
7.	Conducting activities to increase the capacity and competence of human resources as well as to fulfil the need of forest and land fire control infrastructure

Source: modified from various sources

Table 8. Data on the distribution of personnel for 34 units of the Manggala Agni Daops in Indonesia

No.	Province	Operational area (Daops)	Team number	Personnel (PNPN)
A	North Sumatera	Sumatera I (Sibolangit)	4	60
		Sumatera II (Pematang Siantar)	4	60
		Sumatera III (Labuhan Batu)	4	60
B	Riau and Riau Islands	Sumatera IV (Pekanbaru)	2	30
		Sumatera V (Dumai)	4	60
		Sumatera VI (Siak)	4	60
		Sumatera VII (Rengat)	4	60
		Sumatera VIII (Batam)	2	30
C	Jambi	Sumatera IX (Kota Jambi)	4	60
		Sumatera X (Muara Bulian)	2	30
		Sumatera XI (Bukit Tempurung)	3	45
		Sumatera XII (Muara Tebo)	4	60
		Sumatera XIII (Sarolangun)	4	60
D	South Sumatera	Sumatera XIV (Banyuasin)	4	60
		Sumatera XV (Musi Banyuasin)	4	60
		Sumatera XVI (Lahat)	4	60
		Sumatera XVII (OKI)	4	60
E	Central Kalimantan	Kalimantan I (Palangkaraya)	5	75
		Kalimantan II (Kapuas)	3	45
		Kalimantan III (Pangkalan Bun)	4	60
		Kalimantan IV (Muara Teweh)	3	45
F	South Kalimantan	Kalimantan V (Banjar)	4	60
		Kalimantan VI (Tanah Laut)	4	60
		Kalimantan VII (Tanah Bumbu)	4	60

Table 8. Continued

No.	Province	Operational area (Daops)	Team number	Personnel (PNPN)
G	West Kalimantan	Kalimantan VIII (Pontianak)	4	60
		Kalimantan IX (Singkawang)	4	60
		Kalimantan X (Ketapang)	4	60
		Kalimantan XI (Sintang)	6	90
H	East Kalimantan	Kalimantan XII (Pasel)	4	60
		Kalimantan XIII (Sangkima)	3	45
I	South Sulawesi	Sulawesi I (Goa)	4	60
		Sulawesi II (Malili)	4	60
J	South east Sulawesi	Sulawesi III (Tinanggea)	2	30
K	Nort Sulawesi	Sulawesi IV (Bitung)	2	30
Total			125	1,875

Source: Ditjen Climate Change Control MOEF, 2020

Table 9. Control Infrastructure in Seven Provinces Prone to Karhutla

No.	Type of equipment	Numbers (Unit)
1.	Filed operation vehicle	27
2.	Equipment vehicle	69
3.	Water tank vehicle	28
4.	Slip-on vehicle	57
5.	Monilog	53
6.	Motor cycle	627
7.	Back pump	1,392
8.	Extinguisher pump	308
9.	Drone	30
10.	Peatland injection	64
11.	GPS	112
12.	CCTV thermal camera	13

Source: Ditjen Climate Change Control MOEF, 2020

perceptions on the forest and land fire control infrastructure indicate that the resources' availability during COVID-19 is preferable (19 people). More specifically, the perception of infrastructures from all participants can be summarized as follows: 19 people (55.9%) said they were good, two people (5.9%) said they were perfect, ten people (29.4%) said it was enough, and only three people (8.8%) said it was not enough. The ability of MA implementers or members to respond to forest and land fire control policies during a pandemic is quite adaptive, where MA members could adjust their method of carrying out their duties and functions with the forest and land fire control policy in a new habit era.

Some improvements in the quality of human resources in controlling forest and land fires during the pandemic were carried out using virtual training on CCTV Thermal Camera operations, virtual training on drone operations and application use, virtual training on occupational health and safety, and webinars on land and forest fire control during the Covid-19 pandemic. There is still a combination of field practice with limited participants and

adherence to health protocols for those who have difficulties participating in the virtual training. Initially, MA members found it difficult to adapt new habits to protect themselves from Covid 19 transmission while on duty. This condition is more strictly applied as they meet people in court and public areas; for example, in handling the case, the Supreme Court, who are later detected positive for Covid, made them go for healing treatment.

In terms of training during the pandemic, there are various opinions. Sixteen members (47.1%) declared that they still need more forest and land fires training, particularly during the pandemic. However, eight members (23.5%) mentioned that the training was unnecessary concerning the COVID-19 situation, and 17.6% said the training was good. One person (2.9%) stated that they were excellent, while two members (5.9%) noted that the training was inferior, and the other two members (5.9%) indicated that they had not had received training.

3. Communication

In general, policy communication delivers policy information from policymakers to policy implementers (Mardika et al., 2018). During the pandemic, forest and land fire prevention are socialization is conducted using traditional methods like informing door to door (to community huts in rice fields/fields/gardens) to avoid activities with more groups. Socialization is also carried out by utilizing various social media platforms, such as the Kalimantan PPIKHL Balai PPIKHL youtube channel and holding a zoom meeting by the Sulawesi Regional PPIKHL Office. At the PPIKHL Sumatera Regional Hall, communication on forest and land fire control is conducted by creating group Whatsapp from field posts, postal command posts, Balai posts, PKHL Directorate posts, and KLHK posts. The fire complaint channel also uses the contact center at the Daops level. Whatsapp groups were also formed to accelerate operations and reporting in the task force. Even sub-task force groups to

expedite the command line and implementation of field strategies. The leadership role for work coordination is very important to ensure good communication between divisions in the field, so that the potential for a small fire can be controlled (Zulkifli, 2021).

When implementing the door-to-door method, the MA Daops/Work Lodge members included the TNI, POLRI, local BPBD, and other related Satker (generally agricultural extension). Community leaders are still implementing strict health protocols. The Government established the socialization to prevent forest and land fires and an invitation for the public to comply with the health protocols to prevent the spread of the Covid-19 virus. In this case, most participants (55.9%) stated that the socialization of forest and land fire control policies during the pandemic was significantly good. Three members (8.8%) said it was terrific, eight members (23.5%) said it was enough, five members (14.7%) said it was not enough, and only one member (2.9%) said it was very lacking. Regarding the stakeholder understanding of forest and land fire control policies during the pandemic, four members (11.8%) said they were excellent. Twenty-three members (67.6%) said they were good, six members (17.6%)) stated it was sufficient, and a member (2.9%) stated that it was not enough.

4. Disposition

As for the disposition, MA members obey the forest and land fire control policy to implement health protocols during their duties and implement SWAB Antibody/PCR Rapid Test for members. The routine test is conducted by the Regional PPIKHL Balai or the Regency/City Covid-19 Task Force. For reporting work mechanisms, every level of the land and forest fire control organization must prepare a report on implementing land and forest fire control activities in stages. In this case, the reports refer to monitoring early detection data, early detection field checks, field conditions, forest and land fire control activities, and other activities. Other Task Force

agencies also support controlling forest and land fires during the pandemic, which is shown by maintaining an exceptional commitment to controlling forest and land fires in an integrated manner.

Regarding the work team, the forest and land fire-control task force during the pandemic mentioned that the cohesiveness of the task force team is going well (20 members, 58.9%). Eight members (23.5%) stated that the task force cohesiveness is very good, five members (14.7%) said it was enough, and a member (2.9%) said it was not enough. Community involvement in controlling forest and land fires during the pandemic is expressed as follows: fourteen members (41.2%) stated that community participation was going well, a member (2.9%) said it was perfect, fifteen members (44.1%) said it was enough, and four members (11.8%) said it was not enough.

Supervision of forest and land fire control policies during the pandemic period are conducted in stages hierarchy, starting from management by the Head of the team, the Head of MA at the Daops Level, the Provincial MA Coordinator, the Head of the Forest and Land Fire Section, to the Head of the Regional Office. There is still assistance, monitoring, and evaluation at the site level to ensure that fieldwork is administratively correct. The command structure and organization are still conducted according to the prevailing regulations. Monitoring policy implementation is still completed directly by paying attention to health protocols and online reports and documentation from members of MA. All supervision is conducted periodically at the Balai and Daops levels and external coordination with related parties through correspondence mechanisms or limited direct visits. For the management of forest and land fire control tasks during the pandemic, 20 members (58.9%) stated that the supervisory work was going well, five-member (14.7%) said it was perfect, eight-member (23.5%) said it was enough. Only one person (2.9%) said it was not enough.

D. Supporting and Inhibiting Factors for Implementing Forest and Land Fire Control Policies During a Pandemic

1. Supporting factors

The implementation of forest and land fire control during the pandemic is supported by a more conducive climate factor, vigilance, cooperation, cohesiveness, solidity, and synergy between MA and the parties (Provincial/Regency/City Task Force). The Heads of the Regional Office also appreciate the MA members and all forest and land fire stakeholders in implementing forest and land fire control and is supported by policies and strategies to control forest and land fires during the pandemic period. Especially for the Sumatera region (Riau, South Sumatera, and Jambi), control of forest and land fires during the pandemic was supported by the efforts of TMC in collaboration with KLHK, BNPB, TNI AU, BMKG, private sector, and BPPT, which support the availability of rain at critical times. There are good synergies at the provincial level, starting from early detection through air and ground patrols rapid response to blackout from an integrated team on the ground supported by air-extinguishing operations in burnt areas where water is unavailable or difficult to access by ground troops. This cooperation is needed because fires are caused by many factors such as fuel, climatic factors, social economy, ecology, culture, technology, institutional systems and forest and land management (Akbar, 2011).

Apart from that, other supporting factors are online socialization, social media, the use of technology, and the existence of a legal awareness community program or MPA-Paralegal, which is proven to prevent forest and land fires in prone areas. This effort complements other corrective measures such as a permit moratorium, peat governance, and law enforcement. The collaboration between the members of the land and forest fire control Task Force that went well, 34 the heads of MA's operational areas throughout Indonesia claimed

that other supporting factors for the success of work at the site level were due to the availability of Personal Protective Equipment (PPE), thus providing a sense of comfort and safety for MA members in working during the pandemic. The *Kadaops* also found a reduction in the activities carried out by the community during the pandemic period due to fears of exposure to the virus, which had an impact on decreasing land clearing activities employing burning. Another factor is the increasing awareness of the community to open land without burning it.

2. Obstacle factor

During the Covid-19 pandemic, the task force for handling forest and land fire disasters focused on the region's local area (micro). Operationally, the movement of the forest and land fire control team, especially MA, which operates in the red zone, is limited. The stamina of the officers is expected to be excellent in conducting their duties amid the Covid 19 pandemic by implementing health protocols. The difficulty of supervising MA members to follow health protocols occurs in its environment. The existence of a budget refocusing policy, among others, also impacts supporting operational activities and meeting the need for facilities and infrastructure for forest and land fire control to be less than optimal. The awareness campaign, especially among communities around the area, sometimes did not work well since the concerns of both parties, both from the district and from the MA side of the Task Force team. Meanwhile, efforts to conduct online training encountered obstacles because not all people were friendly to e-learning and distance training. In addition, the threat of damage to biodiversity still occurs because of forests, logging products, forest fires due to inappropriate land use (Khan et al., 2021). Communication is still the main obstacle in the socialization of prevention work because not all areas prone to forest and land fires in Indonesia can be reached by technology

IV. CONCLUSION AND RECOMMENDATION

A. Conclusion

Forest and land fires are still a threat amid the Covid-19 pandemic situation in Indonesia. *Manggala Agni* together other Forest & Land Fire Control Task Force teams, implemented forest and land fire control policies during the Covid-19 pandemic went well, where all operational implementation of forest and land fire control went well was carried out by implementing strict health protocols. During the Covid-19 pandemic in 2020, Indonesia's forest and land fire significantly reduced in the number of hotspots (down to 91.32%) and the burned area (down to 81.7%). Despite, there are still obstacles in controlling hotspots, especially in areas designated as the Covid-19 red zone, generally, there will be no forest and land fires disaster in Indonesia in 2020. The decrease of hotspots was supported by more favorable La Nina climatic factors across the continent and policies due to the Covid-19 pandemic prevention policy. However, the fire challenges in 2020 are very tough, as it will be one of the hottest years in history which is the global warming trend is taking place dramatically. Therefore, if there is no policy and field intervention like MA and the task force team did, the threat of forest and land fires will probably be even more significant. Additionally, when several other countries (i.e., USA, Australia, and Brazil) experienced fire disasters in 2020, Indonesia successfully avoided forest and land disasters during the Covid-19 pandemic. These achievements are achieved from various supporting factors such as natural conditions, the solidarity of the MA team and the Land and Forest Task Force, and prevention efforts by Indonesia's weather modification technology and the voluntary participation of local communities such as Fire Concerned Community and Land and Forest Fire Care Community.

B. Recommendation

Consistency in implementing forest and land fire control work is necessary because the threat of the Covid-19 pandemic is not over yet. Members of *Manggala Agni* and the forest and land fire control task force must strengthen synergies and create innovations to control forest and land fires in a new normal period. For this reason, training and budget support are still needed and synergy among members of the Forest and Land Fire task force, especially during the pandemic. In addition, further research is needed to see the implementation of forest and land fire control policies, with a broader focus and object of study, so fire control policies can run better even during a pandemic situation. This is very important to prevent two disasters, namely fire disasters and COVID-19 disasters.

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