

Public policy for strengthening and scaling up community-based fire prevention initiatives of private corporations to benefit the environment and livelihoods

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Summary

Conceptually, a project or program is scaled up in terms of size or scaled in order to produce and magnify impacts. A scale-up can also be understood as a transition of success from a pilot grassroots project to an operational model at larger scale or where the success of a policy/program/project in different places is gradually enlarged, replicated, adapted and perpetuated to cover larger numbers of beneficiaries. The process may include various dimensions such as social (social inclusiveness), physical (replication), political (policy and budget commitment) or even conceptual (mindset and power relations changes), and it can focus on goals (socioeconomic, human and environmental impacts) and methods (system, policy, process). Scale-ups can take the form of vertical expansion, be institutional in nature and involve a wide range of stakeholders at different levels (functional and political scale-ups). They can also be horizontal (scale-outs, quantitative scale-ups), expanding geographically and involving large groups of communities.

The Integrated Forestry and Farming System (IFFS or *Desa Makmur Peduli Api* – DMPA) was launched in December 2015 during COP 15 in Paris and is increasingly recognized as an effort from the private sector to prevent fire and improve community livelihoods. Although this program is quite new and still needs to be improved, the scaling up of this program should be considered ahead of time to magnify its impact. The success in the scaling up of any project or program is determined by various factors such as the political will or commitment of the parties involved, enhanced local capacity, supporting policies and financial support. In addition to the full support provided by the partner company, Asia Pulp and Paper (APP), and various supporting policies as described elsewhere in this report, there are ample opportunities for DMPA to be successfully replicated and expanded into wider geographical areas. High-level instructions issued by the President of Indonesia as expressed in nine national priority programs (*Nawa Cita*), where communities are considered as part of the solution, provide impetus for this kind of program to be expanded. Other corporations such as the Asia Pacific Resources International Holdings Ltd (APRIL) Group, Association of Indonesia Forest Concession Holders (APHI), Musim Mas and Sime Darby have initiated different kinds of fire-free villages programs.

The importance of incorporating community development into program planning and implementation is also highlighted at various levels of governance. As revealed in the testimonies of local people and other parties involved in this program, there is potential for local people to better understand the importance of maintaining the environment and the consequences for failing to do so, and to adapt themselves to the new practices and technologies for opening up land and managing the natural resources surrounding them. There are also indications that people develop their own capacity to improve their livelihoods. Through DMPA, options are being explored to create alternative livelihoods for local people around commodities that were often previously neglected due to the nonexistence of market or technology support.

Public policies from different ministries, agencies and local governments are strongly connected to fire prevention, fire suppression and private sector initiatives such as DMPA. At least 53 policies were identified and are interconnected; some are complementary and some are redundant. Ten of the most connected public policies are Law No. 19/2013 regarding protection and empowerment of farmers, the Ministry of Environment and Forestry's Regulation No. 83/2016 regarding social forestry, Local Regulation of South Sumatra Province No. 8/2016 regarding forest and/or land fire control, Law No. 24/2007 regarding disaster prevention, Presidential Instruction No. 11/2015 regarding enhancement of forest and land fire control, Government Regulation No. 22/2008 regarding financing and management of disaster assistance, Ministerial Regulation of MPWH (Ministry of Public Works and Housing) No. 16/2015 regarding exploitation and maintenance of the irrigation network, Government Regulation

No. 21/2008 regarding implementation of disaster prevention, BNPB Head Regulation No. 1/2012 regarding guidelines for disaster-resilient villages and finally Government Regulation No. 57/2016 regarding protection and management of peat ecosystems.

Public policies are implemented and budgeted for by different ministries and at various government unit levels. From the point of view of public policy and finance, *technology transfer of eco-friendly land management* and *protecting forest areas* are best supported. However, *resolving local conflicts* and *DMPA product marketing* are least supported by public finance. This provides lessons that non-state actors need to pay more attention to conflict resolution and product marketing. To sustain DMPA work, a strong business model for every DMPA, embracing its resources, its value creation and capturing, and its transaction and marketing needs to be developed.

In addition to pledges made by APP to financially support the continuation of DMPA within and beyond its concession areas, there is potential funding that may be sourced from national and subnational governments, other private companies and NGOs. Supported by Otoritas Jasa Keuangan, current efforts to transform village-owned corporations (BUMDes) into a micro-financing institution – as specified in Law No. 1 of 2013 regarding *Lembaga Keuangan Mikro (LKM)* and its implementing regulations including Government Regulation No. 89 of 2014 regarding interest rates, financing earnings and scope of micro-financial institutions, and Financial Services Authority (OJK) regulations regarding business licenses – the development and supervision of a micro-finance institution could be instrumental in scaling up DMPA. There are also emerging collaborations between private companies and other actors such as central banks, financial service authorities and local governments that could support this process.

Other factors that are essential in scaling up include partnerships and networks that function as a catalyst to expansion. To expand DMPA, a synergy can also be potentially created with other similar models such as Disaster-Resilient Village (DESTANA), Fire Care Community (MPA), Village Trained Fire Teams (RKDT), Fire Care Farmer Group (KTPA), Fire Care Village (DPA), Peatland Care Village (DPG) and others. When scaling up, it is also important to have strong linkages and coherence policies between central and subnational governments and effective monitoring and evaluation for generating lessons learned and allowing for corrective actions if anything goes wrong or not in the right direction. Planned programs and their implementations to be developed have also to be coordinated, not fragmented; they need to be transparent and accountable.

Abbreviations

APHI	<i>Asosiasi Pengusaha Hutan Indonesia</i> (Association of Indonesia Forest Concession Holders)
APP	Asia Pulp and Paper
APRIL	Asia Pacific Resources International Holdings Ltd
BAPPENAS	<i>Badan Perencanaan Pembangunan Nasional</i> (National Planning Agency Board)
BIG	<i>Badan Informasi Geospasial</i> (Geospatial Information Agency)
BMKG	<i>Badan Meteorologi, Klimatologi dan Geofisika</i> (Indonesian Agency for Meteorology, Climatology and Geophysics)
BNPB	<i>Badan Nasional Penanggulangan Bencana</i> (Indonesian National Board for Disaster Management)
BPBD	<i>Badan Penanggulangan Bencana Daerah</i> (Regional Disaster Management Agency)
BPN	<i>Badan Pertanahan Nasional</i> (National Land Agency)
BRG	<i>Badan Restorasi Gambut</i> (Peatland Restoration Agency)
BUMD	<i>Badan Usaha Milik Daerah</i> (Regional State-Owned Enterprises)
BUMDes	<i>Badan Usaha Milik Desa</i> (Village State-Owned Enterprises)
BUMN	<i>Badan Usaha Milik Negara</i> (State-Owned Enterprises)
BWS	<i>Balai Wilayah Sungai</i> (Office of River Area)
CMEA	Coordinating Ministry for Economic Affairs
CSO	Civil Society Organization
DESTANA	<i>Desa Tangguh Bencana</i> (Disaster-Resilient Village)
DMPA	<i>Desa Makmur Peduli Api</i> (Integrated Forestry and Farming System)
DPA	<i>Desa Peduli Api</i> (Fire Care Village)
DPG	<i>Desa Peduli Gambut</i> (Peatland Care Village)
FCP	Forest Conservation Policy
FFA	Fire-Free Alliance (<i>Aliansi Bebas Api</i>)
FFB	Fresh Fruit Bunch
FFVP	Fire Free Village Program (<i>Program Desa Bebas Api</i>)
FPIC	Free, Prior and Informed Consent
FSC	Forest Stewardship Council
GAPKI	<i>Gabungan Pengusaha Kelapa Sawit Indonesia</i> (Indonesian Palm Oil Association)
GHG	Greenhouse Gas
GOI	Government of Indonesia
HCS	High Carbon Stock
HCV	High Conservation Value
HGU	<i>Hak Guna Usaha</i> (Use Business Rights)
HTI	<i>Hutan Tanaman Industri</i> (Industrial Plantation Forest)
IDR	Indonesian Rupiah
IFCC	Indonesian Forestry Certification Cooperation
IFFS	Integrated Forestry and Farming System (DMPA)
INPRES	<i>Instruksi Presiden</i> (Presidential Instruction)
IP4T	<i>Iventarisasi Penguasaan, Pemilikan, Penggunaan dan Pemanfaatan Tanah</i> (Land Tenure, Ownership, Land Use and Utilization)
ISCC	International Sustainability and Carbon Certification
ISPO	Indonesian Sustainable Palm Oil
KPH	<i>Kesatuan Pengelolaan Hutan</i> (Forest Management Unit)
KSB	<i>Kampung Siaga Bencana</i> (Disaster Alertness <i>Kampong</i>)
KTPA	<i>Kelompok Tani Peduli Api</i> (Fire Care Farmer Group)
KUB	<i>Kelompok Usaha Bersama</i> (Joint Enterprise Group)

MASP	Ministry of Agrarian and Spatial Planning
MOHA	Ministry of Home Affairs
MOA	Ministry of Agriculture
MOEF	Ministry of Environment and Forestry
MOI	Ministry of Industry
MOSA	Ministry of Social Affairs
MPA	<i>Masyarakat Peduli Api</i> (Fire Care Community)
MPWH	Ministry of Public Works and Housing
NASA	National Aeronautics and Space Administration
NDPE	No Deforestation, Peatland and Exploitation
NFZ	Non-Forest Zone (<i>Areal Penggunaan Lain – APL</i>)
NGO	Nongovernment Organization
NOAA	National Oceanic and Atmospheric Administration
OJK	<i>Otoritas Jasa Keuangan</i> (Financial Services Authority)
PEFC	Programme for the Endorsement of Forest Certification
PERDA	<i>Peraturan Daerah</i> (Regional Regulation)
PERKA	<i>Peraturan Kepala</i> (Regulation of Agency Head)
PERMEN	<i>Peraturan Menteri</i> (Ministerial Regulation)
PKH	<i>Program Keluarga Harapan</i> (Family Hope Program)
PLTB	<i>Pembukaan Lahan Tanpa Bakar</i> (Land Clearing Without Burning)
PMKS	<i>Penyandang Masalah Kesejahteraan Sosial</i> (People with Social Welfare Problems)
POKJA	<i>Kelompok Kerja</i> (Working Groups)
PP	<i>Peraturan Pemerintah</i> (Government Regulation)
PROKLIM	<i>Program Kampung Iklim</i> (Climate Kampong Program)
PRONA	<i>Program Nasional Agraria</i> (Agrarian National Program)
PSKS	<i>Potensi dan Sumber Kesejahteraan Sosial</i> (Resources for Social Welfare)
PUSDALOPS	<i>Pusat Pengendalian Operasi</i> (Operation Control Center)
RAPP	Riau Andalan Pulp and Paper
RKDT	<i>Regu Kebakaran Desa Terlatih</i> (Village Trained Fire Teams)
RPJMN	<i>Rencana Pembangunan Jangka Menengah Nasional</i> (National Long-Term Development Plan)
RSPO	Roundtable on Sustainable Palm Oil
RTRW	<i>Rencana Tata Ruang Wilayah</i> (Regional Spatial Plan)
SDP	Sime Darby Plantation
SLM-MDTF	Sustainable Landscape Management Multi Donor Trust Fund
SMART	Sinarmas Agro Resources and Technology
SOP	Standard Operating Procedures
TAGANA	<i>Taruna Siaga Bencana</i> (Cadet Disaster Alertness)
TAP	Triputra Agro Persada
TNC	The Nature Conservancy
TORA	<i>Tanah Object Reforma Agraria</i> (Land for Agrarian Reform Object)
UMKM	<i>Usaha Mikro, Kecil dan Menengah</i> (Micro, Small, and Medium-Scale Business Empowerment)
UU	<i>Undang-Undang</i> (Law)

1 Introduction

1.1 Background

The smoke haze created by forest and land fires after the El Niño in 2015 was categorized as a national disaster in Indonesia. It affected the health of many Indonesians and caused the death of 24 children and adults; it caused environmental, economic, tourism and educational losses, mostly in Sumatra, Kalimantan and Papua. The rate of premature death was much higher, estimated at 100,300 people (Koplitz et al. 2016). The provinces in Indonesia severely affected by haze were: Riau, Jambi, South Sumatra, West Kalimantan and Central Kalimantan. Singapore, Malaysia, Thailand and the Philippines were also badly affected. Economic losses were estimated at USD 16.1 billion (Glauber and Gunawan 2016) and consisted of water resource damage, carbon emissions, flora impairment, biodiversity loss, health expenses, business travel disruption and the cost of ecosystem restoration.

In 2015, about 2.61 million ha of forest and land were burned, consisting of community lands, forest zone (i.e. areas that are legally classified as forest by the government, although some areas are no longer dominated by trees) and corporate concessions (i.e. wood or oil palm plantations). Community land is owned by a person, a group or a private company outside the forest zone, and is classified as *areal penggunaan lain* (APL) or non-forest zone (NFZ). NFZ is land allocated for other purposes. Forest zones are government managed. Sometimes a person, group of people, and/or small- or medium-scale companies illegally convert forest zones to privately owned swidden areas. Corporate concessions are large-scale, state-owned areas that are managed by private companies and state-owned enterprises through a licensing mechanism over a certain time; the managers of these areas aim to provide economic, social and environmental benefits.

The fire extent has decreased from 2015 to 2016 and 2017. The Ministry of Environment and Forestry (MOEF) revealed that the total extent of fire in 2016 was 438,360 ha, and in 2017 to the end of September was 150,457 ha (MOEF 2017). A total of 59% of fires were located in forest zones (*kawasan hutan*) and 41% in non-forest zones (*Areal Penggunaan Lain – APL*). The number of hot spots indicated by the National Oceanic and Atmospheric Administration (NOAA) of the United States also decreased, from 21,929 in 2015 to 3915 in 2016 and 2572 in 2017. While the rainfall in 2015 was 1614 mm and increased to 2682 mm in 2016, it then decreased to 2409 in 2017 (BMKG 2017). Therefore, significant progress has been made by all stakeholders to reduce fire, discounting weather as a factor. Figure 1 shows the hot spots in Indonesia in the period 2012–2018.

Table 1 shows the land zoning and management type where fire was located. Surprisingly, the biggest area where fire occurred was in conservation forest (22%). Forest concessions, which include both production and limited production forest, contributed 17.0% of burnt areas. From the total burnt area, peatland constituted 8.9% and non-peatland was 91.1%. Annex 1 provides detail of the distribution of fire occurrence in 2017 on peatland and non-peatland. Annex 2 provides rainfall data for 2015–2017.

As shown in Table 1, 17.0% of fires in forest zones in 2017 were located in production and limited production forests, which are commonly managed by private sector operators, such as natural forest and industrial plantation forest (HTI) concessionaires. Fires in non-forest zones including areas managed by oil palm companies constituted 41.1%. In the 2015 fire disaster, fires located on land owned by oil palm companies constituted 21% of the total of 2.6 million ha of burnt areas (Glauber and Gunawan 2016). These numbers show that the forest and palm oil private sectors are very important elements in reducing fires.

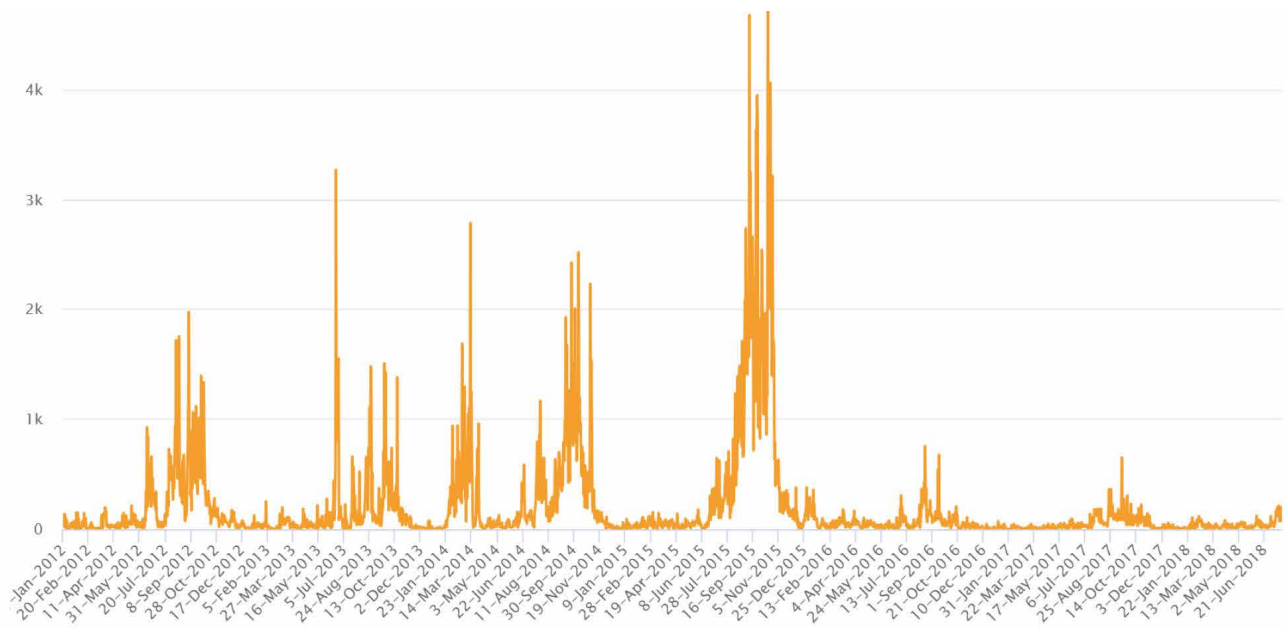


Figure 1. Hot spots 2012–2018 (Global Forest Watch 2018).

Table 1. Fire extent in 2017 (MOEF 2017).

Area zoning	Management type	Fire extent (ha)	%
Forest zone	Conservation forest	33,177	22.0
	Protection forest	16,213	10.8
	Limited production forest	9,191	6.1
	Production forest	16,375	10.9
	Conversion forest	13,638	9.1
Non-forest zone	Crop and oil palm plantations, community land and others.	61,873	41.1
Total		150,467	100.0
Total fire on peatland		13,362	8.9
Total fire on mineral soil		137,095	91.1

In many cases, private sector actors and government, for complex tenurial reasons, are not able to secure forest and land legally allotted to private sector actors to be managed only by the private sector. Local communities may have been living on that land. Migrants from nearby locations or other provinces might come and occupy that land. They can farm the land both with and without the use of fire. It was argued that fires often came from community enclaves inside concessions and from settlements surrounding concessions (GAPKI 2018). Farmers frequently use fire in developing crop and oil palm plantations. These fires may then propagate to land and oil palm that are legally managed by the concession holders (Fatchurroachman 2017).

To improve governance of forest, land and plantation fire management systems, and to reduce fire occurrence while improving local livelihoods, public as well as private actors have taken various measures. The government, through the National Planning Agency Board (BAPPENAS), has launched the Grand Design for Fire Prevention (BAPPENAS 2017). The grand design aims to reduce 50% of fire occurrence from projected business as usual (BAU) in 2017–2019. There are five strategies outlined in the grand design, i.e. economic incentive and disincentive, community empowerment, law strengthening, water and peat infrastructure development, and initial fire attack. The total budget required in the grand design is USD 3 billion, coming from governments, private sector actors, communities and donors. Partnership among actors is a must to execute the strategies.

From the private sector, forestry concession group Asia Pulp and Paper (APP) launched a program of *Desa Makmur Peduli Api* (DMPA) or Integrated Forestry and Farming System (IFFS) in December

2015 to reduce fires and improve livelihoods through partnership with local communities. The APP group together with Sinar Mas Forestry and Golden Agri Resources (GAR) are members of the Sinar Mas Group. APP will provide USD 10 million and will target 500 villages for the DMPA program in 2020. The program aims to reduce the pressure on natural forests while simultaneously improving the livelihoods of local communities. The program is designed to help reduce conflict over land by providing less land-intensive development options and help to reduce instances of land encroachment and slash and burn activities. The program could include the sharing of: rearing initiatives for livestock; sustainable fruit and vegetable farming techniques; and forestry and business skills to enable alternative livelihoods that do not require the clearance of natural forest for further economic development.

The DMPA program focuses on bringing together agriculture, forestry and vocational skills development. The program is designed to build upon local knowledge of communities by bringing in the best practices and applicable techniques from across industries and academia (APP 2015). Up to December 2018, some 284 villages have been implemented as DMPA, and they are part of the total 500 villages set as a 2020 target. In South Sumatra alone, 65 villages have been part of DMPA of 109 targeted villages by 2020. Thirty DMPA villages have been registered as climate villages (*kampung iklim*), a program run by MOEF (Soesilo 2017).

Similar to APP, other private sector organizations such as APRIL, and some oil palm and forestry plantation companies, as described in later sections, embarked on village-based fire prevention programs, either individually or jointly, and made efforts not only to prevent fire from occurring, to protect forests and land, but also to improve local livelihoods. Experiences from various fire programs would be useful lessons on how village- or community-based programs for preventing fires and improving livelihoods can be scaled up for wider application and benefit.

1.2 Aims

Practices of company–community partnerships, such as DMPA, spread out in different areas with different degrees of success and failure, will be examined. Practical success will be affected by internal and external conditions. The internal condition is how the partnership is designed, planned and carried out by the community and companies. Indeed, the government, through CMEA, has published standards for fire prevention at the community level (Girianna et al. 2016). The standards outline, among other items, what we need to do to prepare in systematic way to ensure a village is free from fire. Village, community and customary leaders with Fire Care Community (*Masyarakat Peduli Api – MPA*) have to work together to ensure responsibility is shared and fulfilled.

The external condition is how policies and institutions affect the practice, which may include public as well as private regimes. Government policies exist at national, provincial and regency levels. The governments and parliaments at different levels have the authority to develop various laws (*undang-undang*) and provincial and regency regulations (PERDA). Government policy can be in the form of government and presidential regulations (*peraturan pemerintah dan peraturan/instruksi presiden*), ministerial decrees, and governor and head of regency regulations (*peraturan gubernur dan bupati*). In those policies, budget and economic (dis)incentives can be determined. In addition, some companies have issued their own sustainability policies that support fire prevention measures while improving the local livelihoods of the people surrounding their concessions. Market- and voluntary-based instruments aimed at guiding principles and standards for fire prevention and community development have also affected the behavior of companies in adopting good practices in running their plantation operations.

This working paper aims to analyze existing policies and regulations that support the current DMPA practice and offer an opportunity to scale it up. The analysis was carried out through (a) understanding the occurrence of fire in Indonesia; (b) describing private sector initiatives; (c) reviewing public policies related to DMPA; (d) identifying challenges and key principles for scale-up in reference to South Sumatra; and (d) analyzing policy networks.

2 Corporate commitment to fire prevention and community welfare

2.1 Commitment of corporations on No Deforestation, No Peat, No Exploitation (NDPE)

The last four years, at least since the New York Declaration on Forests in 2014, have seen a proliferation of commitments by various parties including governments and the private sector to end natural forest loss, to eliminate deforestation from the production of agriculture commodities, to reduce greenhouse gas (GHG) emissions, and to restore degraded forests and lands. In particular, a number of large oil palm and forest plantation owners developed various sustainability policies, some of which were issued before the New York declaration, and made pledges to break the link between deforestation and their supply chain; these policies became well-known for No Deforestation, No Peat No Exploitation (NDPE). They are partly driven by law, but this trend is also driven by awareness among those companies of the reputational and market risks associated with commodity-driven deforestation. Embedded in their sustainability policies, there is strong policy for supporting fire-controlling programs that include suppression, prevention and post-fire handling. Individually or in groups, companies engaged in various actions to suppress and prevent fire have integrated their fire programs with ambitions to increase the capacity of nearby communities and to empower them to improve their welfare.

On March 2016, a group of leading forestry and agriculture companies, NGOs and other partners announced the formation of the **Fire-Free Alliance (FFA)** or *Aliansi Bebas Api*, a voluntary, multistakeholder platform to aid in the solution to land and forest fires in Indonesia. The alliance consists of the Asia Pacific Resources International Holdings Ltd (APRIL) Group, Asian Agri, IDH, Musim Mas, PM. Haze, Sime Darby, Wilmar International Limited and IOI. They joined forces to collaborate and share existing knowledge, information and potentially resources to implement the fire-prevention initiatives, which were initiated by the APRIL Group through the Fire Free Village Program (FFVP) or *Desa Bebas Api* (PDBA) Program. They also sought to improve monitoring and detection of fire hot spots. FFA members will adopt and implement the FFVP, sharing lessons and best practices on how partnerships and engagement with the communities can protect forests from the high risk of fires. Currently, more than 200 villages, covering at least 1.5 million ha of land in various parts of Indonesia, are now participating in community-based forest fire prevention initiatives. The FFA demonstrates how the private sector in partnership with civil society groups can advance the fire-free cause through voluntary action.

To support the government's leadership on fire prevention, a voluntary multistakeholder group called Fire-Free Alliance (FFA) led by APRIL was established. More than 200 villages, covering at least 1.5 million ha of land in various parts of Indonesia, are now participating in community-based fire prevention initiatives. This is the result of the first year of collaborative work of the FFA, which is made up of forestry and agriculture companies, NGOs and other concerned partners committed to resolving Indonesia's persistent fire and haze issues. Established in February 2016, the FFA focuses on fire prevention through community engagement. Founding members include APRIL, Asian Agri, IDH, Musim Mas, Wilmar, Sime Darby and the IOI Group. The FFA has expanded fire prevention outreach to 218 villages in various parts of Indonesia. Of these, 77 villages signed up to FFA membership to undertake intensive fire-free programs in 2016. This is a 756% increase in the number of villages involved in this initiative since the Fire Free Village Program (FFVP) was launched by APRIL with nine villages in mid-2015. In some cases, FFA members have reported reductions in fire incidences of between 50% and 90% from 2015 to 2016 (APRIL 2017).

By referring to its Sustainable Forest Management Policy issued on 3 June in 2015, **APRIL Group** is committed to implementing best practices in all of their operations towards achieving sustainable forest management, and will comply with all prevailing laws and regulations. The group participates in global SFM certification schemes, maintains timber legality assurance certification and encourages its wood suppliers to follow the same path. Considering the adverse effect of fires, the group has strict a 'no burning' policy and makes every effort to tackle the impact of fires by complying with national legal requirements addressing fire prevention, and continues to support fire prevention and firefighting efforts across the landscapes in which they operate. It has been the company's mission to enforce its no-burn policy and to heighten awareness and increase vigilance among staff and local communities during the dry season.

APRIL is a member of the Royal Golden Eagle (RGE) Group which was founded by Sukanto Tanoto in 1973. Under his leadership, the RGE Group has grown into a global group employing more than 60,000 people, with assets totaling more than USD 18 billion and has worldwide sales reach. The RAPP Group, under the APRIL Group, has owned the Fire Free Villages Program (*FFVP – Program Desa Bebas Api*) since 2014, with nine villages in Riau Province (Aziza 2017). The communities will be rewarded with IDR 100 million (or USD 7500) if there is no fire at all, and will receive no reward if there is fire. Half of the reward is there to help reduce fire. Apart from this no-burn village reward, APRIL provides programs to improve the capacity of the village leader to oversee sustainable agriculture, community awareness and haze monitoring.

Given that the majority of fires result from burning by neighboring communities, the group of companies sees the importance of village-level engagement in minimizing the risk posed by fires. It cooperated with government authorities on a range of community- and education-based prevention initiatives to ensure that fires are not started within concessions and take all necessary precautions to ensure fires are prevented. The group invested significantly in fire prevention and fire suppression at an operational and community level by implementing education programs, working with local communities, training and resourcing village fire teams, providing forest and village signage, and promoting awareness regarding slash and burn techniques and community-based incentive programs.

Asian Agri is one of the pioneers in introducing a zero-burning policy, which was issued in 1994. In September 2014, the company committed further to adopting a moratorium on forest clearance and new peatland development, setting aside areas for high conservation value (HCV) and high carbon stock (HCS), and undertaking peatland mapping. In the same year, it started its fire community program by educating people on the importance of fire-prevention measures. Stakeholders are trained to eliminate slash-and-burn practices and are educated on the impacts that illegal fires have on the local environment and our global climate. The company has now engaged in socialization programs, appointed crew leaders, and produced banners, signage, and leaflets on fire/haze awareness and the impacts of fire disaster. It is now working to do a pilot project in Tambak village, for villagers to adopt zero burning in developing new agricultural land, and collaborating with local agencies in Riau to increase social awareness about fire. The company adopts five principles when working in collaboration with communities: community awareness; empowerment; leadership; alternatives to land clearing; and incentives or awards, and development of the local economy. In implementing its fire-free village program, the company follows five stages: identifying villages, socializing with village authorities and provincial leaders; entering into an agreement to ensure commitment; selecting and appointing village crew leaders; and engaging partners to implement the programs.

Musim Mas Group issued a sustainability policy in 2014, confirming its commitments to protecting high-conservation value and high carbon stock areas including peatlands, respecting all community rights and social issues especially those that affect the workforce and smallholders, and complying with all local, national and international laws. The company is committed to the Roundtable on Sustainable Palm Oil (RSPO) principles and it was the first company in Indonesia to achieve certification in January 2009, and to achieve 100% RSPO certification for mills, plantations and

its scheme for smallholders in September 2012. It is also committed to not using burning in new plantings, and when replanting or undertaking other development.

In 2016, the company decided to adopt a landscape-level approach to implementing sustainable agricultural production and inclusive development, working to verify third-party compliance against the group's sustainability policy. Included in this effort is making sure that smallholders supplying fresh fruit bunches (FFBs) to the company's mills are not using fire to clear lands for plantations. In the same year, in order to control land and forest fires, the company joined FFA, and started to focus on 71 villages covering an area of 500,000 ha – this is three times the size of the group's planted area – in its efforts to introduce a fire-free community (*Masyarakat Bebas Api*, MBA) program. The group found five of them to be high-risk fire villages, which need special attention, particularly during the dry seasons. The company entered into agreement with the government and villagers to protect the concession area and its surroundings from fire. In May 2016, the company initiated a program to incentivize villagers by awarding them with IDR 25 million if they were successful in achieving a 'zero burning' target over the period of one year. The award can be used to build infrastructure, or sporting as well as religious facilities.

In August 2017, Musim Mas Group granted awards to 10 villages in the regency of Kotawaringin Timur, Central Kalimantan, that have been successful in preventing forest and land fires within the previous year (Norjani 2017). The awards amount to a total of IDR 250 million plus equipment needed by villagers to support their livelihoods, such as motorcycles, boats and other items. The awards have been given in appreciation of those villagers making an effort not to use fire to open up lands and to prevent forest and land fires. Musim Mas Group with its subsidiary companies such as PT Sukajadi Sawit Mekar, PT Maju Aneka Sawit, PT Globalindo Alam Perkasa and PT Unggul Lestari, played an active role in increasing local people's awareness of fire danger and in providing them with equipment to prevent and control forest and land fires.

While increasing awareness among local communities about risks of damage arising from fire through repeated socialization events, the company engaged village governments to implement its fire prevention training program, particularly on how to report a fire, how to put out a fire and to share knowledge and experiences. It also made an effort to introduce alternative methods to burning when opening up new lands for plantations. The company also equips the trained villagers with necessary firefighting tools and teaches them how to build water reservoirs and to drill wells. It puts up notice boards stating that "burning is prohibited" in fire-prone areas, and the company provides communities with heavy machinery to clear lands.

In December 2013, **Wilmar** issued its no deforestation, no peat and no exploitation policy, aimed to advance an environmentally and socially responsible palm oil industry. The company claimed that the scope of the policy extends beyond its mills and plantations to include joint ventures regardless of shareholding and third-party suppliers. Wilmar adopted a strict anti-burning policy in land preparation and development. It did not tolerate the use of fire in the preparation of land or land clearing, and instead promoted the use of a mechanization system in land clearing. To implement its policy, the company took an active role in mitigating the occurrence of forest burning and haze, and applied this rule to its entire supply chain, including its third-party suppliers. The company engaged in supporting community education campaigns and multistakeholder collaborations to entrench sustainable practices throughout the industry.

Considering the adverse impact of fire and haze disasters occurring on peatlands, in October 2012, the company made a strong pledge not to grow oil palm plantations on peatland areas, regardless of the depth, and this has made Wilmar the first company to do so. Where once plantations were built on peatlands, the company worked with expert stakeholders to ensure best management practices were implemented, and effective in stopping the risk of fire.

Wilmar committed to implementing the FFVP program in three estates each in South Sumatra and Central Kalimantan when it joined the FFA in March 2016. The first step Wilmar undertook was to map out the fire-risk areas in and up to 5 km outside of its concession boundaries. Extending the fire risk assessment to areas outside the boundary of the concession enables companies to mitigate the risk of fires from land clearing activities by small farmers. Once the villages with the highest risk of fire incidences were identified, a reward program to encourage the reduction of fire incidences to zero was instituted.

The program was begun immediately in those estates and their surrounding vicinity in the two regions where fire-risk mapping and an assessment had been carried out, followed by a series of socialization sessions with the villagers, in collaboration with local governments, when information was exchanged on the perils of fire and haze to the health of the local people and economy, and on how Wilmar intends to prevent these predicaments through the FFVP. Wilmar has a 24/7 fire monitoring system in place in surrounding concession areas and has a fire-prevention program to minimize the occurrence and impact of fire and haze. Its concessions are equipped with infrastructure and firefighting equipment, and staff in charge of on-site firefighting. Personnel in the field are trained to be alert and ready to respond rapidly and decisively to any fire incidents.

Since the end of 2016, the company has formed an organization structure for a fire brigade, finalizing hot-spot risk mapping across its plantations in South Sumatra and Central Kalimantan, and undertaking socialization sessions across 43 and 22 villages, respectively, and providing the necessary equipment for fire suppression and training to increase the capacity of personnel to tackle and prevent fires.

Sime Darby Plantation (SDP), a subsidiary of the Sime Darby Group, is the world's largest producer of certified sustainable palm oil. SDP's plantation operations span Malaysia, Indonesia, Liberia, Papua New Guinea and the Solomon Islands. Currently, the company has a total land bank of approximately 1 million ha, of which more than 600,000 ha are planted with oil palm, 11,000 ha with rubber, 5000 ha with sugar cane and 9000 ha are grazing pasture for cattle.

Since 1985, SDP has practiced a strict zero-burning policy throughout its operations. It was the first company to commercialize replanting practices without the use of fire and was recognized by the United Nations for Environmental Achievement in 1992. SDP also employs a range of fire mitigation measures in its operations, such as actively managing water tables to reduce the risk of fires and maintaining trained fire response teams. However, fire risks remain in areas where neighboring communities and smallholders use slash-and-burn techniques to plant cash crops, such as corn and coconut. These risks are exacerbated in peatland areas, which are particularly flammable.

To prevent forest fires and haze, SDP directly adopted interventions by establishing the Fire Care Community (MPA) and training local community members to combat fire. SDP also provides firefighting support, and builds canals and fire towers to detect and monitor fires. At the same time, the company increased the amount of firefighting equipment, patrols at the borders of its operations and implements water zoning to maintain water table levels and reduce the risk of fires. It is the company's standard practice to notify local authorities of any fire incidences.

The SDP company initiated a daily fire hot-spot monitoring system in September 2013 and developed a dashboard to monitor fire and haze. It is an around-the-clock monitoring system that utilizes the United States' National Aeronautics and Space Administration (NASA) satellite data for accurate hot-spot detection within the company's operational areas. This serves as an early warning system to notify operational teams of potential fires within plantation estates. As of November 2015, SDP is committed to supporting fire-free zones up to 5 km from the company's concession boundary. To reduce fire risks, the company established a partnership with its subsidiary company PT Bhumireksa Nusa Sejati and University of Riau to work on a pilot program in four villages on preventing fires through sustainable

agriculture practices. The pilot was designed to understand the reasons why people are motivated to use fire in land clearing and to provide alternatives to the use of fire. The successful implementation of this program led in 2016 to extend the partnership with others such as PT Tunggal Mitra Plantation in Riau and to create a new partnership with the University of Lambung Mangkurat in four villages.

IOI (Industrial Oxygen Incorporated Bhd) Group only recently (2017) issued a sustainability palm oil policy and corporate responsibility policy statement. The group is committed to the sustainable management of its oil palm plantations and to the implementation of responsible, global palm oil supply chains. While establishing new plantings, the group is committed to no-deforestation and protection of HCV and HCS areas, no-development of peatlands regardless of depth, and to protecting peatlands through water management and fire prevention. The group will develop and implement a fire prevention and rapid response program, consisting of active measures to prevent fires, in the company's new developments and adjacent lands, and to respond rapidly to any fires if necessary.

IOI strives to be a trusted and responsible corporate citizen through participation in and contributions to the community in which it operates. Key areas of its focus include education, assistance to the deprived, racial/community integration, practical training, and other social and welfare programs.

IOI will bring to the FFA experience in best management practices, which have been the backbone of the organization. IOI recognizes the importance of biodiversity conservation, and strictly adheres to all relevant laws, RSPO and ISCC certification principles, and criteria to protect, conserve and rehabilitate the environment by adopting beneficial practices and incorporating the protection of HCV, HCS and peat areas in its developments. For this to be effective, IOI needs multistakeholder discussions, and FFA provides the best platform to address fire issues, as members will share knowledge and report best practices within FFA and explore potential areas for collaboration.

In 2011, **PT SMART Tbk** (Sinarmas Agro Resources and Technology) published its Forest Conservation Policy (FCP), which committed the group to de-linking palm oil production from deforestation and adopted its Social and Community Engagement Policy to guide and shape its decision-making in its engagement with communities. The group adopted a zero-burning policy in 1997 and made efforts to avoid the use of fire in land preparation or development. These policies also apply to all its subsidiary companies, where the group engaged proactively with suppliers in high-risk areas to help them build capacity in fire management, prevention and suppression. It made sure that all supply chains comply with its zero-burning policy.

The group has put in place a wide range of measures to prevent fires in its plantations as part of Standard Operating Procedures (SOPs) for fire management. It set up a fire command post at the headquarters office in Jakarta to coordinate fire management and suppression, and to train and station more than 3000 emergency response team personnel across its plantations, ready to be deployed in a fire emergency. The group routinely monitors fire outbreaks from monitoring towers; it has set up water reservoirs to ensure an adequate supply of water during a fire, has stationed fire engines at the plantations, and increased the frequency of fire patrols, and involved the community in fire monitoring.

The company invested efforts and resources towards the long-term prevention of fires and adopted a multipronged approach to fire management by focusing on prevention through education. Farmers and communities around the company's concessions are consistently engaged in activities to tackle forest and land fires and help achieve the group's zero-burning policy. To convince small farmers and local communities to stop using traditional methods to prepare land for cultivation, PT SMART Tbk helped local communities to be self-sufficient by offering farmers alternative, sustainable methods of land preparation, which at the same time guarantee food security for their families.

In 2016, 17 villages from West Kalimantan and Jambi took part in the *Desa Siaga Api* pilot program. Villages in the pilot program were provided with training on fire prevention, basic infrastructure and early-warning processes to deal with the risk of fires. The group expanded its collaboration under the *Desa Makmur Peduli Api* program, focusing on three components: fire prevention, forest conservation and food security. There will be greater emphasis on joint community conservation efforts to protect HCV and HCS areas. The participating villages are claimed to have transitioned from being fire-prone to becoming fire-free areas.

In 2012, **APP** published its Sustainability Roadmap Vision 2020, which extends the company's commitments to further improve environmental performance, biodiversity conservation and protection of community rights in its every stage of operation. The company further issued a Forest Conservation Policy (FCP) to accelerate the achievement of its objectives, the most critical one of which is to completely eliminate all natural forest-derived products from its entire supply chain by 2020. APP and its suppliers will only develop areas that are not forested, as identified through independent HCV and HCS assessments, will support the Government of Indonesia (GoI) in achieving its target to reduce GHG emissions, and will resolve social conflicts and respect the rights of indigenous people and local communities. It is also committed to empowering community development programs.

APP has long enforced a no-burning policy for land preparation since 1996. APP's pulpwood suppliers socialize these policies internally and with all outside parties hired to clear land, replant trees, and/or maintain the replanted trees to ensure these policies are adhered to. All parties then sign a contract, which forbids them from using fire to clear land, and ensures they adhere to best practices to avoid accidental fires. To prevent, detect and suppress fires, APP and its pulpwood suppliers have invested heavily in equipment, technology and human resources. They adopted the use of remote sensing technology and conducted aerial patrols with helicopters to detect, control and analyze fire data. They have also built fire lookouts and engaged in partnership with local communities to control and prevent fires. In 2013, APP and its pulpwood suppliers spent more than USD 4 million (excluding capital expenditures) on fire detection and response, infrastructure maintenance and personnel training. APP and its pulpwood suppliers also support fire response efforts outside of the forest concessions.

The company noted that fires are mostly caused by individuals who want to clear land cheaply and quickly for subsistence farming, agriculture or other purposes. Thus, it saw the importance of raising awareness among local communities about fire and engaged local communities in the MPA program. The MPA has been set up in more than 120 villages surrounding the concession areas. MPAs are tasked with conducting fire patrols and assisting with fire suppression.

To further implement its commitments towards reducing fire and improving livelihoods through partnership with local communities, APP launched *Desa Makmur Peduli Api* (DMPA) or Integrated Forestry and Farming System (IFFS) program in December 2015. Together with other members of the Sinar Mas Group, it is committed to providing USD 10 million and targeting 500 villages for the DMPA program by 2020.

APHI, the Indonesian Association of Forest Concessionaires, for instance, claimed to have made a large investment to implement its policies and support the national actions and programs for controlling fires. The forest concessionaires grouped under APHI invested USD 41 million to help suppress and prevent forest and land fires in 2015 and 2016. They also allocated USD 22 for the 2017 fire-control program. The association also claims that around 2700 staff have received international standard certificates for fire brigades, 724 people have been trained on fire prevention and 54 community *Masyarakat Peduli Api* (MPAs) have been established. To help monitor fire occurrence, forest concessionaires have also built 400 fire towers, and invested USD 6 million in fire equipment, USD 2 million/year for operational costs, and another USD 1–2 million to purchase or replace equipment.

Triputra Agro Persada Group (TAP 2018) with areas covering Kalimantan and Jambi Provinces developed the Burning-Free Villages Program (*Program Desa Bebas Kebakaran*). Through multistakeholder processes, TAP encouraged the development of caring for fire-prone MPA communities in neighboring villages in 2016. The program included training, water reservoir (*embung*) construction, fire monitoring and early fire attack methods. TAP was appointed by the Coordinating Ministry of Economic Affairs (CMEA) to pilot fire prevention in collaboration with communities in 2016 (CMEA 2016). The other participants of the piloting scheme were RAPP, APP, SMART Tbk, Asian Agri and The Nature Conservation (TNC) West Kalimantan (Sawit Indonesia 2016).

2.2 Fire prevention and community empowerment in sustainability certification systems

The private sector's initiatives for fire control and prevention and for community empowerment programs are driven by the need of companies to mitigate various risks in doing their business, which may include losing access of their product to market, losing reputation and negative publicity, not complying with laws and regulations, and operational as well as financial risks. Private sector actors are urged to voluntarily meet market requirements as set by certain certification systems such as RSPO, FSC, PEFC and ISCC, and they are required to comply with existing laws and regulations concerning the production of forest and oil palm products as set by ISPO. Annex 3 elaborates the major principles and criteria of different certification systems, particularly those concerned with fire control and prevention measures and community empowerment programs.

3 Environmental and forestry policies

On 23 January 2017, President Joko Widodo made a policy statement during a meeting that brought together relevant ministries amid the country's massive effort to anticipate and prevent forest fires happening in 2017 and beyond. He strongly stressed the need for having the necessary preparedness early on, encouraging communities to take part in preventing fires and making ready a system for fire suppression from the air, enforcing laws and improving governance of forests and lands. He also emphasized the need for coordinating and creating synergy among different ministries, programs and initiatives for fire management and control.

There has been a paradigm shift in the ways that fire prevention measures are now undertaken. Before 2015, measures relied on occurrence, that is, actions were only taken when fire occurred on NOAA, when an existing budget was allocated to fire control, or when reports on the area burnt were received from the regions. This has shifted to prioritizing prevention measures, the participation of communities such as through MPA, the collection of more complete satellite data for early warning and detection systems, early response (long before any crisis happens) and the use of satellite data to calculate burned areas.

3.1 Public policies

There are a variety of people involved with and community movements that are engaged in fire prevention and suppression measures. They include the Ministry of Environment and Forestry's MPA (or *Masyarakat Peduli Api*) or community members concerned with fire control; National Disaster Management Authority (BNPB)'s *Pokmas* or *Kelompok Masyarakat* (community group) and *Tim Reaksi Cepat* (TRC) or fast reaction team; the private sector's *Desa Siaga Api* and other groups, *relawan bencana*; the Ministry of Social Affairs' *Taruna Siaga Bencana* (Tagana); and the Ministry of Home Affairs' *Satlakar* or *Satuan Pelaksana Pemadaman Kebakaran* or *Balakar* or *Barisan Sukarela Pemadam Kebakaran* or Fire Suppression Implementing Unit Brigade.

The Ministry of Environment and Forestry (MOEF) strengthened the village as the basis for implementing its site-level fire prevention and suppression program. Efforts have been made to increase awareness and knowledge among communities of the fires and how to control them, to strengthen local village institutions, to provide villages with the necessary guidance for planning their programs and using the village budget, which was allocated to protect the local ecology, prevent fires and to form relevant taskforces. Village-based prevention measures are undertaken by developing village maps to understand local conditions and to identify fire-prone areas, water sources, accessibility and tenure systems and by establishing village force units or community MPA groups and training and equipping them with the simple tools and plans of activities needed to carry out these measures. In addition, villagers are also trained in making use of the village budget to cover operational costs of activities aimed at controlling forest and land fires. To enable a fast response in the case of fire and to campaign for behavior changes around fire use and its occurrence, existing networks of people and groups at site level are also enabled to facilitate communication and monitoring.

The measures aimed at controlling forest and land fires and the need for communities and people at large to take part in protecting the environment and preventing fires from occurring on land, and in plantations and forests, have generally been regulated through major laws. These laws include those governing: the conservation of natural resources and ecosystems (Law No. 5/1990), forestry (Law No. 41/1999), protection and management of the environment (Law No. 32/2009), prevention and combatting of forest degradation (Law No. 18/2013), plantation (Law No. 39/2014), environmental

degradation and pollution control associated with forest and land fires (Government Regulation No. 4/2001), forest protection (Government Regulation No. 45/2004), measures to manage forest and land fires (Presidential Instruction No. 11/2015) and other ministerial regulations. Law on Plantation No. 39/2014 requires concession holders (Article 56) not to clear land by using fire and to possess the necessary system, means and infrastructure required to control land fires. This has been part of the obligation of the company to preserve the environment (Article 67). The minister's regulation further sets out the forming of groups of farmers concerned with preventing and suppressing fire from happening in their plantations and nearby. The farmers have to be trained in controlling burnt areas and fires.

While it is not clearly focusing on the need to establish community groups, through Government Regulation No. 4/2001, the government requires business entities or those holding utilization or management rights over lands, or businesses whose operations are expected to generate significant adverse impacts on the environment to have the necessary means and infrastructure to prevent forest and land fires, such as early detection systems, equipment, standard operating procedures and organization, and its apparatus and capacity building support. This regulation sets out the mechanisms through which the corporate actors prevent, suppress and restore burned areas. The Environment and Forestry Minister's Regulation No. 32/2016 regarding the control of forest and land fires further governs (Articles 42 and 43) how all holders of forest concessions, either large scale or small scale such as community forestry, village forests, rights forests or a group of farmers are obliged to facilitate the organization of groups of people concerned with fires (*Masyarakat Peduli Api*). One group of MPAs shall consist of two groups comprising 15 members from the residents living in one village. The regulation further sets out the need for the group to have a chair, secretary and head of group, accompanied by necessary means and equipment resources and training.

In 2014, the Director General for Forest Protection and Nature Conservation issued Regulation No. P.2/IV-SET/2014 regarding the establishment and development of MPA. Communities concerned about tackling land and forest fires are given training and empowered to assist in controlling forest fires. To make collective efforts more effective and efficient, the regulation requires that any process for forming of community groups starts with a socialization program in the target village or sub-regency. MPA should consist of those who live around a village or who own cultivated land in a target village that directly borders forests. An MPA commonly consists of two groups of 15 people.

Through another regulation (No. 24/IV-Set/2014) concerning guidelines for reporting and control of forest fires, the Director General for Forest Protection requires the holders of forest utilization permits to prepare monthly and yearly reports on data and information regarding forest fire prevention and suppression measures. The reports should also provide extension to increase people's awareness of fires, to prevent fires and to empower local communities living nearby. The regulation makes sure that the reporting on fires is to be prepared in a coordinated, effective and accountable manner.

The Ministry of Environment and Forestry reported that they have made progress and put forward a plan regarding the formation of forest and fire brigades for a period from 2015 to 2019 based on forest management units (KPHs). One group of fire brigades comprises 15 trained personnel who are well-equipped and provided with the necessary budget. In 2015, 22 groups had been successfully formed. Only 10 groups were formed in 2016, but in 2017, 30 groups were established. The ministry expects to form another five groups in 2018 and five more in 2019. One reason the number of expected brigades is declining is because the budget is no longer available from the Directorate of Sustainable Forest Management. For 2018, fire prevention and suppression will become one of the four national priority programs that also include village development, agrarian reform and acceleration of the development of Papua. There is a need for collaborative actions, and the ministry has set a target for 2018 to launch fire prevention programs in 731 villages across Sumatra and Kalimantan, 50 villages across Java, Sulawesi and Papua, and to establish 300 MPAs.

In the plantation sector, the Minister for Agriculture issued a regulation (No. 47/2014) aimed at providing guidance on measures to prevent and control land fires happening in the sector. The regulation was issued amid concerns about negative impacts of land and plantation fires that occurred particularly from 2009 to 2013. This is despite the fact that different rules and technical guidance for controlling fire, including land clearing without burning or *Pembukaan Lahan Tanpa Bakar* (PLTB), have been issued. The absence of efficient, cheap and environmentally friendly ways of clearing lands as an alternative to burning, and lack of use of waste from plantations have contributed to massive fire occurrence. The Minister for Agriculture then issued this regulation to further provide guidance on an effective and efficient way of controlling fires occurring in land and plantation concessions, to further enforce the implementation of the no-burning policy. Through this regulation, human resources involved in the control of fires are further strengthened. This regulation sets out the establishment of fire brigade organizations at national, provincial and regency levels and the formation of farmer groups concerned with fires, or *Kelompok Tani Peduli Api* (KTPA). It also clarifies the roles and functions of different units responsible for tackling fires, particularly the national-level fire brigade, which is responsible for coordinating and providing necessary guidance and facilitating the adoption of technology, etc. The head of each village is responsible for the KTPA group, comprising 15 to 30 trained farmers. The tasks of the KTPA are assisting to increase awareness of local communities about land clearing without burning, monitoring hotspots, carrying out early suppression of fires and coordinating fire brigades from other ministries.

A grand design for the prevention of forest, plantation and land fires for a period from 2017 to 2019 has been prepared by the National Development and Planning Agency (BAPPENAS), Ministry of Environment and Forestry and other relevant ministries. The grand design does not only aim to reduce significantly fire occurrence based on measurable indicators and to enhance coordination among ministries, but through this grand design, the government also intends to increase participation from the private sector and local communities in a planned and systematic manner. The priority areas include 8 provinces, 66 regencies and 731 villages in Riau, South Sumatra, Jambi, West Kalimantan, East Kalimantan, Central Kalimantan, South Kalimantan and Papua. Relevant programs as specified in the design include providing incentives to those who do not clear and open lands (PLTB), improving the productivity of agricultural crops and providing financial assistance to enable local communities to diversify their livelihoods. The funds allocated to implement all major strategies as put forward in the grand design are estimated at IDR 39.7 trillion, which include financing forest, plantation and land fire prevention, and suppression measures in 731 villages.

To implement the policies, the government is adopting two approaches aimed at preventing forest and land fires as specified in the grand design (BAPPENAS, MOEF). Using site approaches, the government aims to ensure that 2.4 million ha of peatlands where the Peat Restoration Agency operates and 731 fire-prone villages, as identified by the Ministry of Environment and Forestry, are not burned. In addition, the government intends to make the prevention efforts successful by providing necessary economic incentives, enforcing laws, strengthening local community institutions, adopting early fire response systems and by establishing permanent, well-equipped and integrated patrol systems for fire prevention in fire-prone villages. Table 2 shows the number of villages covered by an integrated patrol system across the country.

MOEF has established a volunteering program for local people who are concerned about forest and land fires and who are willing to join in a group called *Masyarakat Peduli Api* (MPA or Fire Care Community), particularly in priority villages prone to forest and land fires. MPA brings together communities concerned about fighting forest and land fires and preventing them from happening. They voluntarily join the group. The ministry reported that they have trained 1980 personnel as *Manggala Agni*, established 37 forest fire stations in 12 fire-prone provinces, and establish 664 groups of *Masyarakat Peduli Api* (MPA) comprising 9936 people in 29 provinces. Throughout 2017, the ministry established MPAs in four locations, namely in Musi Banyuasin, South Sumatra Province; Kutai Regency, East Kalimantan Province; Aceh Besar Regency, Aceh Province; and in East Nusa

Table 2. Number of fire-prone villages and villages covered under an integrated patrol system (MOEF 2017)

Province	Fire-prone villages	Villages with command post (<i>Posko Desa</i>)	Villages covered by integrated patrol system
North Sumatra	30	15	45
Riau	119	65	189
Jambi	70	20	88
South Sumatra	192	50	447
West Kalimantan	66	60	167
Central Kalimantan	263	55	110
South Kalimantan	212	20	67
East Kalimantan	62	15	90
Total	1014	300	1203

Tenggara Province. In addition, it continued to provide advice and development opportunities to other MPAs in other locations such as Bromo Tengger Semeru National Park (East Java), Sintang Regency (West Kalimantan), the buffer zone of Tesso Nilo National Park (Riau), Katingan Regency (Central Kalimantan), and Labuhanbatu Regency (North Sumatra). As of now, it has MPA in 26 provinces consisting of 664 teams in villages that are prone to forest and land fires, both in Sumatra and Kalimantan as well as in Java, Bali, Nusa Tenggara, Sulawesi and Maluku. As of August 2017, the ministry also claimed to have established 300 village command posts (*Posko Desa*) covering 1203 forest and land fire-prone villages across Sumatra and Kalimantan. Tasks are to ensure early detection, socialization, building a site-level network and early suppression.

The ministry's efforts to encourage local communities to actively take part in preventing forest and land fires and to adopt good environmental practices have been made through a nationwide program called *Kampung Iklim* or Climate Village Program or ProKlim. The program was launched in 2012, focusing not only on fire, but also on measures relevant to mitigation and adaptation, such as control of droughts, floods and landslides, increased food security, control of climate-related diseases, handling or anticipating sea level rise, waste management, use of renewable energy, conservation and energy saving and agricultural cultivation. As prescribed in the Regulation of the State Minister for Environment No. 19/2012 regarding the Climate Village Program, the program is intended to increase the awareness of stakeholders about the likely impacts of climate changes, to encourage them to take concrete actions to mitigate and adapt to the changes, and to contribute to reducing GHG emissions. This program is expected to improve the capacities of different institutions such as local government and village institutions and brings about leadership commitments to reducing problems associated with climate change.

Through the implementation of ProKlim, the government rewards communities in certain locations that have been implementing climate change adaptation and mitigation efforts in a sustainable way. ProKlim can be developed and implemented at the level of the hamlet, harmonious citizen group (or RW) or village. Thirty villages under the guidance of Program Desa Peduli Api have been registered as part of the ministry's Climate Village Program. Annex 4 highlights forestry and environmental policies related to DMPA.

3.2 Cluster-based forest and land fire prevention program

A cluster-based forest and land fire prevention measures approach has been integrated in the current government's action to tackle forest and land fires. The government's desire to change its paradigm from suppression to prevention has been one of the reasons behind this new approach, considering that huge amounts of finance had been invested to suppress forest and land fires. The government finds it necessary to mobilize its available resources to different parties. Through this approach, plantation and forestry companies are given a more active role in disaster prevention. Companies are obliged to assist villages in their development. Any concession holders having the largest area of concession will become the lead in particular clusters under this program. Based on the program, villages are classified into three categories depending on their distance from the outer boundary of the concessions:

- Ring-1: villages inside the concession area or that directly border the forest as well as plantation concessions
- Ring-2: villages that indirectly border the concession area and that are located within a radius of 3 km from the concession boundary
- Ring-3: villages that indirectly border the concession area and that are located within a radius of 3 to 5 km from the concession boundary.

The concession holders are responsible for implementing the program and financing all relevant activities carried out in villages within their concession and those located within the radius of 3 km from their outer boundary of their concessions. The lead company will be responsible for coordinating all the development programs in all villages categorized under Ring-3.

Currently, 23 clusters are being set up across Sumatra, namely 10 clusters in Riau, 4 in Jambi and 8 in South Sumatra provinces. The government is now working to develop a regulation that will strengthen the enforcement of cluster-based forest and land fire prevention programs. In order to ensure the smooth implementation of the program, a cluster organization and standard operating procedure for operation including procurement of prevention and suppression equipment will also be developed.

3.3 Financing community-based forest and land fire prevention programs

To support village-based initiatives to prevent forest and land fires, the government is exploring the development of a variety of financing instruments, in addition to the traditional sources of finance from national and local budgets and the private sector. One possibility is to source finance from the remaining budget of a shared budget deriving from reforestation funds. Other sources include different mechanisms as specified in Government Regulation No. 46/2017 concerning environmental economic instruments.

To support the above program, the Coordinating Ministry of Economic Affairs (CMEA), National Development Planning Agency (BAPPENAS), Ministry of Environment and Forestry and the Ministry of Finance will establish a new funding source, namely the Sustainable Landscape Management Multi Donor Trust Fund (SLM-MDTF), in collaboration with the World Bank, Norway and Australia.

4 Agricultural policies

4.1 Policy, planning and program

Based on Presidential Instruction No. 16 of 2011 and No. 11 of 2015, the Ministry of Agriculture is mandated to develop guidelines for controlling fire in agricultural lands, improve the performance of civil service auditors/investigators to enforce punishments that deter perpetrators of fire-use land clearing in agricultural lands, increase the quantity and quality of human resources, and facilitate the application of agricultural technology that can improve efforts to control fires in agricultural lands.

After land and forest fires raged in 2015, the practice of burning up to 2 ha of land by local people as specified in Article 69 of Law No. 32 of 2009 regarding the Protection and Management of Environment was prohibited. This is despite that fact that indigenous and local people have long practiced such a burning tradition, relying on their local wisdom. The instruction to prohibit the practice is based on concerns that the use of fire become uncontrolled (Arumingtyas 2017). Some policy plans and government programs were synchronized to aid in preventing recurrent fires.

In early 2017, President Joko Widodo instructed the Ministry of Agriculture to take measures to prevent forest fires by implementing and enforcing specific articles on the prohibition of burning when opening land as specified in Law No. 39 of 2014 regarding plantations. He said, “Every plantation businessman must maintain the preservation of environmental function and prevent this damage” (Ditjen PPI 2017). As indicated in the Regulation of the Minister of Environment and Forestry No. P.32/MenLHK/Setjen/Kum.1/3/2016 regarding forest and land fire prevention, the Ministry of Agriculture is cited as one of the key ministries charged with controlling fires occurring in plantation areas. Other important policies related to this ministry are Law No. 39 of 2014 regarding plantations and the Agriculture Ministry’s Regulation No. 98/Permentan/OT.140/9/2013 on plantation business permit guidelines. To implement those policies, the Minister of Agriculture is then instructed to build a working group (fire brigade) and develop guidelines for implementation action. In 2014, the minister issued the Regulation of Agriculture Ministry No. 47/Permentan/OT.140/4/2014 setting out the development of land plantation fire control brigades and guidance, which provide the basis for effective and efficient implementation of forest control. The ministry’s development plan for 2015–2019 realized that farmer groups are essential in the success of fire prevention around plantation concession areas. The programs in the development plan include providing information about making preparations for land and plantation fire prevention, anticipating impacts of climate change, strengthening business capital, building networking and providing capital assistance for farmer groups and field instructors (facilitators). Furthermore, several programs that will be developed involve an agricultural facilitators system, human resource revitalization, training system and management and technical support for institutions and facilitators.

4.2 Implementation

Funding required to support fire disaster management can be used in two main ways: a site-based approach requiring about IDR 19.1 trillion and a non-site-based approach requiring about IDR 19.9 trillion (BAPPENAS 2017). Plantation division have funded to protected support activities in the area, it is from the APBN of De-concentration and Co-administration fund by DG. Plantation.

Specific funding totaling IDR 22.750 billion in 2017 was allocated for post-fire prevention, suppression and recovery; these were explicitly mentioned among preparedness of land and plantation fire prevention, anticipation of climate change impact and technical support for the facilitation of plantation protection.

According to Presidential Instruction No. 11 of 2015, the Agriculture Minister is mandated to establish fire control units by forming brigades and mobilizing resources to implement prevention and mitigation measures within the circle of the Agriculture Ministry. As defined in the regulation, brigades refer to work units located in the jurisdictions of central, provincial and regency/municipal governments and are tasked with implementing land and plantation fire control. Farmer groups concerned with fire refer to several planters who have been trained in fire control of land and plantations established by authorized officials. Civil service investigators are certain civil servants whose scope of duties and responsibilities are in the field of plantations and who are given special authority as investigators. The ministry issued technical guidance aimed at anticipating and preventing climate change impacts while strengthening community capacity in the involvement of fire prevention.

One of the targets to be achieved in plantation development is climate change impact anticipation. Activities are intended to facilitate fire prevention and manage climate change impacts in 21 provinces, including the management of droughts, in order to contribute to a 10% decrease in hot spots per year, to bring about drought risk reduction and to support increased production, productivity and the quality of sustainable plantation crops. Sociological and cultural approaches to the local community are very important, considering that one cause of forest and land fires is human behavior in forest/land management.

A decline in the extent of forest and land fires (*Karhutla*), which originally reached 2.6 million ha in 2015 has been achieved, with a fall to 0.12 million ha in 2017 (down by 99.44%). In addition, the distribution of hot spots is down from 21,933 points in 2015 to 1659 points in 2017 (down by 92.4%). An Agriculture Ministry program designed to anticipate the impact of climate change, from a budget ceiling of IDR 5.398 billion has spent IDR 4.892 billion (90.63%) and preparedness of land and garden fire prevention from the ceiling of IDR 4.819 billion has realized IDR 4.309 billion (89.92%) with physical achievement of 100% in 2016 (Ditjen PPI 2017).

The habit of opening the land with fire means that alternative solutions must be found. However, technology that is cheap and easy to use by the community to clear the land is still scarce. In addition, land conflicts should be resolved immediately so that fire is no longer used when claiming land ownership, through an attempt to overcome the conflict of interest. In other cases, because the Agriculture Ministry's planning program (general plantation) gives limited support to fire control, it is necessary to convey the seriousness of the national policy in every role of the technical ministry to support the prevention of land and garden fires.

Human resources supporting fire control programs within the Ministry of Agriculture are still inadequate. Even human resources (facilitators of farmer groups) in agriculture are very limited. In addition, in practice, there is always budget uncertainty in every program so that funding levels are always changing, which limits the capacity-building resources of farmer groups with concerns about fire. Intensive strengthening of technology, materials and knowledge would lead to good governance.

5 Village policies

According to Law No. 6/2014, each village has an obligation to maintain its environment and to support a situation that is safe and comfortable. Each village makes development plans according to its authority and in line with regency or city development plans. Village funds (*dana desa*) are mostly for infrastructure, and only a small fraction of it is to be used for community and economic development at the village level. The use of village funding has to consider and is used according to village typology, formulated based on the developmental progress made by the village. For extraordinary occurrences such as fire, the village fund can be used for infrastructure development to prevent forest and land fires as well as for training or capacity building for farmers and fishermen. Annex 5 shows village-related fire-prevention policies from the Ministry of Villages, Underdeveloped Regions and Transmigration.

6 Agrarian and spatial planning policies

6.1 Public policies

According to Presidential Instruction No. 11 of 2015, the Ministry of Agrarian and Spatial Planning (MASP) is instructed to prevent fire occurrence by identifying community ownership and utilization of peatland, and checking whether they comply with stipulated directions in the spatial plans. This is in line with MASP's tasks and authority to conduct governmental affairs in the division of agrarian/land and spatial planning to assist the President in organizing state government, as stated in Presidential Regulation No. 17 of 2015. To implement its commitment to prevent fire and to anticipate the recurrence of land, forest and plantation fires, this ministry prepares strict rules and sets certain conditions to ensure that use business rights (HGU) granted to plantation investors are exercised in accordance with the intended purpose. The ministry would take the following measures to:

- revoke the business rights if the holders fail to adopt no-burning land management practices, maintain water resources and peat moisture levels
- stop the entire process of the permit holder (HGU) if the land burns
- accelerate regional spatial planning integrated with national planning
- accelerate the completion of land certification through a national agrarian program (*Program Nasional Agraria – PRONA*).

Policies and regulations relevant to support forest fire prevention programs, land and plantations can be found in Annex 6.

6.2 Implementation

Preventive measures that can be taken to reduce the occurrence of fire are controlled through new location permits and RTRW, and the monitoring of plantation areas is assessed through compliance with permits to do with forest/land processing in the form of permit HTI/HPH. The Ministry of Agrarian and Spatial Planning (MASP) does not state explicitly how to support the prevention of fires at the community level. MASP shows a lot of involvement in terms of the suitability of land allocation for the welfare of the community such as through the PRONA and *Tanah Objek Reforma Agraria* (TORA) programs. The priority programs of MASP involve acceleration of land procurement, agrarian reform implementation, acceleration of legal assets, settlement of land disputes and improved spatial plans.

This funding framework has not yet considered the plan of having a land bank, with funding of IDR 50.7 trillion over five years. All the funding is from the state budget. Details about the activities program on strategic planning for 2015–2019 is shown in Table 3.

Acceleration of the completion of land tenure in forest areas requires a lot of resources, a process that is led by the Coordinating Ministry for Economic Affairs and aided by some technical ministries (MOEF, National Land Agency (*Badan Pertanahan Nasional – BPN*), MPWH and Ministry of Home Affairs – MOHA or Kemendagri). The TORA acceleration program of MASP has a team of task forces that oversees the Inventory of Land Tenure, Ownership, Land Use and Utilization (*Inventarisasi Penguasaan, Pemilikan, Penggunaan dan Pemanfaatan Tanah – IP4T*).

Three important stages in fire control efforts that are undertaken by the Agrarian and Spatial Planning Ministry (MASP) are: (1) giving advice about technical considerations regarding land, (2) granting of HGU licenses, and (3) overseeing policy about arranging RTRW. A target of 600,000 ha exists for

Table 3. Funding for Ministry of Agrarian and Spatial Planning (MASP).

No.	Program	Allocation 2015–2019 (in million IDR)
1	Supporting management and technical implementation from other ministries	19,702,709
2	Improving equipment of MASP officers	5,355,466
3	Supervision and improving accountability of MASP officers	86,933
4	Spatial planning and usage	4,768,269
5	Development of infrastructure for agrarian items	2,623,590
6	Structuring of agrarian laws	11,325,193
7	Agrarian settlements (<i>Penataan agraria</i>)	1,309,105
8	Land procurement	423,849
9	Controlling spatial use and land entitlement	3,215,046
10	Resolving agrarian and spatial problems	1,778,890
Total		50,683,474

the land certification plan, of which only 32,820 ha (5.4%) has been realized; a target of 3,900,000 ha exists for asset legalization, of which 1,189,349 ha (30.49%) has been realized; 4.1 million ha for forest release, of which 707,346 ha (17.25%) has been realized; and 400,000 ha for the land redistribution program, of which 189,958 ha (46.49%) has been realized.

One of the challenges in land acquisition is inequality of land ownership. Inequality can be seen within the land ownership and tenure scheme, where 30% of Indonesia's land is privately owned and has the following composition: 10% is controlled by private legal entities, 16% by individuals and only 4% by smallholders/farmers. Further, based on strategic planning in 2010–2014, implementation of the spatial arrangements still faces various obstacles, including the fact that spatial arrangements have still not been completed, that their implementation is still not effective, that their implementation is still not optimal, and that the management of the spatial arrangements is still weak.

7 Peatland policies and programs

7.1 Peatland restoration

The new Peatland Restoration Agency (BRG) established by Indonesian President Joko Widodo presents a major opportunity to reduce fires on peatland. BRG aims to restore 2.49 million ha of peatland in five years (2016–2021) in seven provinces including Riau, South Sumatra and Central Kalimantan. BRG has four types of restoration priorities, i.e. post-2015 fire peat restoration, degraded peatland with canals in protection forest, degraded peatland without canals in protection forest and degraded peatland in cultivation areas (oil palm and wood plantations).

The government has issued Government Regulation (PP) No. 57/2016 for peatland management and conservation, and it provides pros and cons from various stakeholders. Subsequent regulations were issued by the Ministry of Environment and Forestry (MOEF) as decrees Nos. 14, 15, 16 and 17 to operationalize PP 57/2016. Some governmental institutions such as the Ministry of Industry (MOI), the West Kalimantan and Riau Governments, the Indonesian labor union (SPSI) and business associations expressed their disagreement with PP 57. On the other hand, environmental NGOs/CSOs strongly support PP 57. Freezing of the operational permit of Riau Andalan Pulp and Paper (RAPP) provides an example of the will of MOEF to implement PP 57, particularly MOEF's Ministerial Regulation (PermenLHK) No. 17/2017. All these entities have interests that need to be heard and understood. Power contestation among them is happening.

Contestation is also happening on the ground. For example, APP announced that it will retire several of its active plantations and restore them back to native peatland species and has a program called *Desa Makmur Peduli Api*. APRIL has implemented a program called *Desa Bebas Api*. A village-level community initiative through *Masyarakat Peduli Api*, BRG's *Masyarakat Peduli Gambut*, the Ministry of Agriculture (MOA)'s *Kelompok Tani Peduli Api* and various project initiatives on the ground are shaping the future directions of fire prevention and peatland restoration.

Peatland actors have social, environmental and economic interests that drive them to influence both law formulation and implementation. They have power to influence policy and decision-making processes in various arenas at national, provincial and regency levels. Their power is manifested in their capacities to provide economic incentive, coercion and dominant information (Krott 2014). Their power does not lie only with the individual but also with their networks through economic, social and political connection (Varkkey 2016; Purnomo et al. 2017). Therefore, understanding individual interests, power and power contestation among peatland restoration actors that influence how peatland is restored is key to ensure that restoration is governed to achieve its environmental, social and economic goals.

The governments, led by BRG, develop peatland maps and review existing restoration programs. They then come to an agreement on those who are responsible for restoration and develop necessary agreement with them. The execution of restoration is then led by concession holders, local communities, NGOs, provincial governments and technical operational units of the government.

BRG has targeted 2.49 million ha of peatland restoration in 2020 in seven provinces (Table 4). The Riau target is the largest one, followed by those of Central Kalimantan and South Sumatra. Among seven provinces, BRG prioritizes the Regency of Ogan Komering Ilir (OKI), Musi Banyuasin (MUBA), Kepulauan Meranti and Pulau Pisau. APP's IFFS program is located in Riau, South Sumatra and West Kalimantan. IFFS can build synergy with BRG on the ground, particularly in South Sumatra, where the majority of APP-related plantations are located.

Table 4. BRG's restoration targets (Foad, 2017).

Province	Post-Burn Incident in 2015		Peat Dome with Canals		Shallow Peat with Canals		Target in Protected Areas	Target in Community-Managed Land	Target in Concessions	Total
	Production Areas – Licensed	Production Areas – Non-Licensed	Production Areas	Protection Areas	Protection Areas	Protection Areas				
				(Conservation areas and protected forests)		(Conservation areas and protected forests)				
Riau	38,884	63,535	2,008	9,913	31,890	707,386	43,811	63,535	814,732	
Jambi	19,245	26,008	19,642	2,738	3,500	99,775	25,880	26,008	151,663	
South Sumatra	172,290	76,797	41,277	10,427	9,543	477,863	61,247	76,797	615,907	
West Kalimantan	1,769	27,239	2,850	4,801	20,667	64,077	28,318	27,239	119,634	
Central Kalimantan	16,057	162,951	155,899	173,577	190,837	29,811	520,313	162,951	713,076	
South Kalimantan	1,586	11,153				27,608	0	11,153	38,761	
Papua	4,144	29,262	4,659		409	4,422	5,068	29,262	38,753	
Total	253,975	396,945	226,335	201,457	256,846	1,410,943	684,638	396,945	2,492,527	

7.2 Caring for Peatland Villages (*Desa Peduli Gambut*)

BRG implemented three steps of peatland restoration namely rewetting, re-vegetation and revitalization. Rewetting is carried out with canal blocking, deep wells and reservoirs. Revegetation is conducted by developing nursery and then replant seedlings in peatland. Lastly, to revitalize community livelihoods by supporting the transition of community to new way of life, village economic development and trainings.

BRG is developing the program Caring for Peatland Villages (*Desa Peduli Gambut* – DPG). DPG is an intervention program for development villages within and surrounding peat hydrological units (*Kawasan Hidrologis Gambut* – KHG), which have been targeted by BRG. DPG is not a standalone program, but coordinates and facilitates village development programs in priority areas. It is difficult to measure the impact and implementation of various existing village restoration programs. DPG is a program framework to align all activities concerning peat and measures the contribution of various programs to peatland restoration at the village level. DPG uses peat ecosystem landscapes in its development (Syafitri 2016).

Steps to realize DPG are: (a) identifying villages and mapping their social and economic factors; (b) undertaking conflict resolution between villages, between villages and corporations, etc.; (c) developing village areas, i.e. Free, Prior and Informed Consent (FPIC) and village agreements, spatial planning, boundary gazettes, peatland management plans, legalization of village areas, integration to spatial plans at higher levels; (d) legalizing rights and access, i.e. social forestry and agrarian reform; (e) overseeing restoration construction; (f) overseeing the development of village institutions; (g) undertaking capacity building and economic development; and (h) overseeing monitoring and evaluation.

In the seven provinces, there is a total of 2945 villages in peatland areas. Of these, there are 731 villages that are fire prone. The DPG program targets 57 villages in each of seven provinces; therefore, around 300 villages will be targeted up to 2020, or 60 villages/year. Donors are expected to contribute funds sufficient to target 40–100 villages. The government budget was expected to finance 60 villages/year. Annex 7 shows restoration maps for Riau, South Sumatra and West Kalimantan Provinces (BRG 2016a).

8 Public works policies for fire prevention

8.1 Public policies

The Ministry of Public Works and Housing (MPWH or *Pekerjaan Umum dan Perumahan Rakyat MPWH*) plays a role in water management regulation. In 2015, the Constitutional Court declared that Law No. 7 of 2004 on Water Resources contradicts the 1945 Basic Constitution (UUD 1945) and the law has thus no binding legal force. As a result, all implementing regulations of Law No. 7 of 2004 become invalid because it has lost its legal basis. To avoid a legal vacuum, the Constitutional Court reinstated Law No. 11 of 1974 on Irrigation. Other relevant government measures include Government Regulation No. 22/1982 on Water regulation management, No. 27 of 1991 on Swamps and No. 71 of 2014 on Protection and management of peatland ecosystems.

MPWH's Regulation No. 29/2015 on swamps sets out definitions about swamps, different types of swamps and how they shall be managed. It also provides guidelines for development of information systems for swamps and the issuance of licensing and how the issued licenses are supervised by authoritative agencies, and how communities shall be empowered to take part in managing swamps properly and making sure that all decisions on the use and management of swamps are based on transparent and appropriate management. According to regulations issued by MPWH, peatlands are part of the swamp areas. Swamp is defined as an ecosystem, in which the area of land is permanently or seasonally inundated, formed naturally on relatively flat or concave land with mineral or peat sediment, and covered by vegetation. The swamps consist of tidal swamps and *lebak* swamps that can physically be unspoiled swamp or developed swamp. Swamps can have a protection function and a cultivation function.

Swamp management involves swamp conservation, swamp development, and control of water's destructive power. Swamp management is carried out based on water resources management plans in specified river areas. In the case of swamps, peat is found in or outside forest areas, and swamp management is arranged and established after coordinating with the agency that organizes government affairs in the sector of environmental protection and management and/or the agency that organizes government affairs in the forestry sector. The management of swamps associated with this program comes under the water management arrangement. The water management arrangement is a water management system and its physical infrastructure is designed to support cultivation activities, to avoid uncontrolled drainage, to prevent peat fires, to minimize greenhouse gas emissions, and to reduce the level of acidity of the water. Construction of infrastructure that functions as a water reservoir is one of the efforts undertaken to maintain the availability of swamp water or its water quality to suit its function and its benefits.

The development of swamps based on water resources is implemented through water management arrangements for agricultural and non-agricultural activities. Swamp development is carried out by the central government, provincial government, regency government, business sectors and local communities. Swamp developers are required to provide water management infrastructure in accordance with their utilization requirements (technical planning and construction implementation), as well as to carry out the operation, maintenance and rehabilitation of the infrastructure. Development of swamp for agricultural activities is carried out with the development and management of swamp irrigation systems. A swamp irrigation system is a unit of swamp irrigation management consisting of irrigation network infrastructure, water in the irrigation network, irrigation management, an irrigation institution, and human resources.

Table 5. Budget for water governance

No	Activity	Budget (IDR million)					Total
		2015	2016	2017	2018	2019	
1	Development of surface, swamp, and pond irrigation	172,112.53	121,010.65	147,672.57	158,009.65	169,070.32	767,875.70
2	Management of dams, ponds and other water reservoirs	5,640,262.09	13,026,818.41	20,332,389.95	21,615,963.95	22,926,667.31	83,542,101.71
3	Construction and rehabilitation of surface, swamps, and pond irrigation networks	8,458,828.13	18,164,933.24	19,468,431.57	19,318,511.28	15,336,156.38	80,746,860.61

Swamp information systems include information on swamps, infrastructure and facilities, and institutions. Implementation of this system is carried out in several stages, namely the stages of planning, implementation, operation, maintenance and evaluation. Activities on swamps, such as swamp development, need a permit. The permits for swamp development include the principal permit, the construction permit for water management infrastructure, and the utilization permit for the infrastructure. In the case of swamp development within a forest area, a permit of forest area utilization is required.

In the strategic plan of the MPWH for 2015–2019, the activity budget given to the Directorate General of Water Resources Management is IDR 316 trillion. The details for each year are: IDR 31 trillion in 2015, IDR 63 trillion in 2016, IDR 72 trillion in 2017, IDR 76 trillion in 2018 and IDR 76 trillion in 2019. The budgets related to water governance, particularly in the swamp areas, are divided into several activities as shown in Table 5.

In October 2015, the President instructed ministries and agencies to improve the control of forest and land fires. The instructions, especially to the MPWH, are to mobilize the infrastructure for the addressing of forest and land fires in accordance with the specified standards, to assist relevant agencies in the addressing of fire, and to build the necessary infrastructure related to the prevention and control of fire.

8.2 Implementation

The MPWH was involved in coordination meetings between various ministries and agencies in March 2016 about conducting peat restoration in order to improve the prevention of forest and land fires. The MPWH revealed that Indonesia has 33.4 million ha of swampland, of which 20.2 million ha of are peat swamps. The MPWH is committed to assisting the Peatland Restoration Agency (BRG) in carrying out its mandate in accordance with Presidential Regulation (Perpres) No. 1 of 2016. The MPWH, through its minister, states that the ministry will assist in terms of the procurement of goods and services, and will prioritize physical implementation because it has the ability to reach remote areas.

In 2016, the MPWH together with the Geospatial Information Agency (BIG) has coordinated the drafting of swamp maps in accordance with Law No. 4 of 2011 on Geospatial information, and Ministerial Regulation of MPWH No. 29/PRT/M/2015 on Swamps. The MPWH also provides data and maps for making an indicative map of peat restoration by BRG (BRG 2016b). The determination of swamp type is needed to classify swamps as to whether they have protection functions or cultivation functions. In addition, the MPWH also encourages local governments and land management companies to establish a canal block in their area that serves as a water arrangement and a long-term solution in anticipating forest and land fires during the dry season.

Since early 2017, the MPWH has coordinated with the BRG in the physical construction of canals to help restore hydrological functions in peatlands. BRG, the MPWH, the Ministry of Environment and Forestry, and other stakeholders are targeting the construction of 5600 units of canal blocks and 11,000 units of drilled wells in peatlands by 2017. This figure does not include the number of canal blocks that must be built by stakeholder companies. The MPWH will build a canal block in an area of 140,000 ha in restored peatland, the source of funds for which is the MPWH budget (Napitupulu 2016). The MPWH assists the physical implementation of peat restoration in seven priority areas, consisting of Riau, Jambi, South Sumatra, West Kalimantan, Central Kalimantan, South Kalimantan and Papua. Currently, Office of River Area or *Balai Wilayah Sungai* (BWS-MPWH)'s technical assistance is available in six of these regions, but not yet in Papua. The physical construction process in Papua will begin in 2018 (Adventa 2017).

MPWH and the Peatland Restoration Agency (BRG) entered into a Memorandum of Understanding (MoU) in September 2017 to accelerate the recovery process of peat hydrological functions, which were degraded by forest and land fires in 2015. This MoU is prioritized to facilitate physical work, so that the BWS can support peat restoration by procuring goods and services, etc. Five points were agreed upon by the MPWH and BRG, namely (a) coordination and synchronization of the location determination of peat restoration details; (b) exchange of data and information; (c) planning of peat restoration; (d) implementation of peat restoration construction; and (e) monitoring and evaluation.

MPWH and BRG also signed a cooperation agreement between the five working groups (*Pokja*) with five heads of BWS in Kalimantan and Sumatra, namely Head of BWS Sumatra VIII, Head of BWS Sumatra III, Head of BWS Sumatra VI, Head of BWS Kalimantan I and Head of BWS Kalimantan II. These BWS groups will cooperate with BRG to provide technical assistance, oversight and supervision. The focus of the MPWH is to work on rewetting by building the canal blocks and revitalizing old canals. The re-vegetation will be done after the peatland is wet and fertile. MPWH and the BRG have coordinated the construction of canal blocks to restore hydrological functions in peatlands since 2017. Recorded throughout 2017, BRG has constructed 5900 boreholes, 1849 canal blocks, and 110 canal hoarding points; the total area affected by wetting is 103,476 ha. Meanwhile, the partners did the same thing with the total wetting area, reaching 98,978 ha.

9 Social policies

9.1 Public policies

Law No. 24 of 2007 on Disaster Management and Law No. 11 of 2009 on Social Welfare mandate the Ministry of Social Affairs to provide social protection for natural disaster victims. Article 1 (9) of Law No. 11/2009 explains that social protection means that all efforts are directed towards preventing and dealing with the risks of social shocks and vulnerabilities as a result of social crises, or economic, political, disaster and natural phenomena. The Ministry of Social Affairs issued a regulation on Disaster Alertness Kampong (KSB) through PermenSOS RI No. 128 of 2011 to protect communities from threats of disaster through community-based disaster management activities and the utilization of natural and human resources in the local environment. Then, PermenSOS No. 28 of 2012 on TAGANA aims to increase community participation in disaster management both before, during and after any such occurrence.

In 2012, the Social Affairs Minister also published PermenSOS RI No. 08/2012 on General Guidelines for Cadet Disaster Alertness for data collection about and management of People with Social Welfare Problems (*Penyandang Masalah Kesejahteraan Sosial – PMKS*) and Resources for Social Welfare (*Potensi dan Sumber Kesejahteraan Sosial – PSKS*); it is used as the basis for implementation of social welfare, which includes: a) social rehabilitation; b) social security; c) social empowerment; d) social rules; and e) poverty alleviation. PMKS are individuals, families, groups and/or communities who, because of a hindrance, difficulty or disruption, are unable to perform their social function, so that they cannot fulfill their physical, spiritual, or social needs regularly and in a reasonable manner. Business sectors involving organizations engaged in business, industries or goods and services products, state-owned enterprises (BUMN), regional state-owned enterprises (BUMD) and/or entrepreneurs can network to participate in the implementation of social welfare as a form of social responsibility.

Fire disaster, smog and Presidential Instruction No. 11 of 2015 gained significant momentum in the effort to overcome disasters involving forest and land fires. The Minister of Social Affairs is one of the ministers who is mandated to take policy and assistance measures to overcome social problems arising from forest and land fires, such as refugee assistance, funerals, trauma healing and trauma counseling. The Ministry of Social Affairs is responsible for a) developing plans and activities for handling social problems caused by disasters, b) preparing plans and making provision for financing operational activities for the prevention of social problems caused by disasters, c) making provision for social workers for disaster management operations in pre-disaster, disaster and post-disaster situations, d) making provision for food, clothing and equipment supplies and temporary shelters for disaster victims and e) monitoring and evaluating social assistance activities. To implementation activities, the Secretary General in each ministry acts as coordinator of disaster management.

9.2 Implementation

One effort the Ministry of Social Affairs is making is to tackle disaster by forming Disaster Alertness Kampongs (KSBs). The Ministry of Social Affairs aims to form approximately 1000 KSBs in disaster-prone areas at regency level by 2019. The government allocates IDR 107 million per village, including a training fund and KSB stabilization. KSBs are needed as an effort to minimize number of victims in case of disaster. Cooperation between government and community is needed in forming the KSBs. KSBs can be synergized with affected villages that join BNPB programs.

The KSB scheme reflects government policy in community-based disaster management, and also directly facilitates the formation of KSB institutions, providing community understanding and awareness about establishing networking and strengthening social interactions among villagers, organizing, ensuring sustainability, and optimizing potential and resources. Through the KSB program, various interventions by government can be undertaken.

To reduce the hardships of poor and vulnerable people, measures were implemented to attain social protection in the context of fulfilling basic needs, reducing the burdens of life (life risks), improving the quality of life of poor and vulnerable people, through the Family Hope Program (PKH), Joint Enterprise Group (KUB), and through the empowerment of Very Poor Families (KSM) in urban and rural areas, neglected elderly Social Services (PSLUT), Social Rehabilitation of Persons with Disabilities (RSPD), Child Social Protection Program (PPSA) and Poor Rice Assistance (Raskin) (MOS 2015). All of these programs/activities are part of a national priority program as mandated by Presidential Instruction No. 3 of 2010 on Fair Development Program; First and Second Dictum. KUB is a priority activity of the Ministry of Social Affairs, which is integrated in the framework of reducing the hardships of the poor and vulnerable in rural and urban areas.

The Ministry of Social Affairs organizes the TAGANA Jamboree every year to improve preparedness, to renew the skills, knowledge and competence of all personnel, to adapt to rapid natural changes and to create the latest national disaster management system. Revitalization results in 2016 show that TAGANA members numbered 35,504 personnel spread throughout provinces and cities across Indonesia (MOSA 2017).

A budget allocation ceiling for ministries/institutions for 2018 has been set by the Minister of Finance. Accordingly, through the Minister of Finance's document No. S-863/MK.02/2017, the Ministry of Social Affairs received a budget allocation of IDR 41.3 trillion. The Social Protection and Social Security Program gets a budget allocation of IDR 17.7 trillion, in accordance with the general policy of the central government in 2018 to support implementation of various development programs and targets according to Government Work Plan (RKP) 2018.

An indication of the priority expenditure needed to achieve the goals of the Ministry of Social Affairs for the strategic period 2015–2019 under national long-term plan (*Rencana Pembangunan Jangka Menengah Nasional – RPJMN*) funding, including quick wins/follow-up programs as well as duties and functions of the Ministry of Social Affairs is planned at IDR 61,676.9 trillion from APBN (Table 6). For 2015–2019, the Ministry of Social Affairs will get additional APBN-P funds from originally budgeted IDR 8.079 trillion to increase to IDR 22.421 trillion (MOSA 2015).

Table 6. The total budget allocation of the Ministry of Social Affairs 2015–2019.

No.	Program	Proposed budget allocation 2015–2019 (IDR billion)	Allocated budget 2015–2019 (IDR billion)
1	Supporting management and technical works	1,429.18	532.80
2	Social rehabilitation	7,098.30	4,847.80
3	Capacity building of community	7,655.96	5,271.30
4	Supporting poor people	60,483.35	49,737.30
5	Social protection and security		
6	Surveillance	170.63	170.63
7	Education, research and extension	5,486.27	1,220.90
	Total	82,323.069	61,676.90

Because of the limited capacity of the government, individuals, civilians and members of the business sector have the greatest opportunity to participate in the social welfare through full participatory stages, as support, or as a complement. The Secretary General of the Indonesian Society for Disaster Management (MPBI) said that most people have still not received information about disaster management as specified in the regulations. This makes it difficult for communities to monitor the government's performance in tackling disasters. Disaster management in Indonesia is still often weak because it has not been strongly institutionalized, especially involving community. State agencies serving disaster mitigation are considered inadequate to play a maximum role, especially in the case of disaster risk reduction.

10 Disaster management policies

10.1 Public policy

Based on Indonesia's Disaster Data and Information, the intensity of disaster events is likely to continue to increase. In 2011, about 91% of disaster occurrences in Indonesia were hydrometeorological disasters, where floods, droughts, tornadoes and landslides are still the most common. The main factor causing the rise of hydrometeorological disasters is a result of global climate change and environmental degradation caused by humans (anthropogenic). Population growth and uncontrolled spatial use, urbanization and poverty are also suspected to be other factors leading to increased threats and risks of hydrometeorological disasters. Experience has proved and has become a lesson for us all, that dry weather conditions can increase the risk of forest and land fires resulting in smoke disasters.

The haze crisis created by forest fires in Indonesia is an annual occurrence, but in 2015 it was worse because El Niño delayed the rainy season and caused drought in many areas. Humans are the main cause of forest and land fires that occur annually in Sumatra and Kalimantan (BNPB 2015).

The legal framework for disaster mitigation and risk reduction is Law No. 24/2007 on Disaster Management. It sets out principles and goals of coping with disasters, and lists the respective responsibilities of various institutions (both public at various levels and private sector), civil society and international organizations, among others, for handling and managing disasters and for mobilizing financial resources. Other relevant regulations include Government Regulation No. 21/2008 on Disaster Management Implementation, Government Regulation No. 22/2008 on Funding and Management of Disaster Relief, and Government Regulation No. 23/2008 on the Participation of International Institutions and Non-Government Organizations in Disaster Management (BAPPENAS 2017). In addition, the President issued regulation No. 8/2008 to lay a basis for establishing the National Disaster Management Agency (BNPB). BNPB assumes the task of coordinating the implementation of disaster management activities in a planned, integrated and comprehensive manner. In 2011, the President further issued an instruction (Inpres No. 16/2011) stating that the head of BNPB is tasked to: a) coordinate the implementation of disaster risk reduction and disaster preparedness activities in an integrated manner, b) provide support for forest and land firefighting operations at regency or provincial disaster level in accordance with the conditions or needs of forest and land fire disaster management; and c) carry out command functions for resource deployment and coordination of disaster management of forest and land fires at national level, in accordance with legislation. However, Inpres No. 16/2011 still has a 'defect' in which the law does not specify how intersectoral coordination is conducted. It certainly can affect the effectiveness of the law.

To provide provincial as well as district governments with detailed guidance for preparing plans for disaster management, the Head of BNPB issued regulation No. 4/2008 or PERKA BNPB No. 4/2008 on guidelines for developing a plan for disaster management (*Pedoman Penyusunan Rencana Penanggulangan Bencana*). The regulation is concerned with implementing disaster management as stipulated in Articles 35 and 36 of Law 24/2007, and introducing various elements of hazards and risks and vulnerability, including those caused by fires, describing how to analyze impacts of disasters, appropriate actions, options to prevent and handle hazard, and mechanisms through which different institutions take part in managing the disaster and mobilizing resources.

BNPB also stipulates the implementation of the program Disaster Resilient Village (*Desa Tangguh Bencana – DESTANA*) through Perka No. 1 of 2012. DESTANA, as intended in this case, is a village (*desa and kelurahan*) that has the ability to adapt to and face the threat of disaster, and to recover

immediately from the adverse effects of disaster. The regulation is intended as a general guideline for the villages and disaster-resilient villages, in order to realize the vision of Indonesia's disaster management plan, namely to realize the nation's resilience in the face of disaster. The program is aimed at improving a community's capacity, capability and knowledge of local government.

When there was a fire and smoke disaster in 2015, President Joko Widodo issued Presidential Instruction No. 11/2015 instructing all ministries and related institutions dealing with land and forest fires throughout Indonesia. Handling *karhutbunla* includes three aspects, namely prevention, suppression and recovery. Prevention aspects are very important, because fires can be difficult to extinguish and can cause big losses. The National Disaster Management Agency (BNPB) again assumes the same duties and authorities as in the previous Inpres.

Disaster management is described in the seventh Nawa Cita, which reads "*Achieve economic independence by moving the domestic strategic sectors of the economy*" and into the subsection "*conservation of natural resources, environment and disaster management.*" BNPB becomes one of the members of the taskforce to control forest and land fire disasters as stated in the MOEF's regulation No. P.32/MenLHK/2016 on controlling forest and land fires.

10.2 Implementation

BNPB helped initiate the formation of the National Platform (PLANAS) for Disaster Risk Reduction (PRB) as a coordination forum consisting of government business, and community representatives at the national level. Together with the forum, BNPB encourages the establishment of similar forums in regional areas as partners of local governments in implementing disaster management policies. In addition to PLANAS, BNPB encourages the establishment of sectoral PRB forums, such as the University Forum, Disaster Education Consortium, and Coastal and Small Islands Disaster Mitigation Forum.

Risk reduction and disaster reduction programs at the village level are then set through village regulations. The programs can be funded through the APBD, APBDesa/ADD, Mandiri Masyarakat funds, and the private sector or other parties when needed. Activities undertaken include training, education and dissemination of information to the community, especially volunteer groups and disaster management actors in order to have the ability to play an active role as the main actors in planning, implementing and evaluating disaster risk reduction activities. In addition, physical and nonphysical structural mitigation activities should be arranged, such as early warning systems, preparedness for emergency response, and any risk reduction efforts through development interventions and recovery programs, both structural–physical and nonstructural.

The government offers wide opportunities for universities, NGOs, community organizations, the private sector and other parties to participate actively in disaster risk reduction, including in the development of Disaster Resilient Village and other similar initiatives.

A joint commitment to fire prevention and control in and around the concession areas was signed by the Head of BNPB and Sinar Mas Group on 24 April 2016 in Ogan Komering Ilir (OKI) Regency, South Sumatra. MoUs were signed between Sinar Mas Forestry (SMF) and seven heads of villages included in the program of Desa Makmur Peduli Api (DMPA). Together with governments and communities committed to implementing DMPA activities, the Community for Fire Care (MPA) assists with joint patrolling, prevention and control of land fires, law enforcement and emergency smoke alerts.

PERKA BNPB No. 15 Tahun 2012 PUSDALOPS mentions, in the framework of implementation of Government Regulation No. 21 of 2008 on Disaster Management Implementation, that it is necessary

to make a Guidance Center for Disaster Management Operation Control. Furthermore, on 27 August 2016, the government established the Operation Control Center (PUSDALOPS) of BNPB as the national post for Forest and Land Fire Disasters (*Karhutla*).

The problem of *karhutbunla* is quite complex and dynamic because it is not only related to technical problems, but is also influenced by social, legal, economic and political factors. *Karhutbunla* prevention policies and strategies over the next three years (2017–2019) clearly and measurably adhere to six principles: ***Permanent, Cross-Sector, Integrated, Comprehensive, Fast and Responsive, and Right on Target***. The principles contained in the policy direction are spelled out into five main strategies for more specific objectives. These five strategies use site-specific and non-site-specific approaches, as follows: *first*, providing incentives and economic disincentives; *second*, strengthening roles of rural communities and/or social institutions; *third*, enforcing laws, synchronizing legislation and controlling licensing in land-based sectors; *fourth*, developing infrastructure in the burning and vulnerable areas; and *fifth*, strengthening of early fire response. Strengthening early fire response aims to improve early warning technology, early detection and preparedness to face *karhutbunla*. This strategy is implemented by developing fire monitoring technologies primarily at the site level (field detection) supported by remote-sensing technology (especially, improving the quality of hot-spot monitoring), strengthening the Crisis Center and Early Response System, as well as procuring small-scale firefighting equipment. The role of BNPB is crucial in rapidly responding (Advance Response System) as part of the early fire response strategy (BAPPENAS 2017). Support for increased economic growth and community welfare is carried out through the following efforts:

1. increasing awareness and understanding of disaster risk reduction
2. developing anticipatory capabilities, adaptation, protectionism, avoiding/minimizing the impact of disasters, and having information absorption
3. increasing the capacity of regional disaster management institutions
4. encouraging the participation and active role of the business community and the community in the implementation of prevention.

Funding for fire disaster management has two approaches: at site level of approximately IDR 19.1 trillion and non-site of IDR 19.9 trillion. From the allocation of funds, 11% are budgeted through BNPB. Explicitly, the budget is planned by BNPB in relation to disaster management, such as for crisis center infrastructure, establishment of integrated fire prevention posts, integrated patrols and the purchase of firefighting facilities in forest areas and APLs as MOEF/BNPB activities in 2018. Details are as follows:

1. procurement of pre-crisis facilities; BNPB; implementing ministry, MOEF, local government
2. establishment of integrated fire management posts at the provincial level; BNPB, MOEF, local government
3. conducting integrated patrols of land and air routinely, especially in areas prone to fire; BNPB/MOEF, Ministry of Agriculture, local government
4. addition of forest land fire monitoring equipment; BNPB/MOEF, involves local government
5. purchase of early extinguishment facilities in forest areas and APLs; MOEF/BNPB, Indicative Budget IDR 892.39 million; implementing ministry, Agriculture, local government and private sectors.

As given in Presidential Instruction No. 11 2015, BNPB is mandated to be part of the handling of forest and land fire disasters, and has a direct command control function in the case of a fire disaster. In order to perform its functions, BNPB establishes work units at provincial and regency levels, even down to the site level.

11 Regional policies in South Sumatra

11.1 Local regulation (*PERDA*) to control forest and land fires

The scope of this regulation includes prevention, mitigation, handling and monitoring. Table 7 shows the contents of local regulations related to DMPA.

11.2 Governor's regulation (*PERGUB*) on procedures for forest and land fire control

This regulation aims to guide the implementation of forest and land fire control activities so that it can be undertaken in a planned, coordinated, integrated and controlled manner. Permanent procedures for forest and land fire control include prevention, extinguishing and handling of post-fire situations. The content of this regulation relating to DMPA – article 3, paragraph 1, letter a, point 7 – contains the procedures for the formation and development of Village Trained Fires Teams (*Regu Kebakaran Desa Terlatih/RKDT*) and the Fire Care Community (*Masyarakat Peduli Api/MPA*). RKDT/MPA are communities within and outside forest areas/business licenses that are voluntarily concerned about and active in the control of forest and land fires. Technical details on the procedures for establishing RKDT and MPA are contained in Appendix 1 letter G of this rule. Article 7 states that the cost of the implementation of forest and land fire control is charged to the Revenue and Expenditure Budget of State (APBN), Revenue and Expenditure Budget of Provincial and Regency/City (APBD), as well as the business liabilities (companies).

One of the missions of South Sumatra Province is to be haze free by 2018. The mission statement mentioned several issues, such as early prevention of forest and land fires, landscape management, forest and peat restoration, and community empowerment in villages prone to forest and land fires. South Sumatra has formed 171 Fire Concerned Villages (*Desa Peduli Api*) in areas prone to forest and land fires, for community empowerment in the prevention and control of fire up to November 2017. The villages are located and scattered in four regencies that are prone to fire, namely in OKI

Table 7. The contents of PERDA of South Sumatra Province (Sumsel) No. 8/2016 related to DMPA.

Clause	Contents
Article 5 paragraph (1)	The communities living around the forest and/or in fire-prone areas are obliged to always be alert and participate in prevention and control of forest and land fires, either individually or through the Fire Care Community (MPA).
Article 6	The prevention of forest and land fires is carried out in several ways: a) the application of prudential principles; b) the application of early warning and prevention systems; c) the application of non-burn land clearing; d) socialization, counseling, and enhancing community participation in forest and/or land fire control; e) development of forest and/or land fire control technology and procedures; f) giving awards to communities, officers and legal entities that play an important role in the control of forest and/or land fires.
Article 7 paragraph (4)	Any company whose business has the potential to cause environmental damage related to forest fires and/or land is obliged to conduct counseling to communities around the company in order to prevent forest and/or land fires.
Article 14 paragraph (3)	The Regent/Mayor facilitates the formation of forest and/or land fire control groups, which should be constantly vigilant and alert, especially in the face of drought.

Table 8. Villages that experienced fire according to Sumsel in 2016 (UNDP 2017).

Regency	Area							Total
	Industrial forest plantation (HTI)	Oil palm plantation	Between industrial forest and oil palm plantations	Among industrial forest, oil palm plantations and others	Ex-civil transmigration	Oil and gas companies	Forest areas	
OKI	13	15	15	5	5	1	12	66
MUBA	3	10	5	2	-	1	3	24
Banyuasin	1	12	2	-	-	-	2	17
Total number of villages	17	37	22	7	5	2	17	107

Regency (84 villages in 12 subregencies), Banyuasin Regency (23 villages in 11 subregencies), Musi Banyuasin Regency (41 villages in 9 subregencies), and Ogan Ilir Regency (23 villages in 7 subregencies). The establishment of Fire Concerned Villages is facilitated by government, NGOs, and companies operating around the villages.

Table 8 provides details of fire occurrences in 2016. Ninety-six villages are located in the peatlands. Villages are spread in Ogan Komering Ilir (OKI) Regency (55 villages), Banyuasin with 16 villages and Musi Banyuasin (MUBS) with 25 villages. In 2015, peatland fires in 96 villages covered 377,333 ha in OKI Regency, 141,126 ha in Banyuasin Regency and 108,281 ha in MUBA Regency.

South Sumatra provincial government together with *Korem Gapo 044* and South Sumatra police have used technological prevention measures to handle *Karhutla*. These include bios technology and foam technology from *Korem Gapo 044* as well as IT-based technology. The benefits of fire-management village programs are the increased income and food sufficiency of communities in DMPA villages, harmonious relationships between enterprises and communities, solutions for conflict resolution and prevention, functioning of village institutions, and increased participation of villagers and communities in securing and conserving forests.

12 Policy network analyses

Fire prevention policies are spread out across different ministries and local governments. They are linked together to form a network of policies. The following provides policy network analyses to describe the most important policies, how they connect to DMPA and potential financing of the DMPA by the public sector. As they are based on the network analyses, we focused on how the policies interrelate, not on their attributes. For example, when we talk about the most important policy, this is determined by its connections to other policies, not by the importance of the content of the policy itself.

12.1 How related DMPA public policies are interconnected

What we mean by the most important policies are those that directly link to or are referred to by many other policies in the network. We implemented *degree and eigenvector centrality analyses* to find out the links. We identified 53 public policies from different ministries, agencies and local governments in South Sumatra that are strongly connected to fire prevention, suppression and private sector initiatives. Figure 2 shows how these 53 policies are interconnected. The size of a circle represents its degree of centrality. A bigger circle has a greater degree of centrality, and therefore it has more policies connected to it. The connection can be complementary, supply details, or provide repetition or redundancy.

Table 9 shows 10 of the most connected public policies according to their centralities. They are Law No. 19/2013: Protection and empowerment of farmers; MOEF’s regulation No. 83/2016: Social forestry; Local Regulation of South Sumatra Province No. 8/2016: Forest and/or land fires control;

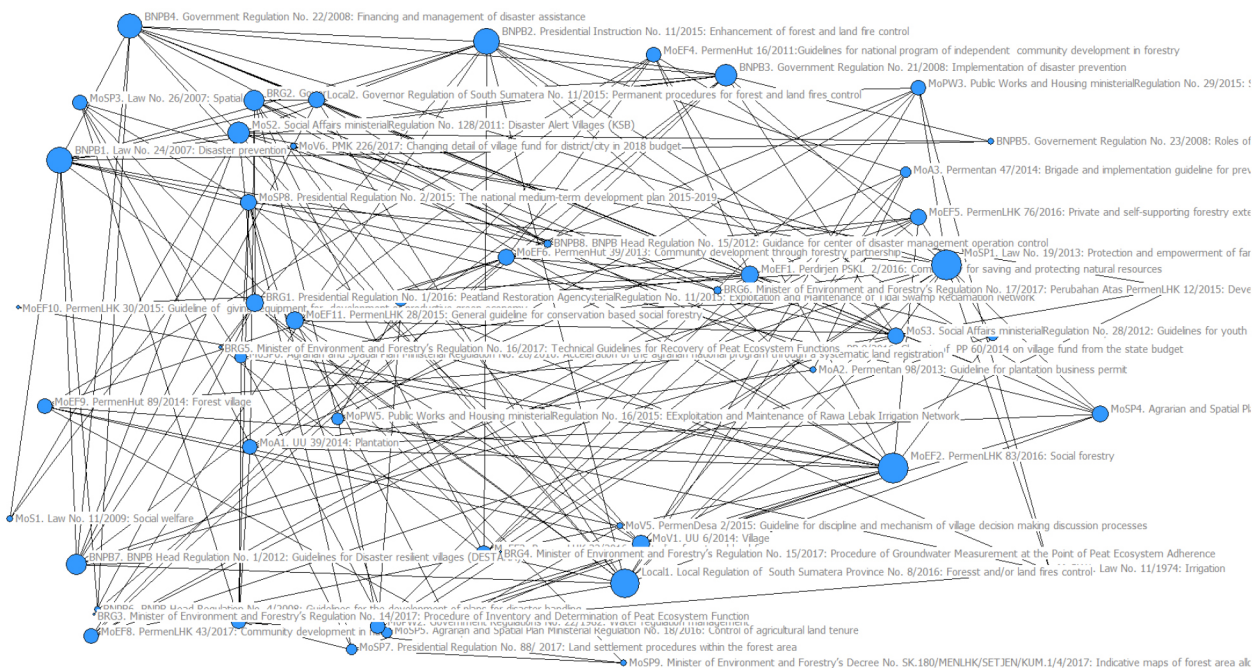


Figure 2. Degree of centrality of the policy network.

Table 9. The most important policies.

No.	Law and regulation	Degree of centrality		Eigenvector of centrality
1	MoSP1. Law No. 19/2013: Protection and empowerment of farmers	0.2888	Local1. Local Regulation of South Sumatra Province No. 8/2016: Forest and/or land fires control	0.322
2	MOEF2. PermenLHK 83/2016: Social forestry	0.288	BNPB4. Government Regulation No. 22/2008: Financing and management of disaster assistance	0.311
3	Local1. Local Regulation of South Sumatra Province No. 8/2016: Forest and/or land fires control	0.269	BNPB1. Law No. 24/2007: Disaster prevention	0.300
4	BNPB1. Law No. 24/2007: Disaster prevention	0.25	BNPB2. Presidential Instruction No. 11/2015: Enhancement of forest and land fire control	0.286
5	BNPB2. Presidential Instruction No. 11/2015: Enhancement of forest and land fire control	0.25	MoS2. Social Affairs Ministerial Regulation No. 128/2011: Disaster Alert Villages (KSBs)	0.278
6	BNPB4. Government Regulation No. 22/2008: Financing and management of disaster assistance	0.231	BNPB3. Government Regulation No. 21/2008: Implementation of disaster prevention	0.269
7	MoPW5. Public Works and Housing Ministerial Regulation No. 16/2015: Exploitation and Maintenance of Irrigation Network	0.212	BNPB7. BNPB Head Regulation No. 1/2012: Guidelines for Disaster resilient villages (DESTANA)	0.269
8	BNPB3. Government Regulation No. 21/2008: Implementation of disaster prevention	0.212	MoSP1. Law No. 19/2013: Protection and empowerment of farmers	0.273
9	BNPB7. BNPB Head Regulation No. 1/2012: Guidelines for disaster resilient villages (DESTANA)	0.192	MoS3. Social Affairs Ministerial Regulation No. 28/2012: Guidelines for youth disaster preparedness (TAGANA)	0.249
10	BRG2. Government Regulation No. 57/2016: Protection and management of peat ecosystems	0.192	Local2. Governor Regulation of South Sumatra No. 11/2015: Permanent procedures for forest and land fires control	0.224

Law No. 24/2007: Disaster prevention; Presidential Instruction No. 11/2015: Enhancement of forest and land fire control; Government Regulation No. 22/2008: Financing and management of disaster assistance; MPWH Ministerial Regulation No. 16/2015: Exploitation and Maintenance of Irrigation Network; Government Regulation No. 21/2008: Implementation of disaster prevention; BNPB Head Regulation No. 1/2012: Guidelines for disaster resilient villages; and Government Regulation No. 57/2016: Protection and management of peat ecosystems. The subsequent column shows 10 policies with the biggest eigenvector centralities that are not the same as the degree of centrality output. The degree of centrality measures how many policies are directly connected to a certain policy (called **ego**). Eigenvector of centrality measures not only how many policies are connected to ego but also how many policies are connected to policies that are connected to ego. Policies that connect to ego are not equally important in the network.

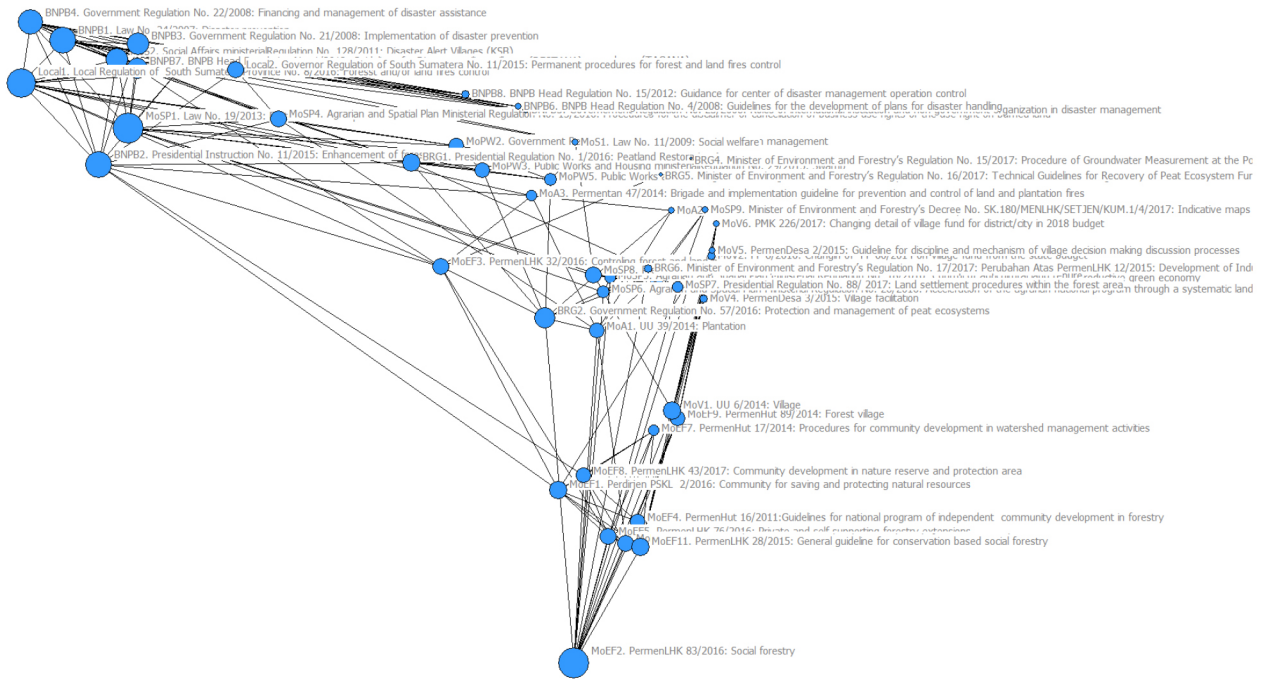


Figure 3. Principle component analysis of the degree of centrality policy network.

Policies of the Ministry of Agrarian and Spatial Planning (MASP), MOEF, local government, BNPB, BRG and Ministry of Social Affairs (MOSA) are the most important policies in this regard according to both types of centralities. Although, in this regard, the degree of centrality is more relevant compared with the eigenvector of centrality due its direct connection. However, the difference lies only with the policy coming from MOS.

Using principle component analysis (PCA), Figure 3 shows how those 53 policies are clustered. We can easily see ‘Prevention’ and ‘Suppression’ clusters. The prevention cluster contains, among others, MOEF and Ministry of Villages, Underdeveloped Regions and Transmigration policies, whereas the Suppression cluster contains, among others, BPNB and local government policies.

12.2 How DMPA is supported by public policies

The 53 policies connect to DMPA, with its six pillars, in different degrees of connection. The six pillars of DMPA are: (1) empowering the community economy; (2) providing participatory mapping resources; (3) transferring eco-friendly land management technology for preventing forest and land fires; (4) protecting and maintaining forest areas; (5) preventing and resolving local conflicts; and (6) partnering in product marketing. Figure 4 provides the connection between the DMPA pillars and the policies related to fires.

Table 10 shows the DMPA pillars and their degree of connection. The DMPA program and its six pillars are supported by public policies. The pillars of *protecting and maintaining forest areas* (Pillar 4) and *transferring technology of eco-friendly land management for preventing of forest and land fires* (Pillar 2) are those that are most supported by public policies. Pillar 6, *partnering in product marketing* is the least supported. Pillar 1, *empowering the community economy*, Pillar 2, *providing participatory mapping resources* and Pillar 5, *preventing and resolving local conflicts* are moderately supported by the existing fire policies. This provides lessons learned that policies aimed at improving



Figure 4. Egonet of DMPA pillars in their connection to fire policies.

Table 10. The DMPA pillars and their degree of connection.

No	DMPA pillar	Number or degree of connection	Normalized degree of centrality
1	Empowering the community economy	6	0.103
2	Providing participatory mapping resources	5	0.086
3	Transferring technology of eco-friendly land management for preventing of forest and land fires	10	0.172
4	Protecting and maintaining forest areas	12	0.207
5	Preventing and resolving local conflicts	7	0.121
6	Partnering in product marketing	1	0.017

the marketing of products produced by communities under the DMPA partnership are still lacking, and attention needs to be focused on securing opportunities for local people to benefit from their resources, enhancing local capacity in marketing their products, and connecting them to market. Marketing skills among the villagers involved need to be prepared from the beginning.

12.3 Policies to finance DMPA initiatives

Public policies are implemented by different ministries and government unit levels. If they are implemented, the budget will be provided, although in most cases, the budget is not sufficient to implement the policy. Figure 5 shows how public finance is linked to the DMPA pillars. Pillars of technology transfer for eco-friendly land management (Pillar 3) and protecting forest areas (Pillar 4) are the pillars most supported by public finance. Development of the community economy (Pillar 1) is also supported, while participatory mapping (Pillar 2), resolving local conflicts (Pillar 5) and DMPA product marketing (Pillar 6) are least supported by public finance. This provides lessons that non-state actors need to pay more attention to participatory mapping, conflict resolution and product marketing.

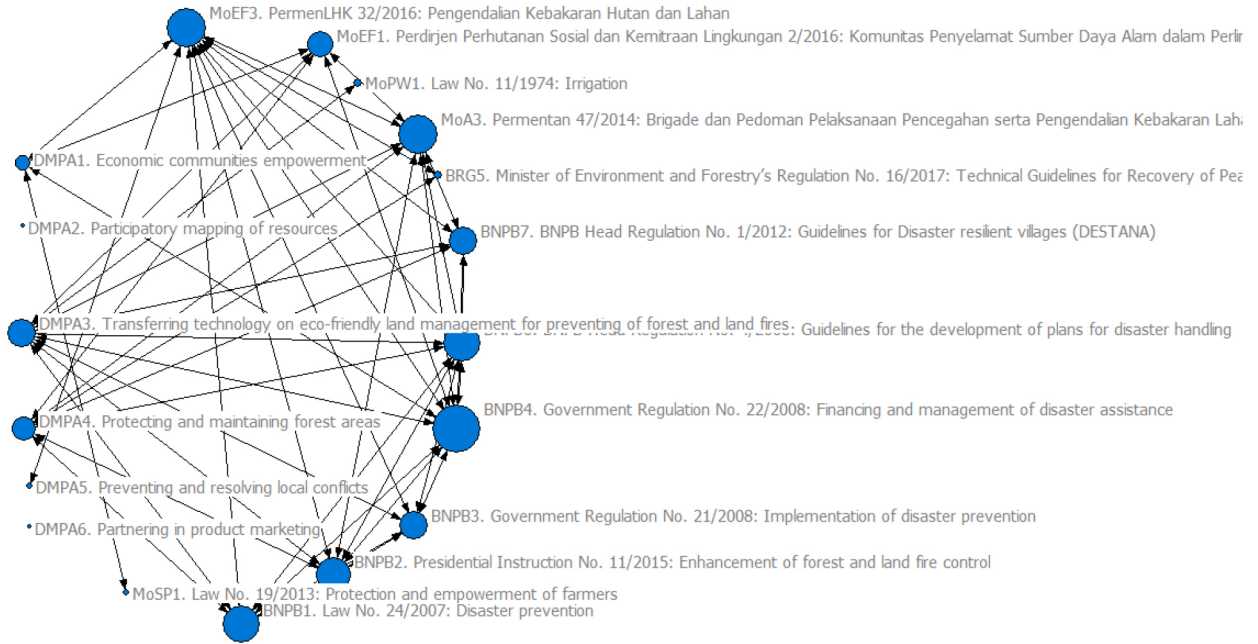


Figure 5. Public finance support for DMPA.

13 Stakeholders' perceptions on scaling up community-based fire prevention in South Sumatra

A multistakeholder workshop on fire prevention in community-based forests and lands and policy to scale it up (*Lokakarya Pencegahan Kebakaran Hutan dan Lahan Berbasis Desa dan Kebijakan Scale-Up*) was held in Palembang, the capital of South Sumatra on 31 May 2018. The workshop aimed to understand the opportunities and challenges of fire prevention in forests and lands as well as of community-based restoration programs in South Sumatra Province. The workshop tried to identify: 1) programs and policies to support fire prevention in forests and lands as well as peatland restoration; 2) capacity of the institution (budget, human resources, and infrastructure) in implementing the programs; and 3) implementation and the impact of those programs.

The workshop was attended by representatives of governmental institutions (South Sumatra Province, OKI District, Musi Banyuasin District, Meranti and Lempuing-Mesuji Forest Management Unit, technical implementation units (UPT) of Ministry of Environment and Forestry, the Financial Services Authority), community forums (South Sumatra Watershed Forum/Forum DAS Sumatra Selatan, DMPA Musi Banyuasin and Ogan Komering Ilir (OKI) Districts), international organizations (CIFOR and ICRAF), NGOs (World Resource Institute, Kemitraan, Zoological Society of London (ZSL), Hutan Kita Institute, etc.), companies (PT. OKI Pulp, PT. (Sebangun Bumi Andalas/SBA, PT. Bumi Mekar Hijau/BMH, PT. Bumi Andalas Permai/BAP, APP), business holder associations (Association of Indonesia Oil Palm Plantation Holders–South Sumatra chapter/GAPKI, Association of Indonesia Forest Concession Holders/APHI) and mass media totaling 84 representatives (Figure 6).



Figure 6. The workshop was attended by leaders and representatives from governmental institutions, community forums, NGOs, business holder associations and the mass media.

The workshop consisted of two sessions: first, “opportunity to scale-up **the implementation** of community-based forest and land fire-prevention program”; second, “opportunity to scale-up **the funding** of community-based forest and land fire-prevention program”. Each of the sessions consisted of presentations from representatives of the central-, province- and district-level governments; private companies; and farmers who were beneficiaries of the DMPA program. The presentations of the speakers are available (Okarda 2018). The following provides an overview of panelist presentations and the conclusions. We have not included information about the participants’ question-and-answer sessions.

13.1 Setting the scene

The workshop was opened by the Chair of Forestry Service Office (DISHUT) of South Sumatra Province. The chair expressed his appreciation for the Center for International Forestry Research (CIFOR) and World Agroforestry Center (ICRAF) teams, who worked together with local governments to prevent fire in South Sumatra’s forests, gardens and lands. He further explained that the incidence of fire was significantly reduced by up to 98.7% and by up to 95.5% for hot spots due to increased and improved fire-prevention efforts and strategies. However, many uncertainties can trigger fire occurrence in the future, for example, the uncertain rainfall rates. Thus, fire prevention and control efforts need to be continuously implemented.

The Chair of DISHUT (Figure 7) further emphasized the importance of fire prevention and control efforts in the upcoming Asian Games, a prestigious and major sports event of Asian countries. DISHUT along with many stakeholders in South Sumatra have implemented various programs and activities to prevent and control fire across 3.47 million ha of forest and 1.4 million ha of peatland. They conducted routine activities such as early detection of fire, company and community readiness evaluations, community empowerment and fire suppression training. It also focused on community development in 86 subdistricts and 324 villages that were considered to be highly vulnerable to fire. In 2018, they prioritized the program in 47 extremely vulnerable villages.



Figure 7. The Chair of Forestry Service Office/DISHUT of South Sumatra opened the workshop and stated his support for scaling up the community-based fire prevention program.

Most importantly, the Chair expressed his support to scale up the conceptual plan and implementation of CIFOR and ICRAF's research on community-based forest and land fire prevention. He expected that this research can be harmonized, complemented and supported by the cluster-based system of fire prevention developed by the Indonesia Coordinating Ministry of Economic Affairs. He hoped for the integration, synchronization, and synergy of this research with other community-based fire prevention approaches, for example, the Fire Concerned Villages (*Desa Peduli Api/DPA*) and peat care village (*Desa Peduli Gambut/DPG*). The synergy of the community-based fire prevention will be beneficial to further strengthen and accelerate the efforts on preventing and controlling forest and land fire. Finally, he confirmed the commitment of the South Sumatra Government to continue increasing its preparedness on fire prevention and control.

Prof. Herry Purnomo, the Chair of the Fire Policy Research Team began the workshop with an overview of the workshop's agenda. In his speech, he spoke of CIFOR's and ICRAF's many research efforts across the region. The lessons learned from CIFOR's and ICRAF's research were expected to be replicated in South Sumatra as part of the push to reduce forest and land fires. In his speech, Prof. Herry highlighted the significant reduction of fire occurrence from 2.67 million ha in 2015 to nearly 16 times lower (0.45 million ha in 2016 and 0.16 million ha in 2017), although the contributing factors should be assessed carefully. The practice of land clearing without using fire began to increase because the communities understand the impact of fire and comply with the regulations. Many stakeholders participated in the fire prevention and control efforts as well. He expected this workshop could help to identify and scale up the current practice and funding on fire prevention. He appreciated the stakeholders' enthusiasm to participate in this workshop and hoped the workshop would be a platform for learning and replicating the success story of fire prevention work at the community level.

13.2 Opportunities in scaling up the implementation

The first session was led by an ICRAF scientist, Mr. Jasnari (Figure 8) with six resource-persons from UPT Ministry of Environment and Forestry, Regional Peatland Restoration Team, Forestry Service Office of South Sumatra Province, the Development Planning Agency at Sub-National Level of South Sumatra Province, Disaster Management Board of OKI District and a private company (Asia Pulp and Paper).



Figure 8. The resource-persons presented “Opportunities in Scaling Up the Implementation of Community-Based Forest and Land Fire Prevention”

A. "Overview of Forest and Land Fire and Peatland Restoration in South Sumatra" by the Regional Peatland Restoration Team of South Sumatra Province

Based on an analysis of forest and land fire data in South Sumatra, there was a significant reduction from 2015 to 2017 for the burned land (99.87% decrease) and hot spots (95.52% decrease). In 2017, fire occurred on mineral soils and swamp areas, but particularly on mineral soil, abandoned land, and land with disputed ownership in Muara Enim and Ogan Ilir Districts. As a part of the fire preparedness efforts, there had been an identification of vulnerable and highly vulnerable areas. Approximately 79 subdistricts or 81% of subdistricts in South Sumatra were considered as vulnerable or extremely vulnerable areas. Three hundred and one villages or 30% of South Sumatran villages were considered as vulnerable areas. These areas, according to the Chair of Regional Peatland Restoration Team of South Sumatra, were prioritized in many fire prevention programs. There was support from 7649 people, 85% of whom came from the communities group (i.e. fire care community (*Masyarakat Peduli Api/MPA*), fire care farmers community (*Kelompok Tani Peduli Api/KTPA*), and fire control teams (*Regu Pengendalian Kebakaran/RPK*) of industrial timber estates and plantations).

B. "Planning and Funding for South Sumatra Fire Prevention Program" by the Development Planning Agency at Sub-National Level of South Sumatra Province

The Governor of South Sumatra Province's commitment to achieve green growth was reflected in the following policies: Pergub No. 21/2017 on the master plan of economic growth; Pergub No. 16/2017 on the institutional structure of a green growth plan and partnership of ecoregion landscapes of South Sumatra Province; and Kepgub No. 452/KPTS/Bappeda/2017 on the institutional structure of a green growth plan and institutional structure of partnership management of South Sumatran ecoregion landscapes. In reference to Pergub No. 21/2017, green growth in South Sumatra encompasses the following visions: 1) sustainable economic growth; 2) inclusive and equal growth; 3) social, economic and environmental resilience; 4) healthy and productive ecosystems that can provide ecosystem services; and 5) greenhouse gas emissions reduction. To achieve these visions, the South Sumatra Government prioritized the following policies for 2019: developing human capacity, reducing regional disparity, increasing the economic value added based on green growth principles, stabilizing the security and consolidating the bureaucracy reform. Specifically, to reduce the regional disparity, the government allocated IDR 1765 billion for technology, information and communication; IDR 191 billion for development of disadvantaged regions; and IDR 8.7 billion for disaster management. In disaster management, the government allocated 75% of its budget for disaster emergency response and the remaining 25% was allocated for a disaster preparedness program.

C. "Efforts to Prevent Forest, Plantation and Land Fire in Ogan Komering Ilir District in 2018" by the Regional Disaster Management Board of OKI District

Flood, fire and drought occupied the highest rank in the disaster risks index of OKI District. Many of the disaster management activities were prioritized to manage the risk of occurrence of flood, fire and drought. On preventing fire, The Chair of Regional Disaster Management Board of OKI District highlighted some regulations that function as the legal umbrella for disaster and fire management activities. Disaster management activities are made possible under: UU No. 24/2007 on disaster management; PP Nos. 21, 22 and 23/2008; and Perda of OKI No. 5/2010 and No. 10/2015. Forest, garden and land fire management are made possible under: UU No. 32/2009; Forestry UU No. 41/1999; PP No. 4/2001, No. 45/2004 and No. 71/2014; Inpres No. 11/2015; Perda of South Sumatra No. 8/2016; Perbup OKI No. 23/2016; and Kepbup No. 176/2018.

OKI District involved 1698 personnel drawn from communities (fire care community/MPA, fire care farmers community/KTPA, Disaster Resilient Village/DESTANA), government (*Satgas Bencana*), private companies (disaster management team/RPK) and volunteers to prevent fires. Each of these groups were supervised by Manggala Agni, UPT of Forestry Service Office, Plantation Office and

private companies (e.g. PT. BMH, PT. SBA, PT. BAP, PT. Sampoerna Agro). The groups covered Air Sugihan, Pedamaran, Pangkalan Lampam, Tulung Selapan Sungai Menang, Cengal Kayuagung, Mesuji Raya, Mesuji Lempuing Jaya and Tanjung Lubuk subdistrict.

In his speech, the Chair of Regional Disaster Management Board emphasized some efforts on community-based fire prevention, namely Disaster Resilient Villages (*Desa Tangguh Bencana/ DESTANA*) and Fire Concerned Villages (*Desa Peduli Api/DPA*). DESTANA was a program to increase community preparedness for disaster and to minimize disaster impact. DESTANA was established in 2015, 2017 and 2018 in seven villages: Riding, Cinta Jaya, Suka Putih, Kota Bumi, Tanjung Beringin, Ulak Depati and Jermun in OKI District. Each village team consisted of 20 people. This program was funded by the state budget in 2015 and 2017. Later, it was funded by regional budget in 2018. Meanwhile, Fire Concerned Villages (DPA) was a program in 63 villages, made possible through SK Bupati No. 348/KEP/BPBD-OKI/2017 on the establishment of fire concerned villages in OKI District.

There were many efforts to prevent forest, garden and land fire in OKI District. For example, the Government of OKI established a forest and land fire control team (*Satgas Dalkarlahut*). The team was responsible for fire prevention, community empowerment, impact control, post-fire management and law enforcement. The Regional Disaster Management Board took part in identifying and mapping the fire risk in many villages. Private companies played a role in the prevention and mitigation efforts by undertaking canal blocking on peatlands and fire monitoring, and building water reservoirs, deep wells and monitoring posts. They also installed early disaster warning devices and conducted routine patrols. Finally, these efforts should be coordinated, synchronized, integrated, and synergized to optimize the outcome.

D. "Desa Makmur Peduli Api: Strategic Partnership at the Village Level to Prevent Forest and Land Fire as well as Empower the Economy of Local Communities in a Sustainable Manner" by Asia Pulp and Paper (APP)

APP is a prominent pulp and paper group company operating in five provinces in Indonesia, with South Sumatra, Jambi and Riau considered as their largest areas of operation. As a part of the corporate social responsibility, APP established a major program titled DMPA (*Desa Makmur Peduli Api*). DMPA is a partnership between the company and communities to empower and increase the economic situation of local communities near forests, in a sustainable manner. In the forest fire and encroachment context, the socio-economic issues played important roles. Realizing these complexities, APP tried to address a protection and conservation program in 2013. The program focused on natural forest protection, sustainable peatland management, social commitment and sustainable use of resource/timber material. In 2015, APP established DMPA as a part of its social commitment to prevent deforestation and fire in forests, gardens and lands. DMPA is defined as an effort to attain more integrated fire risk management. DMPA specifically operates under six pillars: 1) income-generating community empowerment; 2) participatory resource mapping to support community livelihood; 3) technology transfer; 4) forest protection; 5) conflict prevention and resolution; and 6) product marketing partnership. In this program, APP allocated a USD 10 million grant for the local communities. APP will disburse the grant within a five-year timeframe (2015 until 2020) for 500 villages in Riau, Jambi, South Sumatra, West Kalimantan and East Kalimantan. APP has set the following prerequisites to consider the qualification of a village for the DMPA program: 1) the village is located inside or outside the concession (3 km maximum); 2) the community highly interacts with the forest resources; and 3) the village experience of fire, illegal logging and/or encroachment has occurred in the last three years.

APP had established DMPA in 80 villages as of 2016 and 120 villages as of 2017. They targeted 100 villages in 2018. They plan to implement DMPA in 2020. At the moment, they have established DMPA in 114 villages of South Sumatra. They funded DMPA in the form of grants. Grants were used

as capital for BUMDesa (village enterprises), koperasi or *Gapoktan* (farmer groups), and women's groups. APP allocated an IDR 260 million grant for each village. As of March 2018, APP distributed IDR 32.9 billion to 191 partners (7 koperasi, 72 BUMDes and 112 *Gapoktan*) in 119 villages. The focus of community development implementation in these 119 villages is on herbs (15 ha), fruit (219 ha), vegetables (730 ha), paddy fields (629 ha), plantations (149 ha), root and tuber crops (53 ha), fisheries (123 units), 1,097,866 fish, 50 pigs, 2,200 goats, 462 head of cattle, poultry (14,745 birds), and home industries (102 units). For South Sumatra, APP allocated IDR 7.2 billion for 42 villages.

APP oversaw multistakeholder collaboration and cooperation, for example, the collaboration with Ministry of Villages, Development of Disadvantaged Regions, and Transmigration for community development in 104 villages, and the Prukades Program in 22 districts. APP also collaborated with the Ministry of Environment and Forestry to produce *Buku Model CSR* for social forestry. They developed a participatory DMPA model with a university (University of Gadjah Mada) and an NGO (Setara Initiative). APP collaborated with CIFOR–ICRAF to conduct enhancement and scaling up of DMPA. Other collaborations were internship programs (University of Sebelas Maret and State University of Surakarta) and development of local freshwater fish species (Islamic University of Riau).

E. "Program and Implementation of Forest and Land Fire Control in South Sumatra (DMPA/MPA/KTPA etc.)" by the Agency of Climate Change and Forest and Land Fire Control of Sumatra Region

As a part of forest and land fire control and management, the Ministry of Environment and Forestry implemented three programs: fire prevention, suppression and monitoring. Referring to the Ministry of Environmental and Forestry data, there was a significant decrease of fire hot spots from 21,929 hot spots in 2015 to 2567 hot spots in 2017. This trend applied for the burned forest area as well. The agency representative further elaborated on the activities undertaken to strive for improved fire prevention. Some of the activities were: data analysis of hot spot monitoring, routine patrols, integrated patrols, ground checking hot spots and/or fire occurrence notices, reinforcing fire prevention at local and regional levels, introducing fire prevention to the young generation and strengthening the fire care community (MPA). While these activities focused on fire prevention, other approaches involved land and aerial means of fire suppression. Lastly, the representative described the monitoring of post-fire burned areas by collecting information on: the extent of burned area, type of vegetation, causes of fire, land status, coordinates and socio-economic state of the community living near the location. Lastly, the challenges and constraints in managing the forest and land fire of South Sumatra were: the accessibility of the forest area to enable hot spot ground checking or fire suppression; the use of fire for land clearing by the community; the presence of many abandoned/marginalized lands; the slow adoption of land clearing without using fire (*Pembukaan Lahan Tanpa Bakar/PLTB*) due to cost constraints; and the presence of fuel that caused a high risk of forest and land fires.

F. "Program and Implementation of Forest and Land Fire Prevention" by the Forestry Service Office (DISHUT) of South Sumatra Province

The basis of the forest and land fire control in South Sumatra was Permen LHK No. 32/2016. Forest and land fire control is defined as the effort/activity/approach taken to organize, manage human resources, infrastructure, and the operational guidelines on preventing, suppressing and managing post-fire occurrence. The definition also accommodated the urgency to support the evacuation process and management of fire control. The Forestry Service Office planned forest and land fire control through the following activities and programs: 1) establishing and training the fire control brigade and training the village fire team (*Regu Kebakaran Desa Terlatih/RKDT*), 2) producing, providing and disseminating the materials on fire control, 3) planning the approach for increasing the awareness and preventing the fire, 4) analyzing and disseminating the hot spot data and information, 5) predicting the fire area, and 6) analyzing the post-fire vegetation. Now, the Forestry Service Office is currently developing the *Rumah Pengendalian Kebakaran Hutan dan Lahan* (RUDAL). RUDAL will function

as a platform to provide data information and facilitate data exchange online. The stakeholders can access and use the data for program planning. In addition, they also conduct socialization, patrols and integrated fire prevention compliance evaluations (SEPATU).

13.3 Opportunities in scaling up the funding

The second session was led by the Regional Peatland Restoration Team, Dr. Syafrul Yunardy (Figure 9) with six resource-persons from the Financial Services Authority/OJK, Forest Management Units/KPHs, Association of Indonesia Forest Concession Holders, and DMPA beneficiaries.

A. “Role of the Financial Services Authority (*Otoritas Jasa Keuangan/OJK*) on Empowering and Developing the Micro, Small, and Medium-Scale Business Empowerment (UMKM) in South Sumatra Province” by the Financial Services Authority (OJK) Regional 7

The Financial Services Authority/OJK was established through UU No. 21/2011. It is responsible for supervising the operation of banking, the capital market and the non-bank financial industry (*Industri Keuangan Non-Bank/IKNB*). In 2015, OJK started to develop, regulate and supervise a microfinance institution (*Lembaga Keuangan Mikro/LKM*). In the South Sumatra context, OJK stated the current state of lending in South Sumatra was dominated by productive (61%) and consumptive (39%) sectors. The productive sector consists of work capital (38%) and investment credit (23%). In the massive economic sector, OJK reported that wholesalers and retailers lend 21% of the credit, while the agroforestry, hunting and forestry sectors lend 14% of the credit. In the banking sector, South Sumatra’s banks have maximized the business intermediation function - where they have collected and distributed funding for many business sectors.

OJK elaborated the challenges in developing the Micro, Small, and Medium-Scale Business Empowerment (UMKM). The challenges were weak technology, marketing, human resources,



Figure 9. The resource-persons presented “Opportunities in Scaling Up the Funding of Community-Based Forest and Land Fire Prevention”.

management and financing access. The representative further elaborated that financing the UMKM was hampered due to the non-bankable nature of their business, the domination of wholesalers and retailers, and collateral issues (e.g. the collateral does not fulfil the legality aspect). To overcome these challenges, OJK suggested a multistakeholder collaboration to empower the UMKM. In this context, OJK played a crucial role to encourage the financial institutions to lend to the UMKM; to be actively involved in empowerment activities (i.e. capacity building); and to encourage the establishment of microfinancing institutions (i.e. *koperasi*). Some options that may be possible to resolve the challenges were: 1) promoting and supporting the implementation of Smart Act branchless banking services for financial inclusion (*Layanan Keuangan Tanpa Kantor dalam Rangka Keuangan Inklusif/LAKU PANDAI*), 2) optimizing the Regional Financing Access Acceleration Team (*Tim Percepatan Akses Keuangan Daerah/TPAKD*); and 3) shifting the financing focus from downstream (wholesalers and retailers) to the upstream sector (agriculture, tourism, fishery and marine).

B. “Program, Funding, and Implementation of Forest and Land Fire Prevention in the Forest Management Unit” by the Forest Management Unit/KPH of Lempuing-Mesuji, OKI District

Forest Management Unit/KPH of Lempuing Mesuji is the newest KPH in South Sumatra (Figure 10). This KPH is located in OKI District and covers 137,493 ha of forest area consisting of limited production forest (*Hutan Produksi Terbatas/HPT*) of Pedamaran Kayuagung; production forest (*Hutan Produksi Tetap/HP*) of Terusan Sialang, Way Hitam Mesuji, Mesuji III, Mesuji IV; and protection forest (*Hutan Lindung/HL*) of Sungai Lumpur Mesuji. It was funded by state and regional budgets. Its activities were routine forest patrols, fire patrols and empowerment. In 2018, KPH conducted community socialization and facilitation in the villages near the forest areas. In these activities,

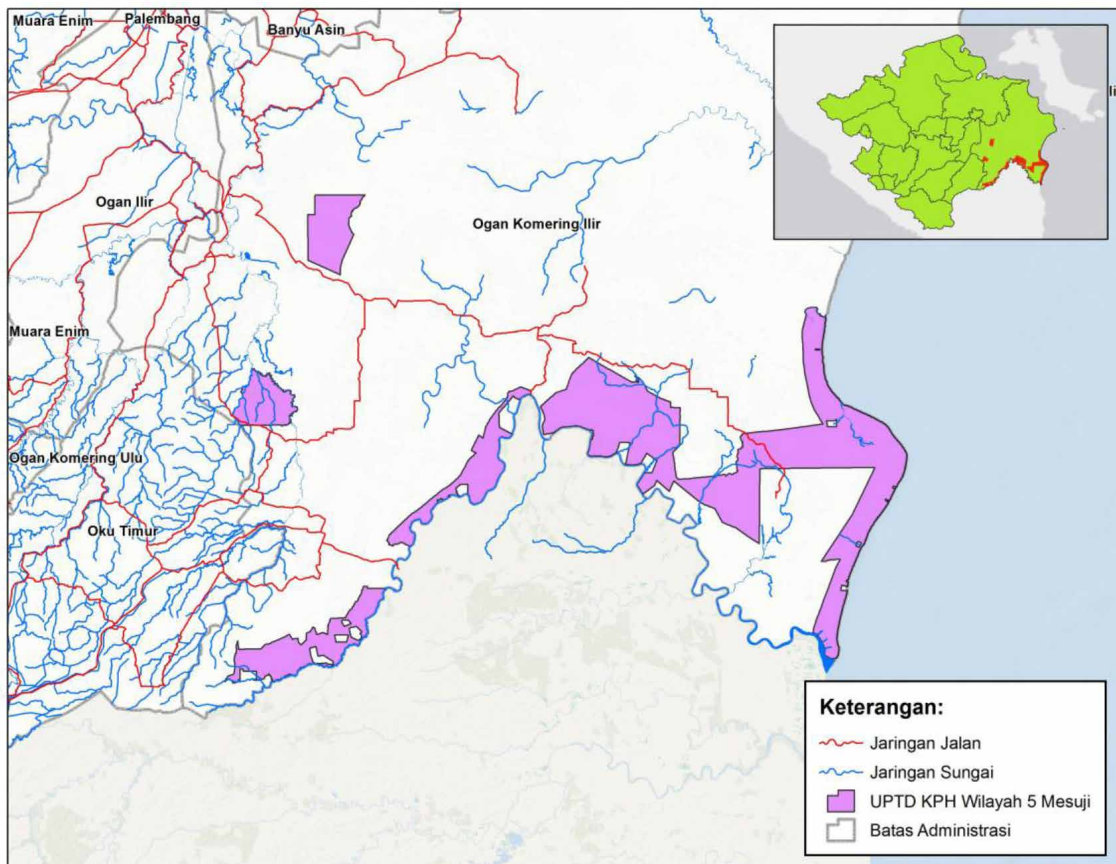


Figure 10. KPH Mesuji.

KPH established koperasi and village enterprises (BUMDes) to enable collaboration between the community and KPH. Both of the koperasi and village enterprises focused on environmental services and non-timber forest products.

One of the areas within KPH Lempuing-Mesuji is a peatland area that is more than 7 m thick and susceptible to fire during the long drought season. Therefore, fire risk management became important. KPH led the fire suppression and prevention efforts. KPH highly encouraged community participation as well. Some of its forest and land fire prevention efforts in 2018 were: fire-prevention socialization/campaign, coordination with the neighboring KPH team and company, and water level monitoring. However, KPH Lempuing-Mesuji did not have adequate infrastructure and human resources. Additionally, their routine patrol track was heavily damaged.

C. "Program, Funding and Implementation of Forest and Land Fire Prevention in Meranti Forest Management Unit" by the Forest Management Unit/KPH of Meranti, Musi Banyuasin District

The Forest Management Unit/KPH of Meranti's activities were made possible by the state and local budgets. It also received support from the collaboration with private companies and NGOs. It began collaborating with the private sector in terms of establishing business licenses (e.g. *Izin Usaha Pemanfaatan Hasil Hutan Kayu – Hutan Tanaman (IUPHHK-HT)*, *Izin Usaha Pemanfaatan Hasil Hutan Kayu – Restorasi Ekosistem (IUPHHK-RE)*, and *Izin Pinjam Pakai Kawasan Hutan (IPPKH)*) within its area. These concessions helped to empower the local community by allocating a certain portion of its budget. There were also many NGOs (Kelola Sendang, Belantara Foundation, HaK, Puter and Lingkar Hijau) that assisted to increase the local community's capacity, especially in forest and land fire prevention.

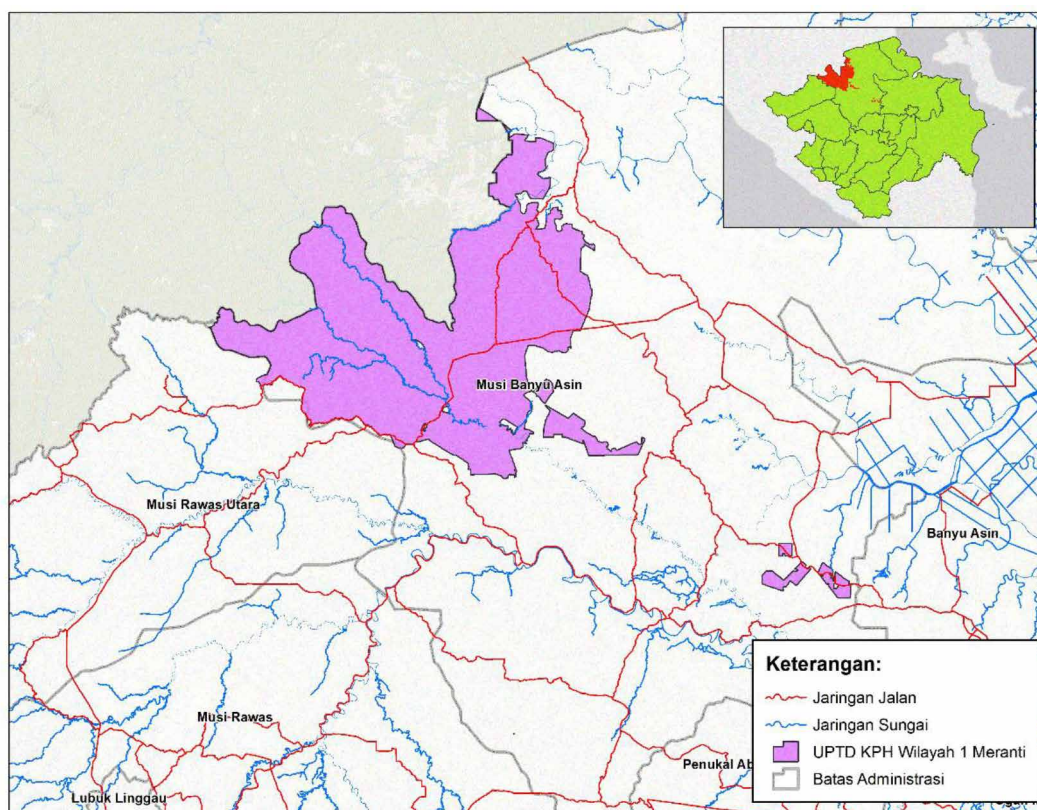


Figure 11. KPH Meranti.

KPH Meranti (Figure 11) has two major programs on protection and control. In the protection program, it conducted three main activities: prevention, management and post-fire management. In terms of preventing fire, the unit identified and mapped the areas considered to be vulnerable to fire, prepared supporting infrastructure and installed early disaster detection devices. KPH also conducted socialization and established a Fire Care Community (*Masyarakat Peduli Api/MPA*). Unit members educated the MPA using a control series of technical training sessions to increase community members' technical knowledge and capacity on fire and on land clearing without using fire. To accelerate the adoption of technical knowledge, KPH Meranti conducted intensive socialization and construction of demonstration plots.

D. "Program and Implementation of Community-Based Forest and Land Fire Prevention in the Concession of the Member of the Association of Indonesia Forest Concession Holder (APHI)" by the Association of Indonesia Forest Concession Holders/APHI

As presented earlier by APP, DMPA was also a part of the Association of Indonesia Forest Concession Holders (APHI) program in preventing fire. APHI planned six main programs, referred to as the pillars of DMPA: 1) community empowerment: encourage clear boundaries for villages located in forest areas; 2) participatory mapping: strengthen the networking; 3) technology transfer: support a commitment to the Integrated Sustainable Forest Management Plan (ISFMP); 4) forest area protection: increase community participation to reduce the anthropogenic pressure towards the forest; 5) conflict prevention and resolution: support the conflict prevention and resolution process; and 6) product marketing partnership: increase the economy and food security. Some examples of DMPA activities that were implemented were: catfish farming in Tulung Seluang and Lebung Hitam Darat Village; paddy farming in Gajah Makmur, Gajah Mukti and Kp. Rengas Merah Village; livestock farming; and many more. APHI also conducted participatory mapping and focus group discussions to plan and discuss DMPA's priority programs (paddy, corn and livestock). In the implementation process of these DMPA programs, APHI members have many concerns, for example, concerns about the timeframe of the program and evaluation of the programs' effectiveness and success. Lastly, APHI expected the DMPA program could achieve the ideal condition, to reduce the anthropogenically based fires, especially in the land clearing process. However, there were many technical constraints in the implementation. To resolve these issues, APHI planned to prepare: a master plan and infrastructure for a water system as well as continuously to assist in community development.

E. "Success Stories and Lessons Learned from the Community-Based Forest and Land Fire Prevention in Musi Banyuasin District" by Mandala Sari Village, Musi Banyuasin District

Mandala Sari Village of Musi Banyuasin District (Figure 13) was one of the beneficiaries of the DMPA program from PT. SHP. Mandala Sari was a transmigrant village where the community worked in the rubber, oil palm and *palawija* sectors. The fire prevention in Mandala Sari focused on one major point: educating the community members to change their behavior in land clearing and farming. In the DMPA program, community members were encouraged to commit to land clearing without using fire. DMPA then gave technical assistance in terms of socialization, training and supporting infrastructure such as a hand tractor. DMPA also gave capital to be managed under the BUMDes scheme. The representative from Mandala Sari Village confirmed how DMPA has helped the community to understand the impact of fire on the environment. This program also improved the community's capacity and knowledge on more environmentally friendly methods to clear and cultivate the land, although there were some constraints on crops marketing, unstable market prices and market access. Finally, the representative of Mandala Sari expected further collaboration and assistance in increasing human resources capacity, funding and infrastructure.

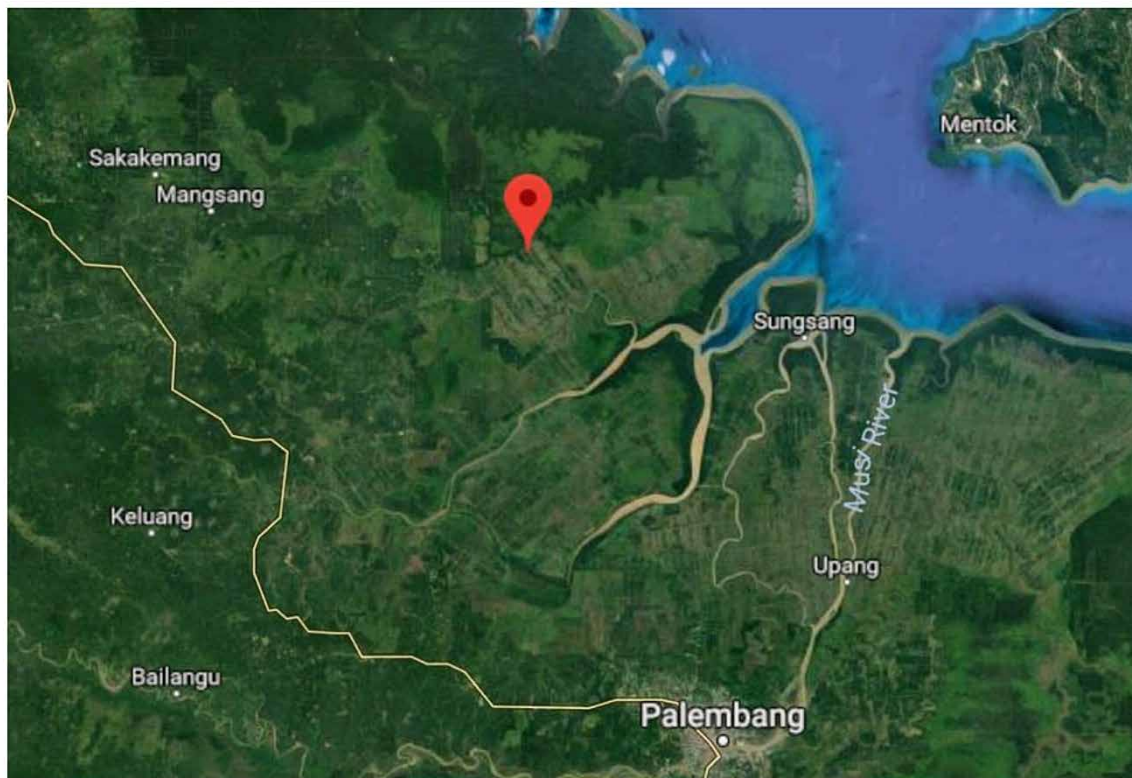


Figure 12. Location of Mandala Sari Village, Musi Banyuasin District (Google Maps 2018a).

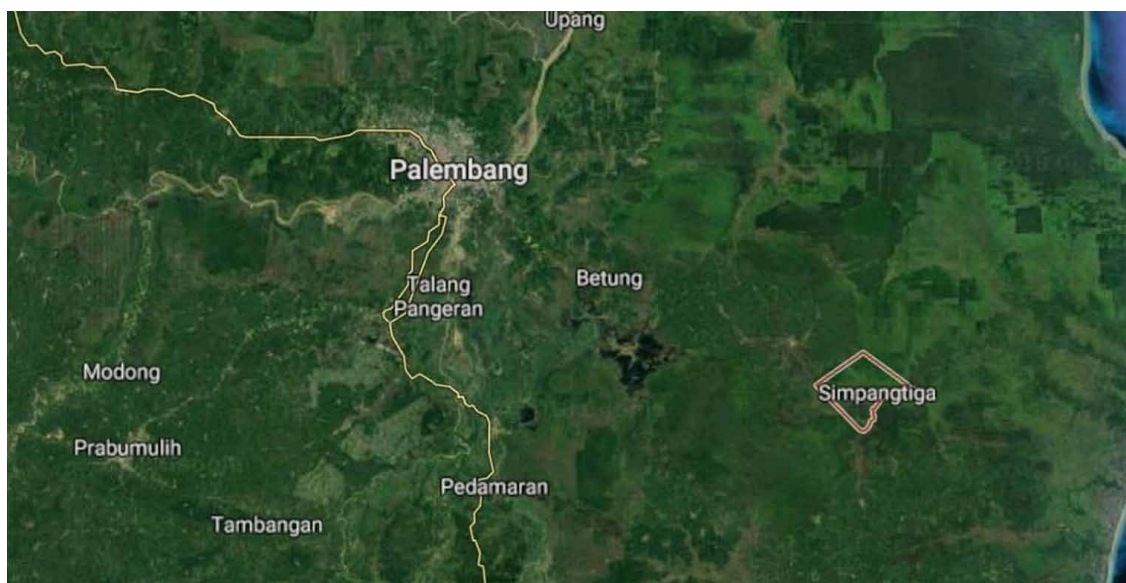


Figure 13. Simpang Tiga Village, Ogan Komering Ilir District (Google Maps 2018b).

F. "Success Stories and Lessons Learned from the Community-Based Forest and Land Fire Prevention in Ogan Komering Ilir District" by Simpang Tiga Village, OKI District

Simpang Tiga Village of OKI District (Figure 14) was one of the beneficiaries of the DMPA program. Villagers were highly dependent on natural resources and frequently used fire for their livelihood



Figure 14. The attendees were participating in a lively discussion.

activities. As the government passed laws banning the use of fire for land clearing, the community sought assistance to find a solution or alternative methods. The APP related company came to educate the communities about the environmental impact of using fire for land clearing and to offer a solution to increase the productivity. Now, villagers can harvest nearly three times more crops compared with the former traditional *sonor* cultivation methods. The company also supported the initiation of the revolving fund (*dana bergulir*). Additionally, the community received help from the government (i.e. a hand tractor). Finally, the representative of Simpang Tiga Village expects to broaden the community's collaboration and hopes the lessons learned will be useful to help future program development.

13.4 Insights from the stakeholders

Local communities have long been positioned and perceived as the actors involved in massive forest fires and land degradation. Now, Indonesia, through its national strategy, promoted a community-based movement primarily focused for repositioning communities to be a part of the solution - to encourage their participation and reduce the pressures on the ecosystem. In the context of forest fire, many schemes on community-based fire prevention were initiated by various stakeholders operating at different scales, i.e. community and village levels (Figure 14). One of the examples was *Desa Makmur Peduli Api* (DMPA) or Integrated Forestry and Farming System. DMPA is an example of integrated community-based fire prevention based on six pillars: income-generating community empowerment, participatory resource mapping to support community livelihoods, technology transfer, forest protection, conflict prevention and resolution, as well as product marketing partnerships.

As of 2017, DMPA has been established in 200 villages and this number will continue to grow to reach 500 villages by 2020. The program covers fire prevention, technology transfer, as well as developing many commodities, from staple foods to herbal plants and from poultry to home industry. Its assistance towards the community has been proven to increase the cropping productivity of local communities,



Figure 15. The conclusions and lessons learned from the scale-up program, implementation, and funding on community-based forest and land fire prevention were shared with the workshop participants.

as much as three times higher. Compared with other community-based fire prevention programs, the DMPA scheme uniquely covers socio-economic and ecological aspects in a more integrated manner. Scaling up DMPA is expected to cover a much larger number of beneficiaries and to magnify these impacts for broader local communities and the ecosystem.

For scaling-up purposes, we identified many laws, regulations and policies at national and subnational levels that function as the legal umbrella to support the fire-prevention efforts. Funding was allocated from the government through state and local budgets; as well as being sourced from non-governmental and commercial sectors (e.g. corporates' social responsibility fund). For example, APP committed to disburse a USD 10 million grant while the Government of South Sumatra allocated IDR 8.7 billion (USD 0.6 million¹) of funding. There were many mechanisms for self-financing DMPA too, for example, through establishing a revolving fund, BUMDes, microfinancing institutions, and cooperatives.

There were many opportunities to scale up DMPA, but scaling-up efforts should consider the challenges in DMPA implementation. Our study noted that slow technology adoption, lack of capacity, unstable market prices and stakeholder interest were a few challenges, among many others. Furthermore, there were concerns about generating a more permanent solution (i.e. creating a master plan for natural resources management) and measuring the effectiveness and success of the program. Another concern was to integrate and synchronize many community-based fire-prevention programs. Unifying the program maybe a good point but it will disempower the uniqueness of each approach. Future study should focus on how the different nature of community-based fire programs may contribute towards more fire-resilient ecosystems and adaptive communities as summarized by a CIFOR's senior researcher Mr. Heru Komarudin (Figure 15).

¹ Currency rate: IDR 14,453 (Bloomberg 2018).

14 Conclusion and recommendation

Governments at national and subnational levels have been developing public policies to suppress and prevent the occurrence of fires and to empower local communities. Similarly, market-based instruments such as certification and various programs and policies initiated by the private sector have set up principles and standards for fire prevention and the enhancement of fire-related community economic development. While the former are mandatory, adoption of the latter is voluntarily and may often be restricted to only subsidiary companies, not to the entire supply chain of actors. Both mandatory public and voluntary private policies have been instrumental in strengthening and scaling-up community-based fire prevention initiatives in order to sustain the environment and improve local livelihoods.

We identified 53 public policies from different ministries, agencies and local governments in South Sumatra that are strongly connected to fire prevention, suppression and private sector initiatives such as DMPA. These 53 policies are interconnected; some are complementary and some are redundant. Ten of the most connected public policies are Law No. 19/2013 regarding protection and empowerment of farmers, the Ministry of Environment and Forestry's Regulation No. 83/2016 regarding social forestry, Local Regulation of South Sumatra Province No. 8/2016 regarding forest and/or land fire control, Law No. 24/2007 regarding disaster prevention, Presidential Instruction No. 11/2015 regarding enhancement of forest and land fire control, Government Regulation No. 22/2008 regarding financing and management of disaster assistance, MPWH Ministerial Regulation No. 16/2015 regarding exploitation and maintenance of the irrigation network, Government Regulation No. 21/2008 regarding implementation of disaster prevention, BNPB Head Regulation No. 1/2012 regarding guidelines for disaster-resilient villages, and finally Government Regulation No. 57/2016 regarding protection and management of peat ecosystems.

Every public policy relies on government unit(s) such as a ministry, non-ministerial government agency such as BNPB and BRG, and a sub-national government unit to implement it. Those government units have plans and budgets. However, the budgets are less than what is needed to actually implement those plans. Therefore, public-private partnerships must take place to increase the effectiveness of the policy. This hybrid governance will increase the legitimacy of private sector initiatives and the effectiveness of government programs.

The private initiatives such as APP's DMPA program and its six pillars are supported by public policies. The pillar of *protecting and maintaining forest areas* (Pillar 4) and that of *transferring technology of eco-friendly land management for preventing of forest and land fires* (Pillar 2) are those most supported by the public policies, whereas, Pillar 6, *partnering in product marketing* is the least supported. Pillar 1, *economic communities' empowerment*, Pillar 2, *providing participatory mapping of resources*, and Pillar 5, *preventing and resolving local conflicts* are moderately supported. Therefore, to sustain DMPA work, a strong business model for every DMPA, embracing its resources, its value creation and capturing, and its transaction and marketing needs to be developed.

Public policies are implemented and budgeted for by different ministries and government unit levels. From the point of view of public finance, pillars of *technology transfer of eco-friendly land management* (Pillar 3) and *protecting forest areas* (Pillar 4) are those pillars best supported by public finance. *Development of community economy* (Pillar 1) is also supported, whereas *participatory mapping* (Pillar 2), *resolving local conflicts* (Pillar 5) and *DMPA product marketing* (Pillar 6) are least supported by public finance. This provides lessons that non-state actors need to provide more attention to participatory mapping, conflict resolution and product marketing.

DMPA will be potentially scaled up in terms of size or scale in order to produce and magnify impacts. The process of scaling up is supported by political will, the commitment of parties involved, enhanced local capacity, supporting policies and financial support. It is also indicated that there are potential partnerships, networks and synergies between DMPA and other similar initiatives. However, to make this scaling up a success, it requires strong linkage and coherence policies between central and subnational governments and effective monitoring and evaluation to generate lessons learned, and to allow corrective actions if anything goes wrong or not in the right direction.

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Annexes

Annex 1. Fire occurrence in Indonesia in 2017

No.	Province	Area extent (ha)		
		Mineral soil	Peatland	Total
1	Bengkulu	100	31	131
2	Jambi	109		109
3	Riau Islands	20		20
4	Lampung	5,966		5,966
5	Aceh	1,233	2,518	3,751
6	Riau	1,203	5,663	6,866
7	South Sumatra	3,626		3,626
8	West Sumatra	1,504	284	1,788
9	North Sumatra	637	131	768
10	West Kalimantan	3,479	3,961	7,440
11	South Kalimantan	4,058	40	4,098
12	Central Kalimantan	1,121	623	1,744
13	East Kalimantan	676		676
14	North Kalimantan	82		82
15	West Java	648		648
16	Central Java	6,028		6,028
17	East Java	5,116		5,116
18	Bali	371		371
19	West Nusa Tenggara	32,668		32,668
20	East Nusa Tenggara	37,585		37,585
21	South Sulawesi	836		836
22	West Sulawesi	188		188
23	Central Sulawesi	1,259		1,259
24	Southeast Sulawesi	2,845		2,845
25	Maluku	3,333		3,333
26	North Maluku	31		31
27	Papua	22,103	31	22,134
28	West Papua	270	81	350
Total		137,095	13,362	150,457

Annex 2. Precipitation 2015-2017²

Province	BMKG station	Rainfall (mm)		
		2015	2016	2017
Aceh	Sultan Iskandar Muda	1,174.60	2,578.80	1,453.80
Sumatra Utara	Kualanamu	920.7	1,756.10	1,771.60
Sumatra Barat	Sicincin	2,979.00	4,593.10	4,093.70
Riau	Sultan Syarif Kasim II	1,978.00	2,752.10	3,056.40
Jambi	Sultan Thaha	1,351.90	1,470.90	1,986.20
Sumatra Selatan	Kenten	1,707.80	3,503.20	2,358.10
Bengkulu	Pulau Baai	2,494.50	3,728.70	3,623.30
Lampung	Raden Inten II	1,530.50	2,251.40	1,415.40
Kepulauan Bangka Belitung	Depati Amir	795.8	3,015.70	2,290.40
Kepulauan Riau	Kijang	1,412.00	3,215.30	2,895.40
DKI Jakarta	Kemayoran	2,086.70	2,711.50	1,926.40
Jawa Barat	Bandung	1,912.70	3,406.20	2,063.70
Jawa Tengah	Semarang	1,077.50	2,336.50	2,200.30
DI Yogyakarta	Yogyakarta	1,051.30	3,047.20	2,173.10
Jawa Timur	Juanda	1,890.70	3,090.40	1,679.80
Banten	Serang	1,305.40	1,774.70	1,659.80
Bali	Ngurah Rai	1,129.90	2,487.40	1,732.20
Nusa Tenggara Barat	Bandara Int. Lombok	1,098.60	2,391.40	1,785.30
Nusa Tenggara Timur	Lasiana	1,355.30	856.4	1,091.90
Kalimantan Barat	Supadio	2,691.60	4,734.10	3,208.80
Kalimantan Tengah	Tjilik Riwut	2,637.20	3,542.50	3,095.00
Kalimantan Selatan	Banjarbaru	1,712.90	2,466.70	2,582.70
Kalimantan Timur	Temindung	2,116.90	2,533.90	2,307.60
Kalimantan Utara	Tanjung Harapan	2,311.50	3,485.40	2,808.40
Sulawesi Utara	Kayuatu	1,672.00	3,227.70	3,847.70
Sulawesi Tengah	Mutiara SIS Al-Jufrie	463.4	683.5	832.3
Sulawesi Selatan	Maros	3,161.10	2,895.80	2,628.80
Sulawesi Tenggara	Sangia Nibandera	1,645.70	2,465.80	2,321.00
Gorontalo	Djalaluddin	782.7	1,501.40	1,570.20
Sulawesi Barat	Majene	466.1	1,633.90	1,074.00

*continued on next page*2 Rainfall data for the period 2015–2017 (processed from http://dataonline.bmkg.go.id/data_iklim)

Annex 2. Continued

Province	BMKG station	Rainfall (mm)		
		2015	2016	2017
Maluku	Pattimura	2,063.80	2,996.60	5,370.20
Maluku Utara	Sultan Babullah	889.5	2,248.30	2,615.90
Papua Barat	Seigun	2,164.80	2,922.50	3,515.40
Papua	Frans Kaisiepo	849.4	2,866.30	2,857.20
Rata-rata Indonesia		1,614.16	2,681.51	2,408.59

Annex 3. Certification principles and criteria embracing no-fire and community empowerment

	Major principles, criteria and indicators ^a		
	Avoidance of the use of fire for land clearing	Social responsibility and community empowerment	
Forest, plantation and oil palm certification schemes	<p>RSPO: Roundtable on Sustainable Palm Oil is a nonprofit organization that unites stakeholders from seven sectors of the palm oil industry. RSPO has developed 8 principles and 43 criteria associated with environmental, economic and social aspects.</p>	<p>Use of fire for preparing land or replanting is avoided, except in specific situations identified in the ASEAN guidelines (on policy on zero burning, issued in 2003) or other regional best practice. Fire should be used only where an assessment has demonstrated that it is the most effective and least environmentally damaging option for minimizing the risk of severe pest and disease outbreaks, and exceptional levels of caution should be required for use of fire on peat (5.5 and 7.7).</p>	<p>Growers and millers contribute to local sustainable development where appropriate (6.11). The contributions should be based on the results of consultation with local communities. The consultation should encourage communities to identify their own priorities and needs, including the different needs of men and women.</p>
	<p>ISCC: International Sustainability and Carbon Certification contributes to sustainable production, conversion and use of agricultural crops and forestry products. The system has 6 principles and 46 criteria. The system requirements related to fire and community empowerment are Principles 2, 4 and 5.</p>	<p>It is required that producers comply with national and local laws and regulations, particularly on burning practices. This is to ensure environmentally responsible production. The burning of stubble or other crop residues is only allowed with the permission of a competent authority and if there are no viable alternatives. Burning as part of land clearance is prohibited (2.4.3).</p>	<p>Various forms of social benefits are offered by producers to incentivize not only employees of the company but also surrounding communities (4.20).</p>
	<p>FSC: Forest Stewardship Council's mission is to promote environmentally sound, socially beneficial and economically prosperous management of the world's forests. The system has 10 principles and 57 criteria for responsible forest management.</p>	<p>Measures shall be taken to prevent fire (10.7.1) and a documented plan shall exist and be implemented for site maintenance and for regular monitoring to prevent uncontrolled fires. Staff, workers and contractors shall be trained in the procedures to follow in case fire is detected (10.7.2 and 10.7.3).</p>	<p>Certified entities shall contribute to maintaining or enhancing the social and economic well-being of local communities (4). They shall implement additional activities through engagement with local communities that contribute to their social and economic development, proportionate to the scale, intensity and socioeconomic impact of their management activities (4.4). The communities within, or adjacent to, the forest management area should be given opportunities for employment, training and other services (4.1).</p>

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^a Numbers in bracket refer to the numbering of principles and criteria of the respective sustainability system

Annex 3. Continued

	Major principles, criteria and indicators ^a		
	Avoidance of the use of fire for land clearing	Social responsibility and community empowerment	
Forest, plantation and oil palm certification schemes	<p>ISPO: Indonesian Sustainable Palm Oil is a mandatory standard for growers, mills, smallholders and CPO-based renewable energy producers to meet. It has 7 principles and 34 criteria for sustainable and legal production of palm oil.</p>	<p>Companies must perform fire prevention and mitigation assessments, and make sure that SOPs, human resources, fire control systems, facilities and infrastructure, organizations, and reporting and emergency response systems, are all in place. Fire prevention training and monitoring shall be done and reported regularly (4.5). Land clearance that meets the principles of soil and water conservation and standard operating procedure has to be in place to make sure that land clearing is not done using fire. The unit has to demonstrate all land clearing activities since 2004 indicating that there has been no burning (2.2.1.1).</p>	<p>Companies shall commit to social and economic development of surrounding local communities (6). They have to provide local communities with programs to improve the quality of life and environment and to improve the welfare of communities surrounding the plantations by engaging in business partnerships. Reports on the implementation of Corporate Social Responsibility programs shall be made available.</p>
	<p>PEFC/IFCC: The Programme for the Endorsement of Forest Certification (PEFC) is a nonprofit, nongovernmental organization dedicated to promoting sustainable forest management. Based on the national standard of PEFC for Indonesia, developed in conjunction with the Indonesian Forestry Certification Cooperation (IFCC), the system has a set of production, social and environment requirements for sustainable forest management, divided into 3 sections, covering 12 criteria for natural forests and plantations, and 3 specific criteria for natural forests and plantations.</p>	<p>The management unit shall identify and monitor disturbances that represent a threat for the forests, such as fires (8.1). The management shall implement measures to protect forests against fires, and carry out analysis of the risk of the fire's start and propagation within the concession (8.4). It has also to develop a fire detection system and adopt appropriate silvicultural systems, and prohibit forest lightening and other use of fire as a management technique (e.g. slash burning). The management is also responsible for maintaining infrastructure for the fire protection (road system, a water system and reservoirs); and provide education and increase awareness of workers and local communities.</p>	<p>The management unit shall provide access to the indigenous people and local communities in utilizing forest resources that provide significant economic, ecological and cultural (including religious) functions for the community (9.4). It shall also establish a mechanism for conflict resolution relating to the customary rights of the indigenous communities and/or legal rights of the local communities (9.5).</p> <p>The management unit shall provide adequate support to indigenous and/or local communities, in order to increase the capacity of the latter and to support economic development. It shall also help build infrastructure and facilities, and maintain long-term health improvement and enhance indigenous and/or local communities' well-being (10.4)</p>

Annex 4. Forestry and environmental policies related to forest fire prevention and community development

Types of regulations (date issued)	Scope	Stipulations supporting the scale up of community-based fire prevention measures
Regulation of Director General of Social Forestry and Environmental Partnership No. P.2/PSKL/Set/Kum.1/3/2016 (15 March 2016)	Social movement and community groups aim to save, protect and manage natural resources, the environment and forests	<ul style="list-style-type: none"> The regulation provides a guidelines for facilitating social movement and community actions to protect natural resources; Community groups or members refer to those who are willing and committed to carrying out conservation, protection and management of natural resources.
The Minister of Environment and Forestry's Regulation No. P.83/MenLHK/Setjen/Kum.1/10/2016 (26 October 2016)	The minister gives local communities legal access to resources through different schemes of social forestry such as village forests, community forests, people's plantation forests, forestry partnerships and recognition of indigenous communities	<ul style="list-style-type: none"> To increase the capacity of the group and strengthen the institutions, the Director General shall provide technical as well as financial support in partnership with other parties such as NGOs, private sector, local governments. While the regulation is intended to provide guidelines for giving rights to local communities and for building partnerships, this is also aimed to resolve any tenure conflicts and to give local communities equal access to benefit from forests in order to improve their welfare. Forest and nature conservation managers (such as forest management units, the agency responsible for managing a conservation area) or holders of forest management permits are obliged to empower nearby local communities through building partnerships for managing specific areas, which can be up to 2 ha in size per household for partnerships between local communities and forest managers, and up to 5 ha for partnerships between local communities and forest concessionaires. Finance for implementing social forestry programs including partnership programs can be sourced from national as well as subnational state budgets, forest financing loans, village funds, forest and land rehabilitation funds and other valid sources. Facilitation for partnership shall be provided by government and local government with support from third parties such as social forestry working groups, forestry extension workers, NGOs, universities etc.

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Annex 4. Continued

Types of regulations (date issued)	Scope	Stipulations supporting the scale up of community-based fire prevention measures
<p>The Minister of Environment and Forestry's Regulation No. P.32/MenLHK/Setjen/Kum.1/3/2016 (15 March 2016)</p>	<p>The minister issued detailed guidelines for controlling forest and land fires in order to make the measures effective and efficient. This includes planning, organization and operations as regards to management of human resources, procurement of equipment and infrastructure for suppressing and preventing fires, supervision, monitoring, and post-fire handling</p>	<ul style="list-style-type: none"> • A well-structured organization of forest and land fire controlling system, established at various levels from national, local and management levels, which has coordinative (a national and local taskforce) as well as operational (forest and fire controlling brigade, Manggala Agni) functions. • The holders of the forest utilization permits, forest managers and social forestry scheme managers are responsible for facilitating community groups under masyarakat peduli api (MPA) which consists of at least two groups comprising 15 community members each. MPA is formed in conjunction with nearby forest management units, Manggala Agni. They are also obliged to provide supporting facilities for the fire brigade. • To enhance the capacity of human resource in controlling fires, it is necessary to conduct education, in-house and on-the-job training, and provide technical guidance. • At least one Forest Fire Controlling Primary Group has to be assigned in every management unit or in natural forest as well as plantation concession unit (where concession area is up to 20,000 ha). Two or three groups have to be assigned for concessions with a size of from 20,000 ha to 40,000 ha, and from 40,000 to 60,000 respectively. • Empowerment of local communities to control and prevent fires shall be made through strengthening their capacity and self-sufficiency in this regard, creating a conducive environment and strengthening local institutions. • Forest and fire prevention programs shall include community empowerment, awareness, fire risk reduction, preparedness, early warning system and patrol or fire prevention. • The forest and land fire prevention activities can take the form of agroforestry, agro-silvopasture, silvopasture, extension workers, campaign for the prevention of fires, providing guidance to fire-aware community groups, adoption of no-burning practices for land clearing. etc. • Innovative techniques for controlling fire (prevention, suppression, post-fire handling, evacuation, management information system) shall be supported by research and development, guidance and knowledge sharing. • Activities aimed to strengthen village institutions shall include preparing village regulations concerning local fire control, establishing fire aware communities, organizing farmer groups, procuring means and infrastructure and the establishment of climate-aware villages.

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Annex 4. Continued

Types of regulations (date issued)	Scope	Stipulations supporting the scale up of community-based fire prevention measures
The Minister of Forestry's Regulation No. P.16/Menhut-II/2011 (14 March 2011)	Guidelines for the <i>Program Nasional Pemberdayaan Masyarakat (PNPM)</i> or national program on forest community empowerment to be self-sufficient. The guidelines are intended as a reference for national as well as local governments, the ministry's implementing units, and other parties involved in empowering communities living within or around the forest concessions, and forest conservation management entities	<ul style="list-style-type: none"> • Partnerships on controlling fires shall be established, which will bind all parties concerned with fire control to agreed terms and conditions detailing rights and obligation for, for instance, developing human resources, creating innovative solutions, providing means and infrastructure, community empowerment and other management support. • Routine and special oversight shall be conducted by an integrated team comprising different parties at different levels to ensure good performance, which will become the basis for development, application of rewards and sanctions. Rewards and sanctions shall be applied to either those implementing fire control and meeting the desired criteria, or those who fail, respectively. • Funding for on-call budget and multi year budget shall be sourced from national and local budgets as well as other non binding sources. Different ministries and local governments are obliged to allocate a budget for controlling fires. Similarly, management units are also required to allocate their yearly operational costs to finance fire-controlling activities carried out by their own and other parties including nearby communities. • A strategy for a national program for community development (or PNPM) as put forward in the guidelines includes establishing conservation villages (rehabilitation of conservation areas, which gets local communities including Masyarakat Peduli Api involved in various activities); community empowerment; coordinating with other sectors' programs for people's welfare through the Coordinating Ministry for People's Welfare to facilitate all forest-related investments in community development; and assigning facilitators to provide guidance and development. • The program shall be integrated with other sectors such as agriculture, fisheries, husbandry, health, tourism, transportation and education. • Support through this program can take the form of training to increase the capacity of local communities in productive economies and relevant activities promoted by other sectors and to strengthen institutions; revolving funding loans and grants; and procurement of seedlings, fruit trees, fast-growing species. • Control, evaluation and oversight, which are the main responsibility of the Directorate Generals for Forest Production Management and for Forest Protection and Nature Conservation, shall also be conducted to ensure the effective implementation of the programs.

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Annex 4. Continued

Types of regulations (date issued)	Scope	Stipulations supporting the scale up of community-based fire prevention measures
The Minister of Forestry's Regulation No. P.76/Menlhk/Setjen/Kum.1/8/2016 (31 August 2016)	The minister mobilizes forestry extensions from the private sector (PKS) and civil society (PKSM) in order to support the successful implementation of forestry programs to build self-sufficiency for communities living around forests	<ul style="list-style-type: none"> • Implementing organizations shall be established at national government, forestry implementing unit and village levels. The latter comprise the head of village, village institution, community groups that will benefit from PNPM programs, and facilitators who will assist local communities in implementing the programs. • Government shall facilitate extension workers and institutions established by the private sector and civil society. Support may include training, materials, use of facilities, incentives for civil society extension workers, giving awards and recognition, and certificates. • Government institutions responsible for extension programs, to which the private sector-led extension workers have to report, include BP4K or regency-based Agency for Extension in Agriculture, Fishery and Forestry Sectors; BAKORLUH or province-level Coordinating Agency for Extension Activities Related to Agriculture, Fishery and Forestry Sectors, and national-level Forestry Extension and Human Resources Development Agency.
The Minister of Forestry's Regulation No. P.39/Menhut-II/2013 (16 July 2013)	The minister requires forest managers and holders of forest management and utilization permits to empower nearby local communities through building partnerships and engaging permit holders in agreements to get access to and benefit from forest resources. The purpose of this policy is to develop their capacity to be self-sufficient and to improve their welfare	<ul style="list-style-type: none"> • Extension workers are responsible for preparing and implementing forestry extension programs, preparing the methods and materials for extension activities, and building networks and partnerships with relevant stakeholders. • Partnerships can be in the form of collective management of an area where activities may range from land preparation, seeding, planting, procurement of infrastructure, maintenance or processing to marketing. Through partnership, both parties can benefit from utilizing and harvesting timber as well non-timber products, intercropping and environmental services. • Area or location under partnership can be within forest concessions (e.g. area allocated for tanaman kehidupan), those under conflict, and those are as that local communities heavily depend upon for their livelihood. • Director general, heads of agencies or heads of local forest agencies are responsible for facilitating the partnerships between forest management and holders of forest utilization permits with local communities. Other parties such as NGOs, universities, forest extension workers and local institutions can also provide assistance in facilitating partnerships through socialization, group formation, institutional development and strengthening. • The financing for facilitating a partnership can be sourced from the national government budget or other valid budgets.

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Annex 4. Continued

Types of regulations (date issued)	Scope	Stipulations supporting the scale up of community-based fire prevention measures
The Minister of Forestry's Regulation No. P.17/Menhut-II/2014 (14 March 2014)	The regulation stipulates a procedure for community empowerment, aimed to increase the capacity of local communities, increase their awareness and to encourage their participation in watershed management activities. The goal of empowerment is to build self-sufficiency and skilful communities	<ul style="list-style-type: none"> In the context of watershed management, local communities are empowered through such activities as education, training and counseling, social assistance, provision of facilities and technical assistance, and granting of access to resources. Source of funds for this empowerment shall be sourced from national and local government budgets, grants and other valid sources of financing.
The Minister of Environment and Forestry's Regulation No. P.43/Menlhk/Setjen/Kum.1/6/2017 (22 June 2017)	The regulation requires community empowerment around nature reserves and nature conservation areas, and aims to develop self-sufficiency and prosperous communities living around those areas	<ul style="list-style-type: none"> Communities living around nature reserves and nature conservation areas can become the target for empowerment, coordinated by the head of the nature reserve and nature conservation area management. Empowerment plans are prepared by a working group in close collaboration with local stakeholders, and have to be in line with the village development plan. Community empowerment (through training, guidance, extension) shall be enabled in order to increase a community's knowledge and skills, and their institutions will be strengthened to enable them to change in attitude towards a conservation-based economy or economic activities that promote conservation. Local communities are introduced to conservation concepts and an array of activities that could lead to an improvement in their income and welfare. Communities shall be guided to form groups, strengthen their collective actions, to develop village rules, working plans, partnerships, access to market information and capital and to various prospective businesses. Community empowerment can take the form of the development of a conservation village, granting of access (to utilize non-timber forest, traditional culture, hunting), partnership facility (capital, marketing, infrastructure, institution and technology), and granting of permits to tourism business. The nature area managers shall also provide technical support to further develop products produced by local communities. They can also give awards to local communities that have played a significant role in establishing a conservation village and helping conserve nature. The awards can include engaging them in a comparative study visit, financial assistance for infrastructure and equipment and for materials such as seedlings to develop their productive economy. Community empowerment shall be financed by national and local government budgets and other non binding sources.

Annex 4. Continued

Types of regulations (date issued)	Scope	Stipulations supporting the scale up of community-based fire prevention measures
The Minister of Environment and Forestry's Regulation No. P.89/Menlhut-II/2014 (29 September 2014)	Through this regulation, the minister shall provide villages through their institutions access to forest resources to improve the welfare of the communities	<ul style="list-style-type: none"> Village forest schemes can be developed based on a proposal by the village head, and the area shall be located outside the forest concessions, and require no permit. Rights to manage village forests can be granted by the governor based on working areas stated by the Minister of Forestry. With the rights, relevant communities can benefit from utilizing environmental services (in protection areas), and harvest timber and non-timber products. Facilitation shall include education, training, forming of institutions for managing village forests, preparing a management plan, product development, use of technology and access to market and capital.
The Minister of Environment and Forestry's Regulation No. P.30/Menlhk-Setjen/2015 (29 June 2015)	As part of community empowerment activities around the "Social Forestry program", the minister issued this regulation to guide in providing equipment assistance aimed to develop the local community's economy and production activities	<ul style="list-style-type: none"> Community groups under target shall be those joining community forestry, village forest and people's forest farmer groups, forest indigenous community groups and other farmer (non-timber forest product) groups. Equipment and machinery shall be made available to support and facilitate communities under different social forestry schemes to develop their productive activities.
The Minister of Environment and Forestry's Regulation No. P.28/Menlhk-Setjen/2015 (29 June 2015)	A general set of guidelines for the development of conservation-based social forestry, aimed to promote the growth of the rural economy, reduce poverty, provide employment, increase local people's income, but also improve the watershed and the environment	<ul style="list-style-type: none"> Community empowerment as stipulated in the regulation refers to different activities of conservation-based forestry enterprises, including farming activities, agroforestry and managing non-timber forest products, livestock, fisheries, etc. The farming activities can be combined with soil and water conservation measures such as construction of terracing, waterways, gully plugs, etc. The priority communities are those having less productive lands, and groups can receive up to IDR50 million. Funds can be allocated for agroforestry, soil and water conservation at the minimum of 70% of the total, and can only be allocated for husbandry, fisheries, non-timber forest products and product processing equipment up to 30% of the total funds. Potential community groups receiving the funds can be proposed through a bottom-up process by a group of interested communities that are qualified to meet the requirements. The Director General of Social Forestry and Environment Partnership will verify the proposed group after it has been verified by the regency agency dealing with forestry, and will formally assign the group. The amount of funding and necessary procedure for disbursement shall be determined by the official within the Local Agency for Watershed Management.

Annex 5. Policies related to fire prevention from Ministry of Villages, Underdeveloped Regions and Transmigration

Types of regulations (date issued)	Scope	Stipulations supporting the scale up of community-based fire prevention measures
Village Strategic Plan 2015–2019	Policy direction, strategy, regulatory framework and institutional framework	Village Strategic Plan 2015–2019 does not specify any plans for the handling of forest and land fires. However, fire handling was mentioned in one of the targeted programs that will run until 2019, titled Development of Natural Resources and the Environment in Disadvantaged Areas under the responsibility of the Directorate of Natural Resources and Environment Development. That program included policy, implementation and assistance to develop natural resources in villages. Indirectly, forest fire is one of many environmental issues that can be handled by the Ministry of Villages, Underdeveloped Regions and Transmigration
Law 6 Year 2014 about Villages	Understanding the village, government and its authorities. Generally, it states that the village has the right of origin and the traditional right to organize and manage the interests of the local community so as to create a strong foundation in implementing governance and development	<ul style="list-style-type: none"> • In clause 68, villages are obliged to maintain the environment and promote a safe, comfortable and peaceful situation. • Allocation of village funds is prioritized for rural development including the environment. • Village has obligations to make rural development planning for sustainable use of natural resources and the environment. • Village prepares development planning in accordance with its authority with reference to regency/city development planning.
Government Regulation No. 8. 2016, on Changes in PP 60 2014	Village Funds are funds sourced from the State Revenues and Expenditures Budget for villages that are transferred through the regency's Revenue and Expenditure Budget and are used to finance the implementation of governance, development implementation, community development and community empowerment	Village Funds (DD) are dominantly used for infrastructure development, and only a small portion are used for empowerment of the community and economic development in the village. Thus, village spending for the Implementation of Village Governance and Community Guidance must be sourced from Village Fund Allocation (ADD) and other village income sources other than DD.
Regulation of Minister of Villages, Underdeveloped Regions and Transmigration No. 21, 2015 on the Establishment of the Priority of Village Funds Usage Year 2016	Contains information on how the use of village funds should consider and adapt to village typologies based on the extent of village development progress (disadvantaged villages, developing villages, advanced villages). The village typology uses a village build index (IDM) established by the ministry	Village typology determines one of the programs used in village planning. There is chance to use the village funds for prevention forest and land fire, as the priority use of funds is determined by the village typology, considering geographic, anthropological and ecological characteristics. Some clauses have been written on the sustainable utilization of natural resources and the environment for villages and forests.

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Annex 6. Continued

Types of regulations (date issued)	Scope	Stipulations supporting the scale up of community-based fire prevention measures
Minister of Villages, Underdeveloped Regions and Transmigration No. 3 Year 2015 About Village Assistance	Definition and arrangement of village assistance. Third parties can help but financial resources and activities cannot come from the village funds, only from NGOs, academia, CSOs, and companies	Community is an effort to develop the independence and welfare of the community by increasing knowledge, attitude, skills, behavior, ability, awareness, and utilizing the resources through the establishment of policies, programs, activities and assistance in accordance with the essence of the problems and prioritized needs of the village community.” Training that can strengthen their capacities and knowledge about how to prevent forest fire is a must, but has limited access if only village funds are used.
Regulation of Minister of Villages, Underdeveloped Regions and Transmigration No. 2 Tahun 2015 About the Code of Conduct and the Decision-Making Mechanism of Village Deliberations	Deliberation Village represents deliberations between the Village Deliberation Agency, Village Government and community elements organized by the Village Consultative Body to agree on things that are strategic	Deliberation Village is a forum of meetings of all stakeholders in the village, including the community, in order to outline matters considered important by the village government and also concerned with the needs of the village community. Village meetings are held at least once a year and are intended to deliberate on strategic matters that are considered important. These strategic items include: a) village management b) village planning c) village cooperation d) investment plans that affect the village e) establishment of Village Owned Enterprise (BUMDes) f) addition to and disposal of village assets g) extraordinary events. Chapter 7 of this regulation specifying about extraordinary events can be interpreted to include forest and land fires as strategic events.
PMK 226/PMK. 07/2017 About the Amendment of Details Funding by Regency/City Budget in Budget 2018	Budget allocation of each regency in Indonesia for 2018	Total budget for 14 regencies (2853 villages) mentioned in PMK 226 in South Sumatra only is IDR2,314,121,041,000 or IDR2.3 T. Specifically, for OKI Regency, the budget allocation is IDR253,191,679,000 M. In OKI, there are 314 villages. It is estimated that each village will get IDR806,342,926.75 for a year. This budget for village development also includes funding for the environment.

Annex 6. Policies relevant to forest fire prevention and community development from Ministry of Agrarian and Spatial Planning (MASP)

Types of regulations (date issued)	Scope	Stipulations supporting the scale-up of community-based fire prevention measures
Law No. 19/2013 on Protection and Empowerment of Farmers	Planning; farmers' protection; farmers' empowerment; financing; surveillance; and community participation	Chapter 7 Article 2f, early warning system and impact handling Climate change, more detail is in Chapter 34 ^a
Law No. 5/1960 on Basic Regulation of Agrarian Principles	The entire territory of Indonesia includes the natural resources contained therein (earth, water and space); communities have rights and legality of land	Some people have rights in land tenure; one right is in Article 46, right to land access and collection of forest products ^b
Law No. 26 of 2007 on Spatial Plan	Arrangement, guidance, implementation and monitoring of spatial planning	Article 1(20) stipulates that the region's main function is for protected areas or cultivation ^c . Article 60 on rights, responsibility and the role of the community in spatial planning
Ministerial Regulation of Agrarian and Spatial Plan No. 15/2016 on Procedures for the Disclaimer or Cancellation of Business Rights or the Use Right on Burned Land	Provide legal certainty about burned land that is released or abandoned, that becomes state land	Article 3 on business license holders having responsibility and poverty rights to burned land
Ministerial Regulation of Agrarian and Spatial Plan No. 18/2016 on Control of Agricultural Land Tenure	Control of land for the ownership of agricultural land (boundary area), thus preventing efforts to avoid the practice of debt bondage (ijon). This regulation acquires the legality of land only owned by people living in the location (indigenous/local communities)	Articles 3, 4 and 5 on land ownership criteria, the legality of an integrated land use with the spatial and individual land ownership transition
Ministerial Regulation of Agrarian and Spatial Plan No. 28/2016 on Acceleration of the Agrarian National Program through Systematic and Full Land Registration	The establishment of Rights and Land Registration for the first time in a systematic and continuous manner implemented by villages for villages	Article 12 on private data and information concerning land acquisition
Presidential Regulation No. 88 of 2017 on Land Settlement Procedures within the Forest Area	Settling land conflicts within forest areas, strengthening community rights to land access, ensuring the boundaries of forest areas	Article 8(1). The pattern of settlement for parcels of land, which is controlled and utilized after the plot of land is designated as a forest area in the following form: a. remove plots of land within a forest area by changing the boundaries of forest areas; b. exchange of forest areas; c. provide access to forest management through social forestry programs; d. undertake resettlements.
Presidential Regulation No. 2/2015 on the National Medium-Term Development Plan 2015–2019	Foundation of performance arrangement agreement, performance measurement, performance data management, reporting and performance evaluation. The entire activities program in 2015–2019	Land rights, Land Registry and community empowerment. Legacy of land asset base on Ministry Regulation No. 4/2015 on National Agrarian Program of (PRONA)

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Annex 7. Continued

Types of regulations (date issued)	Scope	Stipulations supporting the scale-up of community-based fire prevention measures
SK.180/MENLHK/SETJEN/KUM.1/4/2017 Indicative Map of Forest Areas for the Provision of Land for the Agrarian Reform Program (TORA)	Insurance of land access and agrarian reform object to local community in forest areas; guideline for indicative map of social forestry	Scheme of agrarian reform base on verdict numbers 1 and 3 ^d

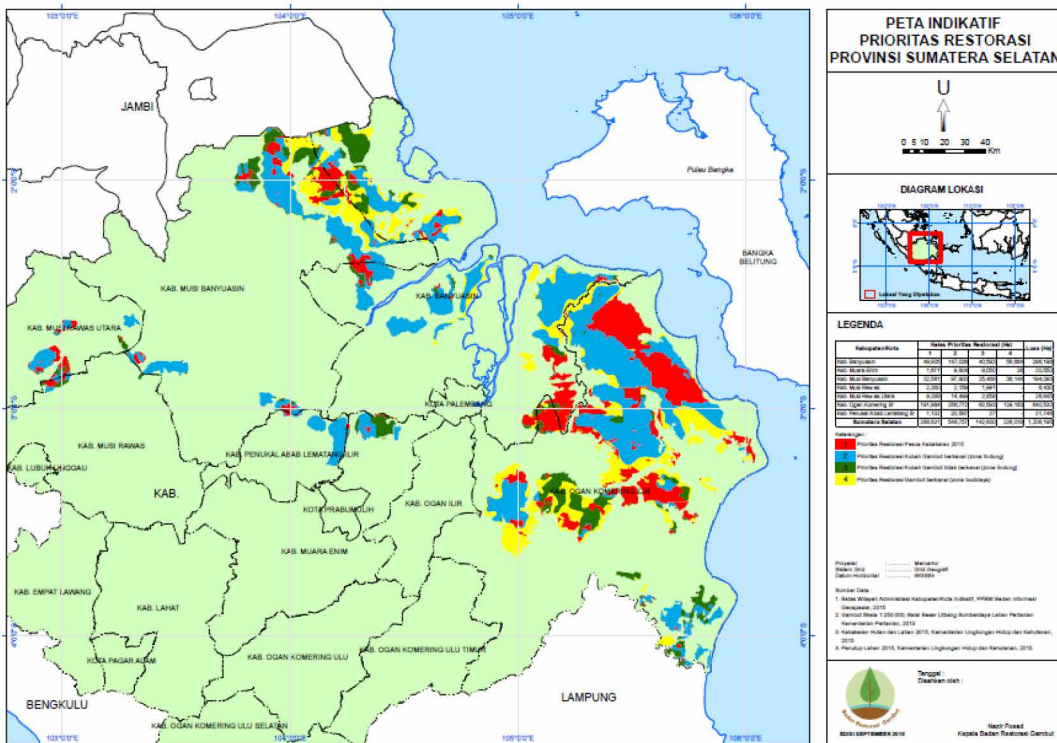
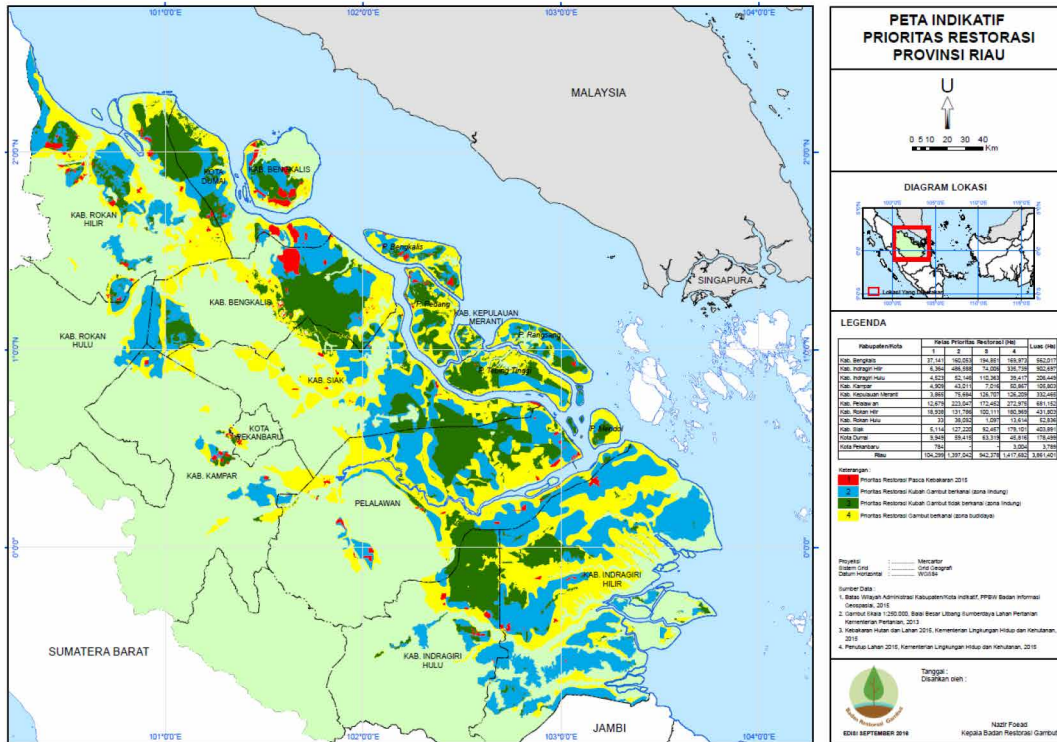
a <http://perundangan.pertanian.go.id/admin/uu/UU%20No.19%20Tahun%202013%20Perlindungan%20&%20Pemberdayaan%20Petani.pdf>

b <https://ngada.org/uu5-1960bt.htm>

c http://www.gitews.org/tsunami-kit/en/E6/further_resources/national_level/undang_undang/UU%2026-2007_Penataan%20Ruang.pdf

d <https://www.slideshare.net/Petakampung/sk180menlhksetjenkum142017-tentang-peta-indikatif-alokasi-kawasan-hutan-untuk-penyediaan-sumber-tanah-objek-reforma-agraria-torapeta-tora-2>

Annex 7. Restoration maps of Riau, South Sumatra and West Kalimantan Provinces (BRG 2016)



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Fire may reduce land preparation cost, but negative externalities can cause high losses, outweighing its economic benefit. The severe fire in Indonesia in 2015 affected health, the economy, the environment, tourism and education. In response, governments at national and sub-national levels have developed public policies to prevent or reduce fires and empower communities. We identified 53 public policies from different ministries, agencies and local governments in South Sumatra that are strongly connected to private sector initiatives, such as IFFS (Integrated Forestry Farming System or *DMPA-Desa Makmur Peduli Api*). Ten of the most connected public policies are Law No. 19/2013: Protection and empowerment of farmers; Ministry of Environment and Forestry (MOEF)'s regulation No. 83/2016: Social forestry; Local Regulation of South Sumatra Province No. 8/2016: Forest and/or land fires control; Law No. 24/2007: Disaster prevention; Presidential Instruction No. 11/2015: Enhancement of forest and land fire control; Government Regulation No. 22/2008: Financing and management of disaster assistance; PUPR Ministerial Regulation No. 16/2015: Exploitation and Maintenance of Irrigation Network; Government Regulation No. 21/2008: Implementation of disaster prevention; National Disaster Board (BNPB) Head Regulation No. 1/2012: Guidelines for disaster resilient villages; and Government Regulation No. 57/2016: Protection and management of peat ecosystems. These 53 policies are interconnected, in that some are complementary, while others overlap.

Government units, such as ministries, non-ministerial government agencies (e.g. BNPB and Peatland Restoration Agency-BRG) and sub-national government departments are responsible for setting budgets, planning and implementing these policies. However, they are restricted financially. Public-private partnerships offer a solution. This hybrid governance will increase the legitimacy of private sector initiatives and the effectiveness of government programs.

A number of laws, regulations and policies at the national and sub-national level provide a legal umbrella allowing fire-prevention efforts to be scaled up. Funding is allocated from the government through state and local budgets, as well as from non-governmental organizations and the commercial sector. There are various mechanisms for self-financing IFFS, for example by establishing a revolving fund, village-owned enterprises (BUMDes), microfinancing institutions and cooperatives. To sustain IFFS programs and activities, a strong business model must be developed for every IFFS activity, incorporating its resources, its value creation and capture, and its transaction costs. Marketing of products is a significant element of sustainability must be developed.

The challenge in scaling-up efforts is the implementation of IFFS program on the ground. Our study noted slow technology adoption, lack of capacity, unstable market price and lack of stakeholders' interest as the most prominent challenges. Stakeholders are concerned about generating a more permanent solution, i.e. creating a master plan of natural resources management in the area, and measuring the effectiveness and success of the IFFS program. Addressing these concerns could facilitate the scaling up the IFFS program at the national level.



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