

# The Role of Fire Care Community for Land Fires Mitigation in Banjarbaru, South Kalimantan

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**Submission date:** 24-Jun-2022 03:58AM (UTC-0400)

**Submission ID:** 1862210113

**File name:** Fire\_Care\_Community\_for\_Land\_Fires\_Mitigation\_in\_Banjarbaru.pdf (421.2K)

**Word count:** 4727

**Character count:** 23893

## THE ROLE OF FIRE CARE COMMUNITY FOR LAND FIRES MITIGATION IN BANJARBARU, SOUTH KALIMANTAN

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### Abstract

Land fires occur repeatedly every year in Banjarbaru, South Kalimantan. The most effective handling of land fires is to involve the community. Fire management in Banjarbaru is carried out by fire care community-*Masyarakat Peduli Api (MPA)* Guntung Payung. The purpose of this study was to analyze the role of the Fire Care Community for land fires mitigating in Banjarbaru, South Kalimantan. The sample in this study was the fire care community in Banjarbaru, totaling 26 people. The instrument of data collection used a questionnaire. The 30 questions items employed a Likert scale (1-4, strongly disagree-strongly agree). Percentages and average values are used to analyze the role of fire care community to mitigation of land fires. The results showed that the role of the fire care community was high to mitigate land fires. Mitigation carried out by the fire care community is constructing boreholes as a water source near the location of land fires, controlling on fire prone land to prevent land fires, procuring simple fire extinguishers with funds from the community, using firebreaks to prevent the spread of fires, and conducting controlled burning on agricultural land. Assistance from local governments such as funds, extinguishing equipment, and training is very helpful for the fire care community in mitigation of land fires.

**Keywords:** *land fires: fire care community: mitigation*

## INTRODUCTION

Land fires have occurred repeatedly every year and have not been handled properly, causing a lot of losses (Purnomo, et. al., 2017). Land fires have caused a lot of damage to peatlands and caused peatland degradation (Syaufina, 2018). Land fires have caused long-term ecosystem degradation (Purnomo, et. al., 2019) . Land fires have also caused poor air quality and are the main cause of global climate change (Tan, et. al., 2020).

Changes in land use have become the main factor causing land fires. Secondary peat swamp forest has decreased and turned into plantation land (Adrianto, et. al., 2020). The dried peat then becomes agricultural land to be a factor that greatly affects the risk of land fires (Carmenta, et. al., 2021). Land preparation by burning land causes fires to spread (Albar, et. al., 2018; Syaufina & Sitanggang, 2020).

Fire management can be done by involving the community in mitigating land fires. Community involvement should be from the beginning in the land fire mitigation program in order to better understand and adapt to land fire mitigation (Paveglio, et. al., 2018). Cooperation with local residents is needed in determining land fire management strategies (Paveglio & Kelly, 2018). Adaptive management of communities around peatlands can reduce the risk of land fires (Karmila, et. al., 2021; Utami & Salim, 2021).

The Fire Care Community-Masyarakat Peduli Api (MPA) has a very large role in mitigating land fires. The Fire Care Society provides socialization and counseling to the community regarding land fire mitigation (Nurjanah & Sakir, 2021). MPA has a role in reducing the social vulnerability of land fires (Arisanty, et. al., 2021). MPA has a role in controlling land fires (Lembasi, 2018). Various problems faced by MPA include the limited number of members and budget, as well as a wide area coverage (Budiningsih, 2020).

Land fires in the South Kalimantan region continue to occur repeatedly, especially on peat land. The area where fires often occur, especially during the dry season, is Banjarbaru. The fire in Banjarbaru is a problem because of the Soekarno-Hatta International Airport. The fire caused smog and flight delays at the airport (Arisanty, et. al., 2019; Arisanty, et. al., 2020; Rosadi, et. al., 2020).

The Fire Care Community in Banjarbaru has a very big role in overcoming land fires, especially on peatlands. MPA is formed by community groups and becomes the controller in dealing with land fires. This study focuses on the role of MPA in mitigating land fires, so that MPA becomes a determinant in the success of handling land fires in the Banjarbaru area. The purpose of this study was to analyze the role of the Fire Care Community for land fires mitigating in Banjarbaru, South Kalimantan.

## LITERATURE REVIEW

Deforestation has caused land fires and caused fires to spread (Wooster, et. al., 2018). Changes in land use have caused disturbance to peatlands (Leifeld, et. al., 2019). In Indonesia, there are active anthropogenic activities, such as drainage, logging, agricultural conversion, and burning that increase land fires and haze. Factors that can increase peatland degradation include oil and gas development, road expansion in peatland areas, and the absence of government policies that explicitly protect peatlands

(Lilleskov, et. al., 2019). Institutional aspects are very important in overcoming land fires (Safitri, 2021).

Mitigation of land fires is very necessary in efforts to prevent land fires. Mitigation of land fires in fire-prone areas can be done by using data on rainfall, slope, peatland, and peat areas that have been burned, as well as social data related to population density, road access, land ownership of small and medium-sized plantations, and trends in land fires. villages to burn land for agriculture (Sze & Lee, 2019).

The peat restoration program in Indonesia has been implemented by the Peat and Mangrove Restoration Agency-*Badan Restorasi Gambut dan Mangrove (BRGM)* from 2016-present. Some of the programs implemented are rewetting, revegetation and economic revitalization programs (BRG, 2018). Efforts to rewet or re-wetting are carried out through the construction of canal blocking or canal filling so that water is always kept pooled and wets the hair around it. Revegetation efforts are carried out by planting peatlands with local species that have economic and conservation value. Efforts to revitalize or revitalize are carried out with efforts to mobilize community businesses based on economic potential peat plant commodities and encourage sustainable marketing institutions (BRG, 2020).

8 The community has a very big role in dealing with land fires. Preparing quality human resources is one important aspect that needs to be considered in efforts to control forest and land fires (Maksum & Zulkarnain, 2020). The Fire Care Community-*Masyarakat Peduli Api (MPA)* is a community-based land fire prevention effort (Arisanty, et. al., 2021). People who care about fire play a role in socializing, preventing land fires, controlling land fires (Nurjanah & Sakir, 2021; Lembasi, 2018).

## METHOD

10 The research was conducted in Banjarbaru, South Kalimantan. Banjarbaru always burns every year, especially during the dry season and is an area that has a high fire vulnerability. Land fires that occurred in the Banjarbaru area became a problem because of the presence of Syamsudin Noor International Airport and the capital city of South Kalimantan Province (Arisanty, et. al., 2020; Saputra, et. al., 2021).

The inside sample is the entire Fire Care Community-*Masyarakat Peduli Api (MPA)*, in the Guntung Payung Village, Banjarbaru, totaling 26 people. Data were collected through a questionnaire with a total of 30 questions. The measurement scale used in this study is the Likert scale (1-4/Strongly disagree-strongly agree). The variables used to analyze the role of *MPA* in land fire mitigation are *MPA's* knowledge of the factors that cause land fires, availability of fire extinguishing equipment, role of *MPA* before land fires, role of *MPA* during land fires, role of *MPA* after land fires, and mitigation carried out by *MPA*. Data collection was carried out in January 2021-February 2021. Data analysis used percentages and average values to understand the role of *MPA* in land fire mitigation.

## RESULT AND DISCUSSION

### *Fire Care Community (MPA) Knowledge*

Knowledge of MPAs about the land fires factors is presented in Table 1.

*Table 1 MPA's knowledge of land fires factors*

No	Land Fires Factors	Likert Scale	Frequency	Percentage (%)
1	The dry season caused fires are becoming more frequent	1	5	19.23
		2	4	15.38
		3	10	38.46
		4	7	26.92
2	Vegetation on peat is flammable vegetation type	1	1	3.85
		2	3	11.54
		3	20	76.92
		4	2	7.69
3	Peatlands undergo excessive drying in the dry season due to the construction of canals and ditches.	1	1	3.85
		2	8	30.77
		3	17	65.38
		4	0	0
4	Clearing or processing of agricultural land by burning land causes land fires	1	11	42.31
		2	5	19.23
		3	9	34.61
		4	1	3.85
5	Low level of community knowledge about the use of peatlands causes land fires to occur frequently	1	1	3.84
		2	0	0
		3	22	84.62
		4	3	11.54
6	Human negligence due to careless disposal of cigarette butts causes fires	1	2	7.69
		2	4	15.38
		3	17	65.38
		4	3	11.54
7	Existence of dry land and dense vegetation flammable causes the fire to spread	1	0	0
		2	10	38.46
		3	14	53.85
		4	2	7.69
8	The existence of fire jumps that come from other areas causes the fire to spread	1	5	19.23
		2	5	19.23
		3	14	53.85
		4	2	7.69

Community has good knowledge regarding land fires, this can be seen from the percentage results regarding MPA's knowledge of the factors causing land fires. The community agrees that land fires always occur in the dry season because there are many drainage channels that cause water in peatlands to be drained. Excessive construction of

drainage canals can cause peatlands to dry out. Vegetation that grows on peat land is weeds and shrubs so it is easy to burn during the dry season. Land in the form of weeds and shrubs is prone to fires (Saputra, et. al., 2021).

Another cause of peatland fires is human negligence, for example throwing cigarettes carelessly or intentionally burning to prepare agricultural land. The preparation of agricultural land by burning is still done by farmers, although they will guard their land so that there is no widespread fire. Peatlands in the Banjarbaru area have been opened and used as agricultural areas or left without productive agricultural efforts. Many *MPA* disagree that clearing agricultural land causes land fires, because they say that land burning is carried out by farmers with strict controls. Most of the land burned is land that has no owner or vacant land without productive farming. Land with productive agriculture will be guarded by the owner so that there will be no fire on the land. While the land is not productive, no one is responsible for maintaining the land. *MPA* stated that the existence of a fire jump will also cause the fire to spread further. The presence of winds with a high enough speed will cause the fire to spread (Saputra, et. al., 2021).

#### *The Use of Fire Extinguishers*

Equipment carried out by *MPA* to extinguish fires is shown in Table 2.

Table 2 The use of fire extinguishers

No	The use of fire extinguishers	Likert Scale	Frequency	Percentage (%)
1.	I use manual or hand fire equipment, i.e. two axes function, rake hoe, shovel, hoe, back pump, torch, and water tub portable.	1	4	15.38
		2	2	7.69
		3	19	73.08
		4	1	3.85
2.	I use fire clothing equipment, i.e. a fire helmet, head lamp, fire goggles, fire mask, fire boots, fire extinguisher clothes, coupling rim	1	2	7.69
		2	1	3.85
		3	14	53.85
		4	9	34.61
3.	I use mechanical fire equipment, i.e. water portable pump machine, pump machine, pump slip on machine, compressor machine gun, suction hose, delivery hose, Y connector, nozzle, GPS, and HT.	1	0	0
		2	0	0
		3	18	69.23
		4	8	30.77

Equipment used by *MPA* in extinguishing fires includes manual equipment, as well as mechanical equipment. *MPA* also uses firefighting suits when fighting fires. Weaknesses in extinguishing fires carried out by *MPA* are equipment that is still limited and water sources are also limited. They get their extinguishing equipment from non-governmental organizations and assistance from the local government. Water sources are difficult because the location of fires is usually far from water sources and the number of water sources is limited. Usually when a land fire occurs, *MPA* will assist the local government in extinguishing the fire so that to extinguish the fire not only use the

extinguishing equipment owned by the MPA but also use extinguishing equipment owned by government agencies such as the Regional Disaster Management Agency-*Badan Penanggulangan Bencana Daerah (BPBD)* and *Manggala Agni*.

**The Role of MPA Before Land Fires**

The role of MPA before the occurrence of land fires in the context of preventing land fires is shown in Table 3.

*Table 3 Role of MPA Before Land Fires*

No	Role of MPA Before Land Fire	Likert Scale	Frequency	Percentage (%)
1.	Checking equipment completeness-Fire extinguishers.	1	0	0
		2	1	3.85
		3	18	69.23
		4	7	26.92
2.	Patrol at the location of the burned land	1	0	0
		2	0	0
		3	22	84.62
		4	4	15.38
3.	Coordinate both with the government and the community related to land fires.	1	0	0
		2	0	0
		3	18	69.23
		4	8	30.77
4.	Determine the method of extinguishing land fires.	1	1	3.85
		2	3	11.54
		3	14	53.85
		4	8	30.77
5.	Participate in land fire alert training.	1	0	0
		2	1	3.85
		3	14	53.85
		4	12	46.15

MPA routinely patrols locations where land fires often occur. The purpose of this patrol is to immediately extinguish the fire when there is a hotspot. They immediately coordinated with the community around the fire location and the local government. Routine patrols are carried out to prevent fires from spreading. MPA also routinely checks fire-fighting equipment, both the condition of the equipment and the amount needed to extinguish the fire. MPA also participated in land fire alert training organized by BPBD. The size of the area they have to guard while the MPA members are limited means that their patrols are also limited. Cooperation with the surrounding community in providing information about the location of the fire will facilitate the work of the MPA. Local governments also help each other with MPA in preventing land fires, especially on peatlands.

### *The Role of MPA During Land Fires*

The role of MPA during land fires is shown in Table 4.

*Table 4 Role of MPA During Land Fires*

No	Role of MPA During Land Fires	Likert Scale	Frequency	Percentage (%)
1.	Stop the spread of land fires.	1	4	15.38
		2	0	0
		3	19	73.07
		4	3	11.54
2.	Fighting land fires directly.	1	1	3.85
		2	1	3.85
		3	14	53.85
		4	10	38.46

MPA's task when a land fire occurs is to extinguish fires and prevent wider fires. MPA assisted BPBD and Manggala Agni in extinguishing the fire. Although the number of MPA is limited, the role of MPA is very large in extinguishing fires. They voluntarily patrolled and extinguished the fire with limited equipment. Fires that occur on peatlands are usually difficult to extinguish and require a lot of water, because of the thick bush. Extensive burning land and limited water sources also make extinguishing difficult.

### *Role of MPA After Land Fire*

The role of MPA after land fire is shown in Table 5.

*Table 5 Role of MPA After Land Fire*

No	Role of MPA After Land Fire	Likert Scale	Frequency	Percentage (%)
1.	Direct measurement of burned area	1	1	3.85
		2	4	15.38
		3	16	61.54
		4	5	19.23
2.	Calculate the economic and ecological impact of land fires	1	1	3.85
		2	4	15.38
		3	13	50.00
		4	8	30.77
3.	Reporting land fires to the government	1	0	0
		2	2	7.69
		3	16	61.54
		4	8	30.77
4.	Participate in rehabilitation on burned areas	1	1	3.85
		2	2	7.69
		3	16	61.54



		4	7	26.92
		1	1	3.85
5.	Re-coordinate the monitoring system for burned areas	2	3	11.54
		3	14	53.85
		4	8	30.77

Roles of *MPA* after the occurrence of fires are predicting areas that have been burned, predicting the impact of fires on the community, and participating in rehabilitation activities for areas that experience fires. *MPA* cooperates with *BPBD* and *Manggala Agni* in handling and preventing land fires. *MPA* coordinates with *BPBD* and *Manggala Agni* in the context of handling land fires and preventing fires from happening again in the area. Rehabilitation and restoration activities on burnt land are carried out by the Regional Peat Restoration Team-*Tim Restorasi Gambut Daerah (TRGD)* of South Kalimantan Province. *MPA* cooperates with *TRGD* in rehabilitating burned peatlands. *MPA* regularly coordinates with *TRGD* to restore burned areas and prevent peatland fires.

#### **Land Fire Mitigation Carried Out by MPA**

Land fire mitigation carried out by *MPA* is shown in Table 6.

Table 6 Land Fire Mitigation by MPA

No	Land Fire Mitigation	Likert Scale	Frequency	Percentage (%)
1.	Making firebreaks.	1	0	0
		2	1	3.85
		3	18	69.23
		4	7	26.92
2.	Clearing the land of shrubs	1	0	0
		2	1	3.85
		3	22	84.62
		4	3	11.54
3.	Conducting controlled burning	1	5	19.23
		2	1	3.85
		3	12	46.15
		4	8	30.77
4.	Consider the time and wind speed when preparing the agriculture land by burning	1	5	19.23
		2	1	3.85
		3	14	53.85
		4	6	23.07
5.	Build the boreholes	1	0	0
		2	0	0
		3	15	57.69
		4	11	42.31
6.	Procurement of simple extinguishers	1	0	0
		2	1	3.85
		3	15	57.69

		4	10	38.46
		1	0	0
7.	Build the smoke observation tower	2	1	3.85
		3	12	46.13
		4	13	50.00

*MPA* undertakes various efforts to mitigate land fires such as drilling wells, conducting controlled burning on agricultural land, paying attention to the time and direction of the wind when preparing land by burning, procurement of extinguishers fires, and the construction of smoke observation towers to observe smoke remotely. Due to limited funds, the number of drilled wells and fire-fighting equipment is also limited. Assistance from local governments and private funds such as borehole assistance and fire-fighting equipment can assist *MPA* in extinguishing fires.

Land preparation by burning controlled land is still carried out by the community. However, land preparation by burning should be reduced because it can cause land degradation (Arisanty, et. al., 2020). The important thing that must be done by *MPA* is to control land fires, especially on unproductive land, because fires occur more often on unproductive land than land cultivated by the community.

The average value aims to classify the role of the *MPA* in mitigating land fires. The average value of *MPA*'s role in land fire mitigation is shown in Table 7.

Table 7 Average Value of *MPA*'s Role in Land Fire Mitigation

Variable	Average value of	Class
Factors causing land fires	2.615	High
Use of land fire equipment	3.038	High
Community role before fire land	3.238	High
Community role during land fires	3.038	High
Community role after land fires	3.100	High
Land fire mitigation	3.175	High

The factors causing land fires in Landasan Ulin resulted in an average value of 2.615, meaning that *MPA* is very knowledgeable about the factors causing land fires. People know that less rainfall in the dry season causes land fires. Insufficient rainfall causes peatlands to dry out especially with the many canals that cause water to drain. The existence of the intentional factor of burning, especially abandoned land, causes peatlands to be prone to land fires. Then, the availability of land fire equipment produces an average value of 3.038 which means that *MPA* uses land fire equipment according to procedures. Extinguishing equipment is available including fire hoses and pumps which are very useful in extinguishing fires.

The role of the community before the land fires resulted in an average value of 3.238, which means that *MPA* has prepared a lot of plans and teams before mitigating land fires. Preparations made include checking the completeness of extinguishing equipment, coordinating with local governments, and participating in land fire-fighting

training. The role of the community during land fires produces an average value of 3.038 which means that MPA has carried out its duties when a land fire occurs with mitigation. The task carried out by the MPA team is to stop the spread of land fires and extinguish fires directly. MPA collaborates with BPBD, and *Manggala Agni* as well as with the Indonesian National Army-*Tentara Nasional Indonesia (TNI)* and Police to jointly extinguish fires when land fires occur. The role of the community after land fires resulted in an average value of 3.1 which means that MPA has carried out area rehabilitation, then coordinated and reported on land fires. Mitigation of land fires in Landasan Ulin District resulted in an average value of 3.175 which means that MPA has carried out most of the land fire mitigation activities well. With the MPA, it can reduce losses caused by land fires (Nurjanah & Sakir, 2021).

## CONCLUSION

MPA has a very important role in mitigating land fires. MPA has the role of monitoring land fires, helping to extinguish fires on burning land and preventing fires from spreading. MPA contributes in the form of manpower and funds to prevent land fires. They voluntarily carry out patrols to keep the land from burning. MPA also prepares tools that can be used to extinguish the fire. MPA collaborates with BPBD and *Manggala Agni* in tackling land fires that occurred in the Banjarbaru area. MPA's role is very large in tackling land fires but must be supported by the surrounding community to prevent land fires.

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