



# **Disaster Communication in Forest and Land Fire Management in South Kalimantan**

**Bambang Dwi Waluyo<sup>a\*</sup>, Achmad Bayu Chandrabuwono<sup>a</sup>,  
Riski Muslim Hidayat<sup>a</sup>, M. Aldi Istihsan<sup>a</sup>  
and Khadafi Nur Muhammad<sup>a</sup>**

<sup>a</sup> Universitas Lambung Mangkurat, Banjarmasin, Indonesia.

## **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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## **ABSTRACT**

The recurrence of forest and land fires in the South Kalimantan region can be attributed to the insufficient implementation of disaster risk communication. Hence, it is imperative for this study to address the topic of disaster risk communication as a means of mitigating forest and land fires in the region of South Kalimantan. This study addresses the scientific subject of why the southern Kalimantan provincial government is still struggling to coordinate the resolve of forest and land fires, despite the implementation of forest and land fire disaster control measures. The research methodology employed in this study utilizes a qualitative approach, namely of a descriptive nature. The data collection approaches employed in this study include interviews, documentation analysis, and literature review. This study aims to elucidate the dearth of educational information pertaining to the prevention and mitigation of forest and land fires within communities. The presence of suitable

\*Corresponding author: Email: [waluyovc@gmail.com](mailto:waluyovc@gmail.com);

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information and education boards is lacking. Despite the government's extensive endeavors in forest and land fire disaster management in the South Kalimantan region, the absence of an early preventive system pertaining to such calamities remains evident. The proper implementation of educational initiatives pertaining to disaster prevention and early detection has not been effectively carried out. The current state of optimizing information pertaining to public education within the realm of catastrophes remains constrained by the limited involvement of the government in actively engaging with other relevant parties, particularly the media.

*Keywords: Forest and land fire disaster; disaster management; disaster prevention and early detection.*

## 1. INTRODUCTION

Forest and land fires, also known as Karhutla, are prevalent occurrences in Indonesia, encompassing both natural and non-natural calamities. Law Number 24 of 2007, which pertains to disaster management, defines forest and land fires as a scenario wherein forests and land become engulfed in flames, leading to detrimental consequences such as economic losses and environmental degradation. The occurrence of forest and land fires frequently gives rise to haze disasters, which can adversely affect the well-being and daily operations of the neighboring community. The government has accorded significant importance to the issue of forest and land fires, as evidenced by the issuance of Presidential Instruction (INPRES) Number 3 of 2020 on February 28, 2020, which specifically addresses the management of forest and land fires.

The occurrence of forest and land fires is a recurring issue in the region of South Kalimantan. The prolonged dry season experienced in South Kalimantan since the beginning of 2023 has served as a catalyst for these fires, also known as karhutla. Aerial monitoring conducted in 13 districts, including Banjarmasin, Banjarbaru, Banjar, Tapin, Hulu Sungai Selatan (HSS), Hulu Sungai Timur (HST), Hulu Sungai Utara (HSU), Balangan, Tabalong, Barito Kuala, Tanah Laut, Tanah Bumbu, and Kotabaru, has revealed the presence of 793 hotspots. Additionally, satellite monitoring conducted by Sipongi Satellite has identified a total of 7,987 hotspots [1]. Notably, the areas most affected by these fires are Tanah Laut Regency and Banjarbaru City.

Forest and land fires have been observed to have a significant impact on the environment, particularly in terms of air pollution and its subsequent effects on human health. As of July 2023, there were 2,793 reported cases of Acute

Respiratory Infection (ARI), a number that increased to 3,635 cases by August 2023 [2]. This rise in ARI cases can be attributed to the haze caused by the forest and land fires, which leads to compromised air quality and respiratory difficulties. Consequently, these health issues disrupt community activities, including an increase in accidents due to reduced visibility during driving. Moreover, the economic flow is also hindered as a result of these adverse effects, and the emission of greenhouse gases from the fires contributes significantly to the phenomenon of global warming.

Table 1 shows data related to forest and land fires in several districts and cities in South Kalimantan between 2020 and 2021. Tanah Laut District recorded a significant increase in land fires, from 2 cases in 2020 to 47 incidents in 2021, including 411.45 hectares of burned land. Meanwhile, Barito Kuala District reported significant forest and land fires in 2020, with 2 forest fires and 19 land fires, burning 80.02 hectares of forest and 53.98 hectares of land. Although the number of fires decreased in some areas in 2021, new concrete efforts are needed from the government to reduce the risk and impact of forest and land fires in the future.

Table 2 shows data on hotspots in four regions of South Kalimantan in 2020, 2021 and 2022. In Tanah Laut district, the number of hotspots increased significantly from 48 in 2020 to 199 in 2021 and continued to grow to 201 in 2022. In contrast, Barito Kuala district has more mixed fluctuations, with the number of hotspots decreasing sharply from 45 in 2020 to 17 in 2021, then increasing sharply to 113 in 2022. Banjarmasin City had a slight change in the number of hotspots from 4 hotspots in 2020 to 16 hotspots in 2021, then decreased again to 11 hotspots in 2022. While in Banjarbaru City, although there was a slight increase from 12 hotspots in 2020 to 31 hotspots in 2021, the number then decreased to 11 in 2022.

**Table 1. Location and year of forest and land fires in South Kalimantan**

<b>Location / Year</b>	<b>Number of Forest Fire Incidents (2020)</b>	<b>Total Forest Area (2020)</b>	<b>Number of Land Fire Incidents (2020)</b>	<b>Total Area of Land Burned (2020)</b>	<b>Number of Forest Fire Incident s (2021)</b>	<b>Total Forest Area (2021)</b>	<b>Number of Land Fire Incidents (2021)</b>	<b>Total Area of Land Burned (2021)</b>
Tanah Laut district	0	00	2 2	6.1	0	47	411.45	411.45
Barito Kuala Regency	2	80.02	19	53.98	0	0	7	38.5
Banjarmasin	0	0	4	11.5	0	0	0	0
Banjarbaru	0	0	0	0	0	0	64	523.3

**Table 2. Number of forest and land fire hotspots in South Kalimantan**

Location/Year	Total hotspots 2020	Total hotspots 2021	Total hotspots 2022
Tanah Laut district	48	199	201
Barito Kuala Regency	45	17	113
Banjarmasin City	4	16	11
BanjarBaru City	12	31	11

As previously stated, the President of Indonesia has issued explicit directives regarding forest and land fires. Additionally, the South Kalimantan government has received a specific directive from the Governor to mobilize all available resources and provide guidance to relevant entities such as the Regional Disaster Management Agency (BPDB), the Indonesian Army (TNI), the Indonesian National Police (POLRI), and Manggala Agni. These entities are responsible for the Karhutla Control Task Force in the Regency/City area and are expected to collaborate in their efforts to address forest and land fires. According to Fatimatuzahra, the director of the South Kalimantan Forestry Service, the total count of marine protected areas (MPAs) under the jurisdiction of South Kalimantan now stands at 129 clusters, which are distributed across nine forest management units (KPH) and Tahura Sultan Adam [3].

Despite the government's extensive endeavors in forest and land fire disaster management in the South Kalimantan region, the absence of an early prevention system for forest and land fire disasters is evident. The effective implementation of educational initiatives pertaining to disaster prevention and early detection remains inadequate. The dissemination of information regarding community education on disaster preparedness has not been optimized, as it primarily emphasizes reactive measures.

This study aims to elucidate the dearth of educational resources pertaining to the prevention and preparedness of communities in relation to forest and land fires. The utilization of the disaster management system, specifically the "Masyarakat Peduli Api" (MPA), exhibits inconsistent implementation, while the dissemination of information through mass media channels remains suboptimal. Furthermore, the absence of information boards and adequate educational initiatives in regions susceptible to forest and land fires beyond the confines of the Tahura Sultan Adam area exacerbates the issue.

The recurrence of forest and land fires in the South Kalimantan region can be attributed to the

insufficient implementation of disaster risk communication. Consequently, it is crucial for this study to examine the government's efforts in disaster risk communication to mitigate forest and land fires in South Kalimantan. In line with the research problem, this paper aims to address the following research question: "why the southern Kalimantan provincial government is still struggling to coordinate the resolve of forest and land fires?".

## 2. LITERATURE REVIEW

There are several previous studies that also discuss similar issues which the author has divided into 2 categories. The first category is related to disaster early warning systems [4,5] and the second category is about the important role of the media in disaster early warning, that early warning of a disaster through mass media is essential in dealing with a disaster [6-8]. The writings that fall into the first category highlight the early warning system initiated by the local city BPDB, which resulted in the findings of the educational system they built to provide information to the community. The early warning system starts with BMKG educating not only through whatsapp messages, but also radio broadcasts. Then BMKG also coordinates with BPDB, the Military Resort and local NGOs. The second category of writings focuses more on the journalists' perceptions of early warning dissemination, such as their responses and priorities. Optimization of communication as a support for overall disaster management of news presented by the mass media.

Previous study has not addressed the topic of forest and land fire catastrophes from the standpoint of disaster communication, specifically in relation to communication efficiency. Hence, the present study examines the occurrence of forest and land fire disasters, focusing on the constituent elements of efficient warning systems and evaluation methodologies that can be employed to gauge the efficacy of disaster warning systems (Suryandari & Wijayani, 2022). Various factors influence the effectiveness of disaster warnings,

encompassing the source, channel, and message content components of the disseminated information. In addition, it is imperative to take into account many indicators in the field of disaster management, including but not limited to the nature of the disaster, its geographical and temporal context, as well as the specific attributes of the intended recipients of disaster-related information.

### 3. MATERIALS AND METHODS

The research methodology employed in this study adopts a qualitative approach, specifically of the descriptive nature. The chosen research approach is descriptive qualitative, as outlined by Creswell (2014), which involves the exploration and comprehension of individual or collective interpretations pertaining to human and social issues. The data collection methods employed encompass interviews, documentation analysis, and literature review.

### 4. RESULTS AND DISCUSSION

#### 4.1 Management of Forest and Land Fire Disasters

The South Kalimantan region, specifically the Landasan Ulin sub-district in the first ring area surrounding Syamsudin Noor airport to Guntung Damar, is characterized by frequent forest and land fires. These fires are primarily caused by the presence of dry peatlands and swampy shrubs. The situation is further exacerbated by the ongoing dry season, which has persisted in southern Kalimantan since May 2023, resulting in reduced rainfall. On September 24, 2023, researchers were informed through an article published by the Health Crisis Center of the Indonesian Ministry of Health about the

occurrence of forest and land fires in Guntung Damar, Guntung Payung village, Landasan Ulin sub-district, Banjarbaru City. The affected area spanned 5 hectares. Consequently, the researchers decided to conduct an on-site visit on September 26, 2023, in order to directly observe the forest and land fires in the area.

Based on the observations conducted by researchers in the Tanah Ulin sub-district of South Kalimantan, specifically in the vicinity of ring 1 of Syamsudin Noor international airport to Guntung Damar on Tuesday, September 26, 2023 at 11:00 WITA (Fig. 1), it was noted that the researchers encountered numerous dense smoke clouds, resulting in an estimated visibility of approximately 20 meters. The prevailing high temperature and the presence of active hotspots in the forest along Andil Gotong Royong road, Guntung Damar road, and Karang Anyar 1 road were also observed. The smoke in the area significantly disrupted flight operations around Syamsudin Noor airport and had adverse effects on community activities, including impaired vision, respiratory difficulties, headaches, accidents, and other related consequences.

Fig. 2 depicts the discovery of four standby posts situated along the route, specifically designed to combat forest and land fires within the vicinity. These posts encompass the BPBD post and the Manggala post. The Agni post, the PUPR post, and the Environmental Agency post have been established in response to specific requests made during meetings, typically conveyed directly by Sahbirin Noor, the Governor of South Kalimantan. Complementing these posts is the deployment of a helicopter (Fig. 3), which serves the purpose of aerial monitoring and fire suppression in inaccessible areas.



Fig. 1. JL. andil gotong royong



**Fig. 2. PUPR command post**



**Fig. 3. Helicopters extinguishing fires at hard-to-reach points**

In the course of the research, the researchers examined the activities of the Indonesian Republican Army (TNI) personnel who were stationed at the location during that period. The individual exhibited a reluctance to comply with requests for information. He contended that the dissemination of information regarding initiatives aimed at mitigating Forest and Land Fires could solely be carried out by his superior. In order to prevent researchers from obtaining information pertaining to the actions carried out by the Indonesian National Armed Forces (TNI), appropriate measures were implemented.

According to researchers' observations, it was discovered that multiple locations experienced wetting. Manggala Agni, utilizing data collected by researchers, conducted wetting activities in three hotspot locations on Tuesday, September 26, 2023. The purpose of these wetting efforts was to prevent the occurrence of wildfires in dry and susceptible areas. The Ministry of Public Works and Housing (PUPR) played a crucial role

in ensuring the availability of water and supporting facilities, as stated by an officer during a direct interview. The officer mentioned, "Our involvement in irrigation and related facilities is essential." The sluice gate, which had been prepared in advance, facilitated the irrigation process to mitigate the risk of forest and land fires. This initiative was led by the Governor of South Kalimantan, Sahbirin Noor, on August 31, 2023.

However, it has been observed by researchers that there is a decline in the water discharge from the irrigation system along the Andil Gotong Royong road (Fig. 4). This decline can be attributed to the dry season, during which the water from the irrigation system is being utilized to suppress and dampen the forest fires in the vicinity. In this particular scenario, both the TNI (Indonesian National Armed Forces) and Polri (Indonesian National Police) personnel have actively participated in the management of forest and land fires. Their responsibilities in this regard

encompass disaster preparedness, emergency response, and the provision of hotspot information. Notably, a police water tank, capable of carrying a substantial volume of water, has also been deployed to dampen the hotspots within the burned area along the Andil Gotong Royong road (Fig. 5).

Barito Kuala Regency or often referred to by the people of South Kalimantan as "Batola" is one of the districts in South Kalimantan. The geographical location of Barito Kuala itself is located in the westernmost part of South Kalimantan Province with the following boundaries: north of Hulu Sungai Utara Regency and Tapin Regency, south of the Java Sea, east of Banjar Regency and Banjarmasin City, while the west borders Kapuas Regency, Central Kalimantan Province. Barito Kuala Regency is one of the areas that is often hit by forest and land fires. We obtained this data from interviews we had conducted previously with volunteers from the Fire Fighting Agency (BPK). Although the scale of fires that occur in Barito Kuala Regency is not as large as Ulin Landasan or other vacant land areas in South Kalimantan. The problem is that the fires that occur in Barito Kuala Regency are right around residential areas, which makes the risk of local residents being affected so great. These problems underlie researchers to conduct further research in the Barito Kuala area.

Researchers conducted data searches in Semangat Dalam Village, which is located in Barito Kuala Regency. This village has the highest population in the regency, estimated to be around 18,000 individuals (Dinas PMD Kab. Barito Kuala, 2022). Given the substantial population size, it is imperative for the government to allocate special attention to Barito Kuala Regency. The research was conducted on Wednesday, September 27, 2023.

The ongoing fire incident was accompanied by the presence of dense smoke, which had spread throughout the affected region. The proximity of the fires to residential areas posed a significant threat to the safety of local inhabitants. Moreover, the air quality in Semangat Dalam Village was severely compromised, warranting immediate attention. It is worth noting that this village is home to a substantial number of infants, who are particularly susceptible to acute respiratory infections (ARIs) and other respiratory ailments [9-11].

According to local residents who were interviewed, the fire initially broke out during the nighttime and subsequently rekindled in the afternoon [12]. The villagers attributed the rekindling of the fire to increased temperatures during the day, which led to friction between grasses. However, the resident expressed confidence in the management and control of the fire situation at the site, citing the occurrence of the Land and Forest Fire disaster in South Kalimantan since 2019.

Fig. 6 show that the fire-fighting activities conducted by the volunteers of the Fire Brigade (BPK). The BPK volunteers employ various equipment, such as hoses and electric generators functioning as water pumping devices, to combat the ongoing fire. The water utilized by the volunteers is sourced from the surrounding bodies of water near the residents' vicinity. The BPK volunteers are transported via designated vehicles commonly referred to as "Pick Ups." Each BPK volunteer team comprises 5 to 6 individuals [13]. Testimonies from cooperative residents underscore the proactive nature of the BPKs in addressing the Land and Forest Fire crisis in the South Kalimantan region. Consequently, the funding for necessary facilities and infrastructure is derived from personal contributions made by the volunteers



Fig. 4. Irrigation that is starting to dry



Fig. 5. A number of police officers



**Fig. 6. Fire fighting efforts by volunteers**



**Fig. 7. Government officials at the fire site**

themselves, as well as voluntary donations from local inhabitants.

The study revealed that individuals residing in close proximity to the fire exhibited no indications of distress. They appeared to be acclimated to and equipped for such incidents. This discovery aligns with prior reports, wherein a resident attested that land and forest fires in Banjarmasin city have been occurring on a yearly basis since 2019, rendering them a familiar occurrence for local inhabitants.

The awareness of the people of Banjarmasin in mitigating land and forest fires in South Kalimantan, without relying on other parties, is something that should be appreciated. However, this situation shows the lack of government involvement in mitigation efforts and disaster management of forest and land fires in South Kalimantan [14-16]. This is an irony because the government's position should act as the first party in disaster management which includes mitigation and disaster management of Forest and Land Fires, this is marked by the issuance of Presidential Instruction (INPRES) No. 3 of 2020.

The instruction was indeed welcomed by the South Kalimantan government with a special direction from the Governor of South Kalimantan who gave directions for related parties such as the Regional Disaster Management Agency (BPDB), the Indonesian National Army (TNI), the Indonesian National Police (POLRI), and Manggala Agni who played a role in the Forest and Land Fire Control Task Force in the Regency / City area to collaborate in efforts to overcome Forest and Land Fires. However, the existence of volunteers who still operate with personal funds and voluntary. The issue of community donations is a significant area of uncertainty. Furthermore, Fig. 7 depicted above illustrates the limited participation of government entities in fire-related matters.

#### **4.2 The Utilization of Communication Media in the Management of Forest and Land Fire Disasters**

Based on the researchers' observations, the utilization of communication media in forest and land fire disaster management in the South Kalimantan region, particularly in the vicinity of



Banjarmasin city, encompasses several mediums. These mediums include banners, radio, and online mass media. Among these diverse mediums, the government directly manages the banners.

The banners disseminated by the government pertaining to forest and land fires in the South Kalimantan region, particularly in the vicinity of Banjarmasin, lack comprehensive information. The majority of these banners merely consist of slogans and appeals to prevent forest and land fires (Fig. 8). However, crucial details such as appropriate actions to be taken in the event of forest and land fires, the reporting procedures to be followed by the community upon detecting hotspots, and essential contact information for reporting purposes are conspicuously absent. Consequently, these banners merely contribute to visual pollution and serve as platforms for individuals to display personal photographs.

The government should possess the capacity to effectively curate significant information disseminated through various media platforms. It is crucial for the government to comprehend the intended audience in order to effectively communicate messages. When media placement is in proximity to a hotspot, the message should provide access to reporting on forest and land fires. Conversely, to reach a broader audience,

the government can collaborate with mass media or utilize media outlets with extensive reach to deliver more suitable educational messages.

The official collaboration between the government and mass media has not yet been established. Consequently, the mass media has solely fulfilled its obligation as a conduit of information to the public by reporting on forest and land fires. The government should prioritize the media's role in disseminating educational messages pertaining to disasters, particularly forest and land fires. Moreover, the media can serve as a valuable partner to the government in facilitating oversight. For instance, the inclusion of a reporting contact for forest and land fire incidents in every mass media article would be beneficial.

Based on the outcomes of a discussion held between researchers and a prominent figure in the online media sector in Banjarmasin city, it has been observed that the government continues to encounter challenges in effectively disseminating information pertaining to disasters. The discussion revealed that the media is still predominantly proactive, which is regrettable considering Banjarmasin's designation as a Smart City, implying integration with various applications. It is imperative that early information regarding areas susceptible to forest and land fires, such as North Banjarmasin and



Fig. 8. Banners put up by the government related to forest and land fires

South Banjarmasin, be disseminated to the public. However, the government appears to exhibit hesitancy in effectively distributing this information, resulting in a flow of information from the media to the government, rather than the reverse. Furthermore, in terms of collaboration, the city government appears to foster a nurturing approach towards news dissemination in this regard. This situation is regrettable since it contradicts the legal requirement for information disclosure. It is noteworthy that information sharing is frequently facilitated by volunteers from BPK.

In the context of a disaster scenario, the mass media assumes a multifaceted role that extends beyond mere oversight and evaluation of governmental actions. Rather, the mass media plays a crucial function in effectively disseminating pertinent information pertaining to disasters. Its significance lies in facilitating communication and fostering collaboration among the government, the community, and other relevant stakeholders in addressing the issue of forest and land fires.

#### **4.3 The Engagement of External Parties in the Management of Forest and Land Fire Disasters**

The region of South Kalimantan, particularly the city of Banjarmasin and its environs, is renowned for its substantial presence of private firefighting personnel (DPKP Banjarmasin City, 2014, 2015). The abundance of private firefighting fleets is expected to enhance the management of forest and land fires. If the government establishes effective collaboration, private firefighters can serve as valuable allies in disaster management.

Regrettably, the available research indicates the absence of a formal collaboration framework pertaining to forest and land fires between the government and private fire departments in Banjarmasin City. Private fire brigades in the aforementioned city extend their assistance in combating forest and land fires on a voluntary basis, while maintaining coordination with the government. These private firefighters actively engage in extinguishing forest and land fires in proximity to residential areas, frequently arriving prior to the government-formed specialized teams.

Based on the researcher's discussion with an officer from a private fire fighting unit in

Banjarmasin city who actively participated in combating forest and land fires, it was revealed that the WhatsApp group encompasses diverse segments of society, enabling their engagement in disseminating fire-related information. However, it is important to note that the current collaboration lacks a formal structure, as the private fire brigade is solely embraced as a volunteer force.

According to the provided information, private fire departments exhibit greater transparency in addressing public complaints. In the realm of fire disasters, private fire brigades possess community networks that facilitate the expeditious flow of communication pertaining to such incidents. This stands in contrast to the government's approach, which lacks a comparable network. However, the government compensates for this deficiency by participating in existing communication channels, albeit with limitations in coordinating efforts beyond its jurisdiction. Consequently, the government's response exhibits a degree of rigidity.

#### **5. CONCLUSION**

Forest and land fires in South Kalimantan have been recurrent, yet the government's preparedness in addressing these incidents remains inadequate. The government exhibits signs of unease, particularly in terms of coordinating efforts with relevant stakeholders. Furthermore, the government's ability to disseminate information, establish networks, and effectively utilize media platforms to combat forest and land fires is still a weak point. Consequently, the response to forest and land fires in the South Kalimantan region appears to be characterized by repetitive actions. In the absence of proactive measures and responsive strategies that are tailored to the specific requirements of the community.

#### **DISCLAIMER (ARTIFICIAL INTELLIGENCE)**

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

#### **COMPETING INTERESTS**

Authors have declared that no competing interests exist.

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