A COMPARATIVE STUDY ON FOREST WILDFIRE RISK MITIGATION AND MANAGEMENT IN INDONESIA AND UNITED STATES (CASE STUDY: JAMBI AND CALIFORNIA)

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Abstract

It has been known globally that Indonesia has the largest forest area in the world and is often called as World’s lungs. However, wildfire disasters in Indonesia’s forest are happening every year in various locations. This paper will study the cases by focusing on case study in Jambi Province and compare it with similar cases that happened in California, United States. The paper shows that various human activities are the main factor on how the accident has happened for the last couple years. Non-environmental-friendly Activities such as illegal logging and fire land clearing for palm oil plantations have been conducted by private institutions and causing long lasting impacts for local communities. The poor knowledge of local people on how to prevent and handle the wildfire forest also has become the issues that need to be solved as soon as possible. Compared with what happened in California, the main causes are different considering the fires are caused by high temperature and climate change's impact. Although the local community in California barely participates in fire management, the mitigation and monitoring infrastructure is much more advanced compared to what Indonesia’s have.

Kata Kunci

forest wildfire; mitigation; management.

Abstrak

INTRODUCTION

Contrary to other natural hazards such as earthquakes or windstorms, wildfires are certainly among the most predictable ones. Therefore, it is a phenomenon which, in principle, should leave modern societies some degrees of freedom and margins of maneuver for implementing efficient counteracting strategies. However, this opportunity has not been properly used. Over the last decades, wildfires have proven to be a subject of growing concern for the Mediterranean Region. Woodlands, rangelands, maquis and garrigues in rural areas or at the interface with urban areas still continue to burn with significant environmental, social and economic impacts, in particular in case of increased frequencies of fires (Fernandes, 2009). As any risk, wildfires cannot and should not be eradicated, and anyhow, managing fire risk through prevention and suppression has a cost. Therefore, in the context of finite financial resources and increased areas subject to fire, the appropriate response cannot be just to continue business as usual, as it will require a dramatic increase in the means and equipment allocated to fire management.

In Indonesia, wildfires are a risky problem and continue to occur every year. This is predominantly caused by land clearing by burning. This seems to be normal, but it is one of the exploitations of the environment. Indonesia, especially Sumatra and Kalimantan are targeted for land clearing activities such as oil palm plantations. Palm oil is a major export commodity of Indonesia and is widely planted in rainforest regions of Indonesia, that receive an ample supply of water throughout the year. As the most productive oil seed plant in absolute terms, compared to soybean and corn, palm oil enjoys a substantial competitive advantage, of which Indonesia is a major player, and its development has created a vibrant economy around palm oil in Sumatra and Kalimantan. Yet the development of palm oil plantations potentially creates environmental problems of its own, in addition to its purported economic
benefits. Indonesia is the largest palm oil producer in the world, in which 43% of total Crude Palm Oil (CPO) produced globally was sourced from Indonesia.

The palm oil sector had enjoyed immense growth of up to 7.8% per annum (2011), faster than Indonesia’s general rate of growth, which stands at around 4.5%-5.5% per annum. As much as 6.93% of the total national palm oil cover area is in Jambi Province. In recent times, however, a combination of moratoriums on palm oil expansion, changes in global trade, and sustainability concerns from European buyers have halted the growth of palm oil in Indonesia (Statista, 2020). Jambi is also home to some of the world’s largest swaths of peatland forests, an important environmental aspect to consider due to its function as a global carbon sink. The province of Jambi has up to 700,000 hectares of peatland, of which 10% of the total peatland area has been utilized palm oil plantations (Disbun Jambi Province, 2015). That 10% of peatland utilized for palm oil has been a major source of contention in terms of environmental sustainability, as the development of palm oil over peatlands, destroys peatlands in its entirety by draining water out of the peatland and thereby diminishing its ability as a global carbon sink.

Wildfires not only exist in Indonesia, but also in the United States. In the United States, the state of California has a Mediterranean climate with mild, wet winters and hot, dry summers that allow it to produce over a third of the country’s vegetables and two-thirds of the country’s fruits and nuts. The state uses around 25% of its land for agriculture, its main crops including grapes, almonds, and avocados. However, California also often faces severe droughts, averaging 21.44 inches of rain per year, compared to the U.S. average of 30.28 inches. In the last decade, the biggest environmental issues faced by California are droughts and wildfires. These issues can both be exacerbated by climate change, with rising temperatures increasing the severity of droughts and wildfires. In 2015, direct impacts from droughts cost the state $1.84 billion, a loss of 10,100 seasonal jobs, and surface water shortages of 8.7 million acre-feet. In 2020, wildfires burned over 4.2 million acres. (Schilli, 2021). In addition, six of the ten largest recorded fires in California’s history occurred in 2020. According to a 2020 study, human-caused climate change made southwestern drought conditions from 2008-2018 about 46% more intense than they would have been naturally, pushing an otherwise moderate drought onto the potentially worst drought in history in the U.S. southwest. Effects of the drought not only affect agriculture, lakes in California, which also supply water to Nevada and Arizona, were about 40% lower than the historical average in 2020 (Nuccitelli, 2021).

Through this paper, we will be further identified on environmental issues in both countries related to wildfires, how government policies and the role of the community in addressing
these problems. So that it can be overcome through the right planning scheme for the problem of wildfires in both countries.

LITERATURE REVIEW

Fire management at the global level mostly uses the Integrated Fire Management (IFM) approach, where this approach also applies the concept of community-based forest fire management. This approach aims to better integrate fire and people into land use and vegetation management systems (Goldammer et al., 2002). The fire management approach can be made by combining all fire management activities such as prevention, preparedness, coordinated recovery with policies and planning in fire management, reducing the incidence of human-caused fires with community-based education programs by providing fire training, integrating and involving all sectors in engaged fire management, and also developing fire management policies (FAO, 2011; Myers, 2006).

The IFM approach has been carried out in Africa, Asia, and Europe (Goldammer et al., 2002). For example, Namibia adopted a community-based IFM strategy by holding fire prevention education activities at the community level, mobilizing community members in fire control at schools and organizations, and involving all stakeholders in the activities. In India, fire prevention is done by surveying fire-prone areas, creating fire bank data, and establishing a fire forecasting system.

In addition to the IFM approach, there is a need for a conceptual framework to integrate spatial planning policies to deal with forest fires. Where the spatial planning and forest fire management system consists of 6 phases (Gonzalez-Mathiesen et al., 2021), namely 1) raise awareness about the importance of forest fire prevention, including the interconnection between fire and residential design and location; 2) the role of spatial planning in a forest fire is to provide guidelines and standards for operationalization; 3) local planning schemes and rural and regional strategies that integrate fire protection steps; 4) harmonize the work of spatial planning and forest fire prevention agencies; 5) roles and responsibilities of stakeholders; 6) recognize the systems' different dynamic spatial and temporal scales.

In Indonesia, one of the community-based management of forest fires is the local wisdom approach to prevent forest fires (Rianawati, 2015). There are three government programs to support community-based forest activities, it is 1) village forests, to utilize production forest; 2) community park forests are built by community groups to increase the potential and quality of production forestry; and 3) community forests involve the community to find a balance between ecosystem conservation and improvement of public welfare.
(Rianawati, 2015). Besides that, there is also peat restoration to prevent the risk of forest fires on degraded peatlands, where peat management includes rewetting, revegetation, and revitalizing local people's livelihoods (Budiman et al., 2021). However, in dealing with forest fires using a local wisdom approach, the people who manage it need to know about environmental impacts, their relationship to the socio-economic environment and a broader institutional setting is necessary (Suyanto et al., 2002).

METHODODOLOGY

Data required for this study comes from secondary source material. The material consists of a research journal, thesis report, and news article. Various statements, future planning, city profile, and past disaster impacts had been collected to state the condition of wildfire disaster in both countries. The research is using a qualitative approach by evaluating both case studies from both countries and making a comparison to state each of their advantages and disadvantages. The case studies are needed to interpret both cases’ perspectives. Jambi and California are chosen as case studies considering its high amount of wildfire cases has happened in the last couple years. The evaluation of both cases are using a descriptive approach, in which we will find all of the case’s aspects from the main cause to the existing government’s weakness on how to manage the disaster. The main aspects that are thoroughly collected are Site identification, occurring environmental issues, environmental governance, and environmental planning.

RESULT AND DISCUSSION

Jambi’s Planning and Governance

Jambi Province is one of the areas that fall into the category of forest fires. Hotspots in Jambi Province each year experience a very fluctuating increase. Based on data from the Karhutla Monitoring System, the total number of hotspots in Jambi province in 2014 was 1,152 and in 2015, the number of hotspots increased to 1,654 or an increase of 43.5% from the total hotspots in the previous year. In that year, the disaster that caused the burning of 19,528 hectares of land caused the smog that covered Jambi and the surrounding area to cross the borders of Singapore and Malaysia and in 2019 a sizable 11,736 hectares of fire occurred again. Estimates made by the Jambi Provincial Forestry Service regarding forest and land fires in 2015 occurred in an area of 19,528 Ha, consisting of 13,459 Ha (69%) of peatlands and 6,069 Ha (39%) of fires. occurs in mineral soils. Based on its function, forest and land
fires mostly occur in other land use areas (APL), namely 12,307 Ha (63%) and the remaining 7,221 Ha occur in forest areas.

Simanjuntak, K. P., & Khaira, U. (2021), stated that most areas of Jambi Province are prone to forest fires and only a few areas in Jambi have a low risk of forest fires. The area of Jambi Province which has a high risk of forest fires is 27,100.90 km², or 54.03% of the total area, while the areas that are at very high risk or very prone to forest fires are 9,208.20 km² or 18.36% of the total area. The areas that are very prone to forest fires are located in Bungo, Merangin, and Tebo with an area of 1,878.52 km² (3.75%), 1,525.97 km² (3.04 %) and 1,229.06 km² (2.45%, respectively) of the total area of the province. Districts that are very vulnerable (very high risk) and require more attention, especially in controlling forest fires, are Batanghari, Bungo, Merangin, Sarolangun, and Muaro Jambi districts. Production forest areas are forest areas that are most at risk of forest fires. 35.50% and 3.76% of production forests have a high and very high risk of forest fires, and only 3.73% of production forest areas have a low risk of forest fires. Production forest areas are at risk or prone to forest fires because they contain forest production activities.
In the last two decades, peatlands in several areas in Jambi have been slowly lost to conversion for oil palm plantations and large-scale industrial forest plantations. Drainage and fires that occur have accelerated the loss of peat ecosystems. The bad impact comes with the large-scale clearing of peatlands in Jambi. Degraded and dry peatlands are highly susceptible to fire. The canals that run along the plantation concessions have sucked the water and all the nutrients in it. According to data from the Indonesian Forum for the Environment (WALHI) Jambi, around 70% of the total peatlands in the regencies of Tanjung Jabung Timur, Tanjung Jabung Barat, and Muaro Jambi have been drained and cleared for oil palm plantations and forestry. The loss of forest and the destruction of peat swamps are a serious threat to biodiversity and cause flooding downstream. Forests have been converted into plantations, industrial plantations, and mining. When forest cover is reduced and peatlands are drained, disaster occurs, in the form of forest fires whose severe effects have been felt in previous years (2015 and 2019)

Several restoration efforts have been carried out by the government as a policy maker. The Indonesian government has issued various regulations that lead to sustainable peat forest management and management, namely PP No. 1/2016 concerning Peatland Restoration. Jambi Province has started implementing a peat restoration policy from 2017-2020 through the Indonesian peat restoration agency budget by conducting monitoring and evaluation. Badan Restorasi Gambut (BRG) has three programs to implement peat restoration.

- **Rewetting or wetting**, the thing that is done from this program is to build canal barriers in peat areas and also the construction of drill wells that serve as water retainers that function to store water in rivers or canals. This wetting is done so that peatlands do not become dry and increase peat moisture to avoid fires in the dry season, as it is known that the dry season in jambi often occurs land fires that result in the end of trees, and make many faunas die in forest fires.

- **Revegetation**, this program replants trees in peatland areas affected by forest fires. Revegetation serves to maintain the sustainability of peat ecosystems and can also strengthen the barrier of canals built.

- **Revitalization of livelihood sources or can be called economic revitalization to help support the welfare of the people around the peatland area.**

The Jambi provincial government has made efforts to overcome these environmental issues by following up on Presidential Decree No. 6/2019 by realizing the Governor's Instruction No. 1/INGUB/DISBUN-3.1/2020 concerning the Jambi Oil Palm Plantation Action...
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Plan 2020 - 2024. This regulation is published by looking at the fact that plantation sub sectors contribute significantly to the Gross Regional Domestic Product (PDRB) of Jambi Province by 54%. Meanwhile, the area of oil palm plantations in Jambi reached 134 thousand Ha supported by at least more than 271 thousand oil palm planters. That is, palm oil is also one of the main supporters of the economic wheels in Jambi Province.

The steps of the Government of Indonesia in tackling the negative campaign of palm oil commodities in European and other developed countries by conducting diplomacy and advocacy led by the Ministry of Foreign Affairs, conducting positive palm oil campaigns in various media, and increasing export value and increasing the export destination of palm oil derivative products abroad. In line with these efforts, multi-party collaboration at the central level (through Presidential Decree 6/2019) and in Jambi Province (Peraturan Gubernur No. 1/INGUB/DISBUN-3.1/2020) is expected to be a road map towards sustainable palm oil governance. SPOI – UNDP also supports the efforts and steps taken by local governments in realizing sustainable palm oil as a strategy to advance the regional economy by supporting the implementation of the Rencana Aksi Nasional Kelapa Sawit Berkelanjutan (RAN – KSB) which carries the components of Strengthening Data, Coordination, and Infrastructure; Capacity Building & Planter Capability; Environmental Management and Monitoring; Plantation Governance and Dispute Handling; and Acceleration of ISPO Certification and Increased Market Access of Palm Oil Products.

California’s Planning and Governance
In the past two decades, changes in climate and land utilization caused by human activities have not only extended the wildfire season, but also significantly increased the severity and burned areas of wildland fires in the California region. California Department of Forestry and Fire Protection (CAL FIRE) has been responsible for preventing and suppressing fires that keep happening for the last couple of years. CAL FIRE has 21 operational units throughout the state that are designated to address fire suppression over a certain geographic area and six ‘Contract Counties’ (Kern, Los Angeles, Marin, Orange, Santa Barbara and Ventura) for fire protection services. Due to the complex environmental and terrain conditions in California, the risk of wildfires varies significantly from region to region, and the causes of extreme wildfires are also completely different.

Effective fire-prevention requires a sound understanding of the patterns and causes of fire ignitions, which are closely aligned with both human and biophysical-landscape characteristics. Gavin Newsom, the elected governor of California has made it clear of its objective to fight the climate change issues and stop the annual forest fires that keep
happening in mentioned areas. Unfortunately, Newsom overstated, by an astounding 690%, the number of acres treated with fuel breaks and prescribed burns in the very forestry projects he said needed to be prioritized to protect the state’s most vulnerable communities. Newsom has claimed that 35 “priority projects” carried out as a result of his executive order resulted in fire prevention work on 90,000 acres. But the state’s own data show the actual number is 11,399. This stated the poor knowledge and sympathy of the local government for this disaster, as the head of CAL FIRE stated that the governor’s office is the one that needs to be prioritized to educate rather than the public. This is causing displacement of the government’s investment and poor public’s trust for fire governance and management.

Comparison in California

Unlike Indonesia, wildfires in California are caused by natural phenomena in the form of climate change, or Santa Ana Winds. Santa Ana Winds are a hot, dry wind that blows across much of California during summer and vastly increases the chance of large wildfires. This influences policy that solely focuses on fire suppression and post fire management through disaster funds and post fire rebuilding. Zoning regulations are in place in an attempt to lessen the likelihood of homes being developed inside wildfire prone forests, and reduce people impacted from wildfires.

In Indonesia, prevention and monitoring have been heavily promoted as means to fight wildfires. Unlike in California, wildfires (mostly anthropologic) tend to happen outside of human inhabited areas, such that much of this impact is indirect rather than direct, necessitating a prevention-based policy. Efforts such as the Palm Oil Campaign and local community partnership have been conducted to fight the annual disaster. Unfortunately, the two cases are not exactly executed as planned. Evaluation and restructure of management are important to ensure the funding and planning are executed well. The agency for California wildfire is much more transparent by publishing ‘Red Book’ every year. The book is available to read by everyone to report the accomplishments and failures of the agency for a year. This could help researchers and academics to prove a point and make a suggestion for future planning of the management. Program evaluation in Indonesia is still in a poor condition, because although the partnership and education to local communities has been conducted, the amount of illegal human activities with fire risk is still increasing every year.
CONCLUSION

A wildfire is an unplanned fire that burnt in a natural area such as a forest, grassland, or prairie. Wildfires are often caused by human activity or a natural phenomenon such as lightning, and they can happen at any time or anywhere. The risk of wildfires increases in extremely dry conditions, such as drought, and during high winds. Wildfires can disrupt transportation, communications, power and gas services, and water supply. Wildfires also lead to a deterioration of the air quality, and loss of property, crops, resources, animals and people.

Wildfires occur almost all over the world, especially in Indonesia and the United States. Although the two countries have different characteristics, they do not escape the problem of wildfires. In Indonesia, especially Jambi Province, there are wildfires. Jambi has 751,000 hectares of peatlands, of which around 70% of this total has been drained and cleared for oil palm plantations and forestry plantations. When forest cover decreases and peatlands are drained, wildfires occur. In the United States, the state of California has faced frequent forest fires that spread rapidly. The overgrowth of trees, excess dried out and dead biomass has accumulated and created conditions that make it vulnerable to wildfires.

The Indonesia government has issued various regulations that lead to sustainable peat forest management and fire management, namely PP No. 1/2016 on peatland restoration. And some efforts such as restoration, environmental sustainability to fire management due to oil palm plantation activities. The Jambi Provincial Government issued several policies such as information on wildfires, regulations on the prevention and control of wildfires. The majority of wildfire response in the U.S. comes from government agencies such as the Bureau of Land Management. Primary responses and prevention include suppression of already existing fires and taking steps to prevent the spread of wildfires. No significant measures to restore any lands affected by wildfires or droughts. Restoration efforts are guided by the BAER program, including prescribed emergency stabilization treatments and only a portion of burned area is treated.

The Indonesian government has tried to deal with cases of peatland damage by establishing the Peat Restoration Agency (BRG) to avoid various disasters, especially wildfires. Peat Restoration Agency (BRG) has three programs to carry out peat restoration, namely rewetting, revegetation (replanting), and revitalizing livelihood sources. Jambi Province has started implementing peat restoration policies from 2017-2020 through the Indonesian Peat Restoration Agency (BRG) budget by conducting monitoring and evaluation.

Lastly, Jambi and California take very different measures on how they manage the disaster in their area. California is focused on suppressing and post management, considering
its nearly impossible to prevent a disaster caused by natural phenomena. Indonesia is fighting the fire by providing a sustainable plan for palm oil and local community partnership to help prevent and monitor the fire risk activities that are conducted in forest areas. From this point, we can conclude the comparison between the two makes a very different argument which cannot be applied to each other considering its distinct situation. For the future, a comparison study should be conducted for cases with similar physical characteristics to help more valid evaluation between the two cases.

REFERENCES
A comparative study on forest wildfire risk mitigation …


PP No. 1/2016 on Peatland Restoration.


