



The forest and land fires control brigade of Kubu Raya forest management unit.
Photo: Teguh, FMU Kubu Raya

Forest management units and local innovations for fire prevention in West Kalimantan, Indonesia

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“Local foresters, together with local communities, are the best agents for fire prevention in West Kalimantan.”

Introduction

The Government of Indonesia initiated a substantial reform of fire prevention approaches immediately after the devastating forest fires of 2015 and 2016. It was based on lessons learned from integrated fire management initiatives over the previous decades. Building on national Regulation 4/2001 regarding the Control of Environmental Damages and Pollution Related to Fires, the Ministry for Environment and Forestry enacted Regulation P.32/MenLHK/Setjen/Kum.1/3/2016 on the Control of Forest and Land Fires. This new regulation specified that the newly operationalized provincial forest management units (FMUs, *Kesatuan Pengelolaan Hutan*), would play key roles in fire prevention. The new regulation also stipulated that in addition to improving coordination among stakeholders, task forces at the FMU level, called forest and land fires control brigades (*Pengendalian Kebakaran Hutan dan Lahan*) were to be established.

Based on these regulations, a Grand Design for Forest and Land Fire Prevention 2017–2019 was defined and elaborated to guide national-level investments in fire management by the Ministry for National Development. The Directorate for Forest and Land Fire Control of the Ministry of Environment and Forestry, as well as national institutions such as the Meteorological Service, Disaster Management Agency, and Ministry of Agriculture, were instructed to implement provisions of the regulations, and to coordinate actions at the national, provincial and local levels.

Building on this framework and on a sustainable landscape-based management approach, the Indonesian-German Forests and Climate Change Programme (FORCLIME) supported the Provincial Forest Management System in West Kalimantan province and local stakeholders in fire prevention from 2017 to 2020. The programme also empowered FMU personnel to become competent facilitators, encouraging communities to develop and strengthen their livelihoods through agricultural or agroforestry techniques and land-use planning, without the use of fire. The technical approaches applied were adapted from successful experiences by various organizations in a range of locations, and incorporated local innovations developed at Tanjungpura University in Pontianak. Alongside fire prevention techniques, the programme promoted dialogue with communities and assistance for them to establish permanent agriculture and agroforestry as a

means of reducing the use of fire to clear land, which is the main cause of wildfires and smoke pollution. This article summarizes lessons learned from this programme and offers recommendations for fire prevention in Indonesia and beyond.

Fire prevention in the forest management unit of Kubu Raya

The forest management unit (FMU) of Kubu Raya regency covers 317,402 hectares (ha) over seven sub-districts (*kecamatan*). Almost 75% of the area (235,991 ha) is peatland, and its specific fire hazard characteristics are the main challenges to fire management in the FMU. See Figure 1. The main mandate of FMUs is to manage state forest land, but they also support fire control in non-state areas outside of these lands (Kubu Raya FMU 2019). The hazard characteristics of the peatland in Kubu Raya FMU were the reason that it was chosen by the provincial authorities as the intervention area for the FORCLIME programme.

Through cooperation with FORCLIME and Tanjungpura University, the institutional and technical capacities and facilitation skills of Kubu Raya FMU staff and its forest and land fire control brigade were improved. This notably enhanced their ability to formulate operational plans and carry out standard operational procedures (SOPs) to implement integrated forest and land fire prevention.

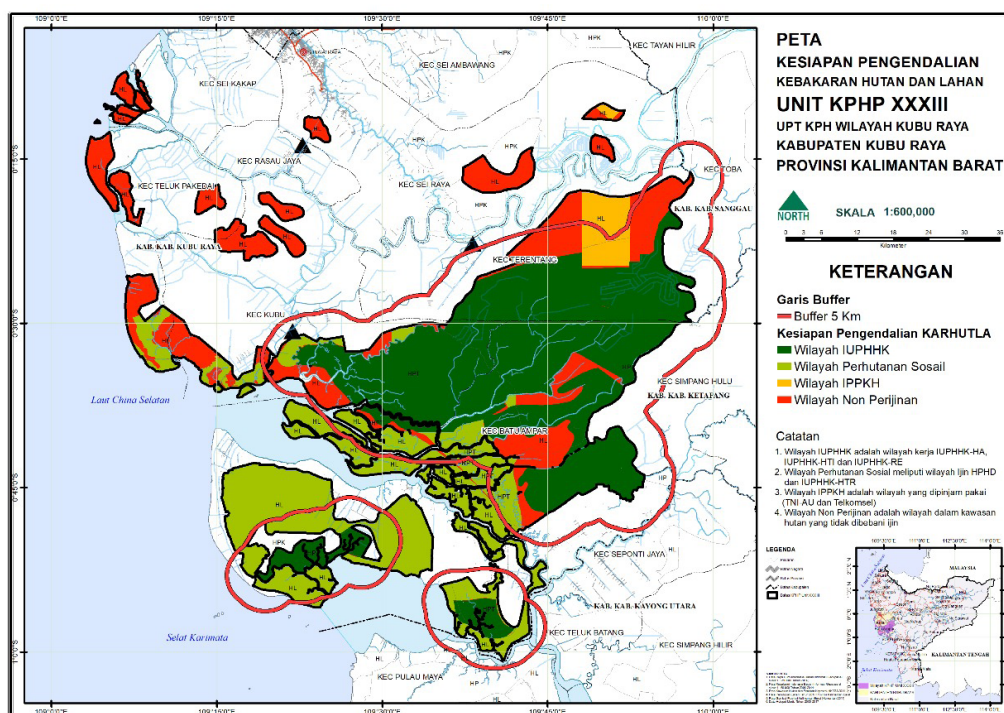


Figure 1: Fire preparedness map, Kubu Raya FMU. Source: FMU Kubu Raya



A forest and land fires control brigade of Kubu Raya forest management unit. Photo credit Teguh, FMU Kubu Raya

Besides strengthening the skills of technical staff, an important change in mindset was made in how the FMU staff perceive fire prevention. One innovation was the establishment of a “learning village” (*desa belajar*) programme in four model villages. It taught skills to community members in agroforestry, agriculture and ecotourism as part of a village development plan that excludes using fire to clear land. This programme used an integrated forest and land fire prevention approach that also increased income from alternative economic activities, without burning. Through the programme networking and cooperation were also built between communities and various government institutions at various levels. The approach is an evolution from previous integrated fire management approaches, such as the IFFM project in East Kalimantan some decades ago (Dennis 1999).

The provincial regulatory framework

The provincial Environment and Forestry Service is now more aware of the need to establish forest and land fire control brigades in each FMU, and to provide clear guidance on integrated forest and land fire prevention through operational planning and best practices. Local government policies on the prevention of forest and land fires, have improved, and Provincial Government Regulation No 6/1998 on Forest and Land Fire Control has been reviewed and enacted. A provincial command centre for forest and land fire control was established in 2019, facilitating improved coordination among institutions, including Kubu Raya FMU. SOPs

were developed to support the implementation of fire prevention and control activities. These included tools and operational guidance for FMUs and other authorities in the development of fire management plans and thematic maps on fire preparedness and fire hazards, in order to determine the priority of fire prevention activities.

Simultaneous work at the provincial and FMU level has also been instrumental in translating the lessons learned from field activities into provincial regulations. For example, Provincial Regulation No 6. 1998 was reviewed in 2020 by all stakeholders working on fire management at the local level. The review process increased the effectiveness of local actors at all stages of the prevention and management of forest land fires. This work culminated in the Directive and Provincial Guidelines for Fire Prevention (SK Kepala Dinas Lingkungan Hidup dan Kehutanan Provinsi Kalimantan Barat Nomor 223./DLHK-V/PP/2020).

Local knowledge hubs

Two important aspects of improving fire prevention are innovation and the creation of new knowledge. There is a need for local champions to adopt new practices. Local universities are key in generating and maintaining knowledge on fire prevention, and also for their work on local policies for forests and fire. Behavioural change is one of the goals of fire prevention and sustainable forestry activities, but this is a long-term process.

Universities provide consistent approaches and keep knowledge local, in contrast to many governmental

structures, which frequently rotate staff, leading to “brain drain.” Additionally, senior university staff are often involved as advisors and service providers for the provincial and district authorities that play important roles in planning processes.

West Kalimantan is fortunate to have Tanjungpura University, with a forestry faculty that serves as a knowledge hub, educating current and future generations on fire prevention. Its curriculum includes forest protection, use of fire equipment and firefighting techniques, and incorporates locally generated experiences. Equally important is the university's innovative research and development work, such as that by Arman et al. (2015), as well as various tools and technologies, including several fire-extinguishing systems that are adapted to the challenging issue of controlling peat fires. One example is the Nyapar firefighting tool; research led to the development of the tool and to special nozzles to extinguish underground peat fires (Hardiansyah et al. 2016).

The university also has its own 19,622-ha forest (*KHDTK Untan*). This is used as a centre of excellence, a living laboratory and an education centre to share knowledge on forests, including fire management. It is also used to provide training for local communities, in collaboration with provincial environment and forestry agencies, and with the firefighting task force of the Ministry of Environment and Forestry (Hardiansyah et al. 2021).

Tanjungpura University is very active in organizing communities and improving their capacities in fire

prevention. These communities have created fire task forces, and receive training in firefighting operations and how to use fire equipment such as the Nyapar tool. The university also provided six villages with fire equipment, and is drilling wells to support fire suppression efforts. The university also established a data and information centre, with locally adapted biophysical indicators for a disaster early-warning system for fire, food security and agriculture in real time.

The overall goal of this forest education is to demonstrate best practices and inspire people by showing how these practices can improve and scale up sustainable forest management activities. The university uses an interdepartmental approach. Implementation related to forest and land fire topics involves three faculties that are responsible for education and teaching, research and development, and community empowerment.

Indonesia benefits from having considerable experience in community-based fire management approaches (GFMC 2022b) and in national and regional policy dialogues (GFMC 2022a) since the 1990s. Furthermore, the country is home to the Regional Fire Management Resource Center – Southeast Asia (RFMRC-SEA), hosted by IPB University in Bogor, West Java province. This centre of excellence also serves as an national innovation hub, disseminating local innovations such as those developed at Tanjungpura University, and with a mandate for national and regional networking, capacity development and providing information. It is hoped that the added value of sharing and replicating experiences gained at the local level, as in this case, is taken up at national and



Nyapar fire equipment being demonstrated in a training session. Photo: Gusti Hardiansyah, Tanjungpura University



Mobile fire control equipment being moved to the fire location. Photo: Erwin, FMU Kubu Raya

international levels, with funding from either national or international sources.

Challenges

During local-level activities, several issues have become apparent that should be addressed.

FMU capacity. Some FMU staff lack the skills needed to gather information from communities, improve coordination with related government institutions and other stakeholders (including plantation companies and NGOs), and maintain networks of FMUs for sharing information and experiences. Most FMU staff are also not yet fully aware of the great potential for collaboration with communities to achieve forest conservation goals and community welfare through fire prevention activities. In addition, new staff lack the understanding and awareness of the need for close and daily contact with communities.

Local facilitation. Villages are dependent on facilitators who are often external and project-based, rather than facilitators who are part of permanent village structures or local government. This increases the possibility that villages will discontinue their work on fire prevention and alternative livelihoods once the facilitator has left.

Village-level planning and priorities. Village councils tend to prioritize physical infrastructure in development planning and do not see forest and land fires as an important issue. This is evidenced by the correspondingly small budget allocations from village funds, which also

tend to be used for responding to fires and not for fire prevention. In addition, FMU activities at the village level related to the prevention of forest and land fires are often not well coordinated, meaning that projects overlap and money is wasted.

Recommendations

Forest management units would benefit from the following specific activities:

- Increase cooperation with other agencies to ensure that activities are planned in a way that simultaneously meets multiple objectives. This is particularly important given the need to optimize funding and to use it for fire prevention and not only fire suppression.
- Identify and make an inventory of all stakeholders working in the FMU area, and become familiar with their projects and land uses so that synergies can be explored and developed. Develop close coordination among FMUs, national fire suppression structures (*daerah operasi* – DAOP) and the National Board for Disaster Management, to share information, clarify roles and expectations, improve planning, and agree on SOPs for fire management.
- Pursue strategies to increase communities' ability to monetize sustainable alternatives to using fire. These strategies should include innovative visual materials to show people what they can do instead of burning, rather than telling people what they cannot do (which they already know).

Such prevention efforts would benefit from promoting water management in peatlands (e.g. canal blocking), agroforestry, land rehabilitation, alternatives to slash-and-burn agriculture, and improving access to markets for fire-free agricultural products.

- Institutionalize fire prevention, rather than fire suppression, as a priority through changes in the FMU system and the organizational structure. This should address the failings of other administrations and incorporate the specific objectives of FMUs in the underlying Indonesian context.
- Limit investments in fire suppression capacities, except for basic training and equipment. Instead, FMUs should increase and rely on cooperation with DAOPs, disaster management authorities, and the private sector.
- Undertake further technical training whenever and wherever possible. Discussions with the Peatland and Mangrove Restoration Agency and provincial task force leaders should continue, as capacity strengthening will improve the management of FMUs while also helping to eliminate some of the obstacles faced by the agency.

Although these recommendations are outside of the scope of direct activities of the FORCLIME project, community engagement is also important in fire management:

- Revise standard budget lines in village funding schemes to include fire prevention.
- Promote and subsidize agroforestry activities as part of fire prevention.
- Increase investments in improving water management (deep wells, channel management, etc.).
- Clarify tenure arrangements and village boundaries.
- Invest in community forestry management and in clear management arrangements for community land.
- Establish internal village structures for fire management and the wise use of fire (e.g. fire volunteers) and establish linkages with neighbouring villages for exchanging information on and experiences in fire prevention.

Furthermore, regarding information and knowledge management, it would be valuable for all concerned to strengthen linkages between local agencies and universities, and with national-level actors such as RFMRC-SEA.

Conclusions

Overall, it has become clear that local forest management units — together with local communities — are the best agents for fire prevention in West Kalimantan. Leaders of forest management units should be encouraged to take advantage of opportunities arising from the FMU system, which is a relatively new creation. This should include thinking creatively, being cautious about replicating old approaches, strategies and accepted norms in forest and fire management, and taking initiatives in brokering participatory processes to overcome challenges.

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