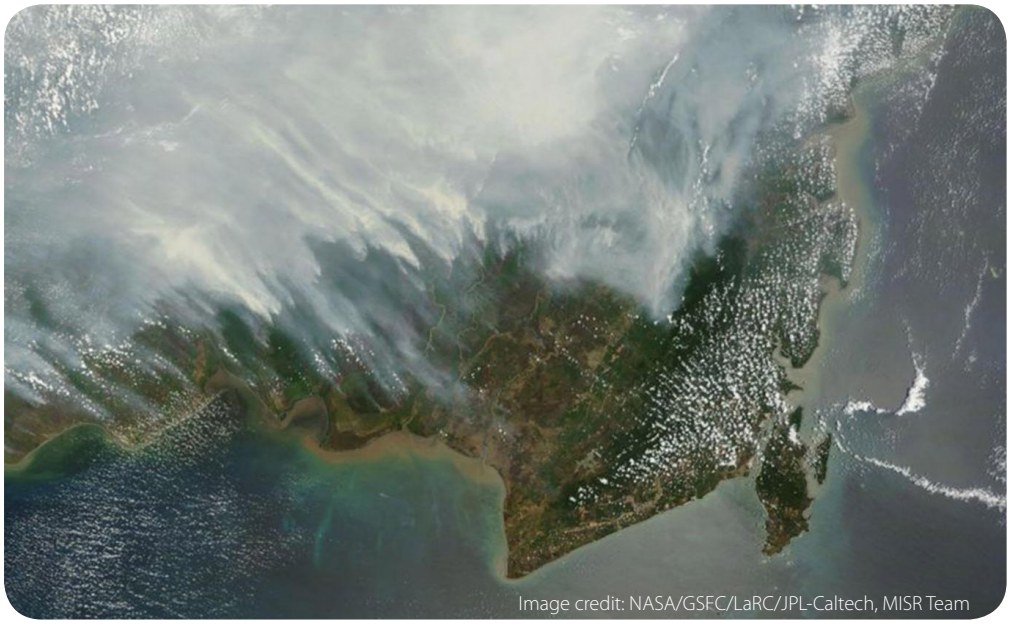
ASB Partnership for the Tropical Forest Margins

Policybrief 51

Peat and land clearing fires in Indonesia in 2015: Lessons for polycentric governance



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Beyond carbon-dioxide emissions that made Indonesia surpass the USA and approach the number one spot China has in global emission ranking, the haze caused major disruptions of lives in many parts of Indonesia and its neighbours. Now that rains have returned, the public debate should not return to business as usual if we are to avoid further record-breaking episodes. We offer a number of 'key findings' and 'implications' that are based on long term engagement in the landscapes of concern (see ASB-PB's 16, 21, 33, 36 and 45 for backgrounds).

Key findings

1. Hot spots in Sumatra and Kalimantan over the past fifteen years predominantly associate with Non-Forest Land and Production Forest Land, while in Papua with Convertible Forest Land. In Sumatra the number of hotspots in Production Forest Land increased sharply in 2015, in areas converted to industrial timber plantations.
2. The 2015 fires were mostly in (peat) swamp and wetland areas at low elevation; fire risk patterns differed between Sumatra (strong positive relation to peat drainage canals, negative with customary lands and positive with oil palm estates), Kalimantan (specific land use/cover types) and Papua (strong link with land use/cover types and industrial timber estates).
3. Projection of future fire-prone area shows 0.56 Mha of peat areas as focus for prevention and 7.12 Mha in need of restoration due to current and recurrent fire; 34% of this is in Non-Forest Land, 37% in Production Forest Land and 29% in Conservation Forest Land.
4. Attention to local 'hot spots' through conflict resolution, tenure arrangements and co-management has reduced fire and emissions where they were prominent before.
5. Current 'Forest Management Unit' modalities are not balanced in responsibility, authority and options for revenue streams in their relations with central forestry institutions and district governments and they do not share a balanced package to local communities.

Implications

- Instead of being 'forest fires' as understood elsewhere in the world, the hotspots occurred in ***'planned deforestation'*** zones where permits for conversion do not allow the use of fire and in ***'unplanned deforestation'*** zones where conversion of forest should not happen.
- Existing law enforcement is inadequate to prevent fires, and the social control that stops most (legal) smallholder land-clearing fires in areas with customary land institutions does not function sufficiently elsewhere.
- Efforts in Sumatra and Kalimantan should be more into restoration while in Papua prevention will have to remain the primary focus. Effective cooperation between local governments and forest authorities is key to success.
- Underlying causes of fire can be addressed, but it is hard work, a slow process and deserves continuous support.
- Changes and readjustments in forest governance need to align with changes in the overall balance of power between central, provincial, district and village governance structures; reduced NTFP taxing conditional to actual forest management could align private incentives with public interests.

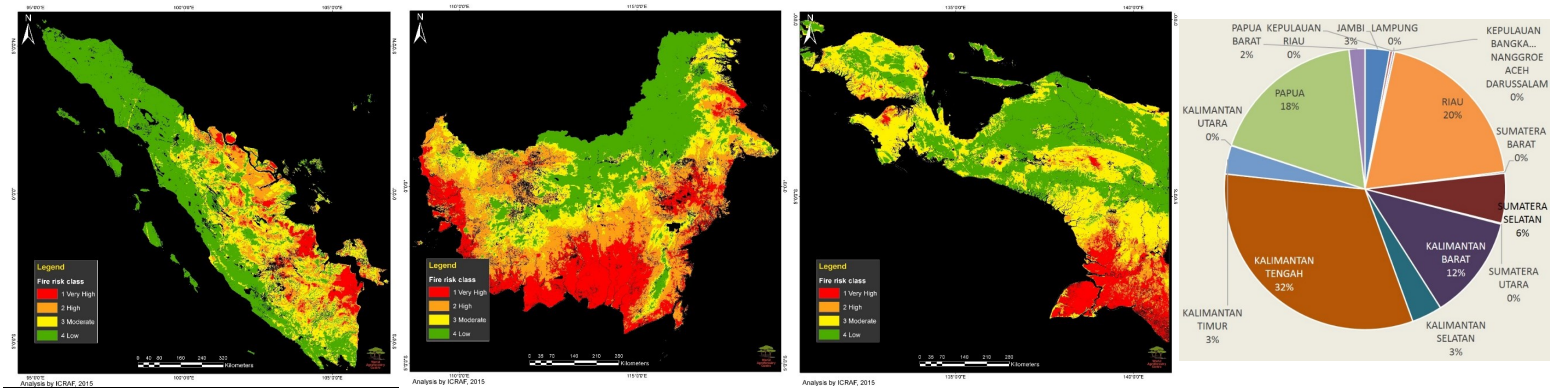

Figure 1. Fire risk maps derived using Maximum Entropy Model on 2015 fire hotspot data and several proxies of land use policies, infrastructure, land tenure, management and human activities, land use/cover type and relevant biophysical characteristics

Only a small part of the 2015 fires that caused haze were 'forest fires' in the way this term is understood in other parts of the world. This implies that a REDD+ mechanism restricted to forests cannot prevent a large share of emissions. It is important to understand the whole landscape and its transitions, where land clearing can be a step in many deliberate land use changes. From the Forestwatch hotspot data, it is clear that fires were widespread, but yet most occurred in pretty well defined areas: two-thirds of hotspots in Sumatra were in a South Sumatra industrial timber plantation landscape, one third of forest in Kalimantan in three subdistricts with logging concessions and conversion to oil palm implied and a historical link to the million-ha rice scheme, and 95% of fire in Papua in three subdistricts that include the new 'food estate'. This patchy characteristic of the fires means there are both strong positive and negative lessons to be learned. In our analysis we focussed on the areas involved in one or more hot spots (temporal fire events), rather than the number of hot spots as such.

Findings

1. Hot spot patterns in Sumatra, Kalimantan and Papua

Areas with at least one hot spot recorded over the past fifteen years were predominantly in Non-Forest Land and Production Forest Land in Sumatra and Kalimantan, while in Papua they were mostly in the Convertible Forest Land category. In Sumatra the number of hotspots in Production Forest Land increased sharply in 2015, in areas converted to industrial timber plantations. Figure 1 provides fire risk ratings based on the past 15 years (MaxEnt model).

2. The pattern of geographical covariates of hot spots varies between the islands

The fire patterns were further analysed for spatial correlation with existing spatial data. Results differed between the three islands, although the 2015 fires were mostly in (peat) swamp and wetland areas at low elevation for all three. In Sumatra we found fires mostly close to peat drainage canals, in oil palm estates and far away from customary lands. In Kalimantan all land use classes beyond primary forest contributed to fire events, but mostly those on peat and wetland areas. In Papua we found a stronger differentiation between land use types, and a positive association of fires and (planned) industrial timber estates.

3. Fire-prone areas as priorities for prevention and restoration and/or rehabilitation

Further analysis of the risk factors identified in past fires led to the projection of future fire-prone areas (Fig. 2). Across the three islands we identified 0.56 Mha of peat areas as focus for prevention and 7.12 Mha in need of restoration and rehabilitation due to current and recurrent fire. From this total 34% is in Non-Forest Land, 37% in Production Forest Land and 29% in Conservation Forest Land.

4. The hard work of conflict resolution

Landscapes that previously were included in the highest risk class have graduated to medium risk, at least in part due to efforts to resolve conflicts over land use rights. In the Tanjung Jabung Barat district a multiyear effort to reduce conflicts between the local government and the surrounding community has now led to a proposal to the central government to designate part of the remaining peat forest as 'community forest' – if approved it will be the first application of the community forest in peat protection forest. There are further steps to take in the approval process, showing the hard work and long time perspective needed. Furthermore, finding the right options for land management and tree-species to contribute to rehabilitation, reducing fire risk as well as livelihood needs are also part of the efforts. Putting out fires is more newsworthy, but the real effort has to happen after the rains have returned (Tata et al 2015b). Another effort is to integrate different knowledge and

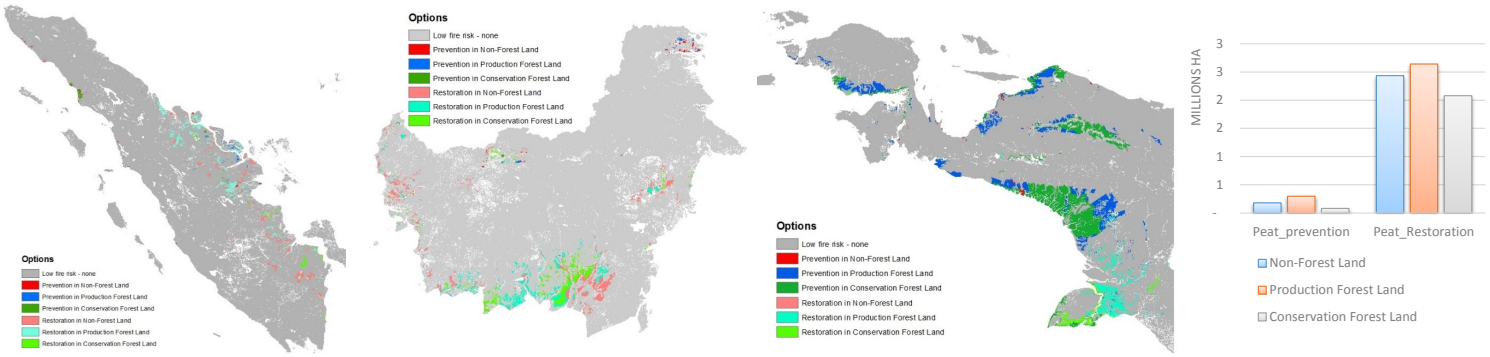

Figure 2. Indicative priority of action: (i) prevention is targeted in areas where peatland fire has not happened lately but the risks are high in natural forest, (ii) restoration and rehabilitation is targeted in areas where peatland fire has happened recurrently and risks are high in non-natural forest.

norms from different social actors (migrants and local people) (Galudra et al 2014) to the community forestry scheme. Successes in resolving conflicts over tenures on peat areas through community forestry depend on how well local knowledge and norms are recognized within the state-sponsored tenure system, as well as the benefits received by the communities. Balancing act between responsibilities and rights in managing peatland needs to be imposed. A study in Tanjabar shows that in peat areas managed by communities, the occurrence of fire is much less (Sakuntaladewi and Wibowo, 2014), even though the process to get the CBFM permit is still ongoing.

5. Reforms needed in the way forest management units interact with local communities

Current 'Forest Management Unit' modalities are not balanced in responsibility, authority and options for revenue streams in their relations with central forestry institutions and district governments and they do not share a balanced package to local communities. For example, Tata et al (2015) attributed the collapse of Jelutong markets to the high revenue sharing demanded by forest authorities, based on past price levels. For the areas on mineral soils that have obtained 'village forest' or 'community-managed forest' status in Indonesia, however, signs are that the local partners are disappointed with the results or lack thereof (de Royer et al 2015; Juita et al 2015).

Way Forward

Priority of action in combating and mitigating impacts of peat fire should be directed spatially as regional approach will be cost-effective. Figure 2 shows indicative priority action and with ground and more detail information on permits, actors and drivers at local levels, road maps can be developed as suggested in Table 1.

Table 1. Recommendation action to be taken in land zonation based on functions

Recommendation of Action	Status of area		
	Non-Forest Land	Production Forest Land	Protection and Conservation Forest Land
Prevention	Smallholder: Community awareness raising and behavior changes; private-people partnerships; early warning systems, trainings in firefighting, water management Large scale permit: best practices, compliance to regulation, water management	Concessions: Private-community partnerships, disincentive policy, including termination of licenses, rezoning to Conservation Forest Land, early warning system, water management Without concessions: Customary land, community based forest management option (e.g. village forest, community forest), capacity strengthening to manage sustainable production forests, incl. agroforestry, canal blocking, re-wetting, rezoning into Conservation Forest Land	Buffer area: Public-or Government-community partnerships, water management Core: local stewardship, technology in monitoring and early warning system, canal blocking
Restoration and Rehabilitation	Smallholder: Agroforestry development across value chain of peat species, combined with PES/RES, supported by government programs, smallholder systems for water management Large scale permit: best practices on peat, compliance to regulation, water management, early warning system	Concessions: Water management, re-wetting, speeding up the planting plans, best practices on peat with specific M&E systems Without concessions: Ecological restoration (paludiculture), re-wetting, rezoning into Conservation Forest Land	Buffer area: agroforestry development of local community with peat species (paludiculture), water management, re-wetting in case there are canals Core: canal blocking, ecological restoration in partnerships with local community, PES/RED scheme development, ecotourism, re-wetting

Further effort is needed to bring the best of 'process facilitation' and 'negotiation support' (van Noordwijk et al 2013) together with a good understanding of the spatial data and the determinants of the local social-ecological system (Minang et al 2015).

References

de Royer S, Juita R, Galudra G, Pradhan U. 2015. *Are Village Forest licences for rural development or conservation? A case study from Jambi Province, Indonesia*. Brief No 53. Bogor, Indonesia. World Agroforestry Centre (ICRAF) Southeast Asia Regional Program. 6 p.

Direktorat Jenderal Planologi Kehutanan dan Tata Lingkungan. 2015. Sistem Pemantauan Kebakaran: Emisi Karhutla 2015. Paper presented in the "Emission from Forest and Land Fire", hosted by Directorate General of Climate Change Control, Ministry of Environments and Forestry.

Ekadinata A, van Noordwijk M, Dewi S, Minang PA. 2010. *Reducing emissions from deforestation, inside and outside the 'forest'.* ASB Brief 16, World Agroforestry Centre, Nairobi

Ekadinata S, van Noordwijk M, Budidarsono S, Dewi S. 2013. *Hot spots in Riau, haze in Singapore: the June 2013 event analyzed.* ASB Policy Brief No. 33. Nairobi: ASB Partnership for the Tropical Forest Margins. 6p

Galudra G, van Noordwijk M, Suyanto, Sardi I, Pradhan U, Catacutan D. 2011. Hot spots of confusion: Contested policies and competing carbon claims in the peatlands of Central Kalimantan (Indonesia). *International Forestry Review* 13: 431-441

Galudra G, van Noordwijk M, Suyanto, Pradhan U. 2010. *Hot spots of confusion: contested policies and competing carbon claims in the peatlands of Central Kalimantan, Indonesia.* ASB Policybrief 21. Nairobi: ASB Partnership for the Tropical Forest Margins.

Juita R, Galudra G, de Royer S, Pradhan U. 2015. *Community-Based Forest Management in Indonesia: A Dual Objective for Climate Change and Social Justice.* Bogor, Indonesia. World Agroforestry Centre (ICRAF) Southeast Asia Regional Program.

Minang PA, van Noordwijk M, Freeman OE, Mbow C, de Leeuw J, Catacutan D. (Eds.) 2015. *Climate-Smart Landscapes: Multifunctionality in Practice*. Nairobi, Kenya: World Agroforestry Centre (ICRAF), 404 pp

Sakuntaladewi N, Wibowo LR. 2014. *The Political Economy of Peat Fire: A Case Study in Kuala Tungkal, Jambi.* Report prepared for ICRAF and Forestry and Environmental Research dan Development Agency project on Secured Landscape from Fire.

Tata HL, van Noordwijk M, Widayati A. 2015a. Domestication of Dyerapolyphylla (Miq.) Steenis in peatland agroforestry systems in Jambi, Indonesia. Agroforestry Systems, published on-line

Tata HL, van Noordwijk M, Sakuntaladewi N, Wibowo LR, Bastoni, Tampubolon AP, Susmianto A, Widayati A. 2015b. *Stopping haze when it rains: lessons learnt in 20 years of Alternatives-to-Slash-and-Burn research in Indonesia.* ASB Brief no 45. Nairobi, ASB Partnership for the Tropical Forest Margins.

van Noordwijk M, Agus F, Maswar, Handayani EP, Marwanto S, Dariah A, Khasanah N. 2013a. *Reassessing peat-based emissions from tropical land use.* ASB Policybrief 36. Nairobi, ASB Partnership for the Tropical Forest Margins.

van Noordwijk M, Lusiana B, Leimona B, Dewi S, Wulandari D (eds). 2013b. *Negotiation-support toolkit for learning landscapes.* Bogor, Indonesia. World Agroforestry Centre (ICRAF) Southeast Asia Regional Program.

van Noordwijk M, Matthews RB, Agus F, Farmer J, Verchot L, Hergoualc'h K, Persch S, Tata HL, Lusiana B, Widayati A, Dewi S, 2014. Mud, muddle and models in the knowledge value-chain to action on tropical peatland issues. *Mitigation and Adaptation Strategies for Global Change* 19, 863-885

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The ASB Partnership for the Tropical Forest Margins is working to raise productivity and incomes of rural households in the humid tropics without increasing deforestation or undermining essential environmental services.

ASB is a consortium of over 90 international and national partners with an eco-regional focus on the forest–agriculture margins in the humid tropics, with benchmark sites in the western Amazon Basin of Brazil and Peru, the Congo Basin forest in Cameroon and DRC Congo, southern Philippines, northern Thailand, and the island of Sumatra in Indonesia.

The ASB Policybriefs aim to deliver relevant, concise reading to key people whose decisions will make a difference to poverty reduction and environmental protection in the humid tropics.

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