## Addendum

## South-east Asia's forest fires: blazing the policy trail

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Our article (Yong & Peh, 2014) reviews the causes and consequences of the 2013-2014 South-east Asian forest fires, evaluating solutions to address the problems, in particular with regard to peatland conservation. Exacerbated by strong El Niño effects, the 2015 forest fires inflicted severe damage, with >110,000 fire hotspots from Sumatra to Papua (Soh & Peh, 2016). Many protected areas of peat swamp and lowland rainforest were damaged (Palangka Post, 2015). The resulting smoke haze affected Indonesian Borneo, Sumatra, Papua, Malaysia, Singapore, Brunei, Thailand and the Philippines. The estimated economic losses suffered by Indonesia were > 16.1 billion USD (The World Bank, 2015). The causes of the 2015 fires were the same as previous episodes: slash-and-burn clearance of deforested and drained peatland. Here we examine whether our recommendation for a multi-pronged approach for tackling South-east Asia's forest fires and transboundary haze pollution have gained traction as a result of the fires of 2015.

When forest fires occur there is a need to synchronize information-sharing to coordinate fire-fighting and evacuation efforts. Indonesian President Joko Widodo reiterated his commitment to implementing a One Map Policy to provide standard data classification and geospatial systems (Soh & Peh, 2016). One Map will be made publicly available online but its effectiveness is still to be tested.

There was progress in tackling forest fires and conserving peatlands in Indonesia. Enforcement agencies initiated the prosecution of companies linked to land clearance by burning, and some executives were arrested (Soeriaatmadja, 2015). Indonesia's Ministry of Environment and Forestry outlined its intention to review slash-and-burn policies for smallholders, and to halt the conversion of peatlands to agriculture and encourage restoration of degraded peatlands. Efforts are underway to build canals to mitigate desiccation of peatlands. However, coordinating these measures remains problematical. Ministries have issued conflicting information: the Ministry of Agriculture aims to cultivate deforested peatland, in antithesis to efforts by the Forestry Ministry to conserve peatlands better. President Widodo and Vice-President Jusuf Kalla have issued divergent signals on Indonesia's commitment to tackle forest fires (Soh & Peh, 2016). In addition, a council representing the palm oil industries of Indonesia and Malaysia is pushing ahead with plans to drop the 'no deforestation' pledge.

Cooperation between ASEAN countries is integral to efforts to halt the fires, primarily because key stakeholders

such as large plantation firms have operations that transcend national borders. But confusion still reigns. An offer by the Singapore government to deploy fire-fighting assets to Sumatra was rejected by Indonesia's Forestry Ministry, only to be accepted later, and the enforcement of Singapore's Transboundary Haze Pollution Act (Lee et al., 2016) was impeded by Indonesia's reluctance to identify errant firms. A firmer Indonesian lead is required to enhance regional cooperation.

International outreach over the 2015 fires was moderately successful, facilitated by social media outlets. Across the region, and particularly in Singapore, NGOs urged accountability in labelling products linked to the forest fires. For example, the Singapore Environmental Council suspended certification of paper-pulp companies that could be responsible for the fires in Indonesia, major supermarket chains withdrew afflicted products and banks are reviewing investment loans for these firms (Wijedasa et al., 2015).

The 2015 South-east Asian forest fires were unprecedented in their scale and in damage to biodiversity, the economy and health. Actions to tackle the causes of the fires gained momentum, and a number of Indonesian moves to strengthen good governance are encouraging. But, given the complexity of the fires, it may be many years before the degree of effectiveness of these measures becomes clear.

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