



Toward clearer skies: Challenges in regulating transboundary haze in Southeast Asia



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ABSTRACT

Addressing transboundary environmental problems, such as pollution, and climate change, hinge on strategies that often require both mandatory and voluntary participation of affected nations. Using an unprecedented approach, the Singapore government recently passed a Transboundary Haze Pollution Act (THPA) that financially penalizes companies for smoke-haze affecting the city-state but originating from activities outside her political boundaries. This Act may set a precedent for future actions against proximate actors of environmental degradation but is fraught with substantial challenges in implementation. In attempting to hold agri-business companies accountable, the THPA must present indisputable evidence of fire burning activities and positively identify the initiator of these fires. We further argue that small amendments to the THPA, and other similar laws, may result in environmental co-benefits related to carbon emissions, ecosystem services and biodiversity preservation.

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1. Transboundary environmental pollution

Environmental pollution transcends political and economic boundaries, especially in light of globalization (Ye and Wei, 2012). Pollution may originate in one country but cause problems in another, reflecting the high connectivity of atmospheric, aquatic and terrestrial environments (Jayakumar et al., 2015). Transboundary environmental pollution originates from various economically driven anthropogenic activities (Naito, 2010). These include industrial discharge or damming of rivers that traverse multiple countries at a location upstream, and consequently affecting downstream countries (Dudgeon, 2000; McCaffrey, 2015), leakage of radioactive material from a nuclear plant in one country may raise serious environmental concerns for an entire region (Van Noorden, 2007), and smoke generated from land

burning activities in one country may affect the regional air quality (Tay, 1998). Transboundary environmental pollution has had significant negative impacts to the biodiversity (Campagna et al., 2011; Dudgeon, 2000), economy (Quah, 2002; Selin et al., 2009), and health of inhabitants (Chiu and Lok, 2011; Marlier et al., 2015; Varady and Mack, 1995) of affected countries.

International negotiations on transboundary environmental issues are becoming increasingly difficult due to disparate interests of participating nations (Seo 2013). Yet, international and regional systems of environmental management and governance are essential to mitigate transboundary environmental pollution (Adger et al., 2005; Kimball, 1999). Environmental governance of transboundary environmental pollution is complex due to the different spatial, socio-political, and temporal scales in which these occur (Dietz et al., 2003; Lemos and Agrawal, 2006). As a result of spatial decoupling of the causes and consequences of environmental pollution, transboundary pollution activities such as the release of industrial waste effluents upstream of an international river or pollution of the regional atmosphere from the use of fire to clear land for agriculture, results in an unequal distribution of costs and benefits for different countries. While

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Principle 21 of the Stockholm Declaration stresses that countries have “the sovereign right to exploit their own resources pursuant to their own environmental policies”, it also states that countries have the “responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or of areas beyond the limits of national jurisdiction” (United Nations, 1972). Cross-scale governance mechanisms such as regional (e.g., the Convention on the Protection of the Rhine) (European Union, 1999) and international (e.g., the Montreal Protocol on ozone emissions) (United Nations, 1987) treaties have been set up to outline mandatory and/or voluntary measures to ensure polluting countries are accountable in the arena of regional and global environmental health. International environmental law, especially in the past five decades, has evolved to address transboundary environmental pollution by seeking to establish legal principles that make states responsible for activities within their jurisdiction, especially ensuring such activities do not cause harm to the environment of other states (Redgewell, 2015). In this paper, we discuss one such example of environmental law that addresses the issue of transboundary air pollution (or haze) in Southeast Asia.

2. The Southeast Asian haze problem

Clearing of tropical forests for large-scale commercial agriculture and medium- to small-scale farming has resulted in significant carbon emissions that contribute to global climate change (Gibbs et al., 2010; van der Werf et al., 2009; Vermeulen et al., 2012). Burning, practiced in many parts of the tropics, is the cheapest and most convenient method of land clearance preferred by smallholder agriculturists and agro-industrial companies alike (Anderson and Bowen, 2000; Ketterings et al., 1999; Siegert et al., 2001). Unregulated land burning for agriculture results in reduced air quality due to emission of hazardous gases and aerosols, forest degradation and habitat loss that negatively impact the provision of ecosystem goods and services (Cochrane, 2003; Heil and Goldammer, 2001; Langmann et al., 2009; Reddington et al., 2014).

Annual burning events in Indonesia release massive amounts of carbon, averaging 0.049 gigatonnes of carbon per year (Gt C yr^{-1}) in Sumatra and 0.074 Gt C yr^{-1} in Borneo (van der Werf et al., 2008) which are exacerbated not only during El Niño-Southern Oscillation (ENSO) events, but also interactions between ENSO and other weather systems such as the Indian Ocean Dipole and the Madden-Julian Oscillation (van der Werf et al., 2008). Prevailing northerly winds during the burning season (June–October) transport gaseous emissions and particulate matter, termed ‘haze’, throughout Indonesia, Brunei, Malaysia, Singapore and Thailand and inflict high social and economic costs (Othman et al., 2014). The transboundary haze episodes in these Southeast Asian nations fully emerged on the regional agenda and gained global attention in 1997/1998, when massive forest and peat fires in Indonesia released an estimated 0.95 Gt of carbon into the atmosphere (equivalent to ~15% of mean annual global carbon emissions from fossil fuels) (Page et al., 2002; Turetsky et al., 2015; van der Werf et al., 2010) producing smoke pollution that blanketed the region and severely impacted public health and tourism (Page et al., 2002; Quah, 2002; Tacconi, 2003). Affected countries estimated losses at USD 383 million as a direct result of this episode alone (Glover and Jessup, 1999). In June 2013, the region was again enveloped by a severe haze event for three weeks. Unprecedented levels of smoke and atmospheric particles during this episode caused air quality to reach hazardous levels in Malaysia with Air Pollution Index values of 750 (values above 300 are deemed hazardous) and Singapore with Pollution Standard Index values of 400 (values above 300 are deemed hazardous). At the peak of this episode, many flights were canceled, affected areas in Malaysia were declared states of

emergency, and hundreds of schools in Malaysia and Indonesia were closed (Ramasmay et al., 2013). Remote sensing analysis indicated that 52% of the total burned area (84,717 ha) in Riau fell within concession boundaries of major oil palm and pulpwood companies (Gaveau et al., 2014). Many of these companies are not headquartered in Indonesia but instead have administrative, financial and operational centers in nearby countries such as Singapore and Malaysia.

Attempts have been made to deal with the haze problem at the regional level. The 10 members of the Association of South East Asian Nations (ASEAN) signed the Agreement on Transboundary Haze Pollution in 2002. However, Indonesia’s delay in ratifying the agreement until September 2014, making it the last signatory, signaled its unwillingness to depart from the ‘business as usual’ scenario (Putri, 2014). Moreover, despite improved monitoring technologies (e.g., the Association of Southeast Asian Nations Sub-Regional Haze Monitoring System) and assurances on cessation of burning activities from the Indonesian government, efforts to curb the haze remained limited (Nurhidayah et al., 2014). Previous exhortations from neighboring countries to stop forest fires have been met with rebukes from Indonesia to respect its national sovereignty (Soeriaatmadja, 2014), demonstrating the complex nature of the problem involving politics, economic interests, and the environment. For example, while ‘zero burning’ legislation does exist in Indonesia, explicit allowances are made for local communities to use fire to clear land (Tan, 2015b). Additionally, there exist nationwide prohibitions against starting fires in or developing peat areas that are more than 3 m in depth. An entity found guilty of setting an illegal forest fire could be imprisoned for 5–15 years and fined up to 5 billion Rupiah (about US\$420,000). These are not inconsequential penalties. However, complexities of political governance in Indonesia result in ineffective enforcement of, and compliance with, these laws. Ultimately the success of the ASEAN’s Agreement on Transboundary Haze Pollution depends on Indonesia’s enforcement will and capacity. Until recently, apart from applying diplomatic pressure and providing financial and technical aid to extinguish fires, neighboring countries have been limited in the ways they are able to address the source of the problem (Lohman et al., 2007; Yong and Peh, 2014).

3. Thinking out of the tinder box

The Singapore Parliament passed the Transboundary Haze Pollution Act (THPA) in August 2014, which allows for imposing of fines on companies that cause or contribute to transboundary haze pollution in Singapore (Box 1 describes the THPA) (Chua, 2014). The THPA’s centerpiece is a regime of multiple legal presumptions (Singaporean Ministry for the Environment and Water Resources, 2014). First, it provides that if there are maps which show that any land is owned or occupied by a company, it shall be presumed that that company owns or occupies that land. The maps can be procured from a variety of sources: any foreign government, any department or instrumentality of the government of a foreign state, and, any person, company, or entity operating the concession in question, who can be legally compelled to furnish its own maps. Second, if there is serious haze pollution in Singapore and satellite and other meteorological evidence shows that at or about that time, there is a land or forest fire on any land causing smoke that is moving in the direction of Singapore, it shall be presumed that there is haze pollution in Singapore involving smoke resulting from that land or forest fire. This is so even if there may be other fires in adjacent areas at the same time. Third, it shall be presumed that the company that owns or occupies the land in question has engaged in conduct, or engaged in conduct that condones any conduct by another, which caused or contributed to that haze pollution in Singapore.

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