



DOCTORAL  
SERIES



STUDY ON MIXED POLICY OF

# Haze Pollution

CONTROL IN INDONESIA

Firman Tatariyanto



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Design and Layout

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Publisher

Politeknik Keuangan Negara STAN  
Jl. Bintaro Utama Sektor V, Bintaro Jaya  
Tangerang Selatan, Banten, Indonesia 15222  
Telp. 021 7361654-58 Fax. 021 7361653

First print: October 2021

Perpustakaan Nasional:

Study On Mixed Policy Of Haze Pollution Control In Indonesia

Tangerang Selatan: Politeknik Keuangan Negara STAN, 2021

ISBN: 978-623-6784-27-3

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Isi di luar tanggung jawab percetakan

## TESTIMONIAL

*Perubahan iklim menjadi sebuah tantangan bagi seluruh negara di Dunia termasuk Indonesia. Penelitian yang dilakukan oleh penulis atas interaksi antara instrumen lingkungan dan pajak menjadi sangat relevan bagi Kementerian Keuangan dan memberikan kontribusi yang signifikan dalam penyusunan kebijakan pajak dalam memitigasi perubahan iklim di Indonesia.*

**Yon Arsal, S.E., Ak., M.Ec., Ph.D. Staf Ahli Bidang Kepatuhan Pajak,  
Kementerian Keuangan Republik Indonesia**

*Apakah kebijakan Pajak dapat ikut berperan dalam mencegah kerusakan lahan di Indonesia? Penulis menguraikan permasalahan dan mampu membangun argumentasi yang robust serta persuasif dengan studi kasus kebakaran lahan yang terjadi di Indonesia atas arah implementasi instrumen pajak lingkungan yang akan melengkapi kebijakan lingkungan hidup dalam mencegah eksternalitas negatif yang terjadi.*

**Dr. Ir. Imam Arifin, M.A. Direktur Transformasi Proses Bisnis,  
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*Penulis meneliti peluang implementasi Pajak Lingkungan di Indonesia yang telah menjadi diskusi di kalangan akademisi. Diskusi dan analisis latar belakang serta kebijakan lingkungan dalam kasus kebakaran lahan yang disampaikan oleh penulis sangat mudah diikuti dan merupakan sumber referensi penelitian yang valid. Implementasi Pajak Lingkungan menjadi salah satu panacea dalam menghadapi perubahan iklim global.*

**Dr. Ir. H. Sarwani, M.T., M.M Direktur Program Pascasarjana  
Universitas Pamulang**

## FOREWORD

This study on mixed policy of “Haze Pollution Control in Indonesia” offers an integrated and relevant analysis on climate change, an area that has been a challenge for all countries across the globe, including Indonesia. In particular, this study relates environmental and tax instruments so that it is relevant for the Ministry of Finance in the preparation of tax policies in mitigating climate change. The study is also in line with the commitment of the Government of Indonesia in international fora, including through the Coalition of Finance Ministers for Climate Action.

This book reflects one of our commitments to contribute through empirical research deemed to fall under state finance realm. As a significant part of the academic reform journey, this book is issued to convene *civitas academica* call for high-quality study that can also invite further research. In a broader horizon, we are optimistic that the insights from this study will lead us to show more attentiveness to our planet.

Rest assured we are prepared to take on the potential of our resource in providing consistently improved research-based policy recommendation. We wish the readers discover novelty.

**Vice Director of Academic - PKN STAN**

**Evy Mulyani, Ak, MBA, PhD, CA, CACP**

## **ABSTRACT**

Haze pollution in Indonesia is a harmful environmental crisis in the Southeast Asian region. The haze pollution source is the fire used by people to clear and convert the land into agricultural purposes, mainly for palm oil plantation. The absence of comprehensive and robust law enforcement coupled with a failure to find the root problem of policy implementation, the social cost resulting from the action of economic agents will exceed the private cost and reducing the environmental quality. The current study is expected to contribute to theoretical and practical implications in strengthening regulatory enforcement policies.

Reaching a better understanding of the enforcement of current regulatory approaches will provide a baseline for enhancing future policy choices for deterring and controlling the devastating effects of haze pollution. Using in-depth interviews with prominent actors who have direct and indirect involvement in the law enforcement process (i.e., Investigators, Prosecutors, Academic Experts, Witnesses in Court, NGO), Chapter 3 investigates how insufficient power and law enforcement capacity could hamper and deter policies for tackling haze pollution. The paper shows that a low probability of detection for environmental offenses, especially in South Sumatra, causes economic agents to incorrectly receive signals to not engage in unsustainable and illegal activities.

More specifically, the paper finds that the absence of a special arrangement for the recovery of environmental costs and direct financial mechanisms for how fines would be utilized has been hampering law enforcement. Moreover, a limited budget and coordination, as part of the

government's capacity, provide a low probability of inspection and create a relatively high benefit for noncompliance, thus inducing the persistence of noncompliance. The establishment of a policy regime that is inclusive of fiscal provisions in mixed environmental management cannot be overlooked as a reference point for effective future solutions. The potential to use taxes to regulate pollution and generate revenue for the government would improve capacity and enhance the enforcement of haze pollution deterrence in Indonesia.

As mentioned earlier in this paper, enforcement is a method of securing compliance with the policy. Enforcement with greater certainty of deterrence, severity, and clarity of punishment is more likely to drive people to comply with the law because they fear legal sanctions. Chapter 4 will investigate the influence of the gravity of haze pollution as environmental harm on judicial sanctioning decisions in the case of land/forest fires. The paper adopts a novel approach to analyze judicial sanctioning decisions on criminal offenders based on different types of defendant occupations and burning site locations. By using a qualitative approach based on content analysis, the paper observes that the actual gravity of environmental harm does not consistently affect the pattern of judicial sentencing decisions. More specifically, the gravity of the judicial sanction imposed on the plantation company and its director and manager is less consistent with internalizing the harm caused by the offense. In contrast, in the case of the estate employee, laborer, and farmer/landowner, the judicial sanction is relatively consistent with the gravity of the environmental harm. Overall, judicial sanctioning decisions that are insensitive to the degree of the environmental harm that

should be internalized underlie the persistent and devastating haze problem in Indonesia.

Building the conceptual connection between the current policy implementation and the haze pollution, the first and second main chapter qualitatively investigate the deterrent effect of enforcement through expected liability and harm. To evaluate the mixed policy impact more systematically, Chapter 5 applied empirical estimation using a fixed-effect with including an interaction term as one of the independent variables. This chapter investigates the impact of fiscal capacity in the context of a mixed instrument on haze pollution. By considering fiscal capacity, this paper provides an empirical analysis whereby regulatory tax enforcement may coexist and may complement the environmental regulatory action. In the first finding, the paper is observing evidence that an increase of 1 unit in fines as a share of GRDP imposed by the court statistically significant decrease in hotspot development. In the main finding, the paper also shows an increase of 1-unit Fines as a share of GRDP will reduce the Hotspot development as the Tax Enforcement on identified tax evasion as a share of GRDP increases by 1-unit. Furthermore, this paper demonstrates that the transition policy to a green tax revenue system is useful for addressing haze pollution.

The research finding shows that prevailing obstacles of current single policy implementation, creating the expected liability faced by market-players is relatively low. Thus, based on that robust evidence, the optimal level of liability at the level of harm created by violations are the Fine reflecting the gravity of harm imposed by the regulator with sufficient budget capacity. Moreover, parallel with detection ability that expanded with the tax

administrator capabilities in capturing the economic actor in the palm oil dan forestry sector.

In practical implementation, research findings would be contributing to environmental management policy in general through strengthening policy implementation based on Law No. 32/2009 and Law No. 39/2014 and establishing policy regimes that include fiscal instruments for environmental management in tackling the haze pollution. Moreover, the policy implementation will be strengthened by tax regulatory enforcement through shifting from regular taxes to environmental taxes, which more challenging to evade and generate revenue for the government in tackling the haze pollution in Indonesia.

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## LIST OF ABBREVIATION

<b>AATHP</b>	ASEAN Agreement on Transboundary Haze Pollution
<b>APBN</b>	<i>Anggaran Pendapatan dan Belanja Negara</i> or National State Budget
<b>APBD</b>	<i>Anggaran Pendapatan dan Belanja Daerah</i> or Local State Budget
<b>ArcGIS</b>	Aeronautical Reconnaissance Coverage Geographic Information System
<b>ASEAN</b>	Association of Southeast Asian Nation
<b>AVHRR</b>	Advanced Very High-Resolution Radiometer
<b>BAPPENAS</b>	<i>Badan Perencanaan Pembangunan Nasional</i> or National Development Planning of Indonesia
<b>BABINSA</b>	<i>Bintara Pembina Desa TNI-AD</i> or Armed Forces Non-Commissioned Officer for Village Guidance
<b>BHABINKAMTIBMAS</b>	<i>Bhayangkara Pembina Keamanan dan Ketertiban Masyarakat</i> or National Police Officer for Public Order and Safety
<b>BNPB</b>	<i>Badan Nasional Penanggulangan Bencana</i> or National Board for Disaster Management
<b>CFO</b>	Chief Financial Officer
<b>CIFOR</b>	Center for International Forestry Research
<b>CO2</b>	Carbon Dioxide

<b>CO</b>	Carbon Monoxide
<b>DAU</b>	<i>Dana Alokasi Umum</i> or General Allocation Fund
<b>DNA</b>	Deoxyribonucleic Acid
<b>DG TAXUD</b>	Directorate-General for Taxation and Customs Union
<b>DIPA</b>	<i>Daftar Isian Pelaksanaan Anggaran</i> or Budget Execution Document
<b>DPR</b>	Dewan Perwakilan Rakyat or Indonesia House of Representative
<b>ENSO</b>	El Niño Southern Oscillation
<b>EOS</b>	Earth Observing System
<b>EPA</b>	Environmental Protection Agency
<b>FIRMS</b>	Fire Information for Resource Management System
<b>GDP</b>	Gross Domestic Product
<b>GEOS-Chem</b>	Goddard Earth Observing System - Chemistry
<b>GRDP</b>	Gross Regional Domestic Product
<b>HGU</b>	<i>Hak Guna Usaha</i> or Right to Cultivation
<b>HCV</b>	High Conservation Value
<b>IUPHHK</b>	<i>Ijin Usaha Pemanfaatan Hasil Hutan Kayu</i> or Business License for Utilization of Timber Forest Product
<b>JKALAHARI</b>	<i>Jaringan Kerja Penyelamat Hutan Riau</i> or Riau Forest Rescue Network
<b>KUHP</b>	<i>Kitab Undang-Undang Hukum Pidana</i> or Criminal Law

<b>KUHAP</b>	<i>Kitab Undang–Undang Hukum Acara Pidana</i> or Code of Criminal Law and Procedures
<b>LAPAN</b>	<i>Lembaga Penerbangan dan Antariksa Nasional</i> or National Institute of Aeronautics and Space
<b>MAC</b>	Marginal Abatement Costs
<b>MODIS</b>	Moderate Resolution Imaging Spectroradiometer
<b>Mt of CO<sub>2</sub></b>	Metric tonnes of Carbon Dioxide
<b>Mt of CO</b>	Metric tonnes of Carbon Monoxide
<b>NASA</b>	National Aeronautics and Space Administration
<b>NGO</b>	Nongovernmental Organization
<b>NOX</b>	Nitrogen Oxides
<b>NOAA</b>	National Oceanic and Atmospheric Administration
<b>OECD</b>	The Organisation for Economic Co-Operation and Development
<b>PM</b>	Particulate Matter
<b>RSPO</b>	Roundtable on Sustainable Palm Oil



# CHAPTER 1

## INTRODUCTION

# CHAPTER 1

## INTRODUCTION

### 1.1 BACKGROUND OF THE STUDY

Land/forest fires in Indonesia that creating dense haze pollution have become a severe and prominent problem that represents a regional environmental crisis. The problem's devastating effects include transboundary haze pollution that spreads to the Southeast Asian Region: Malaysia, Singapore, the south of Thailand, and the Philippines. The term haze in this paper is used following the ASEAN Secretariat<sup>1</sup>, which defines it as smoke, dust, moisture, and vapor suspended in the air that impairs visibility. The World Bank estimates of the haze pollution total economic loss episode in 2015 exceed USD 16 billion and equal to about 1.8 percent of Indonesia's Gross Domestic Product, double than the damage and losses from the 2004 tsunami (World Bank, 2015). In 2015, the Center for International Forestry Research (CIFOR) Researcher concluded that Indonesia's emission from land/forest fire reaches 857.48 million tons of CO<sub>2</sub> (Forest News, 2016), one of conservation scientist calling the 2015 fires as the "biggest environmental crime of the twenty-first century."

Choking haze pollution also contributes to widespread respiratory infection and premature deaths (Hsu *et al.*, 2016). Moreover, the haze in Indonesia had a substantial harmful effect on physical functioning for several months among prime-age women and older adults (Frankenberg *et al.*, 2005).

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1 ASEAN Secretariat Information on Fire and Haze data page <<http://haze.asean.org/about-us/information-on-fire-and-haze>>, 07/08/2017 referred.

The health impacts of the haze include eye and skin irritation, respiratory morbidity, cardiovascular, burns, psychological effects, heat-induced illness, and even death (Finlay *et al.*, 2012; Liu *et al.*, 2015). The previous study using the GEOS-Chem Global Chemistry model together with health response function also suggests that the mortality in 2015 persistence dense haze event had been increased 2.7 times higher than in 2006 on population in Indonesia, Singapore, and Malaysia (Koplitz *et al.*, 2016). Moreover, Johnston *et al.* (2012) were estimating that 110,000 deaths every year in the Southeast Asia region could be attributed to haze pollution.

The land and forest fire that were creating severe haze pollution also has been threatening the biodiverse ecosystem and endangered species in Indonesia. The haze pollution from the peat fires was also impacting animals such as the orangutan, which shares 97 percent of their DNA with humans, through haze-induced respiratory problems as humans (Drake, 2015). Moreover, orangutan habitat in the peat-swamp forest was also profoundly threatened by the fire and palm oil plantation development and continuously adjust their behavior, such as through leave areas of active disturbance, return once it stops (Russon *et al.*, 2015; Ancrenaz *et al.*, 2010). The remaining habitats of orangutans are the range to 19 percent that overlaps with oil palm concessions (Meijaard *et al.*, 2011).

Previous studies have shown that human-made burning practices coupled with El Nino in Indonesia are a driving factor for haze pollution, which releases a significant quantity of carbon into the atmosphere (Hayasaka *et al.*, 2014; Wooster *et al.*, 2012). In general, notorious haze pollution sources are mainly aggressive human activities (Prasad *et al.*, 2000; Langner *et al.*, 2007). Moreover, in the agricultural process, people use burning to clear and convert

the land for palm oil plantation (Anderson and Bowen, 2000; Heil and Goldammer, 2001; Jones, 2006; Miettinen and Liew, 2010; Miettinen *et al.*, 2012; Gaveau *et al.*, 2014; Lestari *et al.*, 2014; Vadrevu *et al.*, 2014). In 2014, Indonesia had the highest gross forest loss in Asia, and it has already lost, reaching 11.9 percent of tree loss in the last ten years (Hsu, 2016). Lee *et al.*, (2014) also argued that in Sumatra Island, the palm oil development was responsible for 4,744 hectares mangrove, 383,528 hectares peat swamp forest, and 289,406 hectares. Thus, the clearing is in the peatland area, and the fire spread out of control, creating peatland burning (Usup *et al.*, 2004; Heil, 2007; Hu *et al.*, 2018). Indonesia is among the four countries: Rusia, Canada, and the United States of America that form 85 percent of the world's peatland area (World Energy Council, 2013). Peat fires are producing a large amount of smoke and contributing to a massive fraction of pollutant emissions factors in the atmosphere, in the end, causing health problems (Page *et al.*, 2002). Even a low intensity of peatland burning will produce significant emissions of pollution (Page *et al.*, 2002; Wilson *et al.*, 2015).

Those conditions coupled with El Nino Southern Oscillation (ENSO) condition in 1982 - 1983, 1997-1998, 2002, 2006, and 2011 create massive and aggregate severity fires in Indonesia (Hayasaka *et al.*, 2014; Field *et al.*, 2009; Langner and Siegert, 2009; Wooster *et al.*, 2012). The land clearing "fire season" from July to November, more pronounced in Kalimantan, were strongly determined by fuel moisture due to connecting the state of abnormality during ENSO fuelling ignitability during this period (Heil, 2007).

ENSO was exhibiting two extremes: El Nino is referring to the period of warming of sea-surface across the east-central equatorial Pacific. During this phase, warm surface waters are generally concentrated in the western

equatorial Pacific Region and shift to eastwards. As a result of the shift, Indonesia, as one of the countries in equatorial Pacific regions, experience a period of abnormally lowered rainfall. On the contrary, La Nina is referring to the periodical cooling of sea-surface across the east-central equatorial Pacific. As a consequence, Indonesia will experience a period of abnormally high rainfall due to the rain confined in the extreme western part of the equatorial Pacific Basin (Heil, 2007)

Figure 1.1 provides the hotspot<sup>2</sup> produced in Indonesia based on Moderate Resolution Imaging Spectroradiometer (MODIS) data<sup>3</sup> from NASA during haze periods and plotting using ArcGIS Online maintained by the Environmental Systems Research Institute (Esri). Tabel 1.1 is also reported a significant haze event in Indonesia.

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<sup>2</sup> Hotspot is a term used to describe a location that releases high temperatures (radiation) captured by a thermal detector from satellites and sent to a receiving station. NASA data page <<https://earthdata.nasa.gov/faq>>, 08/25/2017 referred.

<sup>3</sup> The MODIS instrument is onboard NASA's Earth Observing System (EOS) Terra (EOS AM) and Aqua (EOS PM) satellites. The MODIS instrument acquires data continuously providing global coverage every 1-2 days. Earth Data NASA page <<https://earthdata.nasa.gov/faq>>, 12/01/2017 referred.



**FIGURE 1.1 Hotspot Area in Indonesia (2001–2016)**

Source: FIRMS NASA MODIS Data and Author Calculation using ArcGIS Online by Esri

The Indonesian Government has enacted “command and control” regulation over the past several years to address land/forest fires that create severe haze pollution in the region. However, the current responses to land/forest fires are not sufficiently comprehensive to address the risk of severe haze episodes in the future (Mudiyarso *et al.*, 2004). Moreover, even under strict policies, the persistent problem of haze pollution remains due to a lack of enforcement with the appropriate regulator to address the problem (Varkkey, 2016).

**TABEL 1.1 Major Haze Episodes Corresponding Fire Events**

Year	Burning Area (Province)	Impact
1980	South Kalimantan	4,850 hectares planted forest area.
1982	South Sumatra, Riau and part of Kalimantan Island	Land/forest fire is creating severe haze pollution in the region. Sixty flights were canceled in South Sumatra Airport during 5-12 September 1982.

1983	East Kalimantan	The burning impact includes forest area, reforestation, protected forest, and 2,000 ha natural reserves 400 km from Samarinda.
1987	East Kalimantan	Forest area in Soeharto hill. The firefighting was using a 48-ton air bombing in 4 sorties.
1990	Riau	2,500 Ha reforestation area with loss reached Rp1,5 billion.
1993	South Kalimantan	7,000 hectares out of 13,000 hectares of reforestation areas were burned.
1997	East Kalimantan	136,244 hectares land/forest burned area with Rp619.7 billion loss from April – December 1997. The fire is creating transboundary haze pollution to Malaysia, Singapore, Brunei, Thailand, and Viet Nam.
1998	Most of Provincial Area in Kalimantan Island	Transboundary haze pollution to Peninsular Malaysia. The total burning area is 5.2 million ha
2002	South Kalimantan and West Kalimantan	In Palangkaraya, the PM <sub>10</sub> <sup>4</sup> in September and October 790 and 630 µg/m <sup>3</sup> (above 400 µg/m <sup>3</sup> will be at the dangerous <sup>5</sup> level). In Pontianak, the PM <sub>10</sub> concentration around 300 µg/m <sup>3</sup> . Total burning area 1.2 to 1.5 million hectares.
2003	Riau	Transboundary haze pollution affected the West Coast Peninsula of Malaysia and reached Thailand. The fire activity has been burning in a total of 0.1 to 0.3 million hectares.

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<sup>4</sup> PM<sub>10</sub> is the fraction of total airborne particles smaller than 10 µm diameter. This fraction can be inhaled through the larynx and that can penetrate into the thoracic region. These particles are therefore are also termed 'inhalable' or 'thoracic' (Heil, 2007)

<sup>5</sup> Based on Indonesia Metrological Climatological and Geophysical Agency.

**TABEL 1.1 Major Haze Episodes Corresponding Fire Events (continued)**

<b>Year</b>	<b>Burning Area (Province)</b>	<b>Impact</b>
2005	Most of Provincial Area in Sumatra Island	Transboundary haze pollution affects Northern Peninsula Malaysia, and Singapore also reached southern Thailand. Total burning area 0.2 to 0.5 million hectares.
2006	Most of Provincial Area in Sumatra Island and Kalimantan Island	In October 2006, haze reached Singapore, Brunei, and Malaysia. A total burning area in Sumatra 0.6 to 1.1 million ha and in Kalimantan 0.8 to 1.6 million hectares.
2007	Riau, South Sumatra	35 percent of hotspot detected in Riau Province.
2011-2014	The Primary source of Hotspot Riau, South Sumatra, West Kalimantan, Central Kalimantan, East Kalimantan	Total hotspot during 2011-2014 is 114,040, with 49,987 hectare burned areas.
2015	Jambi, South Sumatra, Riau, West Kalimantan, South Kalimantan, Central Kalimantan, and East Kalimantan	Total loss estimation (loss in agriculture, environmental until firefighting cost) on the burning is USD 16,124 million. The burning area reaches 2.6 million hectares.

*Source:* World Bank Report; Kompas (30/08/2016); Heil (2007); MoEF databank

Barde and Godard (2012) have been find that the shortcoming of the command and control approach to environmental protection due to being costly for the enforcement level regulations (not efficient) and lack of incentive to reconcile private interest and collective preferences. Other

researchers also have been widely criticized the use of command and control policy, for example, in the permit and licensing; equalization marginal pollution cost (see for instance: Hahn and Hester, 1989; Faure and Ubachs, 2003; Tietenberg, 2000; Faure and Weishar, 2012). As a result, in recent years, the versatile and flexible policy (hence often referred to as market-based) has been preferable by policy analysts as environmental policy.

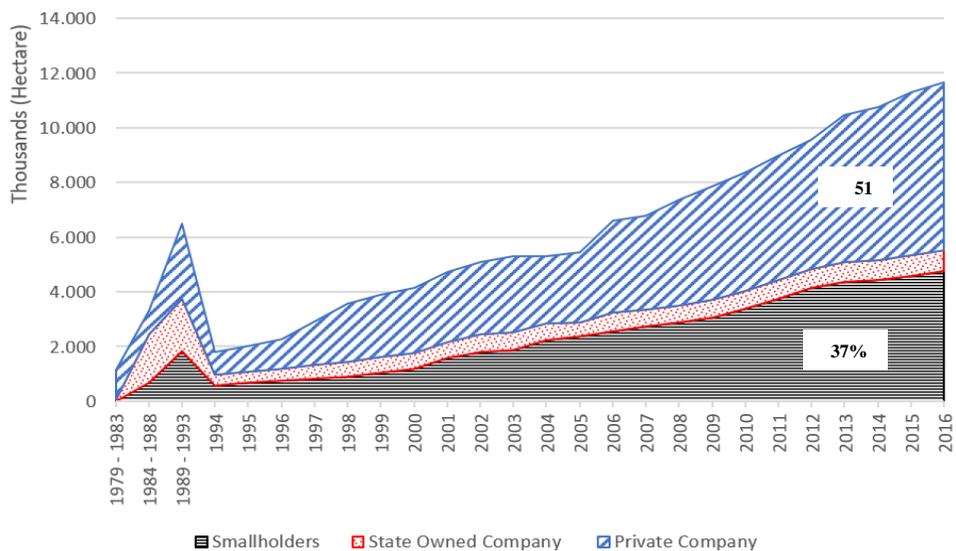
## **1.2 INDUSTRIAL ARRANGEMENT**

Palm oil is often named as liquid gold and as a way to elevate economic development parallel with the issue of transformation of forest assets to agriculture. However, the unbalance development strategy is sacrificing the environment for the sake of economic growth (Koh and Wilcove, 2008). Moreover, the root causes of environmental degradation are in development villain paradigm (Mittelman, 1998). The industry can also bring a negative impact on indigenous people who have traditional culture and livelihoods.

The palm oil sector in Indonesia, as driven factors of research background, has been a significant engine of economic development impact and source income (Feintrenie *et al.*, 2010).

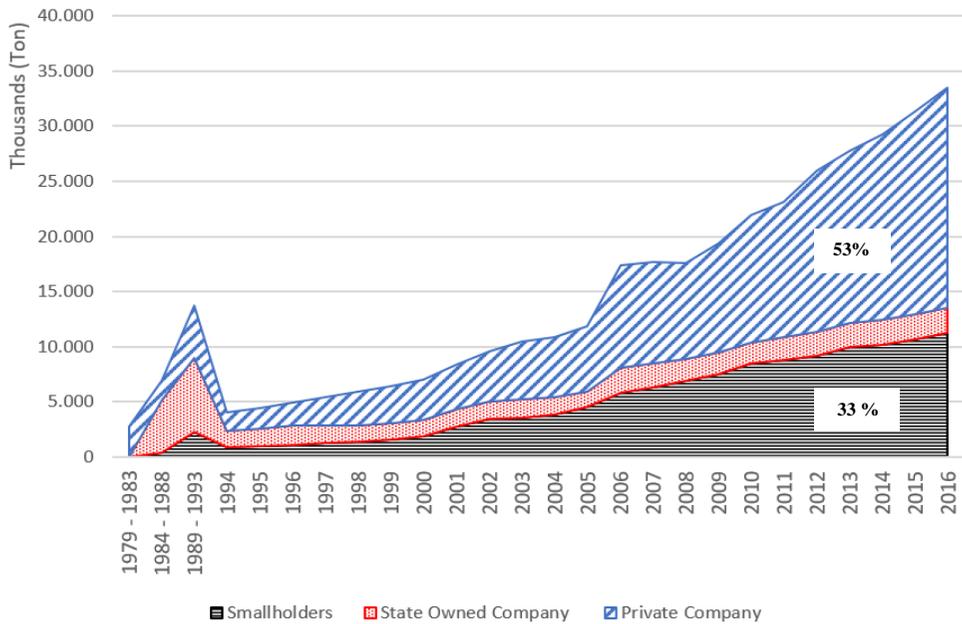
However, the destruction of the environment, including the conversion and opening of forestland, especially for palm oil by the economic actor were parallel in producing developmental miracle (Chang and Rajan, 2001; Sumiani *et al.*, 2007). Economic motivation became the link between fire and palm oil plantation, creating persistence of the haze pollution in Indonesia (Friend of the Earth *et al.*, 2008; Greenpeace, 2016). Please refer to Figure 1.2 and Figure 1.3 for detailed development.

The plantation product is the most significant export product and provides 3.57 percent Gross Domestic Product (GDP). Please refer to Table 1.2. Additionally, the estimated contribution of the palm oil sector in tax revenue for the year 2015 is reaching Rp1.21 billion. Indonesia has become the largest palm oil producer, accounting for over 50 percent of global production by 2012 (Oxfam, 2014). However, the cultivation and production have a severe negative impact related to environmental sustainability, primarily due to the forest and peatlands clearing (Shiel *et al.*, 2009). Sumatra lost two-thirds of its primary forest cover between 1990 – 2010 (Margono *et al.*, 2012), and Kalimantan lost nearly 5 million hectares (Abood *et al.*, 2015).



**FIGURE 1.2 Plantation Area (1979–2016)**

Source: Directorate General of Estate Crops



**FIGURE 1.3 Fresh Fruit Branches Production (1979–2016)**

Source: Directorate General of Estate Crops

**TABLE 1.2 Contribution of the Plantation Sector to GDP and Total Tax Revenue**

	Percentage Plantation to GDP Nominal	Percentage Tax Revenue from Palm Oil Plantation to Total Tax Revenue
2006	1.90	N/A
2007	2.07	0.89
2008	2.14	N/A
2009	2.00	1.27
2010	1.93	1.24
2011	3.87	1.48
2012	3.75	1.34

2013	3.75	1.14
2014	3.77	1.01
2015	3.57	1.21

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Source: Statistically Yearbook, BPS; Unpublished Tax Data and Author Calculation

The private sector has developed several certification initiatives over several years to contributing to the sustainable environmental industry. The palm oil industry, e.g., critical retailers and end-user of palm oil, also producer, together with nongovernmental organization in 2001, establish a private-sector arrangements model, a Roundtable on Sustainable Palm Oil (RSPO). The initiative aims to promote the production and use sustainable palm oil for people, planet, and prosperity. RSPO is a non-profit industry-led in the palm oil sector with eight principles and criteria. Additionally, RSPO is the most prominent private standard-setting body in RSPO certified sustainable oil palm products due to incorporate a third-party system verification (Brandi *et al.*, 2015). The RSPO certification is an assurance to the customer that the palm oil industry production is sustainable.

In the RSPO NEXT<sup>6</sup> principle and criteria using fire for land clearing in new planting or replanting are not permitted, excepts has been approved appropriate authorities (NFR 1.1-RSPO). Additionally, the PT1.1 RSPO principle forbids the plantation development on peatland regardless of depth

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<sup>6</sup> A voluntary effort that engages with RSPO member companies that have met the current requirements and guidance of the RSPO Principles and Criteria and in addition, through their voluntary policies and actions have exceeded them. RSPO NEXT component contained following categories: (1) No Deforestation, (2) No Fire, (3) No Planting on Peat, (4) Respect for Human Rights and Transparency.

after 16 November 2015. Despite its comprehensiveness in promoting environmental sustainability, the RSPO has received comments regarding the stringency of principles and criteria also the ability to enforce economic agent compliance on the ground (Pacheco *et al.*, 2017). For example, the noncompliance of the company to RSPO HCV (High Conservation Value) with no deforestation and no peatland criteria.

According to the RSPO Certification System (RSPO, 2016), the estate is only certified if the company is not involved in converting forest elsewhere. However, research by Greenpeace (2007, 2015) could prove that the major group of RSPO members clearing tropical forests via subsidiaries in Indonesia. Furthermore, local nongovernmental organization Milieudefensie conducted research that showed “three Wilmar subsidiaries in Sambas commenced land clearing in customary right land without prior consultation and due to land acquisition process and affected to communities” (Milieudefensie *et al.*, 2007). Despite the noncompliance to the principle of RSPO, all the company is remaining RSPO certified.

Furthermore, despite after a decade of existence, the RSPO is not necessarily useful in certified the palm oil industry, and only a small number of growers becoming members of RSPO (Arcus, 2015). As a result, even though the RSPO are adopted new standards of prohibiting members from land clearing forest for palm oil plantation in 2018 failed to be promoting sustainable palm oil plantation. Please refer to Table 1.3 for the RSPO coverage compare to the registered taxpayer in the palm oil business sectors.

**TABLE 1.3 Comparison of Member of RSPO and Taxpayer in Palm Oil  
Plantation**

Years	Number of RSPO Member - Plantation Grower	Number of Taxpayer in Palm Oil Plantation
2006	8	3,179
2007	24	3,924
2008	69	4,987
2009	71	9,504
2010	71	11,052
2011	74	16,669
2012	91	25,396
2013	98	33,695
2014	100	51,697
2015	107	69,185

*Source:* RSPO Website and Unpublished Tax Database

### **1.3 ASSOCIATION OF SOUTHEAST ASIAN NATION (ASEAN) AGREEMENT**

Regional concern related to transboundary haze pollution has been becoming a framework for ASEAN countries in establishing ASEAN Agreement on Transboundary Haze Pollution (AATHP) on 10 June 2002 and had been entered into force on 25 November 2003. The AATHP is the first regional arrangement that regulating member states in the ASEAN to work collectively address transboundary haze pollution resulting from land and forest fires. The Agreement has also been considered as a role model for the tackling of transboundary issues. Indonesia Government ratified the AATHP

and approved by Indonesia House of Representative (DPR) through Law No. 26/2014 on 16 September 2014. Moreover, the instruments were deposited in ASEAN Secretariat in January 2015 as a result of Indonesia becoming the final country in the region to join the AATHP<sup>7</sup>.

The Agreement enacted a zero burning policy and embraced the implementation of domestic anti burning laws. Article 2 on the ASEAN Agreement on Transboundary Haze Pollution define the objective are:

*Prevent and monitor transboundary haze pollution as a result of land and/or forest fires, which should be mitigated through concerted national efforts and intensified regional and international cooperation. This should be pursued in the overall context of sustainable development and in accordance with the provisions of this Agreement.*

The AATHP Article 3 (1) in the guiding principles has adopted a legal framework of states responsibility as follows:

*The parties have [.....], the sovereign right to exploit their own resources pursuant to their own environmental and developmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to environment and harm to human health of other states or of areas beyond the limits of national jurisdiction.*

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<sup>7</sup> <http://haze.asean.org/2015/04/indonesia-deposits-instrument-of-ratification-of-the-asean-agreement-on-transboundary-haze-pollution/>, 22/11/2019 referred.

The principle, as articulated in Article 3 (1), is conceptually based on the Charter of the United Nations and the core of international environmental law (Nurhidayah, 2013). The parties have the sovereign right to exploit their natural resources on their territory, but the states also responsible for ensuring the economic activities not causing harm and damage to the environment beyond the limits of states border (Heilmann, 2015).

On the other hand, the Agreement also has several drawbacks in the area of enforcement and lack of incentives (please refer to Tan, 2015; Laode, 2015; Tacconi, 2007). ASEAN should play a significant role in enforcing policies and develop a liability regime in environmental law (Nurhidayah *et al.*, 2015). Mushkat (2004) also argues that the agreement and integration initiatives remain elusive due to the absence of a rule-based system. Moreover, the existence of non-interference of state-based governance deflects regional and global agendas, even those that have been initially agreed upon (Nesadurai, 2016). Thus, taking the persistence of haze pollution in the region, the ASEAN Agreement on Transboundary Haze Pollution has failed as a regional governance tool (Heilmann, 2015).

#### **1.4 OBJECTIVES OF THE STUDY**

The paper draws on the growing body of literature in deterrent based enforcement studies to resolve the queries which originated from necessity to enforce the comprehensive regulation in environmental management due to more than a decade haze pollution in Indonesia. Deterrence is a choice in which would-be offenders balance the benefits and cost of crime (Apel and Nagin, 2015). Moreover, the optimal level of deterrence may be reached when

the expected liability faced by a market player is set at the level of the environmental harm created by the violation, the level that motivates regulator to act in the desirable manner (Oded, 2013). However, a single policy is not sufficiently flexible and resilient in addressing all environmental problems in all contexts (Gunningham and Grabosky, 1999).

Theoretical research has closely examined related to the policy influence of deterrent based enforcement. The Government will tend to choose market mechanisms instead of command and control regulation (Faure and Weishaar, 2012). However, due to the scarcity of previous studies in which considering taxation's role in internalizing harm create from environmental violation, the analysis of the practical implementation of the mixed policy still has plenty of room for improvement. The necessity for an improved regulatory framework has led scholars to develop an approach and must beyond a single policy in deterrence-based enforcement to induce regulatory compliance. According to Hawke (2002) and OECD (1989), the economic policy instrument as complementary to traditional regulatory control has the ability to providing flexibility and given grip the authorities will influence the actor behavior through:

1. Raise revenue for financing environmental measures,
2. Provide incentives to implement the associated regulation better,
3. Have a possible impact on technical innovation.

Tax as a market-based economic policy would be placing a direct cost on environmental damage; the polluter should bear the cost of measures to reduce pollution according to the extent of either damage done to society or the exceeding of an acceptable level (OECD, 1975). A negative externality

occurs when the prices to the customer of a good or service is less than the cost of that good or service to society (Pigou, 1932).

Based on this context and given the industrial background, this research will be investigating a deterrent based using mixed policy to influence regulatory compliance in the case of haze pollution in Indonesia. Moreover, the main research question is as follows: *What is the optimal mix of regulatory and market-based policies for pollution control that strengthen expected liability in deterring the Indonesia haze pollution case?*

The term optimal is a consideration to encapsulate of effectiveness and efficiency in improving environmental performance (Gunningham and Garbosky, 1998). By effectiveness is meant the degree to which determined environmental objective is achieved using the specific policy. Efficiency is meant the static aspect and the dynamic ones (Opschoor and Tunner, 1994). Answering this question, the paper will be divided into three sub-questions that addressed in Chapters 3, 4, and 5.

First, to enhance the expected liability in internalizing harm, it is necessary to investigate the deterrent effect from the existing policy in terms of tackling the haze pollution. One of the significant limitations of the previous study is its failure to understand policy intervention related to enforcement measures by a law enforcement officer. Carmenta *et al.* (2017), using Q factor, find that effective fire management intervention through employ hard measures against the large actor, including sanction, enforcement, and standards directed at large scale actors. However, the paper still has a limited study on policy intervention primarily related to enforcement deterrent effect. This study will extend previous investigations by analyzing

the regulator power and enforcement capacity through law enforcement actor perceptions. Actor perspective in law enforcement is critical in improving the policy design and on-the-ground implementation (Game *et al.*, 2014; Reed *et al.*, 2016). The actor insights will provide a valuable part of the puzzle in helping to zoom in on the primary problem (Lo *et al.*, 2006). Sub-question 1: *How do insufficient power and law enforcement capacity hamper deterrence in South Sumatra and Riau Province?*

In the next part, the paper will further investigate the dimension of harm that has been tackling by the current enforcement policy using judicial decisions in relation to criminal enforcement. Enforcement of criminal offenses is seen as a last resort applied when the harm to society or the benefit to the offender is significant, and the probability of detection is low. The critical criminal environmental policy is the prevention of unjustifiable harm, given that the expected sanction is equal to the harm caused by the offender and that loss of wealth will provide adequate deterrence (Cohen, 1992; Polinsky and Shavel, 1994; Garoupa, 2001). Although the limited body of theoretical research has developed exciting insight into judicial sanctioning decisions regarding environmental criminal violations, no study has explicitly investigated and provided a detailed analysis of defendants' occupation and offense locations. Although this factor should not matter in principle, the analysis of Billiet and Rousseau (2011) showed that there are marked differences in sanctioning decisions across judicial districts. Referring to a previous study on inadequate law enforcement in discussing the background of haze pollution in Indonesia, the chapter thus addresses the following question: *Are variations in judicial sanctioning decisions with respect to*

*defendants and burning site locations influenced by the gravity of environmental harm in the land/forest fire case?*

Finally, based on the understandings existing policy on haze pollution control, sub-question 3 will seeks evidence mixed policy as pollution control in Indonesia. Environmental policy interactions with the fiscal system fundamentally influence the cost-effectiveness of addressing climate change and meeting other social objectives (Goulder, 2013). By considering fiscal capacity, this chapter will provide an empirical analysis whereby mixed regulatory policy between tax enforcement and the environmental policy may coexist and may complement regulatory action. This paper extends the Lim (2016) model while considering that of Besley *et al.* (2013), who found that including tax policy as a fiscal capacity revenue source increased regulatory action capacity. There are no previous studies on environmental policies in which regulatory action considers taxation's role in enhancing fiscal capacity in addressing pollution. This paper contributes to the field by analyzing the dependent variable using hotspots as an indicator of active fire as a source of emissions that cause ozone and particulate matter (PM) pollution. As a result, the set of emission sources is broader than those in most previous studies. Sub-question 3: *What is the impact of fiscal capacity on mixed regulatory action regarding hotspot development, which creates haze pollution in Sumatra and Kalimantan?*

By answering this question, this paper is expected to contribute to enhancing the study on mixed enforcement policy. Furthermore, the paper intends to suggest credible policy recommendations, which may have the potential for being used in implementing comprehensive environmental management in tackling the haze pollution in Indonesia.

## 1.5 ORGANIZATIONS OF THE THESIS

The paper has six chapters; in chapter one, the paper will present general thesis information on the background and objective of the studies. The theoretical framework of deterrence-based enforcement also mixed policy would be discussed in chapter two. Past studies that had been carried out in attempts to enforce the haze pollution are also presented. Based on this chapter, a research framework applied to the three main chapters. The overall data structure of the main chapters is presented in Table 1.4.

**TABLE 1.4 Structure of the Main Chapters**

Chapter	Research Question	Data	Methodology
Chapter 3	Sub-question 1	Interview data transcript from 12 respondent (five Law Enforcement Office, one Expert Witness, and three NGO)	In-depth interviewed analysis with an open-ended question
Chapter 4	Sub-question 2	120 final court case within period 2009-2016 from Supreme Court Database	Content analysis
Chapter 5	Sub-question 3	Panel data from 14 provinces (2012 – 2016), Supreme Court Data, National Budget Data, Directorate General of Taxes and Indonesia Statistic Bureau	Panel data - Fixed Effect

Chapter three will investigate the obstacle in policy implementation in tackling haze pollution that will hamper perceived deterrence from law enforcement actor perceptions. The analysis will be employed in an in-depth interviewed analysis with open-ended question funnel for detailed and subjective understanding in terms of detecting possible risk deterrence effects. The interview in Bahasa (Indonesia Formal Language) started with a prominent representative who has direct involvement in the law enforcement process in Riau and South Sumatra Province. Chapter four will be understanding the dimension of judicial decisions about criminal enforcement and environmental harm, adopting a qualitative approach. The paper conducted a document analysis using a content analysis methodology. The data were collected from a court case directory available online from the Indonesia Supreme Court and developed a documented protocol prepared through content analysis using QRS Nvivo software. Focusing on the expected liability on the land/forest fires, which create substantial emission in the southeast Asian region, Chapter five primarily aims to investigate the effect of Indonesia's regulatory enforcement capacity. This study was conducted using various data on regulatory actions. The period of this study is 2012–2016. The data will be analyzed using panel data, similar to the approach employed by Lim (2016). In chapter six, the paper concludes the study and draw some policy recommendation to tackle haze pollution.



## **CHAPTER 2**

# **LITERATURE REVIEW**

## CHAPTER 2

# LITERATURE REVIEW

*Laws too gentle are seldom obeyed;  
too severe seldom executed  
(Franklin, 1756)*

### 2.1 INDONESIA POLICY IN TACKLING HAZE POLLUTION

The worst haze pollution has been impacting the Indonesian region, especially in the Sumatra and Kalimantan Islands, for more than twenty years. However, despite attempts to tackle haze pollution, the policy has failed to prevent the persistent source of this problem, which is land/forest fires. As a result, Indonesia continues to lose the war on haze pollution. Management or reduction of land/forest fires would go a long way towards eliminating the haze pollution that also significantly impacts the ASEAN Region. Indonesian government policy measures that have been taken will be discussed in the next subsection.

#### 2.1.1 Land and Forest Fires Management

The Indonesian government realizes that land/forest fires are multidimensional problems that have attracted global attention in the past twenty years. The forces causing the land/forest fires are outpacing the policy effort to mitigate the disaster. Indonesia has adopted a zero-burning policy in Law No. 32/2009 of Environmental Protection and Management as an

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<sup>8</sup> Undang-Undang No. 32 Tahun 2009 tentang Perlindungan dan Pengelolaan Lingkungan Hidup

umbrella policy on environmental protection in Indonesia. Article 69 (1) h stated the following:

*Every person is prohibited from conducting burning activities in open land for plantation.*

In parallel with combating land/forest fires that cause haze pollution, Indonesia is simultaneously developing the palm oil and forestry business sector as a key driver of economic growth. Thus, the role of plantation policy in responding to land/forest fire events will be significant. Law No. 18/2008, which was amended by Law No. 39/2014<sup>9</sup> on Plantations, stated that the environment is also becoming one of the focuses of the plantation business sector, as in Article 62 and Article 67 as follows:

*Article 62 (1): Plantation Development is carried out on an ongoing basis with due regard to (a) [the] economy, (b) sociocultural [issues], and (c) ecology.*

*Article 67 (1): Every Economic Agent in the Plantation Business is obliged to maintain the preservation of environmental functions.*

Regarding the burning restriction, the policy is stated in Article 56 as follows:

- (1) Every Economic Agent in the Plantation Business is prohibited from opening and cultivating land by burning.*
- (2) Every Economic Agent in the Plantation Business is obliged to have a system, facility, and infrastructure for controlling land and plantation fires.*

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<sup>9</sup> Undang-Undang No. 39 Tahun 2014 tentang Perkebunan.

(3) [.....]

Moreover, this policy regulates the environmental sustainability requirement to prevent future damage to daily plantation operations. Article 68 states the following:

*After obtaining a plantation business permit [.....], Plantation Business Actors must implement:*

- (1) environmental impacts analysis or environmental management and monitoring;*
- (2) environmental risk analysis; and*
- (3) environmental monitoring.*

The plantation policy design has been comprehensively designed to prevent a negative impact on the environment or social aspects of palm oil plantations in Indonesia. The policy is a targeted economic agent in the plantation and forestry business sector, including smallholders and shifting cultivators (Haze Action Online, 2016).

Peat fires have been identified as the most significant driver of major haze pollution and are a source of greenhouse emissions (Greenpeace, 2018; Shiel *et al.*, 2009). The Indonesian government has also designed and enacted policy mitigation measures protecting the peatland area in Indonesia because peat fires are more impactful in the case land/forest fires. Article 9 in Presidential Decree No. 32/1990<sup>10</sup> mandate the protection as follows:

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<sup>10</sup> Keputusan Presiden Republik Indonesia No. 32 Tahun 1990 tentang Pengelolaan Kawasan Lindung.

*The protection of the peatlands is intended to control the hydrology of the region, which acts as a water repellent and flood prevention, as well as to protect the unique ecosystem of the area.*

The preventive action policy for peatland also has been extended and enhanced in Government Regulation No. 71/2014, which has been amended with Government Regulation No. 57/2016<sup>11</sup> on Peatland Ecosystem Protection and Management. In Article 26, the protection of the peatland area is as follows:

*Every person is prohibited [from]: (a) clearing land in the Protected Peat Ecosystem; (b) making drainage channels resulting in Peat becoming dry; (c) burning Peatlands; (d) carrying out other activities that result in exceeding the standard criteria for damage to the Peat ecosystem [.....].*

The enactment of the policy on the peatland establish a more transparent legal basis for the protection of peat ecosystem and prevent the severe land and forest fire in Indonesia.

In the institutional policy arrangement, the Indonesian government issued a Comprehensive Plan of Action in Dealing with Forest Fires through Presidential Decree to strengthen the collaboration between the national and provincial governments and quicken mitigation acts. Presidential Instruction No. 16/2011, which was an amended by Presidential Instruction No.

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<sup>11</sup> Peraturan Pemerintah Republik No. 57 Tahun 2016 tentang Perubahan atas Peraturan Pemerintah No. 71 Tahun 2014 tentang Perlindungan dan Pengelolaan Ekosistem Gambut.

11/2015<sup>12</sup>, instructed governmental agencies, the military, and Indonesian national policy to work with regional governments to fight land and forest fires. The plan of action was brought together by more than seventeen ministries, agencies, and high-ranking officials to address the issue according to their respective areas and authority. The ministers that joined the task force include the following: Coordinating Minister for Politics, Law, and Security; Coordinating Minister for Economic Affairs; Coordinator Minister for Human Development and Culture; Minister of Environment and Forestry; Minister of Agriculture; Minister of Health; Minister of Education and Culture; Minister of Religion; Minister of Research, Technology and Higher Education; Minister of Social Affairs; Minister of Communication and Information; Minister of State-Owned Enterprises; Minister of Home Affairs; Minister of Agrarian Affairs and Spatial Planning/Head of Agency National Land; and Minister of Public Works and Public Housing. Moreover, the agency includes Head of the National Disaster Management Agency and Head of the Meteorology, Climatology, and Geophysics Agency. Moreover, the Attorney General of the Republic of Indonesia, Commander of the Indonesian National Army and Head of the Indonesian National Police and the Governor are joining the force among the high-ranking officials.

In addition to the coordination and collaboration of governmental agencies, prevention and control policy are the most important component in reaffirming Indonesia's policy goal of preventing the yearly hotspots. Early warning systems and detection activities constitute the front lines of the

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<sup>12</sup> Instruksi Presiden Republik Indonesia No. 16/2011 sebagaimana diubah dengan Instruksi Presiden Republik Indonesia No. 11/2015 tentang Pengendalian Kebakaran Hutan dan Lahan.

program for land and forest fire control measures. In early 1984, a manual<sup>13</sup> bottom-up approach was used by Indonesia to monitor fire events and the size of burned areas. Moreover, from 1997 to 2010, Indonesia undertook centralized monitoring of land and forest fires, with cooperation with the Japan International Cooperation Agency using NOAA<sup>14</sup> and Terra Aqua<sup>15</sup> (MODIS) Satellites. Thereafter, with advances in technologies capabilities, the hotspot early warning system in Indonesia has been using a combination of Landsat<sup>16</sup> satellite images, data from NOAA, and Terra Aqua Satellites and considers field data derived from the Regional Government Office (MoEF, 2018).

The policy in hotspot early response, as the next policy measure, is to comprehensively check the areas identified as hotspots. The early response for disaster emergency response in Indonesia (including forest and land fires), which is under the Indonesia National Board for Disaster Management (BNPB)<sup>17</sup>, was launched in 2009 by the Coordinating Ministry of People's Welfare. The early response team was charged with tasks that included routine integrated land patrol and hotspot ground checks and the

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<sup>13</sup> Ministry of Environmental and Forestry Office and Local Environmental Agency across the provinces in Indonesia reported and scaled up the hotspot event reports of their scale and burned area.

<sup>14</sup> National Oceanic and Atmospheric Administration operates a fleet of environmental satellites that provide critical observation of the Earth, the atmosphere and space. <https://www.nesdis.noaa.gov/content/about>, 04/09/2020 referred.

<sup>15</sup> Terra (EOS AM) and Aqua (EOS PM) are NASA satellites that use MODIS (or Moderate Resolution Imaging Spectroradiometer), which is a key instrument aboard to measure the Earth system. <https://terra.nasa.gov/about>, 04/09/2020 referred.

<sup>16</sup> The Landsat satellite program was created by NASA in 1965; it provides repetitive acquisition of high-resolution multispectral data on the Earth's surface on a global basis. <https://landsat.gsfc.nasa.gov/about/>, 04/09/2020 referred.

<sup>17</sup> Badan Nasional Penanggulangan Bencana.

extinguishing of fires. The members of the response team are from various government agencies. The team membership of the response teams is as follows: Ministry of Environmental and Forestry Land Fire Brigades (*Manggala Agni*)<sup>18</sup>, Armed Forces Non-Commissioned Officer for Village Guidance (*Babinsa*)<sup>19</sup>, National Police Officer for Public Order and Safety (*Bhabinkamtibmas*)<sup>20</sup>; Forest Management Unit and Regional Board for Disaster Management.

The legal instrument for suppressive measures in postfire management activities addressing hotspots is discussed in the next section. The policy, which would be involved in law enforcement against individuals and corporate entities, focuses on the issue of disaster risk reduction and a suppressive approach to violations that have led to the haze pollution in Indonesia.

### 2.1.2 Enforcement Policy on Law No. 1/1946 on Criminal Law

The Indonesia Criminal Law originates from Dutch colonial law, namely, *Wetboek van Strafrecht voor Nederlands-Indië*. The purpose of the law is to govern the nation, upholding human rights, and guaranteeing that all in

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<sup>18</sup> *Manggala Agni* is the Indonesian Forest Fire Control Brigade established by the Ministry of Forestry in 2003 based on Law No. 41/1999 on Forestry. This brigade was formed to carry out the task of controlling forest fires. The brigade's activities include the prevention, suppression and handling of post-forest fires.

<sup>19</sup> *Babinsa* is the structure of the military territorial commands under Military Rayon Command to maintain the security of its territory (Gunawan, 2004).

<sup>20</sup> Members of the Indonesian National Police to foster public security and order also are part of the Community Police function in villages. <https://mediapurnapolri.net/2018/03/22/apa-itu-bhabinkamtibmas/>, 04/09/2020 referred.

Indonesia shall have an equal status in law without exception. This policy does not have any specific chapter to regulate and address land/forest fires. Thus, the law recognizes that land/forest fire is part of environmental crimes that in general, endanger the security of the human right to livelihood of other people and goods.

The law states in Article 187 that every person who intentionally causes a fire, explosion, or flood is threatened

- (1) with a maximum imprisonment of twelve years, if because of the violations as mentioned above [there] arises a general danger to the goods;*
- (2) with a maximum imprisonment of fifteen years, if because of the violations as mentioned above [there] arises a danger to the lives of others;*
- (3) with a sentence of life imprisonment or for a specified period of no more than twenty years, if because of the acts as mentioned above there is a danger to the lives of others and [it] results in the death of persons.*

Furthermore, the crime related to the land/forest fire is not only stated in Article 187 but also in Article 188 as follows:

*Every person who due to negligence causes a fire, explosion or flood, is threatened with a maximum imprisonment of five years or maximum imprisonment of one year or a maximum fine of four thousand five hundred rupiah if due to the act [there] arises a general danger to the goods, if because of the act [there] arises*

*danger to the lives of others, or if because that action results in the death of persons.*

In the next part, the paper presents the enforcement of land/forest fire under the Environmental Protection Management Policy.

### 2.1.3 Enforcement Policy on Law No. 32/2009 on Environmental Protection Management

The enforcement related to environmental protection is regulated in Law No. 23/1997, which was amended by Law No. 32/2009 on Environmental Protection Management. The law enforcement for general violation of environmental standards in this policy introduces the threat of minimum penalties in addition to maximums, expansion of evidence, criminal punishment for environmental damage, the integrity of law enforcement for criminal offenses, and regulating corporate criminal acts. Moreover, enforcement for environmental criminal violations is still considered the *ultimum remedium*<sup>21</sup> after the application of administrative enforcement law is deemed unsuccessful.

In the case of land/forest fire, in Article 21, the policy defines that environmental damage related to the occurrence of land/forest fires is an effective change to the environment in the form of damage or environmental pollution relating to land/forest fires caused by a business/activity. Moreover, the punishment for the crime of land/forest fire creating haze pollution is stated in Article 98 as follows:

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<sup>21</sup> *Ultimum remedium* is a principle in criminal law that states that criminal policy should be a last resort in law enforcement (Husak, 2004).

*Every person who intentionally commits an act that results in exceedance of ambient air quality standards, [.....], or environmental damage standard criteria shall be punished with imprisonment for a minimum of 3 (three) years and a maximum of 10 (ten) years and minimum fines of at least Rp3,000,000,000.00 (three billion rupiah) and a maximum of Rp10,000,000,000.00 (ten billion rupiahs).*

In the case of negligence in Article 99, the punishment is as follows:

*Every person who due to his negligence has exceeded ambient air quality standards, [.....], or environmental damage standard criteria, shall be punished to a minimum of 1 (one) year imprisonment and a maximum of 3 (three) years and a minimum fine at least of Rp1,000,000,000.00 (one billion rupiah) and a maximum of Rp3,000,000,000.00 (three billion rupiah).*

In the case of violation of land/forest fire prohibition stated in Article 69 (1) h, the punishment based on Article 108 is as follows:

*Every person who burns land as referred to in Article 69 paragraph (1) letter h, shall be sentenced to a minimum imprisonment of 3 (three) years and a maximum of 10 (ten) years and a minimum fine of Rp3,000,000,000.00 (three billion rupiahs) and a maximum of Rp10,000,000,000 (ten billion rupiahs).*

Despite the severe punishment in the environmental protection management policy, a policy based on the plantation business sector also provides additional enforcement measures in tackling the haze pollution from

land/forest fires. In the next part, the paper discusses the law enforcement provision in the plantation policy.

#### 2.1.4 Enforcement Policy on Law No. 39/2014 on Plantation

Plantation law is one of the sectoral policies related directly to land/forest fires. As a result, the role of the plantation policy in reducing haze pollution is significant. Plantation Law No. 18/2008, which was amended by Law No. 39/2014, regulates enforcement on a land/forest fire violator that violates burning restrictions through the criminal sanction in Article 108 as stated:

*Every Economic Actor in the Plantation Business who clears and cultivates land by burning as referred to in Article 56 paragraph (1) shall be liable to a 10 (ten) year imprisonment and a maximum fine of Rp10,000,000,000 (ten billion rupiahs).*

The sanction would also be imposed on the violator that did not comply in managing the sustainable operation of a plantation in Article 109 as follows:

*Plantation Business Actor who is not implementing:*

- (1) environmental impact analysis or environmental management and monitoring;*
- (2) environmental risk analysis and;*
- (3) environmental monitoring.*

*As referred to in Article 68, shall be liable to a maximum imprisonment of 3 (three) years and a maximum fine of Rp3,000,000,000.00 (three billion rupiahs).*

In summary, the plantation policy as sectoral policy also has been considering land/forest fires as criminal activities and needs to be enforced by administering severe punishment to the violator.

#### 2.1.5 Review on Current Land/Forest Fire Policy

Despite adopting zero burning policies that were incorporated in various legislation, land/forest fires continue to occur in Indonesia. In 2009, the Indonesia National Planning Agency (BAPPENAS) conducted analyses of the fundamental problems of Indonesian forest management and found weak law enforcement that caused the destruction of remaining forest resources (BAPPENAS, 2009).

Regardless of the antihaze policy being significantly enhanced, there are still deficiencies in the capacity to monitor and control land/forest fire occurrences (Simorangkir and Sumantri, 2002). In the response phase, different institutions and local governments in high hotspot areas have limited strategies and decision-making processes for land/forest fire emergency and response. Additionally, the capacity to implement a policy that involves vertical coordination is still too slow, bureaucratic, and uncertain (Nurhidayah and Djalante, 2017). Moreover, the complexity has become severe, with the implementation of autonomy decentralization in Indonesia that transfers authority to define policy at the regional level without proper guidance (Tacconi, 2007).

Environmental crime is categorized into one of the white-collar crime forms; hence, the event of the crime tends to injure and destroy on a larger scale than a violation in a traditional felony (Muladi, 2002). Therefore, according to Muladi, in those frameworks, the existence of an environmental

criminal sanction is no longer the last resort but becomes the first resort to make it a deterrent to committing a criminal offense. Moreover, there are problems with the current environmental crime policy in inducing the deterrence due to the absence of regulations on treatment (*Matregel*) (Zainal, 2010). The treatments are the order by the court to put a guilty company under trusty, retain the profit of a company, or disclose the company. However, the order cannot be applied if the violation belongs to the so-called certain formal criminal act, which is related to intentional violation (Yoserwan *et al.*, 2019).

Despite the severity of punishment based on the land/forest fire policy, without addressing the underlying driver of the haze, which is an advantage based on the efficiency of using fire, the current policy response will have limited impact to stop land/forest fires (Geh *et al.*, 2018). The total estimated loss (cost) of haze pollution and land/forest fires in Indonesia in the period 1997/1998 ranges between approximately US\$2.3 billion and US\$3.2 billion (Tacconi, 2003). Additionally, the losses of land/forest in 2015 increased dramatically to US\$ 16.13 billion. On the other hand, the study by Purnomo *et al.* (2017) using the value chain and social network analysis finds the interesting fact that the land/fires also generate massive income for several economic agents. The economic rent from surrounding the fire event per hectare added values were US\$856 per hectare for ready-to-plant and US\$3,800 per hectare for ready-to-harvest land for a palm oil plantation. The lack of initiatives in the current policy that take into account loss and economic rent of land/forest incidents will fail to tackle the development of hotspots in Indonesia.

In the next section, the paper presents the detailed literature on policy development to fill the gap of the current policy weakness.

## **2.2 PUBLIC POLICY**

Public policy is defined as the combination of necessary decisions, commitments, and actions made by those who hold or influence government positions of authority (Gerston, 2010). Aside from these definitions, there are three contemporary definitions: public policy as the study of what the government does, why it does it, and what difference it makes (Dye, 2008); Kraft and Furlong (2004) add that public policy is a course of government action taken in response to social problems; and finally, government is the independent variable not only in term of crafting current policies but also future policy demands (Robertson and Judd, 1989).

In public policy, the term policymaking process is a system that translates policy ideas into actual policies as a cycle of problem-solving attempts. The policy process would cover all stages of the cycle, including issue emergence, agenda-setting, policy design, enactment, implementation, and evaluation (Dye, 2008; Dunn, 2004). The natural policy process would emerge in society through various means, such as disaster or concerned citizens or interest groups, and then move up in an agenda to development of policy responses. From there, enactment regulation is issued to solve the problem, which then influences the outcome of the policy through policy implementation.

Due to the importance of the process of designing policy and its implementation, the paper follows Richardson (1982) in differentiating those policies. By discussing policy design, the crucial point is in the aspect of

monitoring and evaluation or policy learning to tackle the dynamic of emerging issues in sustainability transitions (Loorbach, 2007; Kemp, 2011). Furthermore, policy design is a policymaking process with highly political influence, particularly from actors with vested interests (Unruh, 2002).

Furthermore, the study of policy implementation is concerned with what happened to a policy or program after it has been formulated (Ryan, 1995). Policy implementation is the arrangement by the regulator and other actors for executing and enforcing into action (Nilsson *et al.*, 2012). Several elements are assumed present for implementation to occur: an entity with sufficient resources; regulators must be able to translate goals into operational plans; and the task is delivered based on assignment and accountability (Gerston, 2010).

Due to the position of policy implementation on the back end of the process, the value of implementation is often overlooked and undervalued. Assumptions based on public policy decisions are automatically put into effect by the regulator. However, it is not so simple or automatic. The fact is that without consistent application with respect to its emergence issue and a well-regulated structure to implement the decision, the policy has neither substance nor significance (Gerston, 2010). Given the scale and complexity of sufficient implementation, political resistance might also contribute to an implementation failure that reflects widespread dissatisfaction with the policy in particular or the regulator in general. Policy failure will induce policy change through the learning process, thereby illustrating the close link between policy design and implementation (Birkland, 2011).

In summary, public policy is a translation from emerging issues into agenda-setting and policy design; however, the translation does not guarantee that an implementation will always be consistent with its original goal. Policies must be directed appropriately so that the regulator has a clear framework for the implementation. Incomplete implementation would hamper the public policy process for both the regulator and the public. In the next part, a discussion on the policy instrument in the environmental area will be presented to understand the policy design dimension of tackling the environmental problem.

### **2.3 ENVIRONMENTAL POLICY**

The need to protect the environment with all its components from harmful activities has been magnified enormously in recent years. The evidence that pollution, deforestation, and climate change are creating irreversible damage to the environment is increasingly compelling. Developing flexible regulation to be undertaken by policymakers to enable severe damage to be slowed down, halted, or reversed is necessarily the most important means of environmental management. Such regulation is vital to take account of the broader social, economic, and country-specific context. The environment, as part of public policy, has to be conceptualized as a form of government regulation. The idea behind regulation is not to eradicate risk but to manage it and draw boundaries for the acceptable (Lidskog *et al.*, 2005). Regulation is defined as any attempt by the regulator to control the behavior of individuals or organizations, corporations, or subgovernmental structures (Meir, 1985). Moreover, regulation is also defined as a rule, set out in law, and the process to ensure the regulation is implemented (activities of an environmental enforcement authority) (Farmer, 2007). The government has

a broad range of policies available to be used in environmental regulation. Following OECD (2010), the paper categorizes policy into four different taxonomic distinctions as follows: regulatory, also known as command-and-control policy; voluntary policy; a market-based policy; and information.

Regulatory policies are the exercise of influence by imposing a standard backed by criminal sanction (Baldwin, 1997). An environmental standard, generally characterized as command control or regulatory policy, prohibits a particular form of conduct or lays down conditions for entry into the sector, for example, a limit on emissions of a pollutant and subsequent penalties that apply if the target is not met. Permits and licenses are often used to implement standards (Lidskog *et al.*, 2005).

Regulatory policy depends upon enforcement. In other words, the behavior expected of regulatees can be specified with clarity, making it relatively straightforward to enforce the law (McGarity, 1993). This specificity provides an economic agent with a more precise understanding of its regulatory obligation. Despite the strength of regulatory policy, researchers also have been widely criticized for the use of the policy. Issues include the following: the cost of enforcement, permit and licensing; equalization marginal pollution cost; not effective in transitory or firms that are challenging to identify; and rapid change of economic circumstances (see for instance: Hahn and Hester, 1989; Faure and Ubachs, 2003; Tietenberg, 2000; Faure and Weishar, 2012; Barde and Godard, 2012). An additional problem for regulatory policy is the absence of incentives for firms to go beyond minimum standards and its vulnerability to political manipulation (Gunningham and Grabosky, 1998).

The voluntary policy comprises the government initiating social control based on individual firms undertaking to do the right thing unilaterally without coercion. At the general level, the policy embraces binding or nonbinding agreements between the government and individual businesses, thereby reducing the need for legislation (OECD, 1994). Commonly, voluntary approaches are initiated by the government and may involve government playing the role of coordinator and facilitator.

The greatest strength of this policy is where the regulatees perceive their self-interest as being to protect the environment. Thus, the challenge is building the custodial ethic and making environmental protection part of the community norm (Benner *et al.*, 1995). Furthermore, a single policy, a regulatee agreement, is subject to a severe limitation that needs to be periodically renegotiated (Gunningham and Grabosky, 1998).

Market-based policy: These policies rely on cost pricing of consumption or production to motivate firms to find the lowest cost means of abatement for the activity causing environmental damage. Economic theory indicates that this policy, principally taxes, and tradable allowances will impose less cost on the industry to achieve a given level of pollution reduction than command-and-control regulations (Baumol and Oates, 1988). Economists believe that this policy will efficiently achieve environmental objectives by delegating the decision making to the polluting firms with private information regarding the firm-specific cost of pollutant reduction (Crew and Parker, 2006).

Taxes and tradable allowances, e.g., cap-and-trade schemes, are a part of market-based policies that are drawing attention due to their features and

functions. The tax policies, in general, will establish a fixed cost for polluters; however, the tradable policies do not impose even partially auctioned costs (Milne and Andersen, 2012). Thus, taxes can be used to correct for market-based externalities when the prices to the customer of a good or service are less than the cost of that good or service to society (Pigou, 1932). Moreover, the tradable allowance is usually not subject to legal policies such as taxation; e.g., a European tax proposal must receive consent from the member states. Despite the choice of policy between taxation or tradable allowance, market-based incentives are not self-enforcing and may involve considerable control costs. Moreover, with respect to practical application, the policy would heavily rely on information and incorporate an eminent risk of market failure; also, regulatees may not respond rationally to the price signals (James, 1993; Bowers, 1994).

The government has also typically undertaken public service through information dissemination to raise awareness about an environmental issue. This information will overcome informational barriers and reinforce an environmentally related issue. Information policy approaches may be taken to include education and training, corporate environmental reporting, and product certification. Several countries also have introduced legislation intended to inform the community on the environmental impact of the firm's activities and pollution abatement policies, for example, Emergency Planning and Community Right in the United States and the National Pollution Inventory in Canada (Gunningham and Grabosky, 1998). Furthermore, the viability of command-and-control and market-based policy is substantially dependent on the availability and quality of information. Thus, this policy is not dependable to protect the environment, especially when there is a

significant gap between attitudes and behavior. Moreover, in most cases of policy implementation, this policy can be implemented with modest administrative burdens, thus improving its cost-effectiveness.

In summary, in this part, the paper presents the theoretical foundation of policy instruments that are crucial to the reduction of environmental pollution. The extensive range of the policy instrument discussion has shown in the transition from a single policy towards the more pluralistic conception of policy options. The paper also shows that tax policy might be more appropriate in support of current policy, given the ability to assign a price to the externalities and distributive power issues in tackling the externalities of Indonesia haze pollution. In the next part, the paper will discuss in more detail the role of taxation as a market-based policy in designing integrative practical environmental policy.

#### **2.4 ROLE OF TAXATION POLICY IN BROADER ENVIRONMENTAL POLICY**

Tax as a market-based policy places a direct cost on environmental damage; the polluter should bear the cost of measures to reduce pollution according to the extent of either damage done to society or the exceeding of an acceptable level (OECD, 1975). The tax design consists of increased cost for the emitter of carbon dioxide by assigning an explicit and implicit price to encourage behavioral change (market-based driven) and leads to increased human welfare from the environmental benefit (Pigou, 1932; Ekins and Baker, 2001). Hence, Weitzman (1974) and Adar and Griffin (1976) also studied the linking of choice of economic instrument to uncertainty on the risk of improper calibration of the policy.

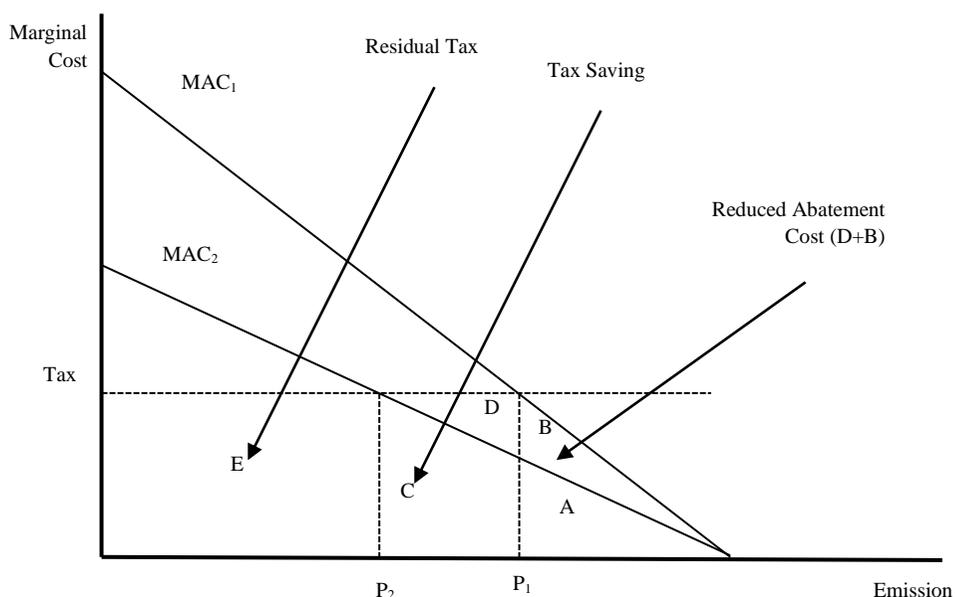
Given the difficulty of designing and enacting the optimal<sup>22</sup> Pigouvian tax, the scholar has invested significant effort to draw the line in the definitional arena of a market-based policy for the environment. In 1997, the European Union's Eurostat and European Commission's Tax Directorate (DG TAXUD) defined the environmental tax as a tax with a base of a physical unit (or a proxy of it) of something that has a proven, specific adverse effect on the environment (OECD, 1995). On the other hand, the OECD has adopted the term environmentally related tax as any compulsory, unrequited payment to the general government levied on the tax base deemed environmentally relevant (OECD, 2001). By focusing on unrequited payments, the definition excludes charges paid to the government for services, such as waste removal and treatment fees (Milne and Andersen, 2012). Following Milne and Andersen (2012), environmentally related taxes are, according to their relative environmental and fiscal functions, classified as regulatory taxes that are driven by environmental impact; environmental financing taxes are driven by their ability to finance environmental measures. In the last part, environmental taxes are also classified as taxes that are independent or complementary by evaluating their role relative to another policy instrument (Maata, 2006).

Conceptually, a tax as a market-based instrument in environmental policy would minimize the total emissions cost by equalizing marginal abatement costs across polluters. Additionally, taxes provide further incentives to be more efficient in the pollution-abatement technique through stimulating reduction abatement cost and tax. The taxpayer's stimulation is to

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<sup>22</sup> The optimal tax in addressing a negative environmental externality is equal to the marginal external damage from the polluting activity (Pigou, 1932).

develop an environmentally friendly attitude by offering tax reductions if they behave in a way considered positive (David and Bohnert, 2000). Figure 2.1 presents the dynamic efficiency of an environmental tax in pollution abatement.



**FIGURE 2.1: Components of Dynamic Efficiency of a Tax**

Source: Barde (2000)

In Figure 2.1, if we assume that the taxpayers were developing advanced technological capabilities in the production process, the marginal abatement costs<sup>23</sup> (MAC) would be reduced from  $MAC_1$  to  $MAC_2$ . In the case of a command-and-control policy using an emission standard at  $P_1$ , the level of emission would remain unchanged, and the polluter would only be safe in area B. However, if a tax is imposed using a market-based policy, the polluter

<sup>23</sup> A Marginal Abatement Cost (MAC) curve increasing from right to left represents that the more a pollutant is abated, the higher is the unit cost for abatement.

would reduce emissions from  $P_1$  to level  $P_2$ . An economically rational polluter will ideally react to an environmental tax by reducing emissions to the level where it assumes that it is cheaper to pay the tax than to abate emissions further. As a result, the shifting from  $MAC_1$  to  $MAC_2$  will provide double cost savings: abatement costs (area D+B) and reduced tax (area C).

The other strong point of a tax as a market-based policy is the administrative cost-saving. Tietenberg (1990) indicates several cases of least-cost policies being cheaper than command-and-control. Moreover, pollution taxes that use emissions as a tax base have a lower risk of evasion than a fixed emission standard that is controlled via regular onsite inspections (Faure and Weishaar, 2012). However, taxation policy implementation is dependent on trusting the citizen, and variations in political acceptability regarding the government policy may render the policy more expensive to administer and evaluate.

Successful application of environmental taxes would depend on the ability of the government to redistribute the revenue from environmental taxes by spending the extra tax revenue on environmental improvements (earmarking revenue). Buchanan (1976, 1993) has argued that an optimal tax system<sup>24</sup> cannot be designed without considering how its revenue will be spent. In practice, there are two principal arguments: first, provide certain circumstances to implement benefit principles, especially efficiency grounds,

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<sup>24</sup> Optimal tax systems to refer to the normative theory of taxation that considers not only the choice of tax instrument to generate the revenue but also the enforcement of any available instrument that can be administered at minimum cost (Slemrod, 1990).

as a link between government expenditures and revenue; second, induce the public to support increased taxes by linking the taxes with the expansion of some government activity (Bird, 1992). Earmarking will thus enhance the behavioral effect that follows a regulatory tax intervention (Soares, 2012). Moreover, Pigou endorsed earmarking that aims to repair damage caused by taxed behavior rather than compensate victims (Pigou, 2002).

As previously discussed, a broader policy framework is needed that provides policymakers with tools on what and who is being regulated. In the next part, we will discuss enforcement theoretical approaches to tackling the behavior of those who are deliberately noncompliant under the regulation and tax as market-based policy.

## **2.5 ENFORCEMENT AS POLICY IMPLEMENTATION**

### 2.5.1 Regulatory Policy Enforcement

Although in practice, as discussed in the previous section, it is not possible to separate regulatory from other policies of environmental control, in this part, the paper will focus on how regulatory, also known as command-and-control, policy should be legally binding and adequately enforced to guarantee a positive impact on the community. The enforcement dimension of the regulation is a vital aspect of every regulatory system, especially in environmental regulations, and has been widely studied. Enforcement indicates the criteria and variables that relate to decisions by the regulator on the deployment of available remedies in the event of noncompliance. Enforcement involves a range of activities that aim to ensure that the regulated comply with the law and acting against activities that are found to be noncompliant (Farmer, 2007). The volume and stringency of environmental

regulations have increased rapidly since the 1970s (Knill *et al.*, 2011). Becker (1968) has developed a compliance framework for the economic analysis based on the rational choice theory, in which individuals consider when the expected penalty is equivalent to the cost of doing business for a firm. Accordingly, the individuals will compare their expected compliance utility with the expected fines when they violate the law. Hence, punishment may efficiently deter individuals from committing crimes by changing the cost of crimes.

Furthermore, the channels for regulatory enforcement are through administrative and criminal regimes (Oded, 2013). Criminal and administrative sanctions often have similar aims, aiming to punish and prevent future noncompliance. The administrative regime is undertaken by the administration, which issues a formal warning letter requiring the firm to come into compliance. Moreover, monetary penalties or fines are a very commonly used sanction. In an administrative regime, firms can also be required to undertake remedial work or pay for the cost of restoration of the damage caused, or the permit of the facility may be revoked (Ogus, 2004).

On the other hand, criminal law is applied as a last resort in cases of noncompliance. This regime will be used where the range of administrative sanctions is not enough to ensure future compliance. Criminal sanctions that might be appropriate include repeated violations, intentional violations, falsification of information, or records (Farmer, 2007). Furthermore, coercive measures through criminal sanction are used to control unregulated activity; for example, polluting activity lies outside regulatory control, involving offenses where the burden of proof is on the prosecution. However, in previous environmental offenses, the onus of proof is usually reversed, and

establishing causation is a potentially difficult challenge to meet due to the lack of evidence in proving many cases of polluting activities.

Problems with the enforcement of regulated activity usually manifest as a failure to comply with the license, permit, or other regulatory authorization or condition attached to it. It is dependent on the regulator to transpose and determine the seriousness of noncompliance, choose other modes of enforcement or justify immediate action through criminal law. However, the administrative regime is often crucial, since it provides a valuable opportunity to impose requirements action in the face of an infraction. The noncompliant may seek to challenge the notice, in which case proceedings will occur by way of an administrative appeal to a tribunal or government. Whether the appeal can be regarded as a remedy is a matter of policy preference, which may be reflected in regulatory policy (Hawke, 2002).

The scholarly literature points out enforcement regulations that significantly changed and motivated firms' practice, for instance, the deterrence impact of fines has reduced many severe forms of air and water pollution (Scruggs, 1999; Shimsack and Ward, 2005) and recycling policy (Feldman and Perez, 2012). Additional examples include the use of enforcement data from Norway to find that minor violations flourished because of lax enforcement (Nyborg and Telle, 2006); pulp and mills pollution (Gray and Shadbegian, 2005); and the effect of EPA's waste regulations on firm compliance resulting in violations decreasing after a penalty charge (Stafford, 2007).

Apart from the above, Harrington (1988) theoretically has also shown evidence seeming to indicate that firms comply to a much higher degree than

is typically predicted. The phenomenon denoted the “Harrington Paradox” can be summarized in three statements as follows: for most sources, the frequency of surveillance is quite low; even when violations are discovered, fines or other penalties are rarely assessed; sources are thought to be compliant a large part of the time. However, another researcher suggests the presence of a paradox, given that the persistent of haze pollution in Indonesia appears to confirm the standard rational theory. Thus, in the next part, the paper will discuss the role of taxation as a market-based policy in designing integrative practical environmental policy enforcement.

### 2.5.2 Tax Policy Enforcement

For tax policy to operate effectively, it is necessary that all lawful revenues are collected. Earlier theoretical models emphasized that the economic nature of tax compliance is based on the assumption that an individual views tax compliance as a gamble, weighing the expected benefits of successful cheating against the risky prospect of detection and punishment (Allingham and Sandmo, 1972). The standard conclusion from the classic model is that an individual not declaring income weighed that action against the fear of being caught and penalized. Empirical evidence is also mainly consistent with the “best practices” policy advice that greater enforcement (e.g., higher audit rates, and more significant fine rates) will improve compliance (Alm, 2019). However, Webley (2002) found other aspects influencing taxpayer noncompliance: opportunity, perception of equal and fair treatment, individual differences in people’s personality, social norms, and knowledge of the tax system. Alm (2019) also found that even though individually-based financial considerations may well motivate many individuals, many other individuals are influenced by nonfinancial

considerations (e.g., social considerations). In particular, Sandmo (2005) suggested that social costs should be considered in any compliance model and indicated the overall fairness of the tax enforcement system.

Slemrod (2007) observed that the probability of being punished for noncompliance creates more-significant deterrent mechanisms and has an impact on tax compliance. Furthermore, studies by Klepper and Nagin (1989) indicated that the perceived risk of criminal prosecution was also found to act as a powerful deterrent affecting enforcement of taxpayer compliance. Other studies that investigated penalties as a deterrent by Gupta (2007) suggested that a penalty equated to a percentage or fraction of the evasion, ultimately reducing the ability to hide noncompliance and therefore improving overall deterrence.

Based on a theoretical study on command-and-control and tax policy enforcement, the next part of the paper discusses the theoretical background on how enforcement is carried out and a regulator responds to noncompliance once it is detected. The regulator response in this context is the application of the sanction<sup>25</sup>. The extent and effectiveness of deterrence is based on the inherently coercive nature of remedies sought. Therefore, in economic studies, environmental regulation is characterized by bargaining for an acceptable level of environmental control (Gray and Shimshack, 2011). The

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<sup>25</sup> Macrory (2005) has argued the principle of sanctioning by the regulator as follows: (1) sanctions should change the behavior of the offenders; (2) sanctions should ensure that there is no financial benefit obtained by noncompliance; (3) sanctions should be responsive to specific violations and regulatory issues; (4) sanctions should be proportionate to the nature of violations and harm caused; (5) sanctions should aim to restore the harm caused by regulatory noncompliance; and (6) sanctions should aim to deter future noncompliance.

low sanction level as an enforcement mechanism will induce industry to budget for the fine imposed for noncompliance instead of attempting to reduce pollution (Lynch, 2000).

### 2.5.3 Deterrent-Based Enforcement

Deterrence theory is embedded with the idea that individuals respond to changes in certainty, severity, and immediacy of punishment (Chalfin and McCrary, 2017). Scholars have relied on the deterrence theory in understanding the regulation enforcement process. In general, the empirical deterrence literature consistently finds that regulatory enforcement action in preventing future noncompliance generates specific deterrence at the individual entity level and general deterrence from spillover at the community level (Firestone, 2002; Shimsack, 2014). However, consistent with maximizing social welfare, regulators would be more concerned, especially from economic studies, with estimating the optimal level of monitoring and sanctions that motivates regulatees to act in a socially desirable manner (Cohen, 1999). The term optimal is a consideration to encapsulate effectiveness and efficiency in improving environmental performance (Gunningham and Garbosky, 1998). Effectiveness means the degree to which a determined environmental objective is achieved using the specific policy instrument. Efficiency means the static aspect and the dynamic ones (Opschoor and Tunner, 1994).

The previous study also discussed the general approach on how sanctioning will influence the level of deterrence. The first notable approach is promoting gain-based sanction, in which the expected liability faced by market players should be set at the level of the offender's expected benefit

from law-breaking (Becker, 1968). The second approach proposes harm-based sanctions, in which the expected liability should be set at the level of the social harm created by the violation action by market players (Stigler, 1970). Given the progressively severe harm from haze pollution in Indonesia, the paper will follow the harm-based sanction determination with the goals of inducing market players to internalize the social consequence or externalities of their activities (Polinsky, 1998); allowing efficient regulatory violations when private gain to the actor is higher than the social cost (Oded, 2013); imposing a similar sanction against various violations that differ from each other because the resulting social harm may distort offenders' decisions and induce them to commit a crime (Stigler, 1970); following approaches broadly accepted by the literature on regulatory enforcement (i.e., Arlen and Kraakman, 1997).

Furthermore, the paper follows Faure and Grimeaud (2003) in classifying the type of environmental harm or environmental damage that needs to be regulated as follows:

1. Personal injury. Damage in the form of death, physical injuries, mental distress or pain, temporary or permanent handicap resulting in economic and earning losses.
2. Property injury. Damage caused to property and damage linked to the uses of the property. For example, it concerns the inconvenience resulting from smells, noises, or loss of trees. In the context of insurability with study cases in Finnish 1994, compensation has been awarded for the loss of trees as part of a reasonable degree of nuisance to the victim for nonpecuniary losses.

3. Pure economic losses are those that do not directly refer to personal or property injury, for example, in the case of land/forest fires creating haze pollution that may affect tourism by reduced tourist visits to Riau and cause revenue losses. The haze pollution may affect a wide array of private interests, including hoteliers, restaurants, or shopkeepers who may all sustain commercial losses following declines in tourist activity.
4. Natural resource damages. Attention is required to damage caused to the biodiversity and the landscape. The addressing of natural resource concerns is often the preferred solution. The polluter then has to mitigate the damage, including remedying the source of the damage and restoring the environment to its original status. Therefore, it would be essential to understand the notion of biodiversity damage defined in the future environmental policy.

Although based on a harm-based determination in setting the level of sanction, given the stochastic nature of environmental violation, the regulator would still be facing complications to generate a deterrence effect. Departing from the Becker model, in theory, the social loss could be minimized by changing not only the level of sanction but also the probability for detection and conviction (Becker, 1968). An optimal level of deterrence may be reached when the expected liability faced by market players is set at the level of the social harm created by violations (Oded, 2013). Expected liability (EL) is the sanction imposed on violators and the probability of detection by enforcement authorities. Based on this approach, when expected liability equals the social cost of the misconduct, potential perpetrators internalize the social consequences of their conduct (Braithwaite, 2006).

$$\text{Social Harm (H)} = \underbrace{\text{Fine imposed/Actual liability (L)} \times \text{Probability of detection (P)}}_{\text{Expected Liability (EL)}}$$

The existing literature based on deterrence has discussed the determination of the sanction (L) to induce a market player level of deterrence. The sanction is imposed transparently and is consistent with a series of principles for the application regime as follows: change the behavior of the offender; ensure that there is no financial benefit obtained by noncompliance; make the sanction proportionate to the nature of the offense and harm caused; restore the harm caused and deter future noncompliance (Macrory, 2005). The practical application of the type sanction described is a fine or, in another form, is an environmental liability. The sanctioning mechanism will have an effect, providing economic agents act rationally in deciding to obey the law rather than violating it (Ogus, 2004). However, having the sanctions in place does not necessarily mean they are optimally implemented. Stigler (1970) found that imposing similar sanction violations may distort and induce violators to commit crimes that may result in increasing the social harm and reduce deterrence. In this research on the case of haze pollution in Indonesia, the sanction is related to the financial penalties or fines imposed in criminal enforcement by authorities for noncompliance that are sufficient to ensure future compliance.

Furthermore, the probability of detecting (P) a violation is an additional consideration that may affect deterrence. Because potential violators' risk preferences are influenced by the probability of being caught, deterrence may be increased. The probability of detection is described as a

function of enforcement effort made by enforcement authorities. Empirical research in Denmark on detection probability has shown that increasing the audit probability from a low level to a very high level positively affects compliance behavior with a modest magnitude (Kleven *et al.*, 2011).

One of the influential critiques of deterrence-based enforcement endorses a regulatory cat and mouse game between law enforcers and regulatory targets (Oded, 2013). Thus, if severe fines are applied for every violation, marginal deterrence is eroded. Similarly, the choice of the probability of detection may be subject to a constraint from the direct cost involved in monitoring actions. However, a higher probability of detection requires greater enforcement expenditure. As a result, in a case in which a regulator faces a limited enforcement budget, the deterrence might be below that which would be the optimal standard in a world in which noncompliance does not exist. Theoretically, if monitoring is costless, the probability of detection goes to unity (Becker, 1968).

To summarize, the environmental deterrence literature increasingly explores the heterogeneity of enforcement responses to lawbreaking. As has been highlighted, a practical implication in a deterrent-based approach to policymaking is that the enforcement system still is not optimal in achieving its end goals. The search for an improved enforcement framework has led scholars to develop an alternative approach, such as through possible policy combinations to compensate for the weakness of standalone environmental policies. Thus, in the next part, the discussion moves from a single policy to a mixed policy, especially in the implementation of enforcement policy, to overcome the environmental problem.

## 2.6 MIXED POLICY INSTRUMENT

Environmental policy, especially enforcement policy, is in a transition towards a much more pluralistic conception of policy design. There is no such thing as a single, perfect, universal solution to environmental problems. Moreover, environmental problems are complex, and the industrial and ecological context is varied; thus, the ideal solution will be context-specific and will necessarily vary from case to case.

The mixed policy is defined as configurations in achieving effectiveness and efficiency with a combination of policies to attain complementary interactions and compensate for the weakness of individual environmental policies (Gunningham and Grabosky, 1998). There are abundant law and economics literatures on the combination of various policy instruments that discuss the comparative benefits of various policies in given situations. Regarding climate change, please see Hansson and Skogh, 1987; Gunningham and Grabosky, 1998; Faure and Weishaar, 2012; Lehman, 2012; and Rogge and Reichardt, 2016. Furthermore, the policy mix encompasses not only a combination policy instrument but also the processes by which such a policy emerges and interacts (Flanagen *et al.*, 2011).

The previous study supports a rational focus on policy mixes. Environmental liability can provide attractive incentives to reduce pollution while still leaving the industry with sufficient revenues. However, liability rules will only give rise to optimal behavior if victims can identify polluters and establish causal relationships between activities and damages caused (Faure and Weishaar, 2012). A policy implication in energy intensities is not considering the effects of competitiveness of the industrial sectors. As a result,

energy and CO<sub>2</sub> taxes applied should be considered different policies to reflect their deterministic nature and long-term pattern (Agnolucci, 2011). Additionally, scholars analyzing control emissions from heavy-duty diesel trucks find that in a highly competitive market, a majority of firms are not investing beyond environmental compliance measures in the absence of an economic regime and regulatory control that raise public concern about the industry's environmental impacts. The previous literature highlights that there is no single policy that can confront all environmentally harmful activities or risks. Moreover, typically, different policy interventions are required to complement or replace government regulation in certain circumstances. Following Gunningham and Grabosky (1998), the paper draws a table for the main observations of four mixed policies.

As shown in Table 2.1, joint application in the form of regulatory and market-based policies may be complementary and provide a mutually supportive signal to the market if they are used to target a different aspect of common environmental issues. However, if both policies target the same behavior, then to the extent that the command-and-control policy limits the choice of firms in making rationally individual decisions, the market-based policy will be compromised. As a result, the net cost of reducing the overall level of pollution will be lessened. However, for a variety of reasons, firms are unlikely to be purely rational actors. Thus, we cannot state in whether the policy instrument combination outcome will be positive or negative.

Tax as a market-based policy would place a direct cost on environmental damage; the polluter should bear the cost of measures to reduce pollution according to the extent of either damage done to society or the exceeding of an acceptable level (OECD, 1975). According to Hawke

(2002) and OECD (1989), an environmentally related tax, as part of a complement to traditional regulatory control, has the ability to provide flexibility and give the authorities a tool to influence actor behavior. Taxes will stimulate the reduction of pollution when abatement costs decrease. Moreover, a tax is a more substantial stimulus compared to developing more-efficient pollution-abatement techniques (Barde and Godard, 2012).

**TABLE 2.1 Summary of Environmental Policy Mixed**

	Regulatory or Command-and- Control	Voluntary Policy	Market-Based or Fiscal Policy	Information Policy
Regulatory or Command- and- Control Policy		Complementing Positive (if environmental performance beyond compliance)	Complementing -Positive and Negative (if targeting the same aspect of environmental issue)	Complementing Positive
Voluntary Policy	Complementing Positive (if environmental performance beyond compliance)		Contextual	Complementing Positive
Market- Based or	Positive and Negative (if	Contextual		Complementing Positive

Fiscal Policy	targeting the same aspect of environmental issue)			
Information Policy	Complementing Positive	Complementing Positive	Complementing Positive	

Source: Gunningham and Grabosky (1998)

Furthermore, the joint policy related to a voluntarism policy may be complementary, although a strict market-based policy would appear to make voluntarism redundant in the face of valid price signals. To the extent that firms behave in a less than sufficiently rational manner, voluntarism might be complementary to the market-based policy.

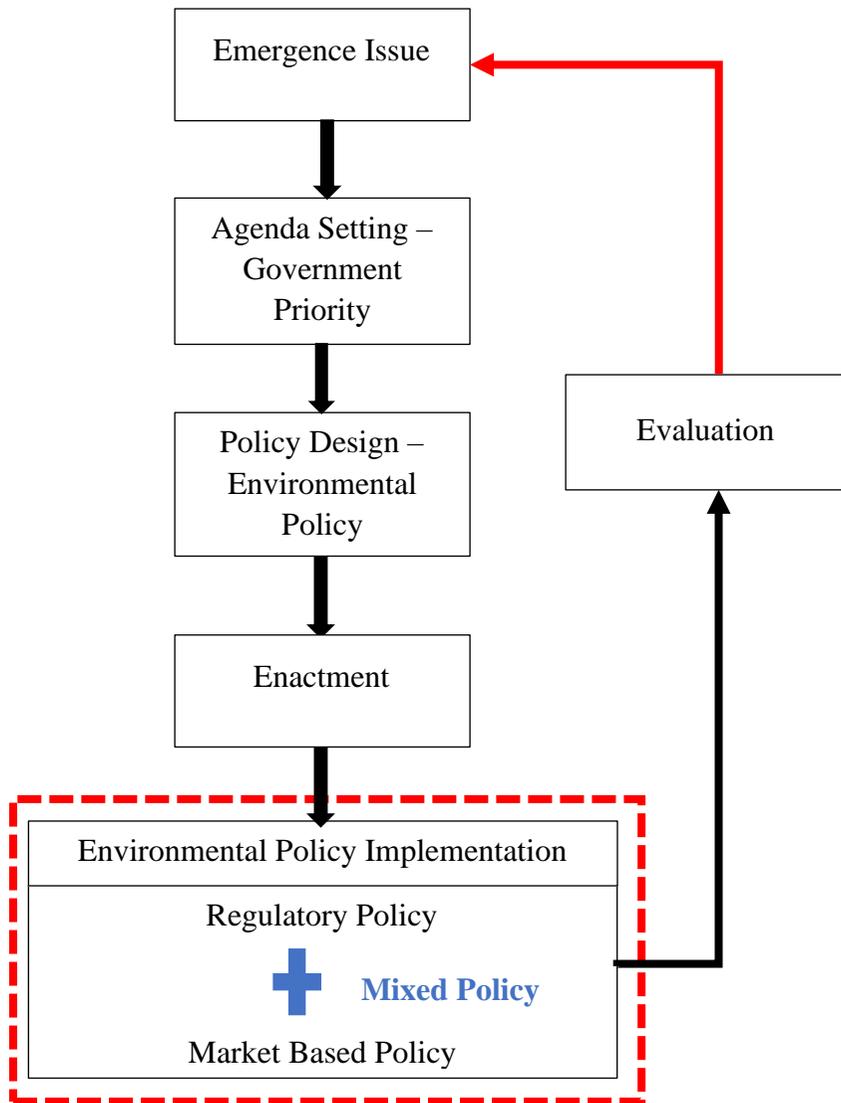
In summary, the single policy approach continues to predominate, with an inability to operate effectively across the board (Gunningham and Grabosky, 1998). Thus, the policy mix will encompass a combination single policy instrument that emerges and interacts to confront all harmful environmental activities. However, the optimal combination should not result in an imposition of all policies at the same time, which might lead to ineffective and costly overdeterrence. The policy design should also reflect a careful assessment to determine the mix of incentives and disincentives that will result in the desired change in compliance (Rosenbaum, 2005). However, the environmental policy to achieve the desired outcome also depends upon the enforcement process as policy implementation is actively changed to

affect the firm's practice and meet the objective of the regulation (Farmer, 2007).

## **2.7 THE CONCEPTUAL FRAMEWORK**

The investigation described throughout this study is intended to develop an effective environmental policy to tackle threats to the environment. Designing and implementing policies are complicated and unpredictable activities. The evidence that pollution, deforestation, and climate change are creating irreversible damage to the environment is increasingly compelling. Environmental policy as part of a public policy to protect the environment with all its components from harmful activities has been magnified enormously in recent years. However, when assessing policy implementation, no human activity can be viewed in isolation.

As a result, developing and implementing flexible regulation to be undertaken by policymakers to enabling severe environmental damage to be slowed is the most important means of environmental policy. A single policy is not sufficiently flexible or resilient in addressing all environmental problems in all contexts (Gunningham and Grabosky, 1999). The mixed policy with combinatory and complementary interactions will compensate for the weakness of a single policy instrument. The policy discussion is presented in Figure 2.2.



**FIGURE 2.2 Discussion in the Policymaking Process**

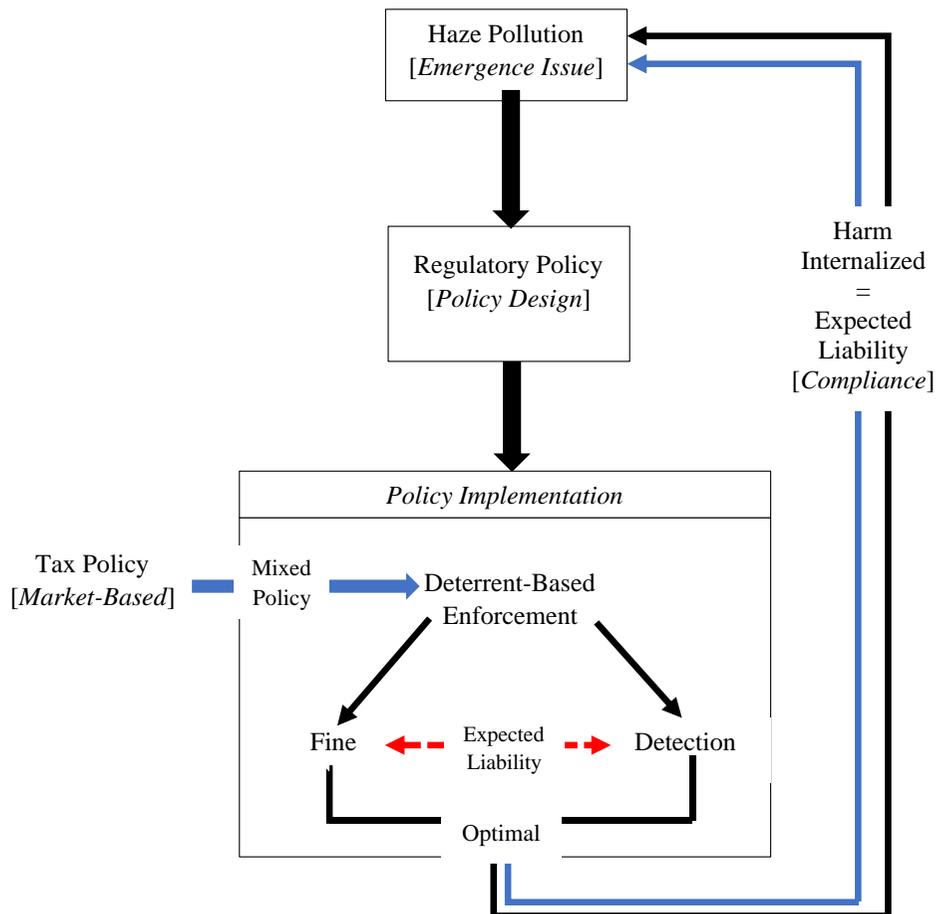
The previous literature on mixed environmental policy is in the stage of policy design and limited study in policy implementation, especially in the area of law enforcement. Please refer to Fullerton and Wolverton (1999), Wall and Palmer (2001), and Meyers *et al.* (2015). Policies must be designed

appropriately so that the regulator has a clear framework for the implementation. The implementation of public policy requires specific behavior and coordination among actors. Moreover, incomplete implementation would hamper the public policy process for both the regulator and the public. No matter how elegantly policy design to encourage behavior changes, if the actor does not perform the tasks, nothing happens (Cohen, 2006).

The paper will draw on the growing body of policy implementation literature on deterrent-based enforcement studies to resolve the queries which originated from the necessity to enforce comprehensive regulation in environmental management. This relatively new area of research will be further advanced by uniquely examining the haze pollution case in Indonesia in the context of more than a decade. Deterrence is a choice in which would-be offenders balance the benefits and cost of crime (Apel and Nagin, 2015). Moreover, the optimal level of deterrence may be reached when the expected liability faced by a market player is set at the level of the environmental harm created by the violation or at a level that motivates the regulatee to act in the desirable manner (Oded, 2013).

This study posits that mixed enforcement will strengthen law enforcement implementation of land/forest fire regulations in Indonesia. Please refer to Figure 2.3 for the conceptual framework of the study. Moreover, Hawke (2002) and OECD (1989) argue that economic policy as a complement to traditional regulatory control has the ability to provide flexibility and enough grip for the authorities to influence the actor behaviors to

1. Raise revenue for financing environmental measures,
2. Provide incentives to implement the associated regulation better,
3. Have a possible impact on technical innovation.



**FIGURE 2.3 Research Conceptual Framework**

In the first part of the investigation, to enhance the expected liability in internalizing harm, it is necessary to distinguish the deterrent effect from the existing policy in terms of tackling the haze pollution. One of the significant limitations of the previous study is its failure to understand policy

intervention related to enforcement measures by a law enforcement officer. Carmenta *et al.* (2017), using Q factor, find that effective fire management intervention employs hard measures against large actors, including sanctions, enforcement, and standards directed at large scale actors. This study will strengthen previous investigations by analyzing the deterrence through in-depth interviews to determine law enforcement actor perceptions. Actor perspective in law enforcement is critical in improving policy design and on-the-ground implementation (Game *et al.*, 2014; Reed *et al.*, 2016). The actor insights will provide a valuable part of the puzzle in helping to zoom in on the primary problem (Lo *et al.*, 2006).

Second, we will further investigate the dimension of harm that has been approached by the current enforcement policy through judicial decisions concerning criminal enforcement. Enforcement against criminal offenses is seen as a last resort applied when the harm to society or the benefit to the offender is significant and the probability of detection is low. The critical criminal environmental policy is the prevention of unjustifiable harm, given that the expected sanction is equal to the harm caused by the offender and that loss of wealth will provide adequate deterrence (Cohen, 1992; Polinsky and Shavel, 1994; Garoupa, 2001). Although the limited body of theoretical research has developed exciting insight into judicial sanctioning decisions regarding environmental criminal violations, no study has explicitly investigated and provided a detailed analysis of defendants' occupation and offense locations.

Finally, based on the understandings of the effects of existing policy on haze pollution control, we will seek evidence of a mixed policy as pollution control in Indonesia. Environmental policy interactions with the fiscal system

fundamentally influence the cost-effectiveness of addressing climate change and meeting other social objectives (Goulder, 2013). However, due to the scarcity of previous studies that consider taxation's role in internalizing harm created from environmental violation, the analysis of the practical implementation of the mixed policy still has much room for improvement. Research on environmental taxes has mainly been done for developed countries, where the income levels and tax systems do not witness rapid changes but are more or less stable (please see, e.g., Wier *et al.*, 2005; Bork, 2006; Dresner and Ekins, 2006; Tiezzi, 2005; Callan *et al.*, 2009). Additionally, most of the Indonesia carbon tax research case (with the source of pollution being burning fossil fuels) has been done in a theoretical, experimental study and distributional impact analysis, see Iskandar (2012); Yusuf and Resosudarmo (2015).

This paper extends the Lim (2016) model while considering that of Besley *et al.* (2013), who found that including tax policy as a fiscal capacity revenue source increased regulatory action capacity. There are no previous studies on environmental policies in which regulatory action considers taxation's role in enhancing fiscal capacity to address pollution. The paper will contribute to the field by analyzing the dependent variable, using hotspots as an indicator of active fire as a source of emissions that cause ozone and particulate matter (PM) pollution. As a result, the set of emission sources is broader than those in most previous studies.



**CHAPTER 3**  
**ENFORCEMENT DETERRENCE**  
**IN TACKLING HAZE**  
**POLLUTION: INSIGHT FROM**  
**IN-DEPTH INTERVIEW**

# **CHAPTER 3**

## **ENFORCEMENT DETERRENCE IN TACKLING HAZE POLLUTION:**

### **INSIGHT FROM IN-DEPTH INTERVIEW**

*Reaching a better understanding of the enforcement of current regulatory approaches will provide a baseline for enhancing future policy choices for deterring and controlling the devastating effects of haze pollution. Using in-depth interviews with prominent actors who have direct and indirect involvement in the law enforcement process (i.e., Investigators, Prosecutors, Experts Witnesses in Court, NGO), this paper investigates how insufficient power and law enforcement capacity could hamper and deter policies for tackling haze pollution. The paper shows that a low probability of detection for environmental offenses, especially in South Sumatra, causes economic agents to incorrectly receive signals to not engage in unsustainable and illegal activities. More specifically, the paper finds that the absence of a special arrangement for the recovery of environmental costs and direct financial mechanisms for how fines would be utilized has been hampering law enforcement. Moreover, a limited budget and coordination, as part of the government's capacity, provide a low probability of inspection and create a relatively high benefit for noncompliance, thus inducing the persistence of noncompliance. The establishment of a policy regime that is inclusive of fiscal provisions in mixed environmental management cannot be overlooked as a reference point for effective future solutions.*

### 3.1 INTRODUCTION

The palm oil plantation and industrial processing sector have been one of the leading sectors for the development of the Indonesian economy. However, at the same time, the Indonesian plantation sector has also been identified as the most significant driver of forest and peatland clearing, which creates major haze pollution and is a source of greenhouse emissions (Greenpeace, 2018; Shiel *et al.*, 2009). The burnt areas that create haze pollution within the Riau and South Sumatra Provinces are in company concession areas (Lee *et al.*, 2013; Budiningsih, 2017). Haze pollution is defined as smoke resulting from land/forest fires, which cause deleterious effects that endanger human health; harm living resources, ecosystems, and material property; and impair or interfere with amenities and other legitimate uses of the environment (ASEAN, 2016). The government of Indonesia has enacted command and control regulations for tackling the haze pollution issue but with limited success and a lack of public trust (please see: Iskandar, 2012; Varkkey, 2016). The need for regulatory enforcement policies that deter and control emissions by increasing the responsibility of the economic agents that pollute the environment is inevitable for future policy choices.

By focusing on the enforcement deterrence, this paper primarily aims to identify the state of implementation of current policies, especially enforcement obstacles for land/forest fires, through the perceptions of actors. Deterrence theory draws on a rational choice phenomenon in which an economic agent is assumed to weigh the costs and benefits of an action to avoid a sanction; when the likelihood of detection and punishment outweighs the benefits, a deterrent effect can be observed (Paternoster *et al.*, 1997).

Understanding how to enhance deterrence is vital because in regulatory enforcement studies, improving enforcement in a country where the governmental capacity is limited and societal support is emerging is a puzzling task (World Bank, 1992; Dasgupta, 2000).

Simorangkir and Sumantri (2002) stated that the weak enforcement of laws and regulations is becoming the biggest problem in managing forest and land fires in Indonesia. Carmenta *et al.* (2017) analyzed the perceived effectiveness of Fire Management Interventions using the Q method to quantify contention and consensus among stakeholders. In the hard measures against substantial actor factors, the enforcement of diverse Fire Management Interventions, including sanctions, would be preferred as an effective solution. Even though there are discrepancies related to the sources of fires, the findings reveal that there is a need to move from an oversimplification of fire phenomena and blaming for setting fires to multistakeholder policy engagement that considers the environment, the economy, and health. Furthermore, Budiningsih (2017) showed that a lack of coordination among governmental agencies was less than optimal in the context of fire suppression.

Based on existing studies of land/forest fires in Indonesia, this paper extends the results of Carmenta *et al.* (2017) and follows the study of Matland (1995) by distinguishing the obstacles in the regulatory enforcement process, including the implementation of policies and within internal enforcement agencies. To the best of our knowledge, no previous study on environmental policies has considered deterrence from the perspective of law enforcement actors for the study areas of the Riau and South Sumatra Provinces. This paper

addresses the following question: *how do insufficient power and law enforcement capacity hamper deterrence in South Sumatra and Riau Provinces?*

The actor perspective, consisting of both internal and external stakeholders and including regulatory enforcement policies to address deterrence, is critical for improving the design of policies and on-the-ground implementation (Game *et al.*, 2014; Reed *et al.*, 2016). Furthermore, actor insights can provide a valuable piece of the puzzle in helping to focus on primary problems (Lo *et al.*, 2006).

The part of the paper is structured as follows: The first part, section 3.2, presents the enforcement process in the case of land/forest fire in Indonesia. Moreover, section 3.3 will discuss the in-depth interview analysis and provincial area selection. Section 3.4 presents the interview results, followed by the research findings and discussion. Section 3.5 contains the conclusions and highlights possible future policy options for tackling haze pollution.

## **3.2 INDONESIA ENFORCEMENT ARRANGEMENT FOR LAND/FOREST FIRE**

### **3.2.1 Institutional Arrangement**

The land/forest fire has been creating haze pollution that resulted in disturbance to a significant increase in greenhouse gas emissions. The law enforcement process, as part of post-fire management activities, will impose sanctions against individual and corporate entities engaged in violations that have led to fires.

Indonesia Code and Procedure of Criminal Law in Law No. 8/1981<sup>26</sup> defines law enforcement institutions as essential components of the system comprising *Kepolisian*<sup>27</sup> (Police), *Kejaksaan*<sup>28</sup> (Attorney General), *Pengadilan*<sup>29</sup> (Court), and *Rumah Tahanan* (Correctional Facilities/Prison). Additionally, in the case of land/forest fire, the President Republic of Indonesia through Presidential Decree No.16/2011 which amendment by Presidential Decree No. 11/2015 has explicitly been instructed Ministry of Environmental and Forestry, Head of the Indonesia National Police and Attorney General of the Republic of Indonesia also Governor of Regional Government to improving the law enforcement and providing strict sanctions against individuals or companies that involved in land/forest fire activities.

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<sup>26</sup> Undang – Undang No. 8/1981 tentang Kitab Undang-Undang Hukum Acara Pidana (KUHAP)

<sup>27</sup> Based on Article 5 (1) Law No. 2/2002 on National Police of the Republic Indonesia (*Kepolisian Negara Republik Indonesia*) stated that the National Police is a state instrument that plays a role in maintaining the security and order of the community, enforcing the law, and providing protection, protection and services to the community in the context of maintaining domestic security. In the criminal violation the National Police have the authority (Article 16 (1) for example as follow: make arrests, detention, search and seizure; prohibit anyone from leaving or entering the crime scene for investigation purposes; summons people to be heard and examined as suspects or witnesses; bring in the experts needed in relation to the examination case.

<sup>28</sup> Based on Article 2 (1) Law No. 16/2004 on Attorney General of the Republic Indonesia (*Kejaksaan Republik Indonesia*) stated that Attorney General Office is a government agency that exercises state power in the field of prosecution and other authorities based on law. Article 30 stated that the Attorney General Office related to criminal violation have the authority including as follows: prosecuting the criminal case in the court room; implementing the judge's provision and court decisions that have *inkracht* legal force; investigating certain criminal acts based on the law.

<sup>29</sup> Based on Article 2 (2) Law No.48/2009 on Judicial Power (*Kekuasaan Kehakiman*) stated that State courts implements and enforces law and justice based on Pancasila. Article 2 Law No. 12/2011 on Legislation Formation stated that Pancasila is the basis and ideology of Indonesia as well as the philosophical basis of the state.

Indonesia National Police is instructed to increase pre-emptive and preventive measures in the context of controlling forest and land fires as well as being repressive in the context of law enforcement against land/forest fire violators. Moreover, the decree also directed the Civil Servant Investigator in the Ministry of Environment and Forestry to carry out law enforcement against the violators together with Forest Rangers. Meanwhile, Prosecutor in Attorney General Office also needs to optimizing law enforcement in handling forest and land fire crime. Governor of Regional Government also has specific instruction from the President for enforcing severe sanctions to agricultural businesses that do not implement land fire control in their concession area.

The institution of environmental enforcement will not be able to function adequately in implementing the enforcement policy without appropriate actor supporting in tackle the land/forest fire cases in Indonesia. Thus, in the next section, the paper will be discussing the law enforcement actor in the case of the land/forest fires in Indonesia.

### 3.2.2 Criminal Enforcement Actor

Enforcement of environmental law will be closely related to the ability of the enforcement actor and the community's perceived compliance with laws and regulations. Hence, the investigator, as enforcement actors, has a vital role in facts finding and gathering substantial evidence in the environmental criminal violation to induce the enforcement deterrence in Indonesia.

Definition of investigator according to Code and Procedure of Criminal Law in Law No. 8/1981 is stated in Article 6 (1) as follows:

*The investigator is (a) Officers of Republic of Indonesia National Police;*

*(b) Assigned Official from Civil Servant who is given special authority by law.*

In the case of land/forest fire, the Investigator will from a Police Officer, Civil Servant Investigator from the Ministry of Environmental and Forestry (based on Article 94 Law No. 32/2009) and Investigator from Local Government (based on Article 257 Law No. 23/2014<sup>30</sup>) on Local Government.

Police Investigator has the authority based on the consideration of the proof gathering need and determination of the causality of the criminal offense, as stated by Article 7 (1), Law No. 8/1981. The range of authority are from receiving a report of a crime; order to stop the crime suspect; making arrest, imprisonment, search and seizure; bringing the expertise needed to the examination case to stopping the investigation. On the other hand, Article 7 (2) Law No.8/1981, Investigators from the Assigned Official from Civil Servant have only had the authority under their respective law in performing their duties with coordination and supervision from Police Investigator. What is meant by "under their respective law" is, for example, Environmental and Forestry Investigator officials who carry out investigative duties only under the authority granted by the Indonesian Environmental and Forestry Law, which the investigator respective legal grounds were based. In Article 94 (2) Law No. 32/2009 stated the investigator's authority was similar to Article 7 (2) Law No. 8/1981. However, Article 94 (3) in Law No. 32/2009 also limit the

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<sup>30</sup> Undang-Undang No.23 Tahun 2014 tentang Pemerintahan Daerah

authority to making arrestment of the violator by Civil Servant Investigator as stated:

*In making arrests and imprisonment [.....], Civil Servant Investigator coordinates with Investigators from the Republic of Indonesia Police Officers.*

The next actors that also intensively related to the process of criminal enforcement offenses are prosecutors from the Attorney General in the prosecution's stages. The investigation's results that been carried out by Investigators are pass on to the Public Prosecutor for prosecuted in the judicial system. In Article 2 Law No. 16/2004<sup>31</sup> on the Attorney General's Office of the Republic of Indonesia, the Attorney General is the government agency that exercises state power in the field of prosecution and other authorities based on the law. In addition, the definition of Public Prosecutor according to Code and Procedure of Criminal Law in Law No. 8/1981 is stated in Article 13. Moreover, the authority of the Public Prosecutor is stated in Article 14. The detail articles are stated as follows:

*Article 13: Public Prosecutors are Prosecutors who are authorized by this law to conduct prosecutions and implement judges' verdicts.*

*Article 14:*

*a. Receiving and examining the investigation case file from the Investigator;*

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<sup>31</sup> Undang-Undang No. 16/2004 tentang Kejaksaan Agung Republik Indonesia

- b. *Conducting pre-prosecution if there are deficiencies in the investigation [.....], by giving instructions in the context of perfecting the investigation of the investigator;*
- c. *Provide an extension of imprisonment, carry out imprisonment [.....];*
- d. *Making Indictment Letter;*
- e. *Bestowing case to Court;*
- f. *Delivering notification to the defendant [.....];*
- g. *Prosecuting [.....]*

Judges in the adjudication are the final stage of the criminal process in judicial action based on prevailing laws and regulations. The criminal law enforcement process is a series of legal proceedings that start from the investigation, prosecution, and adjudication process. Also, the sanctioning policy of the prosecution of criminal offenses or enforcement in the judicial process will be presented during the discussion in Chapter 4.

Due to a vital role in gathering substantial legal evidence<sup>32</sup> to revealing an environmental criminal violation, law enforcement actors, i.e., investigators, prosecutors, and judges, are often confronted with a problem that cannot be resolved by themselves because beyond the limits of the actor expertise. Hence, during the enforcement process, the assistance of an Expert

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<sup>32</sup> Article 184 (1) Law No.8/1981 defines the legal evidence is: (a) Witness testimony; (b) Expert testimony; (c) Letter; (d) The Clue; (e) The defendant's testimony.

Witness is needed in obtaining and assessing evidence based on the truth of the facts.

In the Law No. 8/1981 the definition of expert testimony by Expert Witness, as follows:

*Article 1 (28): Expert testimony is a description given by someone who has special expertise about the things needed to make clear a criminal case for examination.*

*Article 186: An Expert's testimony is what an expert stated in a court hearing.*

Expert testimony has become one of the "strengths" of law enforcement actors to prove the occurrence of criminal violations. Even though Experts Witness not in the crime scene to see or hear directly during the criminal event, the law enforcement process often relies on expert testimony that has the specific knowledge related to the case.

In the next section, the paper will be presenting an initial review of the law enforcement process in the case of the land/forest fires in Indonesia.

### 3.2.3 Initial Review on Enforcement Arrangement

Despite the anti-haze legislation and institutional arrangement also law enforcers activity being enhanced, the enforcement capacity to addressing the root cause of land/forest fire has remained weak. The persistence of land/forest fire has been showing the indication that the occurrence of lack of coordination among law enforcement institutions.

Heroepoetri (2016) explained that the existing laws related to law enforcement in the case of land/forest fire have been excessive. However, its implementation is still very weak, including the capacity of law enforcement officers in investigating, prosecuting, and making court decisions (Trinirmalaningrum *et al.*, 2015). One interesting case that dragging the citizen intention on the land/forest fire enforcement is in the case of palm oil plantation company released from the charge of burning down the forest and the obligation to pay Rp9.2 Trillion in South Sumatra Province. *Kompas* (2016), capturing the unique logic impression from Judge that has created a massive reaction to society is as follows:

*Burning the forest is not a problem; after all, burning land can still be planted and overgrown with acacia.*

By reading the verdict, the inability to prove the ecological losses, i.e., calculation of nutrient loss and biodiversity loss, and the absence of land damage in the burned land during the trial, creating the violations by the corporation cannot be proven. The case has been shown that both legal and enforcement capacity also capability is important, especially in criminal law enforcement. Hence, according to Hamzah (2005), proof systems due to environmental pollution or damage should not only by the element of error (deliberate or negligent elements).

Furthermore, Carmenta *et al.* (2011) described the inconsistent policy between the cause of fires and proposed policy management solutions in addressing the problem. In principle, the destruction of the environment and natural resources is an act of crime that causes state losses, both in economic terms and ecological terms. However, the lack of policy by the government to

push the balance between economic interests and losses that have to be recovered from land/forest fire will weaken the law enforcement on haze pollution. In the next part, the paper will present a detailed methodology in analyzing the enforcement deterrence based on the perspective of law enforcement actors.

### **3.3 METHODOLOGY**

#### **3.3.1 In-depth Interview Approach**

The paper uses in-depth interview analysis, a technique that includes intensive individual interviews with a few respondents to elaborate on their perspectives, in the context of detecting possible risk deterrence issues. Moreover, these interviews were designed to be semi-structured, with open-ended questions funneling the discussion from general law enforcement experience in land/forest fires to the incidence of hotspots and a discussion of obstacles to the enforcement of deterrence.

Once the obstacles have been discussed, the respondent is asked to describe, in more detail, their subjective perceptions about the nature of the obstacles, especially in the context of political implementation and regulatory capacity. Follow-up questions then stimulate discussion with the respondent and a spontaneous inquiry about the probability of enhancing deterrence. Using qualitative in-depth interviews allows for a broader subjective understanding of deterrence that includes the detection of perceptions and the severity of sanctions. The interviews were conducted in Bahasa (the formal language of Indonesia), and supporting data were gathered through fieldwork in the Riau and South Sumatra Provinces in Indonesia during October 2018.

### 3.3.2 Case and Respondent Selection Criteria

The Riau and South Sumatra Provinces were selected as a background of the study because they provide opportunities to observe the complexities of haze pollution in Indonesia. First, the Riau and South Sumatra Provinces are among the 14 provinces in Indonesia located on Sumatra Island, which has been profoundly influenced by the occurrence of hotspots. Second, both provinces have been critical in exposing the natural forest through land-use changes and forest destruction. The 2017 land cover quality index<sup>33</sup> (*Indeks Kualitas Tutupan Lahan*) values for both provinces is among the lowest on Sumatra Island, with 51.89 points for Riau Province and 42.55 points for South Sumatra Province.

On the other hand, the National Peatland Ecosystem Areas<sup>34</sup> in the Riau and South Sumatra Provinces are the most extensive areas on Sumatra Island at 5,042,561 hectares and 1,955,103 hectares, respectively. Previous studies have shown that aggressive human-made burning practices to clear and convert the land for palm oil plantations, especially in peatland, are a driving factor for haze pollution (Gaveau *et al.*, 2014; Lestari *et al.*, 2014)

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<sup>33</sup> The index is calculated by the existing forest area as one of the crucial components in the ecosystem divide by provincial or municipality area. Hence, forest cover in the province which has a value of 30 percent will get the score of 50, while the ideal forest cover has a value of 84.3 percent gets a maximum score of 100. As a forest cover with the ideal value is taken from Papua forest cover in 1982 covering 84.3 percent of the provincial area. The data are derived from Indonesia Statistic of Environmental and Forestry 2017.

<sup>34</sup> Based on the Ministry of Environmental and Forestry Decree No. SK.130/MENLHK/SETJEN/PKL.0/2/2017 on Establishment Map of National Peatland Ecosystem Function.

Due to interviewees were critical determinants of the data and to reduce the interview biased law enforcement representatives were selected for interviews based on the endorsement of their respective office, which assigned a specific officer as a respondent for the in-depth interview. Unfortunately, the Riau Local Environmental Agency did not respond to inquiries related to interviews with law enforcement representatives. The respondents were selected from among various law enforcement stakeholders to enable the elaboration of different perspectives. The selected enforcement officers were knowledgeable and experienced in enforcing environmental externalities, especially for haze pollution. Please refer to Table 3.1.

The interviews started with prominent representatives who have direct involvement in the law enforcement process, namely, an Investigator and a Prosecutor who handle cases in the Riau and South Sumatra Provinces. The Investigator is a Police and Government Official (Civil Servant Investigator in the Ministry of Environment and Forestry and Local Government) who has been given exclusive authority by law<sup>35</sup> to conduct investigations.

**TABLE 3.1 Respondents for In-depth Interview**

ID	Respondent	Role
D-1-RPolice	Riau Regional Police	Investigator
D-7-SSPolice	South Sumatra Regional Police	Investigator
D-2-RAttorney	Riau High Attorney General	Prosecutor

<sup>35</sup> Article 6, Law Number 8 / 1981 on Code and Procedure of Criminal Law.

D-6-SSAttorney	South Sumatra High Attorney General	Prosecutor
D-5-SSLocalEA	South Sumatra Local Environmental Agency	Investigator
D-3-MinEAF	Ministry of Environmental and Forestry	Investigator
D-4-ExpertW	Professor in Forest Fire from Bogor Agricultural University	Expert Witness in Criminal Court
ID-2-EnvNGO	Coordinator – JIKALAHARI	NGO
ID-3-EnvNGO	Executive Director – Green Trade Initiative	NGO
ID-4-EnvNGO	Forest Campaigner – GREENPEACE	NGO

*Source:* Author

Moreover, the Prosecutor is a Public Prosecutor who is authorized by law to conduct prosecutions in the courtroom and execute the decisions of judges<sup>36</sup>. Furthermore, we interviewed an Expert who gives statements in the courtroom related to land/forest fire cases<sup>37</sup> and people in a nongovernmental organization who independently monitor the law enforcement process, specifically for haze pollution in Indonesia.

The interview data were coded using Microsoft Excel and Word. The conversations were recorded after obtaining permission from the

<sup>36</sup> Article 13, Law Number 8 / 1981 on Code and Procedure of Criminal Law.

<sup>37</sup> Article 186, Law Number 8 / 1981 on Code and Procedure of Criminal Law.

interviewees through written consent. Notes were also taken to complement and emphasize the critical points expressed by the respondents. The raw interviews were analyzed by developing a raw table of essential aspects and a summary of the interviewees' answers. Each important aspect of the study was organized and coded.

### **3.4 RESULTS AND DISCUSSION**

#### **3.4.1 The Incidence of Hotspots in Indonesia**

In the first part of this chapter, the paper discusses the points of view of the respondents as they relate to the nature of hotspots. The subjective knowledge of respondents in identifying the primary source of a land/forest fire is becoming an essential foundation for building enforcement policies.

An Investigator from the Ministry of Environmental and Forestry (D-3-MinEAF) argued that the fires in Indonesia are 100 percent triggered by humans. He believed that the tropical rainforest in Indonesia, compared to the temperate forest, is unlikely to burn naturally. Moreover, the Investigator from the Riau Regional Police (D-1-RPolice) stated that based on legal fact-finding during criminal investigations, land/forest fires are deliberately initiated by palm oil companies and smallholder plantation farmer. The Expert in the criminal court for haze pollution cases from Bogor Agriculture University (D-1-ExpertW) stated that humans trigger 99.9 percent of fires, and in most cases, cigarettes and mosquito repellent, which are used as a timer, are connected to a matchstick starter and placed in a stack of wood and branches that have been cut down. The Forest Campaigner from Greenpeace (ID-4-EnvNGO) argued that land forest fires in the peat areas are mainly

caused by changes in the land-use change to plantations by extensive peatland draining through the opening of canals.

In contrast, the paper also identified a counternarrative related to intentional land/forest fires from South Sumatra Regional Police Investigator (D-7-SSPolice), who made the following argument:

*Investigator: In my opinion, there is no intentionally burning except by smallholders who use fire to clear their plantation efficiently. Moreover, it is unlikely for a palm oil plantation to carry out a deliberate burning because it will result in the loss of productive palm oil trees that burns down.*

With regard to further detail on the area of burning, the coordinator of JIKALAHARI, an Environmental NGO based in Riau (ID-2-EnvNGO), stated that most of the fires in Riau Province occur inside the concessions of companies. Table 3.2 shows the Plantation Companies that have HGU<sup>38</sup> and IUPHHK<sup>39</sup> with fires occurrence in their concession areas during 2015-2017 in Riau Province. In 2017, seven companies with HGU, or 54 percent of the companies, had three consecutive years of burning on their land. A total of 65 companies with IUPHHK had burned land in 2017, and 82 percent of the companies with IUPHHK or 53 companies burned their land during the 2015-2017 period. As a result, the coordinator argued that plantation companies

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<sup>38</sup> HGU: The right to cultivate land that is directly controlled by the state, for a certain period of time, for agriculture, fisheries or animal husbandry (*Hak Guna Usaha*).

<sup>39</sup> IUPHHK: Business License for Utilization of Timber Forest Product (*Ijin Usaha Pemanfaatan Hasil Hutan Kayu*)

should be responsible for maintaining and extinguishing fires on their concession areas.

In general, the first finding on the nature of hotspots shows that almost all respondents agreed that the land/forest fires that create haze pollution are triggered by intentional human action to clear and convert land for palm oil plantations, consistent with previous studies (please see: Miettinen *et al.*, 2012; Gaveau *et al.*, 2014; Lestari *et al.*, 2014). However, the interviews also reveal a different law enforcement perspective related to the nature of fires, which is critical in the context of gaining a common understanding of officer perceptions about potential responsibility and observable policy implementation gaps (Anderson *et al.*, 2016). Furthermore, before presenting further respondent perceptions on the nature of hotspots and the detection probability of current policies, this paper presents an overview of enforcement action data in the Riau and South Sumatra Provinces for land/forest fires by law enforcement actors. Please refer to Tables 3.3a and 3.3b.

**TABLE 3.2 Hotspots in Concession Area – Riau Province**

Hotspot in Concession Area			Number Repeated Companies with Concession Area that has the Hotspot (3 Years Observation)	
	Hotspot (Number of Company HGU)	Hotspot (Number of Company IUPHHK)	HGU – Repeated Hotspot – 2 Years (3 Years)	IUPHHK Repeated Hotspot- 2 Years (3 Years)
2015	389 (41)	3,641 (108)		
2016	111 (21)	1,859 (76)	12 (7)	23 (53)
2017	28 (13)	902 (65)		

Source: Author Calculation and JIKALAHARI dataset.

Tables 3.3a and 3.3b show a downturn pattern related to the number of hotspots and burning areas in the Riau and South Sumatra Provinces in the 2015-2017 period, but interestingly, the latest data in the year 2018<sup>40</sup> show a dramatic increase. However, the tables also present a low pattern in the enforcement coverage and monitoring process from the year 2015 until 2017 for the case of land/forest fires. On average, the Police were able to apprehend<sup>41</sup> a suspect in only 8.10 percent of hotspot cases in Riau Province and 0.13 percent of hotspot cases in South Sumatra Province.

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<sup>40</sup> The latest data from SiPongi (Karhutla Monitoring System) show 296 hotspots in Riau Province (an increase of 275 percent) and 394 hotspots in South Sumatra Province (an increase of 39 percent), <<http://sipongi.menlhk.go.id/home/main>> as of 01/27/2019.

<sup>41</sup> The apprehension data for the period 2015-2017 in Riau and South Sumatra Province by Ministry of Environmental and Forestry Civil Servant Investigator were not available. However, the criminal enforcement statistical data from Ministry of Environmental and Forestry only present the cases progressed to the judicial stage were as follows: 2015 (0 cases); 2016 (1 cases) and 2017 (1 cases) (MoEF, 2018).

**TABLE 3.3a Enforcement on Land and Forest Fires in Riau Province**

Year	Hotspot	Plantation Area (000) Ha	Total Burning Area		Apprehension by Riau Regional Police		Court Decision on Land/Forest Fire				Ratio			
			Area (000) Ha	% to Plantation Area	Suspect Company	Suspect Individual	Company Proved Guilty		Individual Proved Guilty		Monitoring Process (%)		Enforcement Coverage (%)	
							Burning Area (Ha)	Number of Company	Burning Area (Ha)	No of Individual	Apprehension to Hotspot	Punished Defendant to Apprehension	Punished Burning Area to Total Burning Area	Punished Burning Area to Plantation Area
1	2	3	4A	4B	5	6	7A	7B	8A	8B	9 [(5+6)/2]	10 [(7B+9B / (5+6))]	11 [(7A+9A) / 4A]	12 [(7A+9A) / 3]
2015	1,927.0	2,290.7	183.8	8.0	19.0	56.0	21,418.0	1.0	2,366.0	26.0	3.89	36.00	12.94	1.04
2016	393.0	2,430.5	85.2	3.5	2.0	77.0	120.0	1.0	2.8	3.0	20.10	3.80	0.14	0.01
2017	79.0	2,493.2	6.9	0.3	0.0	21.0	0.0	0.0	11.3	1.0	0.31	4.76	0.16	0.00
Average											8.10	14.85	4.41	0.35

Source: Ministry of Environmental and Forestry; Supreme Court Database; Riau Regional Police Investigation Data

**TABLE 3.3b Enforcement on Land and Forest Fires in South Sumatra Province**

Year	Hotspot	Plantation Area (000) Ha	Total Burning Area		Apprehension by South Sumatra Regional Police		Court Decision on Land/Forest Fire				Ratio			
			Area (000) Ha	% to Plantation Area	Suspect Company	Suspect Individual	Company Proved Guilty		Individual Proved Guilty		Monitoring Process (%)		Enforcement Coverage (%)	
							Burning Area (Ha)	Number of Company	Burning Area (Ha)	No of Individual	Apprehension to Hotspot	Punished Defendant to Apprehension	Punished Burning Area to Total Burning Area	Punished Burning Area to Plantation Area
1	2	3	4A	4B	5	6	7A	7B	8A	8B	9 [[5+6]/2]	10 [(7B+9B)/(5+6)]	11 [(7A+9A)/4A]	12 [(7A+9A)/3]
2015	3,264.0	1,002.2	646.3	64.5	1.0	4.0	0.0	0.0	6,104.0	4.0	0.00	80.00	0.94	0.61
2016	266.0	1,064.4	8.8	0.8	1.0	8.0	0.0	0.0	203.7	1.0	0.10	11.11	2.32	0.02
2017	283.0	1,020.3	3.6	0.3	1.0	10.0	0.0	0.0	0.5	1.0	0.30	9.09	0.01	0.00
Average											0.13	33.40	1.09	0.21

Source: Ministry of Environmental and Forestry; Supreme Court Database; South Sumatra Regional Police Investigation Data

Furthermore, given the higher hotspot occurrence in South Sumatra Province, as shown in Table 3.3b, the coverage of punished burning land to the overall burning area based on a court case in South Sumatra is lower compared to Riau Province (Table 3.3a), with values of 4.41percent compared to 1.09 percent. However, in the same table, the paper also shows that the court was likely to punish guilty individual suspects and companies that had already been apprehended by the Police in South Sumatra Province compared to Riau Province.

The data reveal that the less stringent actual enforcement and low detection probability, especially in South Sumatra Province, highlight the inadequacy of deterrence for environmental offenses. As a result, economic agents do not correctly receive signals not to engage in unsustainable and illegal activities. In the next section, more detail on how enforcement obstacles shape deterrence perceptions is presented.

### 3.4.2 The Political Implementation of Regulatory Approaches

In policy implementation, securing compliance is an essential part of ensuring that goals are reached and not thwarted by opponents of the policy. Moreover, compliance depends on whether or not regulators have enough power over others. The more regulatory power required for an action, the more likely it is that an economic agent will comply with a request. As a result, the central principle of political implementation states that implementation outcomes are determined by power (Matland, 1995).

A fine, as part of the regulatory power in enforcing compliance, which equals a percentage or fraction of the evasion, ultimately reduces the ability to hide noncompliance and therefore improves overall deterrence (Gupta,

2007). However, the inability to execute a fine as part of a lack of power will hamper the enforcement deterrence.

Three major laws have been enacted in Indonesia to punish the violators in the case of land/forest fire as follows:

1. Law No. 1/1946 on Criminal Law. The defendant will be facing punishment for intentionally causes a fire or explosion faces a minimum of 12 years and a maximum of 20 years imprisonment
2. Environmental Management Law No. 23/1997, which was amended by Law No. 32/ 2009<sup>42</sup> on Environmental Protection Management. The defendant who causes haze pollution and intentionally commits an action that violates the ambient standard will be criminally prosecuted with a minimum punishment of three years and a maximum of 10 years imprisonment as well as a minimum fine of Rp3,000,000,000 and a maximum fine of Rp10,000,000,000 (Article 98 and Article 99).
3. Plantation Law No. 18/2004, which was amended and strengthened by Law No. 39/2014<sup>43</sup>, imposes criminal sanctions through severe fines and sentencing for burning opening plantations. The punishment on the offender who uses the burning method in opening/cultivation plantation land (Article

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<sup>42</sup> Undang – Undang No. 32/2009 tentang Perlindungan dan Pengelolaan Lingkungan Hidup.

<sup>43</sup> Undang – Undang No. 39/2014 tentang Perkebunan.

108) faces imprisonment for ten years and a maximum fine of Rp10,000,000,000.

The interviewee, a Prosecutor from the Riau High Attorney General Office (D-2-RAttorney), explained the existence of obstacles in the execution of environmental recovery fines based on court verdicts, not including detailed regulations in the Act related to the land/forest fire. Furthermore, there are no special arrangements in the case of defendants proposing installments, as part of state debts, for paying ecological recovery costs. The Investigator from the Ministry of Environmental and Forestry (D-3-MinEAF) also strengthened the argument by giving an example:

*Investigator: I am using an example from the criminal cases related to a palm oil plantation company that was found guilty by the court. The company was fined Rp1 billion and required to restore the burning environment at the cost of Rp13,000,000,000 or USD916,331<sup>44</sup>. However, this verdict has become an "advantageous" for the company as a defendant because there is no direct financial mechanism that clearly stated how these fines will be utilized implemented, and as a result, the Rp13,000,000,000 restoring cost has never been paid by the company.*

In contrast, the Investigator from South Sumatra Local Environmental Agency (D-5-SSLocalEA) noted the existence of obstacles in the early stage of the law enforcement process, namely, high political pressure on the

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<sup>44</sup> The Bank of Indonesia transaction exchange rate in June 21, 2019 is 1 USD = Rp14,187.

Environmental Agency. As a result, the Local Environmental Agency could not independently build law enforcement cases on land/forest fires in South Sumatra Province; instead, they could only provide a monitoring and fire prevention function. Moreover, the Investigator argued that the lack of support and prioritization on land/forest fire cases by the provincial government had undermined his role in the South Sumatra Environmental Agency.

Furthermore, given the high political and economic costs to the local government, the obstacles will also create lower incentives for agriculture development (Potter, 2016; McCarthy *et al.*, 2012). The Executive Director of Green Trade Initiative (ID-3-EnvNGO) argued that an incentive mechanism must be built in to provide "rewards" for those who are already effectively developing the sustainable palm oil sector. For example, local governments that are able to manage highly productive palm oil plantations in their region without fire outbreaks or environmental damage will be rewarded an additional transferable fund (General Allocation Fund<sup>45</sup>) from the National Budget. Also, palm oil companies that maintain proper environmental governance and prevent fire in their concession areas will be given a channel to strengthen their investments or provided further financing schemes. Commodity governance is still needed as a safeguard to prevent the negative spillover on the environment.

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<sup>45</sup> Law No. 33/2004 defined the General Allocation Fund (DAU) as a Central Government transferable fund to Local Governments from the National Budget, with the aim of equalizing the distribution of financial capacity between regions in Indonesia in the context of decentralization.

In all, the present study analyzed obstacles to enforcing deterrence and reaching policy goals. Thornton *et al.* (2005) studied deterrence and found that economic agents will reassure their compliance when someone else is caught and penalized. The paper identified insufficient fine enforcement in the Riau and South Sumatra Provinces, which is critical in the context of building regulatory deterrence. The existence of obstacles to enforcing penalties reflects the inability of law enforcement to send a signal of deterrence not to violate legal procedures and influence compliance. Furthermore, the paper also identified a patronage network that creates failure for the government to uphold effective policies against influential companies who ignore illegal commercial fires. The high pressure and political influence in the region, especially in corporate criminal cases, is one of the reasons that regional investigators are not as strong as investigators from the Police and Central Government Office. This finding is in line with Varkkey (2016), who discussed the difficulty of overturning the system of patronage politics. The collusion of local elites and plantation owners at the local level creates a failure to comply with formal legal permit procedures (Environmental Investigation Agency, 2014).

### 3.4.3 The Regulator Organization Capacity

The central principle in administrative policy implementation to ensure desired outcomes is through sufficient organizational capacity or resources (Matland, 1995). Therefore, law enforcement must have adequate financial and political capital support from government agencies to implement regulations successfully. Gajduschek (2015) defined regulatory enforcement capacity as the ability of regulatory agencies to deter potential externalities. Furthermore, a normative mechanism that induces compliance through the

legitimacy of the person requesting an action is generally sufficient in administrative implementation. However, administrative policy implementation problems may occur because of poor coordination, insufficient resources, or insufficient time (Etzioni, 1961). In order to identify the real obstacles in law enforcement implementation, the interviewees were asked to describe their own experience in their respective offices.

The majority of the respondents indicated insufficient budget resources in the Budget Execution (Allotment) Document<sup>46</sup> as a challenge in enforcing land/forest fire cases. Moreover, the Investigator from Riau Regional Police (D-1-RPolice) stated that the enforcement process is without specific budget allocation but only under a routine budget. However, the Prosecutor from Riau High Attorney General Office (D-2-RAttorney) stated that land/forest fires are treated as individual cases, and there is a specific allocation for law enforcement in the Budget Execution (Allotment) Document. However, the expenditure allocation is for the completion of only two land/forest fire cases per year. As a result, given the insufficient budget, the Investigator from Riau Regional Police (D-1-RPolice) and the Forest Campaigner from NGO – Greenpeace (ID-4-EnvNGO) stated that gathering substantial evidence to determine the actor that triggered a land/forest fire is challenging for law enforcement.

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<sup>46</sup> Article 1, Ministry of Finance Decree No. 171/PMK.02/2013 define Budget Execution Document (DIPA) is a budget implementation document prepared by budget user (government institution) and served as the base for budget execution or implementation.

The Prosecutor from South Sumatra High Attorney General (D-6-SSAttorney), in line with Budiningsih (2017), pointed out that coordination is also a problem in the land/forest fire enforcement process.

*Prosecutor: The existence of an egocentricity and lack of coordination between public prosecutors and police investigators has resulted in a limited number of land/forest fire cases prosecuted in the Criminal Court.*

There is another point of view when discussing coordination to tackle haze pollution. The Expert Witness (ID-1-ExpertW) argued that establishing a multidoor enforcement coordination approach to handle land/forest fire cases is the crucial answer due in part to the complexity of cases and the limited capacity of law enforcement, for example, in identifying the extent of a plantation area with an illegal status occupied by plantation companies.

*Expert Witness: There was a company that received cultivation right in 2014 but had been operating since the early 1990s. Moreover, there are non-sustainable plantation areas that have been harvested to supply the existing market demand for fresh fruit brunch but only operate with location permits.*

In parallel to the multidoor coordination arrangement, the Investigator from the Ministry of Environmental and Forestry (D-3-MinEAF) also indicated the necessity of multidisciplinary knowledge in tackling haze pollution:

*Investigator: the economic valuation for the lost benefit in the case of land/forest fires is needed because the burning creates fertile*

*land that is ready to be planted. In addition, the value of the ecological or recovery losses should use an economic valuation to avoid double counting and to increase data accuracy.*

In sum, this paper found that the obstacles that shape deterrence were not solely based on political implementation but also emerged from the implementation of administrative policies. The obstacles emanate from budgets and a lack of coordination among law enforcement officers and institutions. Law enforcement interventions involving the deployment of an investigation and prosecution in the case of land/forest fires need more support, especially in terms of financial resources, to avoid deterrence failure among violators. Previous studies have shown that a lack of sufficient financial resources for the enforcement of environmental regulations creates low deterrence (Sparrow, 2008 and Kagan *et al.*, 2003). Furthermore, the outcomes of the paper, which include a lack of coordination between law enforcement institutions in South Sumatra Province, extend the study by Budiningsih (2017). The chance of environmental policy violators being caught or punished is reduced by ineffective law enforcement coordination. Moreover, enforcement that creates deterrence is related to not only the severity of penalties but also the probability of detection as a crucial element that drives compliance (Cohen, 2000).

### **3.5 CONCLUSIONS**

Deterrence emanates from the probability of detection and the severity of sanctions. This paper investigates how insufficient power and law enforcement capacity could hamper and deter policies for tackling haze pollution. The paper uses in-depth interview analysis, a technique that

includes intensive individual interviews with a few respondents to elaborate on their perspectives, in the context of detecting possible risk deterrence issues. The in-depth interviews reveal that current regulatory enforcement is still limited in sending a strong signal about the punishment of intentional fire behavior.

Previous studies have been analyzed that the hard measures against substantial actor factors, the enforcement of diverse Fire Management Interventions, including sanctions, would be preferred as an effective solution. This paper is extending the results through analyzed in a more comprehensive view by considering deterrence from the perspective of law enforcement actors with the study areas of the Riau and South Sumatra Province. This paper is revealing the enforcement obstacles that hamper deterrence and create the persistence of haze pollution at South Sumatra and Riau Provinces. The average apprehension by Police is only 8.10 percent, with 4.41 percent punished burning area in Riau Province. Moreover, South Sumatra Province, the enforcement coverage, and monitoring are lower compared to Riau Province, 0.13 percent and 1.09 percent, respectively. The lack of special arrangements for environmental recovery costs and direct financial mechanisms for how fines are to be utilized has hampered the enforcement of deterrence. Moreover, the limited budget and lack of coordination of agencies indicate a low probability of being inspected. As a result, the benefit of noncompliance is relatively high, and noncompliance practice prevails.

There are many ways to strengthen regulatory enforcement policies, especially when dealing with substantial political influence. The establishment of policy regimes that include a fiscal policy for environmental management cannot be overlooked as a reference point for the best future solutions. The

ability to impose taxes to regulate pollution and generate revenue for the government should be considered, and an improved capacity can enhance the enforcement of haze pollution deterrence in Indonesia.

In the next chapter, this paper will be further investigating the actual environmental harm that has been internalized by criminal enforcement in the case of land/forest fire. Subsequently, enforcement of criminal offenses is seen as a last resort applied when the harm to society or the benefit to the offender is significant, and the probability of detection is low.



## CHAPTER 4

# CONTROLLING ENVIRONMENTAL HARM: ASSESSING CRIMINAL LAW ENFORCEMENT ON HAZE POLLUTION USING CONTENT ANALYSIS OF COURT DECISION

## CHAPTER 4

# CONTROLLING ENVIRONMENTAL HARM: ASSESSING CRIMINAL LAW ENFORCEMENT ON HAZE POLLUTION USING CONTENT ANALYSIS OF COURT DECISION

*As mentioned earlier in this paper, enforcement is a method of securing compliance with the policy. Enforcement with greater certainty of deterrence, severity, and clarity of punishment is more likely to drive people to comply with the law because they fear legal sanctions. This chapter will investigate the influence of the gravity of haze pollution as environmental harm on judicial sanctioning decisions in the case of land/forest fires. We adopt a novel approach to analyze judicial sanctioning decisions on criminal offenders based on different types of defendant occupations and burning site locations. By using a qualitative approach based on content analysis, we observe that the actual gravity of environmental harm does not consistently affect the pattern of judicial sentencing decisions. More specifically, the gravity of the judicial sanction imposed on the plantation company and its director and manager is less consistent with internalizing the harm caused by the offense. In contrast, in the case of the estate employee, laborer, and farmer/landowner, the judicial sanction is relatively consistent with the gravity of the environmental harm. Overall, judicial sanctioning decisions that are insensitive to the degree of the environmental harm that should be internalized underlie the persistent and devastating haze problem in Indonesia.*

## 4.1 INTRODUCTION

Land/forest fires in Indonesia have become a severe and prominent problem that represents a regional environmental crisis. The problem's devastating effects include transboundary haze pollution, with a Pollutant Standard Index greater than 2,000 in the Southeast Asian Region. In addition, haze pollution contributes to widespread respiratory infection and premature deaths (Hsu *et al.*, 2016). Indonesia is adopting command-and-control regulatory policies in addressing haze pollution (Varkkey, 2016). A regulatory or known as command-and-control is one of the policies in environmental management that includes legislative development, strategic planning, permitting, monitoring, inspection, enforcement, and reporting (Farmer, 2007). The previous chapter has examined various types of instruments in environmental policy, such as regulatory, voluntarism, market-based instruments, and information (for a detailed comparison, see Gunningham and Sinclair, 1999; Faure and Weishaar, 2012).

Despite adequate environmental policy regulations, the hotspot data suggest that burns have been and remain frequent and persistent pollution-causing events within Sumatra and Kalimantan. The persistence of haze pollution in Indonesia is due to a lack of enforcement by appropriate actors who could have exerted a lasting impact on the problem (Varkkey, 2016). For example, in the year 2000, two burners from South Sumatra, believed to have been hired by a plantation company (Varkkey, 2013), were sentenced to 20 months in prison for allegedly setting fire to concession lands (Saharjo *et al.*, 2003). In contrast, plantation companies are rarely prosecuted because they have cultivated strong patronage linkages with key figures in the ruling government elite who have shielded them from responsibility for their role in

causing environmental problems (Varkkey, 2013). Aligned with this background, the main aim of the paper is to analyze law enforcement concerning haze pollution, especially in the judicial system, adopting a qualitative approach. The aim is to understand the dimension of judicial decisions in relation to criminal enforcement and environmental harm.

To the best of our knowledge, most of the previous studies by economists have understood enforcement as a method of securing compliance with policy (e.g., Gray and Shimsack, 2011; Kagan *et al.*, 2003). However, in environmental policy, enforcement also requires ensuring that preventative action is taken to protect the environment and mete out appropriate sanctions for criminal offenses (Farmer, 2007). Enforcement of criminal offenses is seen as a last resort applied when the harm to society or the benefit to the offender is significant, and the probability of detection is low. Enforcement with greater certainty of deterrence, severity, and clarity of punishment is more likely to drive people to comply with the law because they fear legal sanctions (Zimring and Hawkins, 1973). Thus, stimuli (e.g., punishments and rewards) drive people to engage in or desist from crime (Becker, 1968). This assumption is based on logical choice models of crime whereby actors are generally rational such that social conditions can be manipulated to reduce crime (Cornish and Clarke, 2014).

Courts are critical elements in the enforcement of criminal law. They can impose stricter sanctions and punish noncompliance (Farmer, 2007). Moreover, a court in a judicial system acts as an independent arbiter of the interpretation and implementation of the law. A significant study on the frame of the common law and an economic viewpoint was performed to help understand judicial behavior (please see Spiller and Gely, 2007, in a US-based

overview; Monsieurs *et al.* 2009 in Belgian case). However, in the environmental offense context, there are limited studies that discuss the issue of enforcement from the perspective of the judicial system regarding the prosecution of environmental crime. One of the studies using an empirical method, Billiet *et al.*, (2014), analyzed the details of different judicial policy options and a path to the appellate court in the case of Flanders. The analysis determined that the sanctioning policies of judges varied and consisted of balancing environmental and criminal law, whereas penalties increased with the level of harm.

Furthermore, Fogel and Lipovsek (2013) performed an analysis of 29 legal cases filed in Ontario, Canada, between 2008 and 2012. They found that the court's decision to determine the ability of environmental crime evidence to overcome the challenges of the limited scientific evidence and expert testimony<sup>47</sup> in a trial is critical. Finally, White (2010) studied the development of the prosecution of environmental crime. Using socio-legal development case studies, this researcher observed that consistency in the sentencing of environmental offenses determines the deterrent effect of legislation. If the sanctions are perceived to be low, this will potentially weaken environmental law enforcement efforts.

Furthermore, although the limited body of theoretical research has developed exciting insight into judicial sanctioning decisions regarding environmental criminal violations, no study has explicitly investigated and provided a detailed analysis of defendants' occupation and offense locations.

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<sup>47</sup> In the Indonesia case, Art. 184 Law No. 8/1981 states that one type of legal evidence in a criminal court is expert testimony. The evidence verification of the expert testimony in trial will be necessary to elucidate the case (Art. 186 Law No. 8/1981).

Although this factor should not matter in principle, the analysis of Billiet and Rousseau (2011) showed that there are marked differences in sanctioning decisions across judicial districts. Referring to a previous study on inadequate law enforcement in discussing the background of haze pollution in Indonesia, the current study thus addresses the following question: *Are variations in judicial sanctioning decisions with respect to defendants and burning site locations influenced by the gravity of environmental harm in the land/forest fire case?*

The notion of harm in the context of this paper follows Brickey (2008), who perceived it as an axis connecting criminal conduct and the punitive sanction. The critical criminal environmental policy is the prevention of unjustifiable harm, given that the expected sanction is equal to the harm caused by the offender and that loss of wealth will provide adequate deterrence (Cohen, 1992; Polinsky and Shavel, 1994; Garoupa, 2001). Furthermore, the sanction should be affected by gravity consideration whereby certain conduct warrants more severe sanctions (Brickey, 2008).

There are several benefits of using court decisions to understand judicial sanctioning decisions within various contexts. First, courts constitute a public forum for a person with a just claim to bring evidence and have it heard and acted upon (Preston, 2016). Second, courts' decisions help us understand the dimension of law enforcement. Courts enforce the law made by the government and hold executives responsible for their decisions (Preston, 2016). Third, courts' decisions as the outputs of enforcing environmental laws provide feedback of clarity, certainty, predictability, and effectiveness regarding the actual implementation of the law (Preston, 2012). Fourth, courts' decisions contain reasoned arguments and explicitly exhibit

rationality and logical decision (Preston, 2016). The discussion on judicial sanction decisions in this chapter is fine and imprisonment in the case of land/forest fire.

This chapter is structured as follows. The next section presents an overview of domestic law and Indonesia's legal system. Next, the chapter will discuss content analysis and data collection. Then, the paper presents the analysis followed by research findings and a discussion. In the last section, the study's conclusions are presented.

## **4.2 OVERVIEW OF INDONESIA DOMESTIC LAW**

### 4.2.1 Indonesia Criminal Legislation

This part would be discussing the policy design related to the land/forest fire. The discussion will start with an overview of Indonesia's legislation construction, primarily related to criminal law. The standard ground for the separation of powers in the Indonesian government, known as the *Trias Politica*, is based on the 1945 Constitution, which distributes power between the legislative, executive, and judiciary branches. The Supreme Court and other general courts constitute the judicial branch, which carries judicial power and is an independent entity, along with the legislative and executive branches (Law No. 48/2009 on Judicial Power). The judicial power of the courts is to adjudicate criminal and civil cases according to the provisions of laws and regulations (Article 25, Law No. 48/2009).

*Kitab Undang-Undang Hukum Pidana* (KUHP), which is outlined in Law No. 1/1946, and *Kitab Undang-Undang Hukum Acara Pidana* (KUHPA), which is outlined in Law No. 8/1981, together constitute the Indonesian code of Criminal Law and Procedures. KUHPA defines law enforcement institutions as

essential components of the system comprising Police, Attorney General, Court, and Correctional Facilities/Prison. This paper follows the definition of 'defendant' stated in KUHP as a suspect prosecuted, investigated, and adjudicated in court (Article 1 (15), Law No.8/1981). Additionally, the criminal law should suspect a person who committed an act or was negligent based on initial evidence of a violation (Article 1 (14), Law No.8/1981).

Indonesia's criminal justice process encompasses three main stages. In the first stage, police authorities conduct an examination and investigation, as stated in Law No. 2/2002 on National Police. Furthermore, there is a predefined condition as start base for criminal justice process: a report of a crime (Article 1 (24), Law No.8/1981), a complaint of a crime (Article 1(25), Law No.8/1981), or a crime caught in action (Article 1 (19), Law No.8/1981). Then, the Attorney General, as a public prosecutor, triggers the next stage of the criminal justice process through the prosecutorial function, as stated in Law No.16/2004 on the Indonesian Attorney General. One of the primary functions of the public prosecutor is a completion on the file of a case and conducts an additional examination before it is passed by a court (Article 30, Law No. 16/2004). Moreover, the public prosecutor also prosecutes the case to the relevant court having jurisdiction over the matter. Law No. 8/1981 Article 143 (1) requires the prosecutor to prepare a letter of conviction, presenting the case at trial and for executing the sentence from the court decision.

Adjudication is the final stage of the criminal justice process that involves judicial action that determines matters equally and honestly based on prevailing laws and regulations. The panel of judges is appointed based on the case submitted by the prosecutor. Furthermore, the verification of

evidence in the court hearing serves as a basis for the judges to decide whether the defendant is guilty (Article 183, Law No. 8/1981). Criminal judges may shape the sanctioning policy based on facts proven in the court hearing. Article 191 (1) Law No. 8/1981 defines that the defendant will be released from punishment when no substantial evidence is underlying the crime presented in the courtroom, as stated as follows:

*If the court in it is of the opinion that from the results of the examination at the courtroom, the defendant's guilt for the actions committed against him was not legally and convincingly proven, then the defendant is given acquittal verdict.*

However, when the evidence is sufficient to prove the violation of the offense, then the judge will decide to impose the sanction on the defendant, as stated in Article 193 (1) Law No. 8/1981 as follows:

*If the court believes that the defendant is guilty of doing a criminal offense was indicted, then the court handed down the crime verdict.*

Based on the judicial decision, the prosecutor and the defendant or his lawyer have the right to appeal (Article 223, Law No.8/1981). The appeals shall not be subject to the decision of acquittal (*putusan bebas*) or the judgment of dismissal of all allegations (*putusan lepas dari segala tuntutan hukum*) (Article 67, Law No. 8/1981). A high court in the appeals and cassation process may overturn the judgment of all criminal cases other than those of the Supreme Court.

The element of court decision letter in the criminal verdict as stated in Article 197 (1) Law No. 8/1981 as follows:

- a. *The letterhead of the verdict is written: FOR JUSTICE BASED ON ALMIGHTY GOD (Demi Keadilan Berdasarkan Ketuhanan Yang Maha Esa);*
- b. *Full name, place of birth, age or date, gender, nationality, residence, religion, and occupation of the defendant;*
- c. *The indictment, as contained in the indictment;*
- d. *Concise considerations about facts and circumstance along with the evidentiary tools obtained from the examination at the courtroom which is the basis for determining the violation of the defendant;*
- e. *Criminal prosecution, as contained in the letter of prosecution;*
- f. *The statutory provisions which are the basis criminal sanctions or actions and articles of law and regulations which form the legal basis of the decision accompanied aggravating circumstances and alleviating the defendant;*
- g. *The day and date when the panel of judges convenes unless a single judge examines the case;*
- h. *Statement of the defendant's violation, the statement has been fulfilled all elements in the formulation of a crime are accompanied by the qualifications and penalties or actions imposed;*
- i. *Provision to whom the court fee is charged with stated the exact amount and provisions regarding evidence;*
- j. *Statement that all the letters turned out to be fake or statement where lies, if there is an authentic letter considered fake;*

- k. An order for the defendant to be imprisonment or remain in prison or to be released;*
- l. day and date of the decision, name of the public prosecutor, name of the judge who decides and names the secretary of the court;*

The decision letter is signed by the Judges and the court secretary immediately after the verdict is pronounced (Article 200, Law No. 8/1981).

#### 4.2.2 Domestic Law on Haze Pollution

The broader framework of legislation related to land/forest fires has adopted a zero-burning policy with disaster risk reduction and preventive and repressive approaches (Nurhidayah, 2013). Three major laws have been used to criminalize land burners in Indonesia. The first is Law No. 1/1946 on Criminal Law. An offender who intentionally causes a fire or explosion faces a minimum of 12 years and a maximum of 20 years imprisonment (Article 187). In the case of negligence, the offender faces a minimum of one year and up to five years of imprisonment (Article 188).

The second law is Environmental Management Law No. 23/1997, which was amended by Law No. 32/2009<sup>48</sup> on Environmental Protection Management. An offender who causes haze pollution in Indonesia and intentionally commits an action that violates the ambient standard also breaches the standards of environmental damage. It will be criminally prosecuted under the law. The offender punishment is a minimum of three

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<sup>48</sup> Undang-Undang No. 23/1997 sebagaimana terakhir diubah dengan Undang-Undang No. 32/2009 tentang Perlindungan dan Pengelolaan Lingkungan Hidup.

years and a maximum of 10 years imprisonment as well as a minimum fine of Rp3,000,000,000 and a maximum fine of Rp10,000,000,000 (Article 98). Furthermore, in the case of negligence (Article 99), the lowest sanction is one year, and the maximum is three years imprisonment; the minimum fine is Rp1,000,000,000 and the maximum Rp3,000,000,000.

In addition, Plantation Law No. 18/2004, which was amended and strengthened by Law No. 39/2014<sup>49</sup>, imposes criminal sanctions through severe fines and sentencing for burning opening plantations. The punishment on the offender who uses the burning method in opening/cultivation plantation land (Article 108) faces imprisonment for ten years and a maximum fine of Rp10,000,000,000.

## **4.3 METHODOLOGY**

### 4.3.1 Content Analysis Approach

We argue that in understand better-sanctioning decisions and determinant factors in evaluating the enforcement process, it is necessary to analyze and interpret court decisions in the case of land/forest fire using content analysis. Content analysis is one of the numerous research methods used to analyze text data. Content analysis is an empirically sound technique for making replicable and valid inferences from texts that follows an exploratory process (Krippendorff, 2012). The content analysis flexibility for classifying a comparative and standard material is a fundamental rationale for the paper's assertion that the method is a meaningful approach to analyze the enforcement process. Moreover, the content analysis also context-specific

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<sup>49</sup> Undang-Undang No. 39/2014 tentang Perkebunan.

in sharing interpretive orientation that is used in symbolic material requiring a degree of interpretation (Schreier, 2012). Furthermore, content analysis reliability is consistent and systematic, also transparent in the coding frame (Groebe and Rustemeyer, 1994).

We conducted a careful document analysis using a content analysis methodology. The data were collected from a court case directory available online from the Indonesian Supreme Court<sup>50</sup>. The analysis initially screened 2,826 court case decisions on criminal cases<sup>51</sup> related to environmental crimes in natural resources, environmental and plantations, and forestry. Due to the court data are vital determinant, we are identifying and selecting the data source that related to content to be analyzed with the selection process as follows:

1. We excluded unsettled court cases or ongoing cases without a legal verdict due to a lack of a judicial argument.
2. We were used several keywords to locate relevant cases within the initial data. Since the study primarily investigates haze pollution from land/forest fire, several keywords were used as follows: *asap dan*

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<sup>50</sup> Indonesia Supreme Court Database page <<https://putusan.mahkamahagung.go.id/>>, 10/27/2017 – 11/20/2017 referred.

<sup>51</sup> Case related special environmental crime involve in natural resources: 599 cases; special environmental crimes involve in plantation: 2,007 cases; special crime involves in forestry: 220 cases.

*bakar*<sup>52</sup> (haze and burning), *lahan dan hutan*<sup>53</sup> (land and forest), and *perkebunan*<sup>54</sup> (plantation).

Through a careful search, we selected 180 criminal cases that are closely related to the focus of this study.

Furthermore, we conducted an initial review of the court case content to determine the information available meets the objective of the investigations. The review process is as follows:

1. We drop the cases that had incomplete information needed to be analyzed using document protocol. For example, the case without information on the source of fire, reason for burning, letter of prosecution, expert testimony.
2. We drop the case that involved in multiple court decisions from the District Court to the Supreme Court<sup>55</sup>. We counted and analyzed only final court case decisions<sup>56</sup>.

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<sup>52</sup> In keywords *bakar* (burning), we were also using other words that have the same meaning as follows: *terbakar, kebakaran, pembakaran, membakar, dibakar, api* (fire).

<sup>53</sup> In keywords *lahan dan hutan* (land and forest), we were also including other word that have same meaning or related as follows: *tanah, areal, kehutanan, kayu* (wood), and *gambut* (peatland).

<sup>54</sup> In keywords *perkebunan* (plantation), the same with footnote No. 52 and No. 53, we also included other words as follows: *kebun, sago* (sago), *sawit* (palm oil), and *blok* (block).

<sup>55</sup> To fulfil a sense of justice, the judicial system in Indonesia is divided into two levels, the first level of tribunal (court in original jurisdiction) namely District Court in Municipal Level and appellate courts (courts with appellate jurisdiction), namely High Court in Provincial Level (Article 26, Law No. 2/1986 that had been amended by Law No.8/2004 and Law No. 49/2009 on General Tribunal). Moreover, Appellate court decisions can also be appealed to the Supreme Court by the parties concerned, unless the law determines otherwise (Article 23 and Article 26, Law No. 2/1986 that had been amended by Law No.8/2004 and Law No. 49/2009 on General Tribunal).

<sup>56</sup> In the law there are provisions governing the understanding of final decisions or decision that have permanent legal force (*inkracht van gewijsde*) relating to criminal cases, Article 2 (1) Law No. 22/2002 concerning Clemency which stated that:

In total, the analysis included 120 final cases within the period 2009-2016. In the paper, the observation period is the year when a court verdict is pronounced to the public by the judge in the courtroom.

#### 4.3.2 Court Decision Document Protocol

We developed a documented protocol prepared through content analysis using QRS Nvivo software. The software will support organizing and managing qualitative court decision data from the Indonesia Supreme Court database.

The analytical codebook protocol development starts with pilot codes to categorize the data and then formulate the variable. The underlying coding process in content analysis is to organize large quantities of text into smaller content categories (Weber, 1990). In this paper, the pilot variable code was follows Ozymy and Jarrel (2016). We developed five codes: Case Summary, Charges, and Statutes, Location of Offence, Sentencing Information, and Defendants, which merged from the variable of indictment and sentencing. Then, as we are going through highlighted the impact of environmental harm in the court decision document, the text or data was coded using predetermined code wherever possible. The data that could not be coded into one of the categories will be coded and identified also analyzed later to determine if they represent the analytical unit of an existing variable. The

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The definition of meant by "court decisions that have permanent legal force" are:

1. A court decision of the district court which is not appealed or appealed within the time determined by the Law on Criminal Procedure;
2. Appellate court decisions that are not appealed within the period determined by the Law on Criminal Procedure Law; or
3. Cassation decision.

detailed final code and analytical units of the codebook are presented in Table 4.1.

Once all documentation has been coded, we examined all the data within a strictly defined analytical unit for coding. The analysis explains a clear and concise definition of the analytical unit in the study on the coding sheet as a factor related to judicial enforcement. After that, the detailed codebook contents of the document were analyzed and categorized. The advantage of this approach in content analysis is that existing theory in enforcement can be extended further (Hsieh and Shanon, 2005).

**TABLE 4.1 Content Analysis - Analytical Codebook on Enforcement**

Code	Analytical Unit
Case Summary	The case summary defined to the source of fire (e.g., burning the wood, the grass, the tools to burn), reason of burning (e.g., opening palm oil plantation, paddy field, burning trash, clear the land), period of burning (when the burning started, e.g., the date, month and year).
Charges and Statutes	Statutes associated with Public Prosecutor Letter of Prosecution or <i>Requisitoir</i> (e.g., violation of environmental and criminal law; the proposed fines and imprisonment). Charges calculated by Expert Witness in the court ( <i>Saksi Ahli</i> ) related to Environmental Loss (e.g., carbon release, NOx, CO2, particle, the monetary unit of restoring the burning site)
Defendants	The background of defendants (farmer, landowners, the plantation company, director, estate manager, estate employee). Moreover, related legal action was taken by law enforcement (e.g., arrestment, detention)

Location of Offence	Detail location of offense (e.g., peatland, plantation company area, backyard, forest)
Sentencing Information	An aggravating factor in judge decision (e.g., environmental harm, health impact, third party's loss) and other forms under the term of <i>mengadili</i> (adjudicate) like fines and imprisonment.

Source: Frame adopted from Ozymy and Jarrel (2016) with improvement from Author.

## 4.4 FINDINGS

In this section, the paper presents the results of the investigation of judicial decisions regarding land/forest fire that created severe haze pollution in Indonesia using the predefined content analysis frame. First, we present the case summary that generally discusses the source of the fire and the reason for burning. Second, to capture the dimensions of judicial decisions in criminal enforcement and environmental harm, this relation is presented based on aggravating factors in judicial sanctions. Finally, we extend the investigation of judicial sanctioning decisions to the types of defendants and locations of burning sites.

### 4.4.1 Summary of Background of the Case

Previous studies and detail Chapter 1 have shown that the source of haze pollution is human-made burning (Wooster *et al.*, 2012). Court decisions confirm some of this finding and provide a detailed picture of how fire is initiated and intensified in a short period. In most cases, the defendants were using gasoline and grease to burn twigs, wood waste, and dry grass. One of the critical findings is that most of the burning is prepared well before the fire

is started. Twigs and grass are dried for two weeks to six months before the burning process. As a result, a fire mixed with wind and dry weather creates a severe short-term impact. According to court decisions, we find that most burnings occurred in September (23 percent), June (18 percent) and February (17 percent).

The reasons for burning are one of the most extensively studied areas. Studies of court decision documents reveal four main categories of reasons for burning: land clearing and tree replanting for a palm oil plantation (confirming previous studies, e.g., Lestari *et al.*, 2014; Vadrevu *et al.*, 2014); illegal logging in conservation areas; land clearing for other plantations or agricultural development (e.g., rubber, corn, paddy fields, pineapple, vegetation), thereby confirming Langner *et al.* (2007); and other reasons (e.g., family conflicts and indigenous people traditions).

#### 4.4.2 Criminal Court Sanction Decisions

Indonesian criminal law requires criminal judges to impose a sanction that is supported by at least two solid pieces of evidence and relies on a high level of certainty that convicted defendants are guilty of committing a crime (Article 183, Law No.8/1981). Moreover, in their decision, judges should explicitly describe the severity of the defendant's violations. The general findings of judicial sanctions in 120 court cases are as follows: not guilty (7 percent), guilty (90 percent), and other decisions (3 percent).

One of the best tools for achieving environmental compliance is adequate and consistent judicial enforcement to internalize the harm severity caused by the offense. However, determining the magnitude of the harm is not easy. Although the harm cannot be precisely quantified, the law provides

judges broad discretionary freedom in deciding on the level of the sanction in a criminal case<sup>57</sup>. The paper captures and investigates in detail the dimension of environmental harm presented in the courtroom and aggravating factors that judges consider in their verdict. The aggravating factor that will merit a harsh sentence is one crucial element in the defendant punishment determined by the court decision (Article 197 (f), Law No. 8/1981). Table 4.2 reports the case distribution of judicial sanctions based on environmental harm as an aggravating factor that influences the sentencing decision.

As shown in Table 4.2, there is an unusual pattern in which only 86 cases of a total of 120 cases in the dataset report environmental harm as an aggravating factor of the judicial decision. Furthermore, the same table also shows that only 38 cases of a total of 86 cases specifically present the ecological recovery cost<sup>58</sup> of environmental destruction in monetary units. Analyzing the details of court decisions on these 34 cases, it appears that

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<sup>57</sup> Article 4, Article 5 and Article 53 Law No. 48/2009 on Judicial Power (*Kekuasaan Kehakiman*).

<sup>58</sup> Environmental Ministry Decree No. 13/2011 that has been amended with Ministry Decree No. 7/2014, define the ecological recovery cost is the cost issued to restore the ecology in the original stage before the occurrence of the destruction. The decree defines the ecological recovery cost due to ecological damage is include as follows: (1) the cost of procuring substitute materials for damaged ecosystems (real costs); (2) revegetation costs; (3) reservoir construction costs; (4) nutrient recycling costs; (5) waste decomposition costs; (6) biodiversity costs; (7) genetic resource costs; (8) carbon release costs; and (9) carbon reduction costs.

In addition, Article 4 in Environmental Ministry Decree No. 13/2011 that has been amended with Ministry Decree No. 7/2014 also has been pointed out that the calculation of the losses is carried out by experts in field of Environmental Pollution and/or Damage; economic valuation of the environment. In the case of land/forest fire the environmental recovery cost were based on the testimony by the Expert Witness in court room that had been stated and comprised in court decision.

major aggravating factors are a public concern (19 cases), as are third parties' monetary loss (eight cases). In only a small proportion of the cases did judges identify aggravating factors as irresponsible actions, including not extinguishing the fire and being uncooperative during the trial.

In order to put criminal fines severity comparable between the case in the dimension of judicial decision, the paper is controlling the fire severity through differentiate the case with the burning area less than two hectares destruction and more or equal than two hectares<sup>59</sup> destructions (severe land/forest fire). For the criminal case with a burning area of fewer than two hectares, the mean fine<sup>60</sup> ranged from Rp119,684,211 for the case without identification of ecological recovery cost to Rp637,282,220 for the case with ecological recover cost. In an unexpected finding, the table presents that in the criminal case in which environmental harm does not serve as an aggravating factor, have a relatively high mean fine of Rp137,812,500 and the high maximum fine for Rp1.000.000.000 compare to other judicial decision.

However, this pattern is changing in the criminal case with burning are more or equal than two hectares. The lowest mean criminal fine is in the judicial sanction without environmental as aggravating factor for Rp667,805,556 ranged to Rp1,749,305,364 in the case of environmental harm

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<sup>59</sup> The two hectares boundaries are based on the explanation of Article 69 Law No. 32/2009 that stated "controlled fire" with firebreaks to prevent the spread of fire and destruction to the surrounding land area are maximum of two hectares per household. These boundaries are part of local wisdom in burning land to be planted with local varieties of plants.

<sup>60</sup> The mean fine is the average criminal fine calculated by adding the environmental criminal fine and then divided by the number of cases in judicial sanction criteria based on environmental harm as an aggravating factor.

as push factor with the availability of ecological recovery cost in the court decision. The maximum criminal fine was considerably higher compared to the burning area less than two hectares: Rp5,000,000,000 for non-aggravating factors, Rp6,000,000,000 for cases with environmental harm as aggravating factor and Rp8,773,718,002 for case the availability of ecological recovery cost. As noted above, there is some preliminary evidence that level criminal fine tends to be increased with the level of severity of land/forest fire.

**TABLE 4.2 Judicial Sanction Decision and Environmental Harm**

	Environmental Harm NOT as Aggravating Factor	Environmental Harm as Aggravating Factor	
		NO Identification of Ecological Recovery Cost	Case with Identification of Ecological Recovery Cost
Criminal Act No. 1/1946			
Article 187	9	4	2
Article 188	9	8	0
Environmental Protection Management Law No. 23/1997 Amended by Law No. 32/2009			
Article 98	8	6	14
Article 99	1	2	3
Plantation Law No. 18/2004 Amended by Law No. 39/2014			
Another Act	2	4	0
Total Number of Case	34	48	38

*Case with Burning Area < 2 Hectares*

Mean Criminal Fines (Rp)	137,812,500	119,684,211	637,282,220
Median Criminal Fines (Rp)	0	5,000,000	60,000,000
Maximum Criminal Fines (Rp)	1,000,000,000	1,000,000,000	3,000,000,000

*Case with Burning Area > 2 Hectares*

Mean Criminal Fines (Rp)	667,805,556	1,547,894,737	1,749,305,364
Median Criminal Fines (Rp)	0	1,000,000,000	1,250,000,000
Maximum Criminal Fines (Rp)	5,000,000,000	6,000,000,000	8,773,718,002

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Number of Individual Jailed	27	43	32
Average Prison Time (Year)	1.380	1.410	1.570

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Ratio Fine Multiple  
for 38 Cases with Identification of Ecological Recovery Cost

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	<i>Case with Burning Area &lt; 2 Hectares</i>	<i>Case with Burning Area &gt; 2 Hectares</i>	All Cases
Mean	0.917	0.443	0.630
Median	0.055	0.006	0.008
Overall	0.029	0.009	0.011

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Source: Author Calculation

Although this increase was shown for criminal fines, it is unclear whether the increase in fines parallels with the increase of environmental harm.

Another way to compare harms is to compute the relationship between monetary harm and criminal sanction for judicial cases in which

ecological recovery cost as monetary harm has been estimated. This relation is following Cohen's (1992) method to summarize the information by computing a fine multiple - the ratio between the fine in the case of ecological recovery costs to the ecological recovery cost as monetary environmental harm. The mean fine multiple in the paper is computed by the average from the ratio fine multiple every case with the identification of ecological recovery cost. Moreover, the term overall fine multiple is computed by the total imposed criminal sanction by the court divided the total ecological recovery cost as monetary harm.

Table 4.2 presents the relation for the 38 cases in which ecological recovery costs are identified; the mean fine multiple for all cases is 0.630, while the overall fine multiple for all cases is only 0.011 or only 1.1 percent of the ecological recovery cost. Moreover, as also shown in Table 4.2, the case with a burning area < 2 hectares relatively has a higher ratio fine multiple compared to the case with a burning area > 2 hectares. For 38 cases convicted, the overall fine multiple for case less than 2 hectare is 0.029, while the overall fine multiple for case more than 2 hectare is 0.009. That is, the defendant that punished in judicial sanctioning will only expect to pay a sanction of 2.9 percent and 0.9 percent, respectively, from harm as part of ecological recovery cost. As a result, the gravity of the environmental harm does not equal influence judicial sanctioning decisions across different cases.

#### 4.4.3 The Variation of Defendants in Judicial Sanction Decisions

In this section, we discuss environmental crimes from a comprehensive perspective of judicial sanctioning decisions by analyzing environmental harm with different types of defendants and locations of burning sites. Table 4.3

presents the distribution of the occupation of defendants<sup>61</sup> involved in committing burning; 69 were farmers/landowners, 23 worked in the private sector (plantation company – 4 cases, director – 4 cases, manager – 13 cases, estate employee – 2 cases), 16 were laborers, and 12 had other occupations.

As Table 4.3 interestingly shows, the plantation company and its director and manager were liable for the maximum and meant of the ecological recovery cost. The maximum ecological recovery cost imposed on the plantation company and its manager was Rp1,046,018,923,000, far exceeding that imposed on other types of defendants. Furthermore, the plantation company was liable for the highest mean ecological recovery cost, which reached Rp504,617,469,900. It appears that the plantation company committed severe violations that posed threats to the environment.

The robustness of the argument is also supported by the verdicts of these defendants, where the highest percentage of cases incurred measurable ecological recovery costs compared to other defendants. Although the plantation company and its manager were liable for the highest measurable ecological recovery cost, the maximum fine imposed on them was far less than that imposed on the estate employee and farmer/landowner.

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<sup>61</sup> A director is a person who leads business functions in the plantation company. A manager is a person who supervises the other staff in the plantation company. (e.g., Estate Manager, Estate Supervisor, Divisional Manager, Plantation Chief Assistant, Operational Manager). An estate employee is a staff person in the plantation company. A laborer is a person who works as a wage laborer and is paid for maintaining the oil palm tree; he/she is typically a landless farmer. A farmer/landowner is a person who cultivates palm oil plantations with land ownership.

Another interesting pattern that emerges is related to the fine multiple. The overall fine multiple for the plantation company and its director and manager were low compared to those incurred by other defendants. In the case of the plantation company, the overall fine multiple is 0.004. In other words, the plantation company was convicted in a case involving inestimable harm and was fined an amount that was equal only to approximately 0.400 percent of the ecological recovery cost.

**TABLE 4.3 Judicial Sanction Decision Based on Defendant Occupation**

	Plantation Company	Director Plantation Company	Manager Plantation Company	Estate Employee	Laborer	Farmer / Land Owner	Others (e.g., Gov't Officer; Teacher)
Maximum Criminal Fine (Rp)	3,000,000,000	5,000,000,000	3,000,000,000	8,773,718,000	3,000,000,000	6,000,000,000	3,000,000,000
<b>A. Number of Case with Fine</b>	<b>4</b>	<b>4</b>	<b>8</b>	<b>2</b>	<b>12</b>	<b>48</b>	<b>7</b>
Average Prison Time (Year)	N/A	2.417	2.416	1.500	1.250	1.417	1.333
Maximum Prison Time (Year)	N/A	4.000	4.000	2.000	3.000	5.000	3.500
<b>B. Number of Case only Imprisonment</b>	<b>N/A</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>19</b>	<b>5</b>
<b>C. Number of Case Convicted Not Guilty</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>0</b>
<b>Total Number of Case (A+B+C)</b>	<b>4</b>	<b>4</b>	<b>13</b>	<b>2</b>	<b>16</b>	<b>69</b>	<b>12</b>
<b>Case with Identification of Ecological Recovery Cost</b>							
Mean Ecological Recovery Cost (Rp)	504,617,469,900	204,810,050,933	408,069,716,733	8,773,718,002	2,068,630,924	4,156,056,645	9,402,095,876
Maximum Ecological Recovery Cost (Rp)	1,046,018,923,000	439,018,402,800	1,046,018,923,000	8,773,718,002	2,281,652,743	24,638,944,370	24,638,944,370
Number of Case	3	3	6	1	2	20	3
Ratio Fine Multiple							
Mean	0.008	0.003	0.005	1.000	0.003	2.130	0.635
Median	0.008	0.001	0.006	1.000	0.003	0.651	0.001
Overall	0.004	0.005	0.004	1.000	0.003	0.233	0.106

Source: Author Calculation

Regarding the estate employee, the judges imposed the highest maximum fine, although the mean and maximum of the ecological recovery cost were far less than those faced by other types of defendants. Furthermore, the analysis finds that the maximum fine equals the value of the measurable ecological recovery cost, with overall fine multiple ratios of 1.000.

Moreover, in a relatively similar pattern, the lengthiest imprisonment term, five years, imposed through a judicial sanction involved the farmer/landowner. The seriousness of judicial sanctioning on environmental harm was also reflected in the mean fine multiple, which was 2.130 for farmer/landowner. In other words, the mean compensating fine for farmer/landowner was equal to approximately 213 percent of the ecological recovery cost.

#### 4.4.4 The Variation of Locations in Judicial Sanction Decisions

In the next part, the analysis investigates judicial sanctions based on burning site locations in two significant islands. Table 4.4 distinguishes between defendants sentenced in Sumatra and those sentenced in Kalimantan. The paper's investigation on the enforcement of the Criminal and Environmental Act for haze pollution based on the burning site location will show the variation in judicial sanction decisions at the regional level as well as the possible influence of the environmental harm level.

As shown in Table 4.4, the number of cases in Sumatra, by comparison, is observed more higher than in Kalimantan. Moreover, the judges also impose a significantly higher sanction in Sumatra relative to Kalimantan. The average criminal fine imposed on defendants in Sumatra and Kalimantan is Rp1,172,379,596 and Rp605,452,381, respectively. The average prison time

also exhibits the same pattern, with a significantly higher in Sumatra than in Kalimantan. Furthermore, based on a detailed investigation, the paper finds that the most severe judicial sanction was imposed in Riau Province, Sumatra, with a fine of Rp8,773,718,000 and two years of imprisonment.

**TABLE 4.4 Judicial Sanctioning Decision Based on the Location of Environmental Offences**

	Sumatra Island	Kalimantan Island
Mean Criminal Fine (Rp)	1,172,379,596	605,452,381
Median Criminal Fine (Rp)	800,000,000	500,000
Maximum Criminal Fine (Rp)	8,773,718,000	5,000,000,000
<b>A. Number of Case with Fine</b>	<b>71</b>	<b>21</b>
Average Prison Time (Year)	1.500	0.833
Maximum Prison Time (Year)	4.000	5.000
<b>B. Number of Case only Imprisonment</b>	<b>20</b>	<b>0</b>
<b>C. Number of Case Convicted Not Guilty</b>	<b>5</b>	<b>3</b>
<b>Total Number of Case (A+B+C)</b>	<b>96</b>	<b>24</b>
<b>Case with Identification of Ecological Recovery Cost</b>		
Mean Ecological Recovery Cost (Rp)	115,558,894,299	192,984,214,275
Maximum Ecological Recovery Cost (Rp)	1,046,018,923,000	285,688,135,200
Number of Case	34	4
<b>Ratio Fine Multiple</b>		
Mean	1.200	0.008
Median	0.008	0.008
Overall	0.012	0.004

Source: Author Calculation

Similar to the observation regarding defendant types, further analysis will also examine the relationship between the severity of the harm of haze pollution and the judicial sanction based on the burning location. The data distribution shows that the number of verdicts for defendants and the measurable value of environmental harm is significantly higher in Sumatra than in Kalimantan. The maximum ecological recovery cost in Sumatra and Kalimantan is Rp1,046,018,9123,000 and Rp285,688,135,200. Moreover, the mean fine multiple for the convicted defendant in Sumatra was 1.200. Unlike the mean multiple, the overall ratio is only 0.012. Hence, this ratio suggests even though the majority of the judicial sanction is equal to the measurable environmental harm from the offense, several cases causing harm and receive sanction much less than the value of the harm. Hence, it is interesting to note that the gravity of measurable environmental harm in Sumatra was generally consistent with the judicial sanction.

#### **4.5 DISCUSSION**

The analysis and findings presented in the previous section provide a unique view of the judicial policy developed by criminal courts in Indonesia concerning the sanction of land/forest fires that create severe haze pollution as part of the enforcement of environmental crimes. Following Billiet *et al.* (2014), who noted that the severity of the sanction is expected to internalize the harm caused by the environmental offense, the paper's analysis finds evidence that the determinate factor in judicial sanctioning decisions and the seriousness of sentencing is inconsistent. In most of the cases, the aggravating factor in a judge's decision is the environmental impact of the land/forest burning. Surprisingly, as shown in Table 4.2, in 38 cases, did the

verdict identify the detailed financial harm in the form of ecological recovery costs. Furthermore, the sentencing pattern for all cases is not consistently influenced by the actual gravity of environmental harm. As another insight into the case sentencing pattern, only in case number 27/Pid.Sus/2015<sup>62</sup> did the judge impose an additional sanction in the verdict that required defendants within one year to improve the fire prevention and mitigation system under the supervision of the Regional Environmental Impact Agency. The analysis suggests that the severity of environmental harm is not necessarily positively related to a higher judicial sanction. The judge mostly considers the environmental impact of land/forest fire as an aggravating factor in his or her judicial sanction without recognizing the core value of the harm and with little reflection on the gravity of the decision.

Inspecting the relationship between the gravity of the environmental harm and the judicial sanction was given the variations in defendant occupations suggests that the sentencing patterns are also skewed, at least to a certain extent, and are less consistent with the goal of internalizing the harm caused by the offense. The paper presents a detailed ecological recovery cost breakdown as a function of different types of defendants. By establishing the seriousness of the environmental harm, we find that the plantation company and its director and manager were liable for most of the ecological recovery costs.

We expected that judges would impose a sanction based on the seriousness of the destruction caused by the defendants. The paper observes

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<sup>62</sup> The case No.27/Pid.Sus/2015; in this case, the defendant is a plantation company (PT. NSP). The reason for burning is land clearing for the plantation. The burning area is in Riau Province. The judge decision on 01 June 2015 is guilty as charged.

that the plantation company and its director and manager were subject to severe sentences equal to the mean and median of the fine and imprisonment terms. However, the treatment of the plantation company and its director and manager exhibited the weakest relation between the gravity of the environmental harm and the fine imposed based on the mean fine multiple. Furthermore, the manager was also the highest defendant in the judicial line convicted, not guilty. Moreover, somewhat unexpectedly, the analysis finds that there are cases with an "outlier" judicial sanction imposing a fine less than 100 million. One of the detailed punishment patterns is found in case number 1266.K/Pid.Sus/2014<sup>63</sup>. This case, involving a director as a defendant, presented the court substantial evidence that before the fire, the defendants had received a warning letter from the Regional Environmental Impact Management Agency in Riau Province requiring them to improve the standard of their operating procedures and their company resources to address the risk of burning in the plantation. The defendants' disobedience resulted in an uncontrollable fire that caused an ecological recovery cost of approximately Rp87,705,875,000. Regardless of the defendants' disobedience and the seriousness of the environmental harm presented to the court, the defendants' punishment consisted of a fine of Rp100,000,000 (far less than the ecological recovery cost) and an imprisonment term of one year. Based on this example, although proof was presented in the courtroom that the director "knowingly" engaged in prohibited conduct, the judicial sanction failed to internalize the harm. One possible explanation for this decision is

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<sup>63</sup> The case No. 1266.K/Pid.Sus/2014; in this case, the defendant is the director of a plantation company (PT. MAL). The burning area is in Riau Province. The reason for burning in the verdict is land clearing for a palm oil plantation. The judge decision on 05-03-2015 is guilty as charged.

that the court, aware of the uncertain legal standard relating to the requirement of "knowingly violates," may have been relatively lenient on the defendants who contested the criminal charge.

However, although the gravity of the environmental harm was relatively low in the case of the estate employee and farmer/landowner, the highest maximum fine and imprisonment reported were imposed on them. Furthermore, interestingly, the mean fine multiple of those defendants is higher, reflecting the gravity of the environmental harm. For further insight, the paper investigates in detail a case with a maximum fine in the judicial sanctioning decision. In case number 212/Pid.Sus/2014<sup>64</sup>, the burning site was in the concession area of PT RPI (the plantation company). In this case, the defendants claimed to have conducted land clearing outside the company's plantation concession. The seriousness of the environmental harm was reflected in the ecological recovery cost, which amounted to Rp7,510,220,200, aligned with the judge imposing on the laborer a severe fine of Rp3,000,000,000 and an imprisonment term of three years. It is noteworthy that the judicial sanction regarding the environmental violations was not in line with the signature pattern, especially when compared to other individuals of the same type as the defendants who committed similar violations. This treatment is explained by the fact that in this case, the defendants were burning land/forest on or near a company plantation concession area. This suggests a trade-off between judicial sanctions and a robust possible

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<sup>64</sup> The case No. 212/Pid.Sus/2014; in this case, the defendant is a farmer/landowner. The reason for burning is an order from the landlord to clear land for the plantation. The burning area is Riau Province. The judge decision on 22-10-2014 is guilty as charged.

influence by a corporate entity, leaving out consideration of the internalization of the environmental harm.

The final major issue is the variation of judicial sanction decisions based on the burning site location. The data show that law enforcement in Sumatra is significantly higher than that in Kalimantan. Together with the higher mean fine multiple, this variation in Sumatra can be explained by the fact that pressure from organized public interest groups (e.g., Greenpeace, 2017) has been increasing public awareness on the devastating environmental conditions caused by unsustainable palm oil plantations. The effect of greater haze pollution concerns among the public is urging an increase in governmental efforts to prosecute actors who engage in environmental violations. The uneven judicial sanction decision pattern between Sumatra and Kalimantan complements the picture of law enforcement patterns based on variations in burning sites.

All in all, the judicial process is critical for the implementation and enforcement of environmental law; however, this system will only work if judicial sanctions are sufficiently robust so that economic agents wish to avoid them (Farmer, 2007). Due to the general failure to internalize environmental harms, especially those related to land/forest fires, the sanction fails to repair the harm caused by offenders and to deter future noncompliance. Under the current enforcement policies, the plantation company and its director and manager perceive the low risk of criminal prosecution and the possibility of being subject to minimal fines as the cost of doing business.

Hameiri and Jones (2013) through the study, found that local policymakers and the prosecutor will tend to side with plantation companies

as ways to bring development also continued support for the community. Additionally, Varkkey (2016) has been found that the patronage system within the palm oil sector would not necessarily make the government decisions based on what rational at the level of society but would benefit the well-connected minority. Therefore, well-connected companies are able to continue to use fire as a cost-efficient way to clear land while disregarding environmental implications. Hence the role of cultural patronage instrumentally will be weakening state capacity to implement effective policies to prevent and mitigate land/forest fires and haze pollution. The higher level of corruption will reduce, systematically, the quality of environmental policy (Damania *et al.*, 2003; Het *et al.*, 2007). It is essential, therefore, that the judiciary understands the environmental problem and takes the issue more seriously. The current practices thus fail to take affirmative steps to prevent harm to the environment.

#### **4.6 CONCLUSION**

Land/forest fires have hampered the environment through haze pollution over the last three decades in Indonesia and Southeast Asia. Given the failure of the current enforcement policy to tackle the issue, criminal law enforcement is a last resort to address it, providing greater certainty of deterrence, severity, and celerity of punishment and thereby constituting a preferred policy choice. The paper uses a content analysis approach that has painted an exciting picture and provided insights into judicial sanctioning decisions with detailed variations in the defendant and burning location types.

The analysis in this study indicates that Indonesia's judicial sanctioning decisions in cases of land/forest fires diverge from the pattern suggested in the law and economics literature. The actual gravity of environmental harm does not consistently influence the sentencing pattern for all cases. The overall fine multiple is 0.011, or in other words, the convicted case involving land/forest fire was fined an amount that only equally to 1.1 percent of the ecological recovery cost. Judges mostly consider the environmental impact of land/forest fire as aggravating factors in their judicial sanction decisions without identifying the core value of the harm and reflecting it in the gravity of their sanction decision; thus, they do not adhere to the goals of environmental law.

The current study also has been developed a unique view of judicial sanctioning decisions in Indonesia criminal courts. In particular, the gravity of the judicial sanctions imposed on the plantation company and its director and manager is less consistent with internalizing the harm caused by the offense. This finding is supported by the fact that although defendants had a relatively high mean and median fine, the mean fine multiple is low and is inconsistent in specific cases; additionally, it accounted for most, not guilty sentences. On the other hand, in the case of the estate employee, laborer and farmer/landowner, the judicial sanction generally reflected the gravity of the environmental harm. In that case, the judicial sanction decision was set at the maximum fine for environmental severe harm violations. With respect to the burning site location factor in two islands, we find that the judicial sanction policy in Sumatra is more stringent and more reflective of the level of the environmental harm compared to Kalimantan.

To conclude, the current rigid policy does not always lead to higher levels of deterrence and is ineffective in internalizing environmental harm. The paper results are verified by the facts we provide on a general description of cases as well as case specifics. Finally, because this study only discusses judicial sanctioning decisions in criminal courts, additional studies on enforcement considering mixed policy enforcement, influencing the monitoring and enforcement inland/forest fires would be useful comprehensively resolving the problem. Taking this into account, the next chapter will carefully investigate tax policies that influence environmental management during the implementation stage of the law enforcement process as part of mixed policy instruments for land/forest fires that create persistent haze pollution in Indonesia.



## **CHAPTER 5**

# **FISCAL CAPACITY AND REGULATORY ENFORCEMENT ACTION ON HAZE POLLUTION: EMPIRICAL EVIDENCE FROM INDONESIA**

## CHAPTER 5

# FISCAL CAPACITY AND REGULATORY ENFORCEMENT ACTION ON HAZE POLLUTION: EMPIRICAL EVIDENCE FROM INDONESIA

*Haze pollution in Indonesia is a harmful environmental crisis in the Southeast Asian region. This paper investigates the impact of fiscal capacity in the context of a mixed policy instrument on haze pollution. By considering fiscal capacity, this paper provides an empirical analysis whereby tax enforcement may coexist and may complement environmental regulatory action. In the first finding, the paper observes evidence that an increase of 1-unit in fines as a share of GRDP imposed by the court decreased hotspot development by approximately 0.217 units. In the main finding, an increase of 1-unit Fines as a share of GRDP will reduce the Hotspot development as the Tax Enforcement on identified tax evasion as a share of GRDP increases by 1-unit. Furthermore, this paper demonstrates that environmental regulatory action capacity should not be approached as a single policy due to the growing complexity of land/forest fires.*

### 5.1 INTRODUCTION

The Indonesian government has enacted stringent environmental laws over the past several years to address land/forest fires that create severe haze

pollution in the region. Haze pollution is defined as sufficient smoke, dust, moisture, and vapor suspended in the air to impair visibility (ASEAN Secretariat, 2008). However, the current responses to land/forest fires are not sufficiently comprehensive to address the risk of severe haze episodes in the future (Mudiyarso *et al.*, 2004). Moreover, even under strict policies, the persistent problem of haze pollution remains due to a lack of enforcement by the appropriate regulator to address the problem (Varkkey, 2016). The fire<sup>65</sup> in 2012–2016 produced 47,519 Mt of CO<sub>2</sub>, 8,809 Mt of particulate matter, and 108,104 Mt of CO.

Focusing on the minimization of haze pollution, this paper primarily aims to investigate the effect of Indonesia's regulatory enforcement capacity on the land/forest fires, which create substantial emission in the southeast Asian region. According to Gajduscheck (2015), regulatory enforcement capacity is defined as the ability of regulatory agencies to deter potential externalities. Furthermore, the main approach in the regulatory enforcement model is based on a logical and rational choice of the regulated person and the stimuli that will drive people to engage in or desist from crime (Becker, 1968).

The previous literature, pioneered by Stigler (1971), which analyzes government regulatory enforcement capacity, has been extensively studied. Please see, e.g., Gray and Shimshack (2011). The optimal level of the pivotal role of regulatory action in monitoring and enforcement is undoubtedly the most challenging question in this field of study. Laboratory research designs

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<sup>65</sup> Verdict Data <<https://putusan.mahkamahagung.go.id/>>, 10/27/2017 – 11/20/2017 referred.

and empirical analyses using air pollution data have shown that interaction with greater enforcement and predicted inspections are critical elements in increasing compliance (Deily and Gray, 2007; Shadbegian and Gray, 2005). Empirical analysis by Lim (2016) on the effect of monitoring and enforcement by the US Environmental Protection Agency on criteria pollutants (NO<sub>x</sub>) indicates that sanctions have a robust deterrence impact on emission, where NO<sub>x</sub> concentrations decline as sanction increase. The study also shows that different regulatory actions can have different impacts in different contexts and that the regulator should develop country-specific regulatory strategies to overcome externalities. As a result, no single model is universally applicable to all enforcement policies.

Environmental policy interactions with the fiscal system fundamentally influence the cost-effectiveness of addressing climate change and meeting other social objectives (Goulder, 2013). In the fiscal system context, limited studies are discussing the issue of current regular tax (e.g., income tax, value-added tax, personal income tax, land, and building tax) policy from the perspective of mixed policy in addressing externalities.

Besley *et al.* (2013) analyzed a dynamic approach to the investment of state capacity. They found that low fiscal capacity in supporting a state arises from the combination of a lack of institutional cohesivity and political instability. Fiscal capacity represents the state's ability to raise taxes and monitor tax compliance. Additionally, the paper suggests that a secure budget base is essential for government policy implementation on the ground. A fiscal capacity interaction with regulatory action will magnify the deterrence of monitoring and the enforcement capacity. The findings of the paper undoubtedly reveal that there are potential needs for a mixed policy

model in comprehending the regulatory enforcement action capacity for addressing environmental externality issues. The combination of economic policy and liability rules is an optimal and efficient policy in controlling environmental externalities (Gunningham and Grabosky, 1999).

Based on existing studies of regulatory action, this paper extends the Lim (2016) model while considering that of Besley *et al.* (2013). They found that including tax policy as a fiscal capacity revenue source increased regulatory action capacity. There are no previous studies on environmental policies in which regulatory action considers taxation's role in enhancing fiscal capacity in addressing pollution. This broad-based policy instrument is essential for optimal regulatory action to function efficiently and equitably, especially in Indonesia's case. This paper also contributes to the field by analyzing the dependent variable using hotspots as an indicator of active fire as a source of emissions that cause ozone and particulate matter (PM) pollution. As a result, the set of emission sources is broader than those in most previous studies.

A hotspot<sup>66</sup> is a term to describe a location with an active fire that releases high temperatures (radiation), as captured by a satellite thermal detector, and sent to a receiving station. Hotspot parameter data were derived from NOAA-18/19 NASA satellite imagery acquired during the haze period.

Referring to the previous study on regulatory enforcement policy that has been ineffective in addressing haze pollution, this paper addresses the

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<sup>66</sup> ASEAN Specialized Meteorological Centre data page <<http://asmc.asean.org/asmc-hotspot/>>, 07/08/2017 referred.

following question: *What is the impact of fiscal capacity on mixed regulatory action regarding hotspot development, which creates haze pollution in Sumatra and Kalimantan?*

## **5.2 INDONESIA FISCAL CAPACITY**

Fiscal policy has a central role in mobilizing fiscal capacity to promote growth and in managing a sustainable macroeconomy through strengthening the allocation, distribution, and stabilization function. Hence, the potential ability of the government to raise the revenue would be an important factor to increase the regulatory capacity in addressing land/forest fires.

Indonesia's fiscal policy is based on the constitution, specifically, Article 23 paragraph (1) of the 1945 Constitution of the Republic of Indonesia. The President, as the head of state, holds the power to manage state finances as part of a government authority. As the President's assistant in the financial sector, the Minister of Finance is essentially the Chief Financial Officer (CFO) of the government of the Republic of Indonesia. Article 2 (a) Law No. 17/2003<sup>67</sup> on States Finances describes the power of finance as follows:

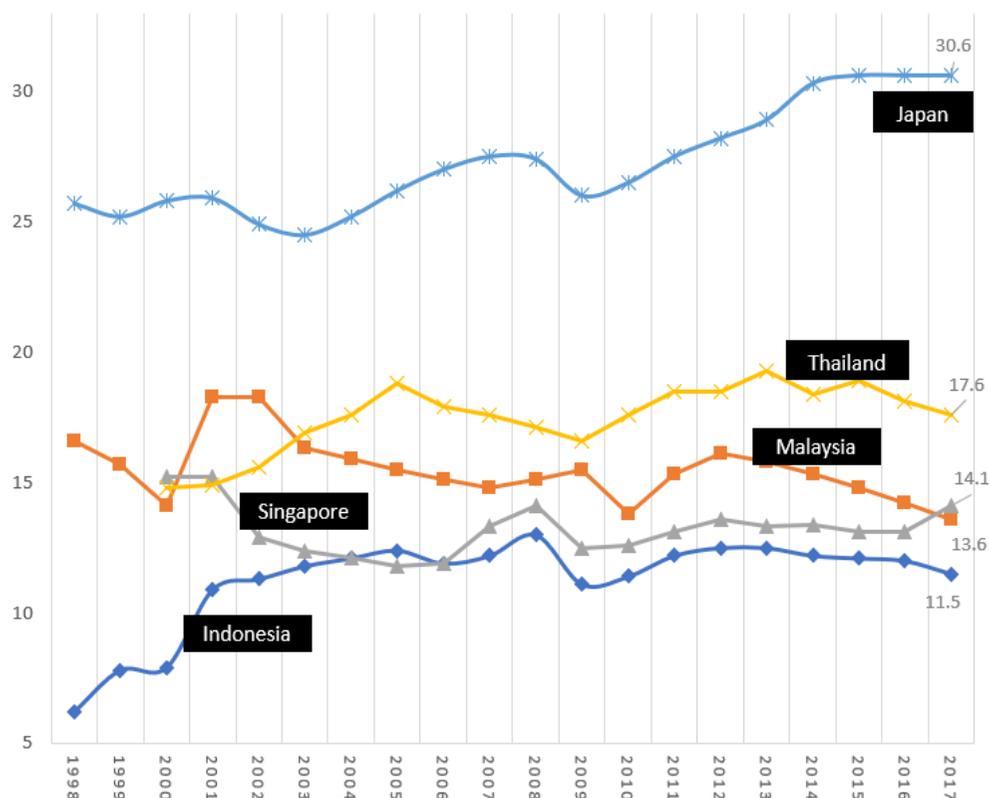
*The right of the state to collect taxes, issue and circulate money, and make loans.*

Indonesia's state fiscal capacity is carried out through the policy in collecting the revenues. Therefore, an increase in government revenue from taxes will increase policy output through the effect of government spending. The Indonesia tax-to-GDP ratio shows a relative stagnation pattern from 2010

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<sup>67</sup> Undang-Undang No. 17 Tahun 2003 tentang Keuangan Negara.

until 2017 compared to neighboring economies. Please refer to Figure 5.1. Indonesia's tax-to-GDP ratio in 2017 has the lowest ratio, only reaching 11.5 percent compared to Thailand, which reaches 17.6 percent. Moreover, the developed countries have greater comparable percentages; e.g., in Japan, the tax revenue generated reached 30 percent of GDP in 2017.



Notes: Tax to GDP Ratio = (Tax Revenue in national currency / GDP) \*100

**FIGURE 5.1 Cross-Country Comparison of Tax Ratio (1998–2017)**

Source: OECD Revenue Statistical – Asian and Pacific Economies Data and Author Calculation

Fiscal analysis has shown that this trend is critical and involves actively broadening the tax base; in the framework of the Sustainable Development Goals, the country's ability to mobilize revenue has a central role (Addison *et al.*, 2018). In the next section, the paper will present the empirical research design of regulatory action on haze pollution in Indonesia.

### 5.3 METHODOLOGY

#### 5.3.1 Empirical Research Design

Monitoring and enforcement data are analyzed using panel data, similar to the approach employed by Lim (2016). That analysis overcame reverse causality by including a wide range of control variables, such as gross regional domestic product (GRDP) growth (e.g., Magat and Viscusi, 1990). This paper uses a fixed effect in controlling heterogeneity across the province and thus relies on differences within facilities across time for identification. The fixed effect has been used as a method to account for reverse causality; e.g., please refer to Shimshack and Ward, 2008, and Lim, 2016. The model is represented by the following:

$$y_{it} = \text{Regulatory Action}_{it} \beta + \alpha_i + X_{it}\gamma + \delta_t + u_{it} \quad (1)$$

Since the paper has multiple observations for each province, running the base model of regressions would be shown as follows:

$$\begin{aligned}
Hotspot_{it} = & \beta_0 + \beta_1 Fine_{it} + \beta_2 Imprisonment_{it} \\
& + \beta_3 LN\_BudgetCentral_{it} \\
& + \beta_4 LN\_BudgetLocal_{it} + \beta_5 LN\_TaxRevenue_{it} \\
& + \beta_6 NumberTaxpayers_{it} \\
& + \beta_7 TaxEnforcement_{it} + \gamma_1 GRDP_{it} \\
& + \gamma_2 Crime_{it} + \gamma_3 Rainfall_{it} + \alpha_i + \delta_2 Yr2013 \\
& + \delta_3 Yr2014 + \delta_4 Yr2015 + \delta_5 Yr2016 + u_{it}
\end{aligned} \tag{2}$$

Due to the important policy implementation in comprehending the regulatory enforcement action, the model includes interaction terms as follows:

1. Adding interaction terms between Fine (Environmental Enforcement) and Budget Local Government (Resources Assigned Capacity in Monitoring).

$$\begin{aligned}
Hotspot_{it} = & \beta_0 + \beta_1 Fine_{it} + \beta_2 Imprisonment_{it} \\
& + \beta_3 LN\_BudgetCentral_{it} + \beta_4 LN\_BudgetLocal_{it} \\
& + \beta_5 LN\_TaxRevenue_{it} + \beta_6 NumberTaxpayers_{it} \\
& + \beta_7 TaxEnforcement_{it} \\
& + \beta_8 Fine_{it} LN\_BudgetLocal_{it} + \gamma_1 GRDP_{it} \\
& + \gamma_2 Crime_{it} + \gamma_3 Rainfall_{it} + \alpha_i + \delta_2 Yr2013 \\
& + \delta_3 Yr2014 + \delta_4 Yr2015 + \delta_5 Yr2016 + u_{it}
\end{aligned} \tag{3}$$

2. Adding interaction terms between Fine (Environmental Enforcement) and Tax Enforcement (Fiscal Capacity).

$$\begin{aligned}
Hotspot_{it} = & \beta_0 + \beta_1 Fine_{it} + \beta_2 Imprisonment_{it} \\
& + \beta_3 LN\_BudgetCentral_{it} \\
& + \beta_4 LN\_BudgetLocal_{it} \\
& + \beta_5 LN\_TaxRevenue_{it} \\
& + \beta_6 NumberTaxpayers_{it} \\
& + \beta_7 TaxEnforcement_{it} \tag{4} \\
& + \beta_9 Fine_{it} TaxEnforcement_{it} \\
& + \gamma_1 GRDP_{it} + \gamma_2 Crime_{it} + \gamma_3 Rainfall_{it} + \alpha_i \\
& + \delta_2 Yr2013 + \delta_3 Yr2014 + \delta_4 Yr2015 \\
& + \delta_5 Yr2016 + u_{it}
\end{aligned}$$

The value of the hotspot in the burning area  $i$  in year  $t$  is represented by  $Hotspot_{it}$ . The time-invariant provincial fixed effect characteristic of the province is captured by  $\alpha_i$ .  $\delta_t$  estimates the common change/difference (to all provinces) in the hotspot density as  $km^2$  from the provincial area in year  $t$  relative to the year 2012. Yr2013, Yr2014, Yr2015, and Yr2016 are indicator variables for the year 2013 to the year 2016. Another control variable  $X_{it}$  varying at the province level controls for the change in hotspots unrelated to regulatory action. The  $\beta$  is the estimated regulatory action on the hotspots controlling for province-specific time-

invariant characteristics and yearly specific effects. Furthermore, in this paper, the mixed regulatory action capacity is expected to reduce the number of hotspots; thus, the coefficient of the regulatory variable is expected to be negative.

### 5.3.2 Selection of Provincial Area

There were 34 provinces in Indonesia during the period of observation, but 80 percent of the sources of the fires that created severe haze pollution in the region only come from 14 provinces in Sumatra and Kalimantan Islands (Yulianti and Hayasaka, 2013). The high intensity of fires in the 14 provinces closely relate to the rate of degradation and conversion of forests and tropical peatlands. The 2012-2016 land cover<sup>68</sup> quality index (*Indeks Kualitas Tutupan Lahan*) average ratio for both islands is among the highest degraded in Indonesia, with -1.39 points for Sumatra Island and -1.46 points for Kalimantan Island. Table 5.1 presents the ratio calculation.

Previous studies have shown that aggressive human-made burning practices to clear and convert the land for palm oil plantations, especially in peatland, are a driving factor for haze pollution (Gaveau *et al.*, 2014; Lestari *et*

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<sup>68</sup> The land cover describes the condition of the land surface appearance physically, both natural appearance in the form of vegetation and man-made appearance. The quality of land cover is currently measured based on the presence of forests as an important component in the ecosystem. In addition to functioning as a guardian of water management, forests also have the function of preventing soil erosion, regulating the climate and growing areas of various germplasm that are very valuable for the advancement of science and technology. The state of land cover in Indonesia is obtained from the interpretation, classified as forested area and non-forested area, of Landsat 8 OLI satellite imagery. The index calculation please refer to footnote number 33.

*al.*, 2014). The fires on the peat soil area easily spread out of control and can become challenging to extinguish.

**TABLE 5.1 Land Cover Quality Index in Indonesia Major Island**

Island	Average Provincial Land Cover Quality Index					Change 2016 - 2012
	2012	2013	2014	2015	2016	
Sumatera	49.83	49.37	49.44	49.15	48.44	-1.39
Kalimantan	64.13	63.42	63.43	63.40	62.67	-1.46
Sulawesi	68.38	68.19	68.11	68.02	67.85	-0.54
Papua	98.54	98.47	98.40	98.41	98.45	-0.09
Indonesia	58.54	58.28	58.21	58.07	57.64	-0.89

*Source:* Ministry of Environmental and Forestry

The average speed for a surface peat fire (at a depth of 0-20 cm) was 92 cm per day and in deep peat (at a depth of 20-50 cm) was 29 cm per day (Usup *et al.*, 2004). Heil (2007) demonstrates that fires in peat deposits predominate overall emission production by fires in Indonesia, contributing an estimated 58 percent of the total amount of carbon, 78 percent carbon monoxide, and 88 percent total particulate matter released throughout 1960 to 2006. The study highlights that the emission inventories of fire activity in Indonesia and related emission production are large. Thus, peat fires in Indonesia may influence the interannual budget of climatically and atmospherically active trace species globally. Based on those studies and the importance of maintaining a sustainable peatland area, the paper selected the

province in Indonesia with the highest peatland area to investigate regulatory enforcement capacity in preventing the land/forest fires. The provincial peatland area and hotspot occurrence in the three major islands is presented in Table 5.2. The higher hotspot occurrence in 2012–2017 was observed within a provincial area that has a large peatland ecosystem area.

**TABLE 5.2 Peatland Ecosystem and Hotspot in Provincial Area**

Province	Hotspot Occurrence (2012 – 2017)	Peatland Ecosystem Area	
		Hectare	Percentage
<b>Sumatra Island</b>		<b>9,179,066</b>	<b>37.90</b>
Riau	16,588	5,042,561	20.82
South Sumatra	15,154	1,955,103	8.07
Jambi	6,649	1,053,910	4.35
North Sumatra	3,599	408,168	1.69
Bangka Belitung	2,993	98,517	0.41
Lampung	2,680	97,786	0.40
Aceh	2,572	339,282	1.40
West Sumatra	1,737	158,356	0.65
Bengkulu	669	8,943	0.04
Kepri	279	16,437	0.07
<b>Kalimantan Island</b>		<b>8,408,163</b>	<b>34.72</b>
West Kalimantan	19,440	2,817,262	11.63
Central Kalimantan	16,416	4,598,745	18.99
East and North Kalimantan	8,765	693,396	2.86
South Kalimantan	4,388	298,758	1.23
<b>Papua Island</b>		<b>6,571,094</b>	<b>27.13</b>
<b>INDONESIA</b>		<b>24,218,491</b>	<b>100.00</b>

Source: Ministry of Environmental and Forestry Decree No. SK.130/MENLHK/SETJEN/PKL.0/2/2017

### 5.3.3 Variable Measures and Data Sources

This study was conducted using various data on regulatory actions. The period of this study is 2012–2016. The dependent variables in the analysis are the number of hotspots, as proxies of air pollution that primarily arise from human interventions. The variable is measured by the density of hotspots in km<sup>2</sup> of the provincial area. The hotspot data are from NOAA<sup>69</sup> 18/19 satellite imagery reported in Environmental and Forestry Statistics from the Indonesia Ministry of Environment and Forestry. A hotspot is one of the most effective tools used by the Indonesian government in detecting land/forest fires in large areas by using remote sensing satellites. LAPAN<sup>70</sup> and the Ministry of Environment and Forestry used NOAA-AVHRR (Advanced Very High-Resolution Radiometer) data with spatial resolution of 1.1 km for their fire monitoring activities and research (Thoha, 2008). Ratnasari (2000) stated that NOAA would provide reliable data hotspots as an indicator for crown fire, surface fire, and ground fire.

Even though hotspots are an indication of fire, not all hotspot information indicates fire, and vice versa due to interference with or limitations on the satellite data hotspot recorder. Therefore, field checking a hotspot is necessary to check directly on the data to confirm the occurrence of land/forest fires (Vetrita and Harjani, 2012). Ministry of Environmental and Forestry Decree No. P.8/MENLHK/SETJEN/KUM.1/3/2018 has been providing the field checking procedures through visual confirmation of hotspots in the case of land/forest fires. As a result, it can be argued that the paper employs

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<sup>69</sup> NOAA is National Oceanic and Atmospheric Administration.

<sup>70</sup> LAPAN is Indonesian National Institute of Aeronautics and Space (*Lembaga Penerbangan dan Antariksa Nasional*).

reliable sources of data. In this paper, the hotspot density unit of the number of hotspots per km<sup>2</sup> was used. The paper counts two fires that occur in the same km<sup>2</sup> as two hotspots. Hence, the area with higher hotspot density is assumed to have a higher concentration of land/forest fires compared to the areas with lower numbers of hotspots. The calculation can be obtained by dividing the number of hotspot occurrences in the province by the provincial area.

For the independent variable, understanding the role of regulatory agency enforcement capacity as a driving factor to punish violators with a long history of violations is critical. Karpoff *et al.* (2005) found that legal sanctions and enforcement are the most important factors in deterring environmental violations. Moreover, Stafford (2007) examined the effect of EPA sanctions on violations of hazardous waste found that violations decreased after the penalty, fines and custody change. The fine deterrence impact in a state is almost as strong as on the sanctioned plant (Shimsack and Ward, 2005). The fine imposed by the court for environmental crime was used to measure sanctions in deterring violations. The variables are measured by fine imposed for the year in a rupiah base divided by Gross Regional Domestic Product (GRDP) in thousands of rupiah. Moreover, imprisonment as part of penalties is measured by number of conviction days of the defendant as enforced by the police, prosecutor, and judge for an environmental criminal violation as a proportion of the total population in thousands of people in the

provincial area. The fine and imprisonment<sup>71</sup> data are derived from the Indonesian Supreme Court Database<sup>72</sup> in the case of land/forest fires.

Resources Assigned Capacity in Monitoring. The availability of resources is more determined by the frequency with which the economic agent is monitored and inspected by the regulatory agency. Furthermore, the regulator possibly is motivated by budget constraints. According to Decker (2006), an increase in expenditure of state budget per facility environmental management will increase inspections and change the per capita emissions. Firms may feel compelled to invest more in pollution control equipment as the enforcement budget of the regulator increases (Regen and Seldon, 1997).

Moreover, Colson and Menapace (2012) argued that being budget-driven could also generate positive spillover effects for noncompliance, which is perfectly discoverable through regulatory monitoring. The variables, Central Government Budget and Local Government Budget, are measures by rupiah amount of environmental function<sup>73</sup> in spending of Central Government

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<sup>71</sup> Based on the persistent haze problem, Indonesia adopted a zero-burning policy in Law No.32/2009. The law recognizes that land/forest fire is part of criminal offences. The fine and imprisonment are imposed based on three major laws used to criminalize land burners in Indonesia as follows: (1) Law No. 1/1946 on Criminal Law (*Hukum Pidana*); (2) Law No. 23/1997, which was amended by Law No. 32/2009 on Environmental Protection Management (*Perlindungan dan Pengelolaan Lingkungan Hidup*); and (3) Law No. 18/2004, which was amended and strengthened by Law No. 39/2014 on Plantation (*Perkebunan*). A detailed discussion on the law is presented in Chapter 2 and Chapter 4.

<sup>72</sup> <<https://putusan.mahkamahagung.go.id/>>, 10/27/2017–11/20/2017 referred.

<sup>73</sup> Environmental function expenditures are part of government spending in Central and Local Government Budget according to the function. Government expenditures are used to carry out government functions as follows: public service functions, defense functions and security functions, economic functions, housing functions and public facilities, health functions, tourism functions, environmental functions, religious functions, education functions, and social protection functions.

Budget (APBN<sup>74</sup>) based on province and Local Government Budget (APBD<sup>75</sup>); divide GRDP in thousands of rupiah. The environmental functions in central and local government are spending related to arrangement, development, monitoring, and implementation of environmental policy in tackling externalities (e.g., waste, land management, and pollution) (Ministry of Finance, 2019). Moreover, the paper relies on the spending of environmental function data as an alternative because a more reliable source of data related to the environmental policy enforcement budget was unavailable. The budget for central and local government data are from the Directorate General of Budget and Directorate General of Fiscal Balance<sup>76</sup>, Indonesia Ministry of Finance.

Fiscal capacity. The availability of the budget ensures that regulatory enforcement capacity needs are met. The revenue from taxation ensures

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<sup>74</sup> APBN (*Anggaran Pendapatan dan Belanja Negara*) is approved annual government financial budgets

by the House of Representatives (Article 1 (16), Law No. 33/2004 on Financial Balance between the Central Government and Regional Government (*Perimbangan Keuangan Pemerintah Pusat dan Pemerintah Daerah*)).

<sup>75</sup> APBD (*Anggaran Pendapatan dan Belanja Daerah*) is local government's annual financial budgets, which are jointly discussed and agreed upon by the regional government and the Regional House of Representatives and stipulated by a Regional Regulation. (Article 1 (17), Law No. 33/2004 on Financial Balance between the Central Government and Regional Government (*Perimbangan Keuangan Pemerintah Pusat dan Pemerintah Daerah*)).

Based on Article 13 Law No. 32/2004 on Local Government, Local Government in Provincial and Municipality including development planning and control implementation of public order; environmental control provision of public facilities and infrastructure; handling the health sector [.....]. Furthermore, Article 22 (k) stated that one obligation of local government in implementing autonomy is protecting and preserving the environment.

<sup>76</sup> <https://www.kemenkeu.go.id/informasi-publik/anggaran-dan-realisisi-keuangan-kemenkeu/?page=2>

environmental sustainability by addressing externalities. The greater the state fiscal capacity, the greater is the ability to promote sustainable development (Crenshaw and Jenkins, 1996). The tax administrator's actions will support and strengthen regulatory action capacity. However, a combination is necessary to make optimal use of the instrument to provide adequate monitoring and enforcement in addressing environmental harm. With imperfect monitoring and fines, individual polluters would choose how much to pollute and how much risk of being caught is worth taking (Alesina and Passarelli, 2014). The absolute compliance limit shows the range of relevant taxes that the government can collect (Shiota, 2014).

Tax Revenue will be used as the first variable of fiscal capacity. Tax Revenue as a proxy is a measure by revenue collected by the Indonesia Tax Administrator<sup>77</sup> by rupiah amount as a fraction of GRDP in thousands of rupiah. The revenue is generated from Income Tax<sup>78</sup>, Value Added Tax<sup>79</sup>, Sales Tax on Luxury Goods, Land and Building Tax for Plantation Forestry and

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<sup>77</sup> In this paper, the administrator for the tax that is managed by the central government. The tax administrator is the Directorate General of Taxes under the Ministry of Finance based on the Presidential Decree No. 28/2015 on Ministry of Finance and Ministry of Finance Decree No. 234/PMK.01/2015 on Organization and Working Procedure of Ministry of Finance.

Due to the limitations of the study on data gathering, the paper was not included by the Local Provincial and Municipal Tax Administrator in Indonesia. The Local Tax Administrator is based on Law No. 18/1997, which has been amended by Law No. 34/2000, and Law No. 28/2009 on Local Tax and Retribution administers local taxes such as, for example, Vehicle Tax, Fee of Motor Vehicle Ownership Transfer, Surface Water Tax, Cigarette Tax, Hotel Tax, Restaurant Tax, Advertisement Tax, Parking Tax, and Street Lighting Tax, etc. (Article 2).

<sup>78</sup> Based on Law No. 7/1983 which has been lastly amended by Law No. 36/2008 on Income Tax (*Pajak Penghasilan*).

<sup>79</sup> Based on Law No. 8/1983, which has been for the third time amended by Law No. 42/2009 on Value Added Tax and Sales Tax on Luxury Goods (*Pajak Pertambahan Nilai dan Pajak Penjualan atas Barang Mewah*).

Mining<sup>80</sup>, and Document Duty<sup>81</sup>. For the policy to operate effectively, it is necessary that all lawful revenues are collected. Hence, maintaining the level of compliance of taxpayers requires identifying noncompliance and applying enforcement measures. Tax enforcement is the second variable in fiscal capacity. Slemrod (2007) has determined that the probability of being punished for noncompliance creates a more significant policy deterrent. The amount of tax evaded as a fraction of GRDP in thousands of rupiah would be the proxy of Tax Enforcement. The identification of tax evaded is based on the tax audit<sup>82</sup> conducted by the Directorate General of Taxes.

Moreover, the paper also uses the Number of Taxpayer as the third variable as a proxy in capturing tax regulator action in expanding the tax base. The ability of tax administrations to identify entities subject to a tax as the underlying structure in tax policy design will increase the strength factors in identifying noncompliant economic agents. Based on crowding theory, how a tax administration identifies a taxpayer (as external intervention) has an impact on the taxpayer's behavior (as intrinsic motivation) (Frey and Feld, 2002). The tax administration will be able to tag personal characteristics<sup>83</sup>,

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<sup>80</sup> Based on Law No. 12/1985 which has been amended by Law No. 12/1994 on Land and Building Tax (*Pajak Bumi dan Bangunan*).

<sup>81</sup> Based on Law No. 13/1985 on Document Duty (*Bea Materai*).

<sup>82</sup> Based on Article 1 (25) Law No. 6/1983, which was last amended by Law No. 16/2009 on General Provisions and Tax Procedures (*Ketentuan Umum dan Tatacara Perpajakan*) and stated that the tax audit is a series of activities in collecting, processing data, information, and evidence to measure tax compliance and / or for other purposes in the context of implementing the provisions of tax legislation. The tax audit examines the accuracy of the income declared by a taxpayer and verifies whether the income is completely reported on the tax return.

<sup>83</sup> Following Mirrless's concept that the optimal tax depends on the identification of personal characteristics (Mirrless, 1971; Arkeloff, 1978).

income, and land ownership records from data pool integration<sup>84</sup> and measure the economic value of the benefits lost to land/forest fires. The variable is measured by the registered taxpayer as part of the population in the provincial area. The Tax Revenue, Tax Enforcement, and Registered Taxpayer are from Directorate General of Taxes, Ministry of Finance unpublished data.

This paper also considers the effect of haze pollution by including GRDP Growth, Crime Rate, and Rainfall as control variables. The GRDP is used to capture the economies of scale expansion that contributes to the probability of burning violations that create haze pollution. These variables are similar to those employed by Lim (2016) and Magat and Viscusi (1990). Furthermore, the crime rate is reflected as a community characteristic, following Earnhart (2004). The criminal activity associated with violations of regulations appears to influence the burning that creates haze pollution. Another control variable, productivity, was removed because of exceptionally poor internal consistency.

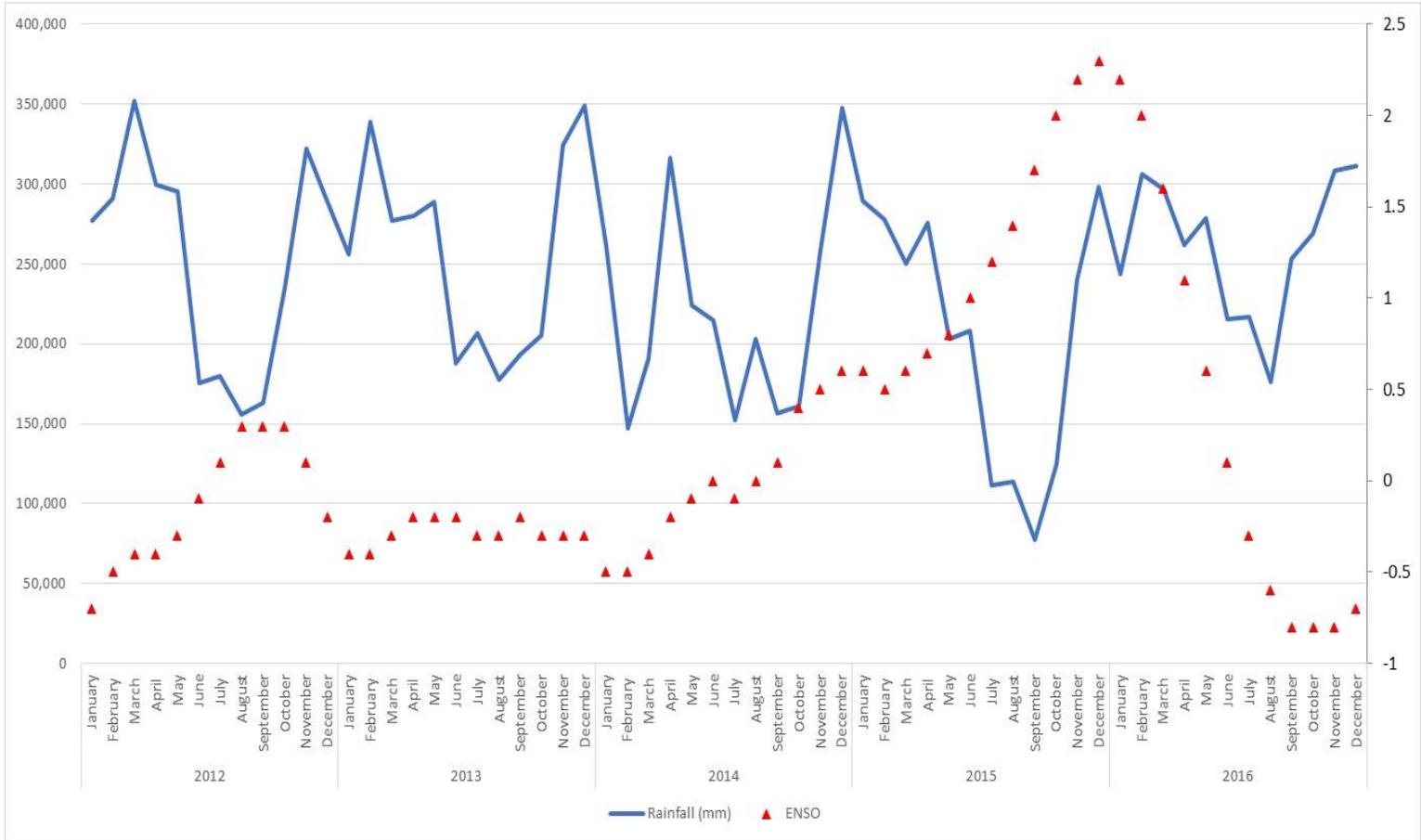
The previous study has shown that there is a good and statistically significant correlation between rainfall variations and the El Niño Southern Oscillation (ENSO) phenomenon and the severity of fires in Indonesia (Hope *et al.*, 2005; Hayasaka *et al.*, 2014; Field *et al.*, 2009; Langner and Siegert, 2008;

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<sup>84</sup> Based on Government Regulation No.31/2012 Government Agencies (Including: National Land Agency and Ministry of Domestic Affairs), Institutions (Including: Bank and Financial Industry), Associations and other agencies must provide data to the Directorate General of Taxes at the Tax Administration.

Wooster *et al.*, 2012). The ENSO phenomenon refers to cyclic variations in oceanic and atmospheric quantities across the equatorial Pacific Ocean, such as sea surface temperatures, convective rainfall, surface air pressure, and atmospheric circulation (McPhaden *et al.*, 2006). The ENSO indices can, therefore, be used as a predictor for the Indonesian rainfall anomaly. The paper includes rainfall per km<sup>2</sup> provincial area in the regression to control for the ENSO effect. The rainfall information was obtained from the Indonesia Central Bureau of Statistic.

Figure 5.2 presents the overall precipitation and ENSO occurrence in Indonesia. The pattern of rainfall and ENSO occurrence for the years 2012-2016 are shown; in general, ENSO has an inverse relationship with rainfall. As results, when the year of ENSO occurrence shows a low pattern, the precipitation it reports is a high pattern.



**FIGURE 5.2 Indonesia Precipitation and ENSO 2012-201**

Table 5.3 shows the details concerning the summary statistics. Moreover, Table 5.4 presents the summary variable definitions. Table 5.3 reports mean, standard deviation, and minimum/maximum for the 70 observations. These tables provide an overall picture of the environmental enforcement action and fiscal capacity with respect to regulatory enforcement actions in Indonesia.

**TABLE 5.3 Descriptive Statistics of Regulatory Action Variables**

Variable	Obs.	Mean (Std. Dev)	Min/Max
Hotspot	70	0.0189 (0.0163)	0.0010/0.0695
<b>Control Variable</b>			
GRDP Growth	70	4.8632 (1.9148)	-1.2100/8.2100
Crime Rate (Crime)	70	0.0057 (0.0072)	0.0000/0.0496
Rainfall (Rain)	70	0.0793 (0.0957)	0.0135/0.4201
<b>Environmental Policy Enforcement</b>			
Fine	70	0.0058 (0.0143)	0.0000/0.0623
Imprisonment (Imprist)	70	7.41e-0 (0.0000)	0.0000/0.0003
<b>Resources Assigned in Monitoring</b>			
Log_Budget Central Government (CB)	70	-0.0542 (0.7057)	-1.6695/1.3285
Log_Budget Local Government (LB)	70	-0.3553 (0.6222)	-1.7460/0.9312
<b>Fiscal Capacity</b>			
Log_Tax Revenue (TRev)	70	3.4624 (0.4981)	2.6958/4.7428

Tax Enforcement (TEnforce)	70	0.0262 (0.0365)	0.0000/0.1496
Number of Taxpayer (NoTP)	70	0.0278 (0.0192)	0.0023/0.1009

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*Source:* Author Calculation

**TABLE 5.4 Definition of Variables Used in The Analysis**

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Variable	Description
<b>DEPENDENT VARIABLE</b>	
Hotspot	<p>The number of hotspots is measured by the density of Hotspots in km<sup>2</sup> of the provincial area. The hotspot data are from the Ministry of Environmental and Forestry.</p> <p>Hotspot = number of Hotspots from NOAA 18/19 satellite in province <i>i</i> at year <i>t</i>/Provincial Area <i>i</i> in km<sup>2</sup> (<i>Luas Wilayah</i>).</p>
<b>INDEPENDENT VARIABLE</b>	
Fine	<p>The value fine imposed for the year in rupiah base as a share of GRDP (Nominal) in thousands of rupiah. The fine data are from Indonesia Supreme Court Decision data.</p> <p>Fine = the value of fines in environmental criminal violations on land/forest fire cases in province <i>i</i> at year <i>t</i>/GRDP Nominal (000) in province <i>i</i> at year <i>t</i>.</p>
Imprisonment	<p>The total number of conviction days enforced by the police, prosecutor, and judge for environmental criminal violators divided by the total population in thousands of people. The fine data are from Indonesia Supreme Court Decision data.</p> <p>Imprisonment = the total number of days of defendant convictions for environmental criminal violations on the land/forest fire case in province <i>i</i> at year <i>t</i>/number of populations in province <i>i</i> at year <i>t</i>.</p>

**TABLE 5.4 Definition of Variables Used in The Analysis (continued)**

Variable	Description
Budget Central Government (CB)	<p>The amount of environmental functions in central government spending based on the province as a share of GRDP (Nominal) in thousands of rupiah. The environmental function spending data are from the Directorate General of Budget.</p> <p>CB = the natural log of the total rupiah amounts of environmental function spending in the Central Government Budget (APBN<sup>85</sup>) in province <i>i</i> at year <i>t</i>/GRDP Nominal (000) in province <i>i</i> at year <i>t</i>.</p>
Budget Local Government (LB)	<p>The amount of environmental functions in local government spending divides GRDP (Nominal) in thousands of rupiah. The environmental function spending data are from the Directorate General of Fiscal Balance.</p> <p>LB = the natural log of the total rupiah amounts of environmental function spending in the local government budget (APBD<sup>86</sup>) in province <i>i</i> at year <i>t</i>/GRDP Nominal (000) in province <i>i</i> at year <i>t</i>.</p>
Tax Revenue (TRev)	<p>The amount of total tax revenue administered by the Directorate General of Taxes as a share of GRDP (Nominal) in thousands of rupiah. The tax revenue data are from the Directorate General of Taxes.</p> <p>TRev = the natural log of total rupiah amounts of Tax Revenue generated from Income Tax, Value Added Tax, Sales Tax on Luxury Goods, Land and Building Tax for Plantation Forestry and Mining and Document Duty in province <i>i</i> at year <i>t</i>/GRDP Nominal (000) in province <i>i</i> at year <i>t</i>.</p>

<sup>85</sup> Please refer to footnote number 74, page 121.

<sup>86</sup> Please refer to footnote number 75, page 121.

Number of Taxpayers (NoTP)	<p>The number of taxpayers is Taxpayers registered in the Directorate General of Taxes as part of the population in the province. The Number of Taxpayer data are from the Directorate General of Taxes.</p> <p>NoTP = the number of taxpayers registered in Directorate General of Taxes - Taxpayer Identification Number in province <i>i</i> at year <i>t</i>/number of populations in province <i>i</i> at year <i>t</i>.</p>
Tax Enforcement	<p>The amount of tax evaded as a share of GRDP (Nominal) in thousands of rupiah. The tax evasion data are from the Directorate General of Taxes.</p> <p>TEnforce = the amount of total rupiah amounts of tax evasion identified by an audit conducted by the Directorate General of Taxes in province <i>i</i> at year <i>t</i>/GRDP Nominal (000) in province <i>i</i> at year <i>t</i>.</p>
GRDP	<p>Gross regional domestic product measure by growth; used to capture economies of scale expansion. The GRDP growth data are from the Indonesia Central Bureau of Statistics.</p>
Crime Rate (Crime)	<p>The number of crimes is associated with violations of regulations as part of the population in the province. The crime data are from the Indonesia Central Bureau of Statistics.</p>
Rainfall (Rain)	<p>Rainfall measures the amount of rain in km<sup>2</sup> of the provincial area. The rainfall data are from the Indonesia Central Bureau of Statistics.</p>

*Source:* Author

Table 5.5 shows the correlation between variables. Some variables report a statistically significant correlation—for example, Budget Local Government and Hotspot, Imprisonment and Hotspot, and Number of Taxpayers and Hotspot. Additionally, variable Rainfall and Number of Taxpayers have the highest correlation coefficient, 0.7456.

**TABLE 5.5 Correlation between Variables**

Variable	Hotspot	Ln (CB)	Ln (LB)	Fine	Imprisonment	Ln (TRev)	NoTP	TEnforce	GRDP	Crime	Rain
Hotspot	1.0000										
Ln (CB)	-0.1833	1.0000									
Ln (LB)	<b>-0.4126</b>	<b>0.4737</b>	1.0000								
Fine	-0.1054	-0.0497	0.0990	1.0000							
Imprisonment	<b>0.2298</b>	<b>-0.2745</b>	<b>-0.2422</b>	0.0623	1.0000						
Ln (TRev)	-0.0240	<b>0.3073</b>	<b>0.4095</b>	0.1095	-0.1279	1.0000					
NoTP	<b>-0.2861</b>	<b>-0.3048</b>	0.0546	-0.0206	0.0468	-0.0655	1.0000				
TEnforce	-0.0679	-0.0909	0.1314	-0.1836	-0.1008	0.0332	0.1053	1.0000			
GRDP	0.0597	<b>0.3096</b>	0.1224	<b>-0.3820</b>	-0.1986	0.2206	0.1481	0.1595	1.0000		
Crime	0.1356	0.1838	0.1405	0.0996	0.1065	<b>0.2922</b>	-0.0834	-0.1433	0.0261	1.0000	
Rain	<b>-0.2732</b>	-0.0639	-0.1743	-0.2101	-0.1220	0.1807	<b>0.7456</b>	0.0170	<b>0.3269</b>	<b>-0.2825</b>	1.0000

Notes: Correlations that are in boldface are significant at  $p < 0.05$

Source: Author Computation

## 5.4 REGRESSION RESULTS

Table 5.6 presents our main regression results. Because this statistical test revealed differences in the significance of the relationships among the variables, the paper conducts four separate regression analyses. Column 1 shows the base model fixed effect of regulatory action on the hotspot (without interaction policy and yearly effect). In Column 2, the paper adds the yearly effect to the model. In Column 3 and Column 4, the paper adds an interaction variable in the mixed regulatory enforcement action. The interaction variables are *Fine X Budget Local Government* and *Fine X Tax Enforcement*. In Column 3–Column 4, the yearly effect also enters the model of mixed regulatory enforcement actions on the hotspot. Moreover, in both columns, the paper removes the variable Number of Taxpayers in the analysis due to poor internal consistency.

The model test (F) value in Column 1–Column 4 is less than 5 percent. The results of the Hausman test for Column 1–Column 4 also show that the p-value is less than 5 percent. Thus, this paper rejects the null hypothesis. As a result, the fixed effect is the appropriate and correct model. Furthermore, the Wald test was performed to estimate the heteroscedasticity of the model, and the results show that the p-value is less than 5 percent. Hence, this paper rejects the null hypothesis and accepts the heteroscedastic residuals.

The paper also tests cross-sectional dependence on whether the residuals are correlated across variables using Pesaran CD. The Pesaran test of cross-sectional independence results in Column 1–Column 4 showing a rejection of the null hypothesis; therefore, there is no cross-sectional dependence. The highest explanatory power was found in Column 4

compared to Column 1–Column 3, with an adjusted R<sup>2</sup> of 0.557 and within an R<sup>2</sup> of 0.647.

**TABLE 5.6 Regression Coefficient of Regulatory Action**

	Dependent Variable: Hotspot			
	Column 1	Column 2	Column 3	Column 4
Constant	0.1415** (0.0554)	0.1522** (0.0632)	0.1490** (0.0658)	0.1503** (0.0643)
<b>Control Variable</b>				
GRDP	-0.0001 (0.0016)	-0.0033* (0.0017)	-0.0032* (0.0017)	-0.0032* (0.0016)
Crime Rate (Crime)	0.5995*** (0.1907)	0.4614** (0.2170)	0.4499** (0.2084)	0.4668** (0.2026)
Rainfall (Rain)	-0.1016 (0.0886)	-0.0345 (0.0993)	-0.0254 (0.0865)	-0.0242 (0.0862)
<b>Independent Variable</b>				
<i>Environmental</i>				
<i>Enforcement</i>				
• Fine	(0.0832)	(0.1062)	(0.0994)	(0.1080)
• Imprisonment	13.1605 (21.6343)	-12.6339 (28.5595)	-16.2843 (24.7725)	-10.2703 (30.0359)
<i>Resources Assigned</i>				
<i>Capacity in Monitoring</i>				
• Ln (Budget Central Government)	0.0005 (0.0054)	-0.0027 (0.0061)	-0.0024 (0.0060)	-0.0025 (0.0062)
• Ln (Budget Local Government)	- 0.0101*** (0.0032)	-0.0000 (0.0032)	-0.0001 (0.0032)	-0.0004 (0.0033)
<i>Fiscal Capacity</i>				
• Ln (Tax Revenue)	-0.0328** (0.0149)	-0.0299* (0.0174)	-0.0289 (0.0181)	-0.0294* (0.0177)
• Number of Taxpayer (NoTP)	-0.1614 (0.2297)	0.0636 (0.1581)		
• Tax Enforcement	- 0.0698*** (0.0235)	-0.0445* (0.0247)	-0.0442 (0.0258)	-0.0414 (0.0272)
<b>Interactions</b>				

• Fine X Ln (Budget Local Government)	0.0249 (0.0861)	
• Fine X Tax Enforcement		-3.1476 (2.6987)
<i>Marginal Effect</i>		
• Marginal effect of Fine	- 0.2532*** (0.0854)	-0.3003*** (0.0711)
• Marginal effect of Ln (Budget Local Government)	0.0000 (0.0032)	
• Marginal effect of Tax Enforcement		-0.0596** (0.0255)

**Model Information**

Observation	70	70	70	70
Province	14	14	14	14
Adjusted R <sup>2</sup>	0.387	0.556	0.554	0.557
Within R <sup>2</sup>	0.476	0.646	0.645	0.647
Year Effect	N	Y	Y	Y

Notes: \*\*\*p < 0.01; \*\*p < 0.05; \*p < 0.1; Huber-White robust standard errors shown in parenthesis.

Column 4, as shown in Table 5.6, provides evidence that the nine variables, as part of mixed regulatory action and control variables, have behaved as predicted with respect to the hotspot value. Four variables, including Fine, GRDP, Crime Rate, and Tax Revenue, have a significant impact on influencing the hotspot value. Moreover, the impact of Fine on the Hotspot development that depends on Tax Enforcement also has statistical significance. These effects of interaction terms on the model provide evidence for the relationship between enforcement variables with fiscal capacity.

Substantively, the control variable, Crime Rate, was found to be positively significant in Column 1–Column 4. This finding provides strong

evidence that a higher crime rate in the community is more likely to influence the development of hotspots. Furthermore, this statistical test revealed that Rainfall has a negative impact on the development of the hotspot. The impact was observed as statistically insignificant in the model.

The results in the same table also indicate that a 1-unit increase in fines as a share of GRDP imposed by the court as part of criminal enforcement in the mixed regulatory action statistically significantly decreases the hotspot development based on the provincial area in Column 1–Column 4, respectively. These findings agree with some previous studies demonstrating that the presence of penalties increases compliance (Shimshack and Ward, 2008; Lim, 2016).

As shown in Table 5.6 for Column 4, although the local government resource assigned capacity in monitoring is negative, as expected, the results show lower impact and statistical insignificance with respect to reducing hotspots, with a value of only 0.04. However, higher impact and significant statistical results were observed in Column 1 and Column 2. Overall results confirm the study of Decker (2006), which demonstrated that an increase in the state environmental management budget increases the state's aggressiveness in addressing environmental externalities. Unfortunately, there is no significant statistical effect on hotspot reduction for central government environmental spending in Column 1, Column 2, Column 3, or Column 4.

Substantively, Fiscal Capacity in Table 5.6 also indicates that a 1-unit increase in the ability of tax administrators to identify tax evasion (TE<sub>enforce</sub>) as a share of GRDP will decrease the hotspot development in the provincial

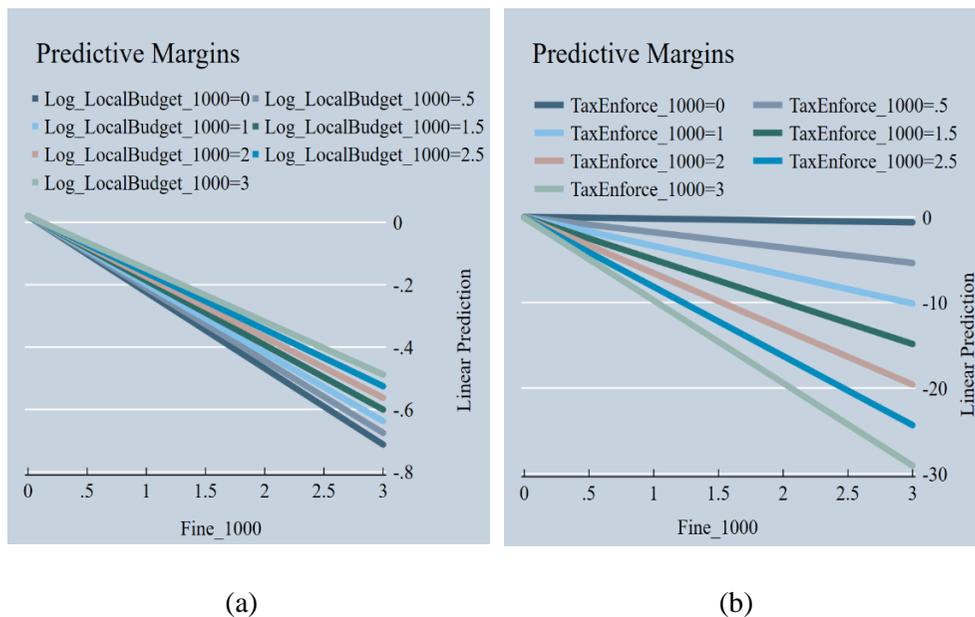
area by 0.04. Moreover, 1 percent increase in Fiscal Capacity expanding the Tax Revenue (In (Trev)) as a share of GRDP also being statistically significant ( $p < 0.1$ ) will decrease the hotspot development in  $\text{km}^2$  of provincial area by 0.0294. Somewhat surprisingly, Tax Enforcement and Tax Revenue consistently have a significant effect on Column 1 and Column 2.

When the interactions term and yearly effect were computed in the model as Column 3 and Column 4, significant improvement in the F-statistic of the regulatory enforcement model was observed. The model with the interaction term is when two or more independent variables depend on the value of one or more other variables. As a result, estimates of the marginal effects of the independent variable should be provided to aid in understanding the conditional arguments in the model (Brambor *et al.*, 2006). The first interaction between Budget Local Government and Fine, as reported in Column 3, shows the effect of Fine on the Hotspot development that depends on Local Government Budget in spending of the Environmental Function, as monitoring policy exhibits a negative effect and is statistically insignificant. The increase of 1-unit of Fine as a share of GRDP Nominal in thousands of rupiah will reduce the hotspot development in  $\text{km}^2$  of provincial area by 0.253 unit as the Budget Local Government on environmental function spending as a share of GRDP Nominal thousands of rupiah increases by 1 percent.

Interestingly, a higher average marginal effect and statistical significance ( $p < 1\%$ ) were reported in Column 4, even though the coefficient on the interaction term was insignificant. The interaction shows that the marginal effect of Fine on the Hotspot development that depends on Tax Enforcement in identified tax evasion exhibits a negative effect and is

statistically significant. That is, an increase of 1-unit Fines as a share of GRDP Nominal in thousands of rupiah will reduce the Hotspot development in km<sup>2</sup> of provincial area as the Tax Enforcement on identified tax evasion as a share of GRDP Nominal in thousands of rupiah increases by 1-unit. Moreover, a negative marginal effect that is statistically significant is also observed when Tax Enforcement that depends on Fine reduces Hotspot development. Thus, it may be possible that regulatory enforcement is being primarily driven by environmental policy, and support by fiscal policy is effective in overcoming haze pollution.

Enhancing the illustrations of the interaction term in Table 5.6, the paper presents a graphical plot of predictive margins of the interaction term in Figure 5.3. The plot on the interaction between Fine and Budget Local Government is presented in Figure 5.3 (a), and the interaction between Fine and Tax Enforcement in Figure 5.3 (b).



**FIGURE 5.3 Plot of Interaction in Predictive Margin of Regulatory Enforcement**

Figure 5.3 (b) shows that Fine has a higher reductive effect on hotspot development when combined with an increase of Tax Enforcement as a fiscal policy measure in land/forest fire. On the other hand, in Figure 5.3 (a), Fine has a lower reductive effect on hotspot development when interacting within the regulatory enforcement policy as Local Budget Government in monitoring policy. Thus, in the mixed regulatory policy, the Fine as environmental enforcement policy would combine with Tax Enforcement in Fiscal policy to yield a higher reductive effect of hotspots in land/forest fire.

## **5.5 DISCUSSION**

This paper has investigated the impact of fiscal capacity on mixed regulatory action in reducing hotspots that create haze pollution in Sumatera and Kalimantan. The study also reveals a possible interaction between policy in comprehending measures in tackling land/forest fires that create haze pollution in Indonesia.

### **5.5.1 Single Policy Regulatory Action Impact**

In general, a significant, negative impact is found between the hotspots and fines as criminal penalties in deterring hotspot development. The threats of penalties play a role in deterring offenders from committing harmful acts. This judicial enforcement is consistent with theory and may reflect resource allocation by the regulator to influence deterrence at the highest level of law enforcement.

However, not all provinces have a basis and capacity for criminal offenses related to land/forest fires. As Chapter 3 discussed, based on the field research in Riau Province and South Sumatra Province, the limited budget and

lack of coordination of agencies create less stringent actual enforcement and a low detection probability. As a result, economic agents do not correctly receive signals not to engage in unsustainable and illegal activities due to the inadequacy of deterrence for environmental offenses.

Furthermore, a sanction imposed on a responsible defendant through monetary fines will influence compliance; otherwise, the “right” defendant will escape the fine and dilute overall policy deterrence. Moreover, the expected monetary fine has to be equal to the harm done so that it will also affect potential violators in the case of land/forest fires. A closely current policy observation related to fines and environmental harm is discussed in Chapter 4. In the case of land/forest fires, the actual gravity of the environmental harm does not equally influence the monetary fine in all cases. In particular, the gravity of the judicial sanctions imposed on the plantation company and its director and manager is less consistent with the goal of internalizing the harm caused by the offense. The patronage system within the palm oil industry has been weakening the state capacity for implementing effective policies related to haze pollution. Therefore, well-connected companies are able to continue to use fire as a cost-efficient means of clearing land while disregarding environmental implications (Varkkey, 2016). Thus, the fine as part of the sanctioning policy that the defendant suffers may not achieve the compliance goal initially targeted by the regulator without further policy implementation interaction using the so-called policy mix. The findings on regulatory enforcement lead to the concern that moving from a single to mixed regulatory enforcement policy should be implemented to include tackling the haze pollution in Indonesia.

### 5.5.2 Fines and Monitoring Policy Interaction

The previous study often emphasized that the choice of the type of policy instrument is critical to controlling externalities. With regard to the interaction between fines and local government budget as monitoring proxies, the paper results expand the previous literature. As mentioned previously in the regression analysis, the marginal effect of fines significantly influences hotspot development to depend on local government monitoring in the region. The finding reflects the growing importance of enforcement coordination within intragovernmental institutions in central and local governmental agencies. However, the wide range of local environmental agencies mostly depends only on their setup of monitoring and enforcement strategies in tackling land/forest fires.

Indonesia's adoption of decentralized<sup>87</sup> government has encouraged local institutions to develop strategies and play a greater part in enforcing the policy. However, in the case of land/forest fires, the Environmental Agency, as part of the local government institution, is also responsible for enforcing central/local government policies related to land/forest fires. Moreover, the Indonesian government issued Presidential Instruction No. 16/2011, which was amended by Presidential Instruction No. 11/2015<sup>88</sup> to strengthen the collaboration to enhance mitigation and monitoring coordination in the case of land/forest fires. Unfortunately, the policy implementation capacity that involves vertical coordination is still too bureaucratic and slow and is coupled

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<sup>87</sup> Law No. 32/2004 as been amended with Law No. 23/2014 on Local Government (*Pemerintah Daerah*).

<sup>88</sup> Please refer to footnote number 12, page 22.

with the transfer authority to local government without proper guidance (Nurhidayah and Djalante, 2017; Tacconi, 2007).

Field research results discussed in Chapter 3 show that the South Sumatra Local Environmental Agency only provides a monitoring and fire prevention function. The agency is not able to independently build law enforcement cases on land/forest fires in South Sumatra Province. The investigator argued that the lack of support and prioritization of land/forest fire cases by the provincial government had undermined the investigator role in the South Sumatra Environmental Agency. Therefore, budget optimization for the local environmental agencies to increase enforcement capacity should ensure that the above-mentioned shortcomings will not influence and induce noncompliance.

### 5.5.3 Fines and Fiscal Policy Interaction

The implementation of a strengthened regulatory approach with a tax policy to tackle haze pollution will increase the probability of detection and punishment for violators of the law. Knorring and Welzel (1998) showed that punitive taxes may improve compliance with regulatory policies.

The interaction term also shows the possibility of a joint effect through a combination of fines leveraged as part of environmental enforcement and tax enforcement as a fiscal capacity measure. The increase of the marginal effect of Fine will reduce hotspot development being subject to the increase of tax enforcement in identifying tax evasion. The taxpayer's noncompliance will affect the government's ability to generate tax revenue. The probability of being punished for noncompliance is creating a significant deterrent mechanism for improving compliance (Slemrod, 2007). Furthermore, Park and

Hyun (2003) find that the magnitude of the fine based on identified evasion affects compliance more strongly than the probability of a tax audit. Hence, this combination has an implication for further reinforcing policy integrity and coordination within the related Ministry and Bureaus.

Tax administration<sup>89</sup> action in obtaining full knowledge of the potential gaps in relation to enforcement would maximize revenue. Moreover, based on the regression results, the tax administration's ability to generate overall tax revenue, including identifying tax evasion, also significantly reduces hotspot development. Tax policy is a possible means of linking the scale of revenue to the degree of a problem in the Indonesia National Budget (APBN). Maatta (2006) stated that environmental taxes are taxes with the primary purpose of generating revenue that also have a significant positive effect on the environment. Moreover, regular tax policy will influence economic agents by ensuring accurate income tax liabilities, as government tax revenues are reportedly more significant than offsets of land/forest fire-induced taxpayer-deductible expenses.

Additionally, this finding suggests that a possible shift from regular taxes to environmental taxes, which are more challenging to evade, will increase revenue in parallel with the effectiveness of regulatory action capacity. Regulations to hold firms liable for potential damages from their

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<sup>89</sup> The Presidential Instruction Decree No 16/2011, amended with No. 11/2015, stated that the Ministry of Finance, as part of the government institution, was involved in controlling land and forest fires. However, the role of the Ministry of Finance is not clearly defined in the supporting process. Moreover, in the Ministry of Environmental and Forestry Decree No. P.32/MenLHK/Setjen/Kum.1/3/2016 for the national level of coordination, the Ministry of Finance and the Directorate General of Taxes are not part of an organizational structure.

pollution may improve policy compliance (Bohm and Russel, 1985). Uncertainty on the enforcement would be reduced in advance by the provision and improvement of overall compliance. Furthermore, strengthening fiscal institutions would be an integral part of tackling corruption (IMF, 2019). The critical role of fiscal institutions in helping to contain corruption through the overarching impact on the public sector, such as fiscal transparency, is expected to correlate with the control of corruption in the palm oil industry.

Finally, the finding of this study also seems consistent with the previous study, whereas the level of crime in Indonesia provides a relatively statistically significant sign on land/forest fires. The apparent existence of a high crime rate in the community can be attributed to a serious moral problem, which has received relatively little attention and is likely to influence the development of hotspots. Moreover, the study confirmed the previous study that rainfall, especially with the existence of ENSO and a quasi El Nino condition, creates massive and aggregate severity fires in Indonesia (Hayasaka *et al.*, 2014; Field *et al.*, 2009; Langner and Siegert, 2008; Wooster *et al.*, 2012).

## **5.6 CONCLUSIONS**

This exploratory study is among the few papers directly investigating regulatory enforcement capacity based on a mixed policy instrument model. From an examination of regulatory enforcement, this paper indicates support for a mixed policy in decreasing hotspot development. There is evidence that a 1-unit increase in fines as a share of GRDP imposed by the court as part of criminal enforcement in the mixed regulatory action statistically

significantly decreases hotspot development based on provincial area by 0.217 unit.

This paper also shows that environmental policy that depends on the interaction of tax policy through strengthening tax enforcement produces a statistically significant marginal effect on reducing hotspot development. That is, an increase of 1-unit Fines as a share of GRDP Nominal in thousands of rupiah will reduce the Hotspot development in km<sup>2</sup> of provincial area as the Tax Enforcement on identified tax evasion as a share of GRDP Nominal in thousands of rupiah increases by 1-unit. Moreover, the marginal effect is also statistically significant when Tax Enforcement on Hotspot development that depends on Fine are also found to be negative and statistically significant. Consistent with the previous study, the paper also finds that the control variable, the crime rate, and rainfall will influence the development of the hotspot.

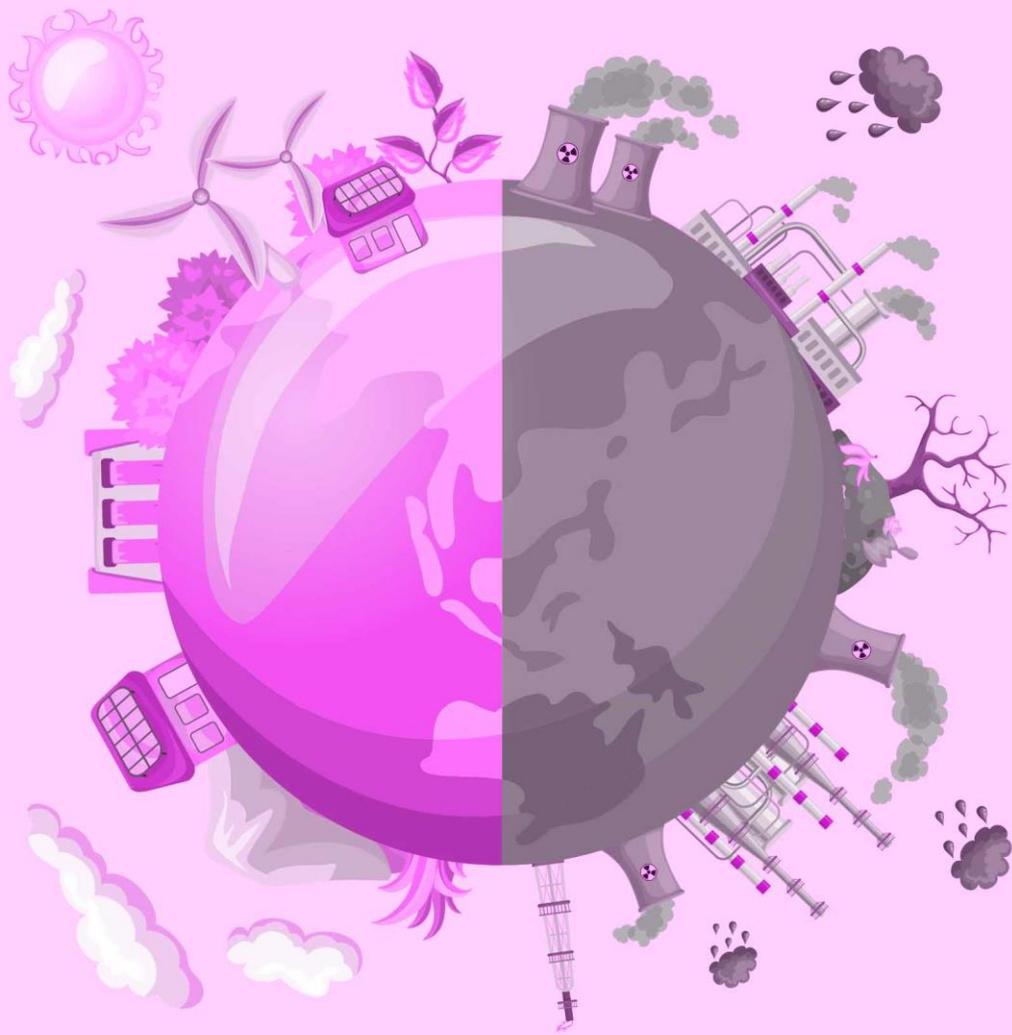
Based on the findings, this paper suggests empirically possible directions for future Indonesian environmental policy to tackle the current policy implementation failure. The model assumes that environmental regulatory action capacity should not be approached as a single policy due to the growing complexity of land/forest fires. The policy implementation might be strengthened by tax enforcement through the transition to a green tax revenue<sup>90</sup> system. Building the institutional capacity for a mixed enforcement policy in different dimensions should be the core task in the long term. However, it will be challenging to implement improvement inside the

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<sup>90</sup> The green tax revenue, a revenue neutral swap between an environmental tax and an existing tax, can create economic benefits and correct environmental externalities. The swap would reduce the distortion in the tax system.

bureaucratic setting and without also having government political support in Indonesia.

Using the regulatory enforcement model, the research investigates the option of adding fiscal capacity to prevent haze pollution. However, this paper does not address the dimensions of fiscal capacity or the complexities of local government tax revenue. Further exploration will contribute to better policies that address the haze pollution issue.



## CHAPTER 6

# CONCLUSION AND POLICY RECOMMENDATION

# CHAPTER 6

## CONCLUSION AND POLICY RECOMMENDATION

### 6.1 INTRODUCTION

The thesis draws to resolve the queries which originated from the necessity to enforce the comprehensive regulation in environmental management that reaching deterrence at the level of the environmental harm created by the violation. The theoretical framework is underlying that a single policy is not sufficiently flexible and resilient in addressing all environmental problems in all contexts. Moreover, the government will tend to choose market mechanisms instead of command and control regulation. Due to the scarcity of previous studies in which considering taxation's role in internalizing harm create from environmental violation, the analysis of the practical implementation of the mixed policy still has plenty of room for improvement. Building the conceptual connection between the current policy implementation and the haze pollution, the first (Chapter 3) and second (Chapter 4) main chapter qualitatively investigate the deterrent effect of enforcement through expected liability and harm. To evaluate the mixed policy impact more systematically, the third (Chapter 5) main chapter applied empirical estimation using a fixed effect with including an interaction term as one of the independent variables.

The main research question for the study is as follows: *What is the optimal mix of regulatory and market-based policies for pollution control that strengthen expected liability in deterring the Indonesia haze pollution case?* The research finding shows that prevailing obstacles of current single policy

implementation, creating the expected liability faced by market-players is relatively low. Answering the research question that based on robust evidence, the optimal level of liability at the level of harm created by violations are the Fine reflecting the gravity of harm that imposed by the regulator with sufficient budget capacity and supported with tax administration capabilities in ensuring the economic actor compliance with the tax policy.

The current research has been showing that the fine imposed on the plantation company and its director and manager is less consistent compared to estate employee, laborer and farmer/landowner in reflecting the gravity harm caused by the offense. Moreover, the research also finds the inconsistency implementation of the fine policy, whereas in Sumatra is more stringent and more reflective of the level of the environmental harm compared to Kalimantan. Furthermore, the current policy also burdened with the existence of obstacles in the execution process of environmental recovery fines based on court verdicts that were not including a detailed policy-related financial mechanism in the Act on how the fines would be utilized.

The data also reveal that the low detection probability highlights the inadequacy of deterrence for environmental offenses. On average, the Police were only able to apprehend a suspect in only 8.10 percent of hotspot cases in Riau Province and 0.13 percent of hotspot cases in South Sumatra Province. Moreover, the limited budget and lack of coordination of agencies also lowering the probability of being inspected. As a result, the benefit of noncompliance is relatively high, and noncompliance practice prevails.

Furthermore, this paper also indicates that environmental policy that depends on the interaction of tax policy through strengthening the Tax

Administrator's ability to identify the evasion and increase the tax revenue will produce a significant deterrence impact and reduce the hotspot. Moreover, even though the empirical results are observed the necessity of mixed policy, it cannot be ignored how the patronage would be influencing and overturning the policy implementation in tackling environmental externalities.

## **6.2 SUMMARY RESEARCH FINDING**

Deterrence emanates from the probability of detection and the severity of sanctions. It is necessary to investigate the deterrent effect from the existing policy in terms of tackling the haze pollution. One of the significant limitations of the previous study is the failure to understand policy intervention related to enforcement measures by a law enforcement officer. The actor insights will provide a valuable part of the puzzle in helping to zoom in on the primary problem (Lo *et al.*, 2006). Sub-question 1: *How do insufficient power and law enforcement capacity hamper deterrence in South Sumatra and Riau Province?*

The in-depth interviews reveal that current regulatory enforcement is still limited in sending a strong signal about the punishment of intentional fire behavior. This paper contributes to the literature by extending Carmenta *et al.* (2017) finding through revealing enforcement obstacles that hamper deterrence and create the persistence of haze pollution at South Sumatra and Riau Provinces. The average apprehension by Police is only 8.10 percent, with 4.41 percent punished burning area in Riau Province. Moreover, South Sumatra Province, the enforcement coverage, and monitoring are lower compared to Riau Province, 0.13 percent, and 1.09 percent, respectively. The lack of special arrangements for ecological recovery costs and direct financial

mechanisms for how fines are to be utilized has hampered the enforcement of deterrence. Moreover, the limited budget and lack of coordination of agencies indicate a low probability of being inspected. As a result, the benefit of noncompliance is relatively high, and noncompliance practice prevails.

In the next part, the paper will further investigate the dimension of harm that has been tackling by the current enforcement policy using judicial decisions in relation to criminal enforcement. Given the policy failure of the current noncompliance is relatively high and noncompliance practice prevails, criminal law enforcement is a last resort to address it. The enforcement will be providing greater certainty of deterrence, severity, and celerity of punishment. The paper uses a content analysis approach that has painted an exciting picture and provided insights into judicial sanctioning decisions with detailed variations in the defendant and burning location types. The paper addresses the following question: *Are variations in judicial sanctioning decisions with respect to defendants and burning site locations influenced by the gravity of environmental harm in the land/forest fire case?*

The analysis indicates that Indonesia's judicial sanctioning decisions in cases of land/forest fires diverge from the pattern suggested in the law and economics literature. The current rigid policy does not always lead to higher levels of deterrence and is ineffective in internalizing environmental harm for all cases. Judges mostly consider the environmental impact of land/forest fire as aggravating factors in their judicial sanction decisions without identifying the core value of the harm and reflecting it in the gravity of their sanction decision; thus, they do not adhere to the goals of environmental law. In particular, the gravity of the judicial sanctions imposed on the plantation company and its director and manager is less consistent with internalizing the

harm caused by the offense. On the other hand, in the case of the estate employee, laborer and farmer/landowner, the judicial sanction generally reflected the gravity of the environmental harm. The judicial sanctioning on environmental harm was reflected in the mean compensating fine for farmer/landowner that equal to 213 percent of the ecological recovery cost. Thus, the judicial sanction decision was set at the maximum fine for environmental severe harm violations.

With respect to the burning site location factor in two islands, we find that the judicial sanction policy in Sumatra is more stringent and more reflective of the level of the environmental harm compared to Kalimantan. This was supported by the fact that the mean fine multiple for the convicted defendant was 1.200. This ratio suggests that the average judicial sanction fine is approximately equal to the measurable environmental harm from the offense.

Finally, the current study fills the gap in the judicial sanctioning decision in criminal court that analyzed a variety of defendant occupation and extending the Billiet *et al.* (2014) study. Furthermore, in the case of land/forest in Indonesia is providing evidence the current enforcement of the environmental policy has been failed to mete out appropriate sanction for criminal offenses.

Based on the understandings existing policy on haze pollution control, sub-question 3 will seeks evidence mixed policy as pollution control in Indonesia. Environmental policy interactions with the fiscal system fundamentally influence the cost-effectiveness of addressing climate change and meeting other social objectives (Goulder, 2013). By considering fiscal

capacity, this chapter will provide an empirical analysis whereby mixed regulatory policy between tax enforcement and the environmental policy may coexist and may complement regulatory action. This paper extends the Lim (2016) model while considering that of Besley *et al.* (2013), who found that including tax policy as a fiscal capacity revenue source increased regulatory action capacity. Sub-question 3: *What is the impact of fiscal capacity on mixed regulatory action regarding hotspot development, which creates haze pollution in Sumatra and Kalimantan?*

The model of regulatory enforcement assumes that environmental regulatory action capacity should be approached not as a single policy due to the growing complexity of the land/forest fire. Moreover, from the examination, this paper indicates support for the mixed policy in decreasing hotspot development. There is evidence that an increase of 1-unit in fines as a share of GRDP imposed by the court as part of criminal enforcement in the mixed regulatory action statistically significantly decreases the hotspot development based on km<sup>2</sup> the provincial area.

However, a higher average marginal effect and statistically significant has been shown through the interaction of Fine that depends on Tax Enforcement in reducing the Hotspot development. That is, an increase of 1-unit Fines as a share of GRDP Nominal in thousands of rupiah will reduce the Hotspot development in km<sup>2</sup> of provincial area as the Tax Enforcement on identified tax evasion as a share of GRDP Nominal in thousands of rupiah increases by 1-unit. Moreover, the marginal effect also statistically significant when Tax Enforcement on the Hotspot development that depends on Fine is found to be negative. Consistent with the previous study, the paper also finds

that the control variable, the criminal rate, and rainfall will influence the development of the hotspot.

Based on the finding, this paper suggests empirically possible directions for future Indonesian environmental policy to tackling the policy implementation failure. The policy implementation might be strengthened by tax regulatory enforcement through the transition to a green tax revenue system. Building the institutional capacity for mixed enforcement policy in different dimensions should be the core task in the long run.

### **6.3 POLICY RECOMMENDATION**

The current study is expected to contribute to practical implications in strengthening regulatory enforcement policies. The explorations are contributing to environmental management policy as follows:

1. Strengthening policy implementation based on Law No. 32/2009 and Law No. 39/2014 related to imposing Fine that equal fraction of the harm created and adding ecological recovery cost as part of state debts.
2. Building the coordination and institutional capacity for mixed enforcement policy in different dimensions. The single policy and single authority would be failed to tackle the growing complexities of the land/forest fire.
3. The establishment of policy regimes that include a fiscal policy for environmental management in tackling the haze pollution. Even though it will be challenging to implement an improvement inside the bureaucratic setting and without having government also political support in Indonesia.
4. The policy implementation might be strengthened by tax regulatory enforcement through:

- a) Shifting from regular taxes to environmental taxes, which more challenging to evade.
- b) Strengthening and enhancing tax enforcement that deters and identified noncompliance in the palm oil and forestry industry to generate revenue for the government in tackling the haze pollution in Indonesia.

#### **6.4 LIMITATION OF THE RESEARCH**

The complexity of the policy implementation on the land/forest fire was evident by a variety of conditions within the enforcement policy—these complexities creating limitations for the research. Although the research was triggered by the necessity to enforce the comprehensive policy implementation, the research does not deal with evaluating the judicial behavior in the case of land/forest fire. These researches only investigated as far as the judicial decision aggravating factor on the case on land/forest fire. Hence, the behavior effect of the judge in the courtroom is omitted. For example, the possible corruption that influences in the judicial decision. Furthermore, this study concentrates on regulatory enforcement in criminal environmental violations. However, possibly additional judicial measures such as through class action and citizen suit would be more influencing the land/forest fire in the future as the people are more aware of the risk of pollution.

Furthermore, the research concentrates only on the effect tax revenue generated by the Central Government as fiscal capacity in mixed policy enforcement to hotspot development. Consequently, the fiscal capacity does

not capture the tax revenue generated by the Local Government. Despite these limitations, the findings improve some of the conclusions presented in existing literature in the field of environmental enforcement. The fiscal capacity improves upon the quality of its regulatory enforcement, updating the enforcement deterrence in the case of land/forest fire.

## **6.5 FUTURE RESEARCH**

Going forward from this current study that only discusses judicial sanctioning decisions in criminal courts, additional future studies considering mixed policy enforcement with civil procedures will be contributing to comprehensively resolving the policies that address the haze pollution issue. For instance, a comparative mixed judicial enforcement policy study with class action and citizen suit would be interesting. Even though the government has the primary responsibility to enforce the economic agent for their non-compliance, a citizen who is threatened by the risk of pollution may commence a civil penalty and litigation cost. As a result, the prevailing of the preventative aspect of policy enforcement to requiring polluters to modify their activity to be more sustainable.

Future additional studies agenda on enforcement that was influencing the monitoring and enforcement of inland/forest fires would include the discussion on the complexities of local government tax revenue. This would help deepen understanding the comprehensive framework concerning the optimal mixed enforcement policy. As seen in this research, haze pollution does not end up simply by central government policy enforcement.

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## ABOUT AUTHOR



Firman Tatariyanto, S.S.T, M.A, Ph.D, adalah Aparatur Sipil Negara pada Direktorat Jenderal Pajak, Kementerian Keuangan Republik Indonesia sejak tahun 2001. Penulis meraih gelar Sarjana Sains Terapan pada Program Diploma IV dari Sekolah Tinggi Akuntansi Negara (2005) dan Master of Arts dari Keio University, Jepang, dengan jurusan *Taxation Policy and Management* dengan dukungan dari Joint Japan World Bank Scholarship Program (JJ/WBGSP)

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Dalam beberapa tahun terakhir, penulis juga pernah terlibat sebagai tim pengajar pada *Graduate School of Asia Pacific Studies* dan *School of Liberal Studies* serta PKN STAN dan saat ini aktif mengajar pada Universitas Pamulang. Penulis telah mempublikasikan tulisan pada beberapa jurnal ilmiah dengan area riset *underground economy* maupun *policy mixed* dalam *environmental taxation policy*.

Penulis dan Istri, Ratih, adalah orangtua dari dua orang putra putri: Sekar dan Kaze.

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## APPENDIX – 1

### DETAIL PROFILE OF RESPONDENT IN IN-DEPTH INTERVIEW

No	Name	Current Office	Interview Location / Date
1.	AKP. Rusyandi Zuhri Siregar [Main]	Investigator - Riau Regional Police	Pekanbaru / Oct 16, 2018
2.	Rozi Dhasa Prima, S.IP, MH [Assisstant]	Assistant Investigator - Riau Regional Police	Pekanbaru / Oct 17, 2018
3.	Syafril, SH	Prosecutor - Riau High Attorney General Office	Pekanbaru / Oct 17, 2018
4.	Made Ali, SH	JIKALAHARI Coordinator	Jakarta / Oct 19, 2018
5.	Ardhi Yusuf	Investigator – Ministry of Environmental and Forestry	Jakarta / Oct 19, 2018
6.	Fitrian Ardiansyah	Executive Director – IDH Sustainable Trade Initiative	Bogor / Oct 20, 2018
7.	Prof. Dr. Bambang Hero Saharjo	Expert in Fire Ecology - Bogor Agricultural University	Jakarta / Oct 23, 2018
8.	Asep Komarudin	Forest Campaigner - Greenpeace Indonesia	Jakarta / Oct 23, 2018

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9.	Benni Yusnan	Head of Section - Local Government Environmental and Forestry Agency	Palembang / Oct 24, 2018
10.	Siti Fatimah, SH, MH	Prosecutor - South Sumatra High Attorney General Office	

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11.	AKP. Priyatno, SH, SIK [Main]	Investigator - South Sumatra Regional Police	Palembang / Oct 25, 2018
12.	AIPDA. Manijo, SH [Assistant]	Investigator - South Sumatra Regional Police	

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## APPENDIX – 2

### CONSENT LETTER

**Title: Haze Pollution and Future Indonesia Environmental Policy: An Analysis of Enforcement Policy**

**Consent Form for Interviews: A Qualitative Sub-study on Perceptions of the Effectiveness of Law Enforcement**

Thank you for reading the Document A / B about the detail questionnaire interview sub-study. Please initial the boxes below to confirm that you agree with each statement:

*Terimakasih telah membaca dokumen A/B terkait detail kuesioner dalam interview sub-study. Mohon untuk memberikan checklist dalam kotak dibawah ini yang menunjukkan Bapak/Ibu menyetujui setiap pernyataan berikut:*

**Please,  
Initial  
box:**

I confirm that I have read and understood document A / B and have had the opportunity to ask questions. [*Saya telah mengkonfirmasi telah membaca dan mengerti dokumen A / B dan diberikan kesempatan untuk menanyakan hal-hal yang kurang jelas.*]

I understand that my participation is voluntary and that I am not wishing to answer any particular question or questions, I am free to decline. *[Saya memahami bahwa partisipasi dalam kegiatan ini adalah sukarela dan ketika saya tidak berkeinginan untuk menjawab atas pertanyaan spesifik, saya memiliki kebebasan untuk menolak.]*

I understand that my responses will be kept strictly confidential. I understand that my name will not be linked with the research materials and will not be identified or identifiable in the report or reports that result from the research. *[Saya memahami bahwa jawaban saya akan sangat rahasia. Saya memahami bahwa nama saya tidak akan ada dalam seluruh dokumen riset dan tidak akan diidentifikasi dalam laporan apapun terkait riset ini.]*

I agree for this interview to be tape-recorded. I understand that the audio recording made of this interview will be used only for analysis and that extracts from the interview, from which I would not be personally identified, may be used in any conference presentation, report or journal article developed as a result of the research. I understand that no other use will be made of the recording without my written permission and that no one outside the research team will be allowed access to the original recording—*[Saya menyetujui pelaksanaan wawancara ini direkam dalam alat perekam. Saya memahami bahwa recorder sebagai hasil dari interview ini hanya akan digunakan untuk analisis dan ekstraksi dari proses wawancara, dimana saya tidak akan diidentifikasi secara personal, akan digunakan dalam presentasi karya ilmiah dan penulisan jurnal ilmiah. Saya memahami tidak akan ada penggunaan lain tanpa memperoleh*

*ijin secara tertulis dari saya. Rekaman ini tidak dapat diakses dan digunakan selain oleh peneliti yang bersangkutan.*

I agree that my anonymized data will be kept for future research purposes, such as publications related to this study after the completion of the study. *[Saya menyetujui bahwa data anonym saya akan digunakan dalam tujuan riset selanjutnya seperti publikasi karya ilmiah dan penulisan disertasi untuk penyelesaian study.]*

I agree to take part in this interview. *[Saya menyetujui untuk berpartisipasi dalam wawancara ini.]*

\_\_\_\_\_  
Name of participant                      Date                      Signature

Principal Investigator                      Date                      Signature

*To be counter-signed and dated electronically for telephone interviews or in the presence of the participant for face to face interviews*

**Copies:** *Once this has been signed by all parties, the participant should receive a copy of the signed and dated participant consent form, and the information sheet. A copy of the signed and dated consent form should be placed in the main project file, which must be kept in a secure location.*

## APPENDIX – 3

### QUESTIONNAIRE IN IN-DEPTH INTERVIEW

No	Bahasa Indonesia	English Translation
1.	<i>Sudah berapa lama kah Anda bertugas dalam menangani kebakaran hutan dan lahan</i>	How long have you been in charge of / involved in handling forest and land fires
2.	<i>Mohon untuk dapat menceritakan secara umum tentang kasus kebakaran hutan dan lahan</i>	What is your opinion (view), in general terms, related to the land/forest fires case?
3.	<i>Mohon untuk menjelaskan peran dari institusi anda / peran anda dalam fungsi penegakan hukum dalam penanggulangan kebakaran lahan?</i>	Would you explain briefly related to your institution's role / your role in the law enforcement process in handling the land/forest fires?
4.	<i>Apakah anda pernah mendapatkan pelatihan terkait proses penegakan hukum atas kasus kebakaran hutan / lahan? Dan menurut anda apakah telah mencukupi?</i>	Have you ever received training related to the law enforcement process in cases of forest/land fires? Furthermore, in your opinion, do the training program adequate?
5.	<i>Berdasarkan kasus kebakaran lahan yang pernah Anda tangani selama ini, apakah penyebab utama dari terjadinya kasus - kasus tersebut?</i>	Based on the land fire case you have handled so far, would you explain further the leading cause of these cases?

6. <i>Siapakah aktor yang menjadi tersangka utama dari kasus tersebut? perusahaan atau petani?</i>	Who is the main suspect in the case? Company or farmer? Can you elaborate?
7. <i>Menurut Anda, bagaimanakah perbandingan proses penegakan hukum kebakaran lahan pada saat ini dengan proses penegakan hukum kebakaran lahan 5 tahun yang lalu? 10 tahun yang lalu?</i>	Observing the current law enforcement process for land/forest fires and then compare to the process of law enforcement for land/forest fires five years ago? Ten years ago? What is your opinion?
8. <i>Berdasarkan sudut pandang anda, apakah kebijakan terkait HUKUMAN bagi pelaku pembakaran lahan yang terdapat dalam UU 32/2009, UU 18/2004 - UU. 39/2014, KUHP dan UU. 41/1999 telah mencukupi dalam upaya melakukan perlindungan lingkungan dan penegakan hukum dalam kasus kebakaran lahan?</i>	Based on your opinion, is the policy related to PUNISHMENT for land burning actors regulated in Law 32/2009, Law 18/2004 - Law. 39/2014, Criminal Code, and Law. 41/1999 sufficiently protect the environment from land/forest fires cases?
9. <i>Menurut anda, apakah penegakan hukum atas pembakaran lahan dengan menggunakan Undang Undang tersebut telah memberikan efek jera kepada pembakar lahan?</i>	Does the law enforcement on land burning base on the current law already given a deterrent effect to the violators? What do you think of the enforcement activities?
10. <i>Berdasarkan sudut pandang anda, apakah diperlukan adanya alternatif aturan (kebijakan) untuk dapat lebih</i>	In your opinion, is there a need for alternative rules (policies) that can further

<p>meningkatkan efektivitas penegakan hukum terkait kebakaran lahan? Sebagai contoh melalui pendekatan ekonomi?</p>	<p>enhance the effectiveness of law enforcement to tackle the land/forest fires? For example, through an economical approach?</p>
<p>11. <i>Terkait dengan opini dan pemikiran anda sebelumnya pada angka 10, apakah industri perkebunan (utamanya perkebunan kelapa sawit) saat ini terbebani dengan aturan terkait kelestarian lingkungan dalam kasus kebakaran lahan?</i></p>	<p>Concerning your previous opinions in point 10, is the plantation industry (mainly oil palm plantations) currently burdened with regulations related to environmental sustainability in the case of fires?</p>
<p>12. <i>[PENYIDIK – PENUNTUT UMUM] Berdasarkan sudut pandang anda, apakah aparat penegak hukum (utamanya instansi anda) telah mendapatkan dukungan yang maksimal (dukungan anggaran termasuk sarana dan prasarana, sumber daya manusia ataupun kebijakan) dari PEMERINTAH PUSAT dalam menangani kasus kebakaran hutan dan lahan?</i></p>	<p>[INVESTIGATOR – PROSECUTOR] In your opinion, has law enforcement institution (especially your agency) received maximum support (budget support including facilities, infrastructure, human resources, or policies) from the CENTRAL GOVERNMENT in handling cases of forest and land fires?</p>
<p>13. <i>[PENYIDIK – PENUNTUT UMUM] Berdasarkan sudut pandang anda, apakah aparat penegak hukum (utamanya instansi anda) telah</i></p>	<p>[INVESTIGATOR – PROSECUTOR] In your opinion, has law enforcement institution</p>

<p><i>mendapatkan dukungan yang maksimal (dukungan anggaran termasuk sarana dan prasarana, sumber daya manusia ataupun kebijakan) dari PEMERINTAH DAERAH dalam menangani kasus kebakaran hutan dan lahan?</i></p>	<p>(especially your agency) received maximum support (budget support including facilities, infrastructure, human resources or policies) from the LOCAL GOVERNMENT in handling forest and land fires?</p>
<p>14. <i>[PENYIDIK – PENUNTUT UMUM] Apakah penganggaran (DIPA) yang dilakukan dalam proses penegakan hukum utamanya terkait dengan kebakaran lahan telah mampu memberikan dukungan kapasitas yang memadai bagi institusi?</i></p>	<p>[INVESTIGATOR – PROSECUTOR] Has the budgeting (DIPA) carried out in the process of law enforcement mainly related to land/forest fires been able to provide adequate capacity support for institutions?</p>
<p>15. <i>Sejauh pengetahuan anda, apakah proses penegakan hukum yang memerlukan dukungan anggaran paling besar dalam kasus kebakaran lahan?</i></p>	<p>As far as your knowledge, what is the process in law enforcement that requires the most significant budget support in the case of land fires?</p>
<p>16. <i>Apakah peningkatan anggaran akan mampu meningkatkan kapasitas institusi dalam memberikan efek deterrent yang lebih besar dalam proses penegakan hukum</i></p>	<p>Are the budget increase able to simultaneously increase the capacity of institutions to provide a more significant deterrent effect in the law enforcement process</p>

17. <i>Bagaimana menurut anda apabila peningkatan anggaran tersebut dibiayai melalui perluasan pengenaan pajak atas perusahaan/individu yang melakukan pembakaran lahan?</i>	What do you think if the increased budget is financed through the expansion of taxation on companies/individuals who burn land?
18. <i>[PENUNTUT UMUM] Berdasarkan pengalaman anda, dalam proses penuntutan di muka pengadilan hal apakah yang menjadi kendala utama untuk dapat melakukan pembuktian atas kebakaran lahan yang terjadi (baik melalui tindak pidana ataupun perdata lingkungan hidup)?</i>	[PROSECUTOR] Based on your experience, in the prosecution process in court, what is the main obstacle in being able to prove land/forest fire violation (either through criminal acts or environmental civil)?
19. <i>[PENYIDIK] Sejauh pengetahuan anda, bagaimana proses koordinasi antara Penyidik pada KemenLHK (Balai Pengamanan dan Penegakan Hukum) dengan Penyidik pada Dinas di Pemda dan Kepolisian dalam penanganan kasus kebakaran hutan?</i>	[INVESTIGATOR] Based on your knowledge, what is the process of coordination between Investigators at the Ministry of Environment and Forestry and the Investigator at the Local Government and the Police in handling forest fires?
20. <i>Apakah hambatan yang secara signifikan mempengaruhi KOORDINASI dalam proses penegakan hukum menanggulangi kasus kebakaran lahan?</i>	What are the obstacles that significantly affect COORDINATION in the law enforcement process in dealing with cases of land fires?
21. <i>Berdasarkan kasus kebakaran lahan yang pernah Anda tangani, pernahkah</i>	Based on the land fire case you have handled,

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*ada "pengaruh" (politik, masyarakat, pimpinan) untuk mempengaruhi proses penegakan hukum yang dilakukan? --  
> Mohon untuk dapat menjelaskan secara lebih detail.*

has there ever been an "influence" (politics, community, leadership) to influence the law enforcement process carried out? -> Please be able to explain in more detail by the example.

---

*22. Apakah terdapat saran ataupun pendapat lain terkait efektifitas penegakan hukum atas peristiwa kebakaran lahan yang ingin anda sampaikan?*

Are there any other suggestions or opinions regarding the effectiveness of law enforcement on land fire incidents that you want to convey?

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## APPENDIX – 4

### WORD CLOUD IN THE COURT VERDICT DATA



Analyzing the word frequency using Nvivo-12 will helps the concepts can be found in file demographic. Gathering all the content, the appendix presented lahan (land), saksi (witness), and kebakaran (fire) have emerged as the most frequent words.

# APPENDIX – 5

## CASE NODES IN Nvivo - 12

The screenshot shows the Nvivo 12 Pro interface for a project titled "Law Enforcement\_Court Decision Analysis (NVivo 12).nvp". The main workspace displays a tree view of nodes under the "Nodes" section. The nodes are organized hierarchically, with "Criminal\_prosecution" at the top level. Below it are "Case Summary", "Charges and Statutes", "Defendants", "Location of Offence", and "Sentencing Information". Each node has a sub-tree of related nodes. A search bar is visible at the top right of the workspace.

Name	Files	References	Created On	Created By	Modified On	Modified By
Criminal_prosecution	165	1766	14/11/2017 15:41	PARMIN	21/11/2017 10:23	PARMIN
Case Summary	119	457	13/11/2017 13:39	PARMIN	21/11/2017 10:23	PARMIN
monitoring	71	81	15/11/2017 1:07	PARMIN	05/12/2017 15:20	PARMIN
Period of Burning	118	118	15/11/2017 13:54	PARMIN	27/11/2017 15:01	PARMIN
Reason of Burning	118	130	15/11/2017 0:29	PARMIN	05/12/2017 11:00	PARMIN
Source of Fire	119	128	15/11/2017 0:29	PARMIN	21/11/2017 18:10	PARMIN
Charges and Statutes	121	252	13/11/2017 13:40	PARMIN	21/11/2017 10:23	PARMIN
Environmental Loss - Expert in Opinion	89	111	15/11/2017 0:30	PARMIN	27/12/2017 22:37	PARMIN
Public Prosecutor - Requisitoir	120	141	15/11/2017 0:30	PARMIN	03/12/2017 13:42	PARMIN
Defendants	165	427	13/11/2017 13:41	PARMIN	21/11/2017 10:23	PARMIN
Appeal	30	31	15/11/2017 0:38	PARMIN	21/11/2017 17:53	PARMIN
Custody	165	177	15/11/2017 0:38	PARMIN	23/11/2017 17:19	PARMIN
Who are the Defendants	165	219	15/11/2017 0:31	PARMIN	23/11/2017 23:02	PARMIN
Location of Offence	165	236	13/11/2017 13:42	PARMIN	21/11/2017 10:23	PARMIN
Burning Site	65	70	15/11/2017 0:39	PARMIN	04/12/2017 15:16	PARMIN
Kalimantan	28	29	15/11/2017 0:39	PARMIN	21/11/2017 10:23	PARMIN
Sumatra	137	137	15/11/2017 0:39	PARMIN	21/11/2017 15:44	PARMIN
Sentencing Information	118	394	13/11/2017 13:43	PARMIN	28/12/2017 11:11	PARMIN





**T**he absence of comprehensive regulation in tackling negative externalities of Haze Pollution in Indonesia creating severe and devastating effects of regional environmental crisis includes transboundary pollution spreading to the Southeast Asian Region. Based on this context and given the industrial background, what is the optimal mix of regulatory and market-based policies for pollution control that strengthen expected liability in deterring the Indonesia haze pollution case?

The theoretical framework is underlying that a single policy is not sufficiently flexible and resilient in addressing all environmental problems in all contexts. Tax as a market-based economic policy would be placing a direct cost on environmental damage; the polluter should bear the cost of measures to reduce pollution according to the extent of either damage done to society or the exceeding of an acceptable level. This book reveals that environmental policy that depends on the interaction of tax policy through strengthening the Tax Administrator's ability to identify the evasion and increase the tax revenue will produce a significant deterrence impact and reduce the hotspot. Moreover, even though the empirical results are observed the necessity of mixed policy, it cannot be ignored how the patronage would influence and overturn policy implementation in tackling environmental externalities.



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ISBN 978-623-6784-27-3

