Forest Policy and Economics 97 (2018) 67–72

Contents lists available at ScienceDirect

Forest Policy and Economics

journal homepage: www.elsevier.com/locate/forpol

# Online media seizure reports: A tool to monitor CITES implementation in regulating the international rosewood trade

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A B S T R A C T

Rosewoods are a group of timber species exploited and harvested heavily in the region of Southeast Asia predominantly for luxury furniture consumption in China. In this paper, we demonstrate the use of online media seizure reports as a tool to monitor enforcement and CITES implementations of rosewood (*hongmu*) species using Thailand as a case-study.

Three rosewood species are found in the region of Southeast Asia, including, Siamese rosewood (*Dalbergia cochinchinensis*), Burmese rosewood (*D. bariensis),* and Burmese paduak (*Pterocarpus macrocarpus*). We analysed 1895 independent seizure reports from January 2013 to December 2017. Despite Siamese rosewood accounting for the majority, we find that the other two species are also exploited for the same trade purposes through similar channels. The analysis suggests that while the border regions are key seizure activity zones, industrial shipping ports and sea-routes are also used to illegally export timber. The international scope of the trade in terms of unregulated movement of timber and humans poses regional security concerns. Inter-agency cooperation is vital in combatting the trade, both domestically and internationally.

Current domestic enforcement is found to not coincide with international regulations such as CITES. The role of CITES in regulating the rosewood trade in Thailand is still not effectively acknowledged. It is imperative for individual countries in the region to strengthen domestic legislation whilst also increasing regional cooperation to effectively acknowledge and enforce CITES regulations. The methods used in this study are novel and can be applied for policy management, offering information in a real-time manner which may otherwise be unavailable for timber species.

## 1. Introduction

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is an international agreement aimed to prevent the exploitation of and regulate the trade of wildlife and plant species (Blundell, 2007). With 183 signatory parties, managing authorities in respective countries feed wildlife trade data to a centralised database system (Phelps et al., 2010). Using the data of trade and market trends, CITES parties deliberates and imposes specific regulatory measures such as trade controls, licensing systems and electronic permits bans (Phelps et al., 2010). Furthermore, CITES works to ensure compliance, enforcement and strengthening of national legislation (Reeve, 2015).

The implementation of CITES falls under domestic laws established to protect endangered species within the country (Smith et al., 2010; Wei-Min et al., 2015). Since the establishment, trade of many species have been successfully regulated under CITES (e.g. Fuchs, 2010), however, in many cases, limitations and deficits which have been more commonly highlighted (Challender et al., 2015a). On a day to day basis, enforcement officers face fundamental issues like the ability to correctly identify species or where, geographically, to focus their efforts (Ugochukwu et al., 2018). In the larger perspective, factors such as non-compliance, lack of knowledge or anticipation of market trends, absence of consistent trade monitoring are factors which contribute to impose further general difficulty in enforcement (Bohannon, 2010; Challender et al., 2015b). Anticipation of market trends, for example, is crucial as it contributes to a better understanding of replacement species, and thus instead of enforcing proactive laws, enforcement agencies are often on the back foot in regulation and legislation (Barrett et al., 2010; Innes, 2010).

The illegal timber trade is a trade which accounts for nearly half of the total estimated value of illegal wildlife trade (INTERPOL, 2016). As a result, CITES is used as a tool to monitor the illegal trade of some endangered hardwood species (RBG Kew, 2017). Similarly to the trade in animals, CITES has had varied success in regulating the trade (Innes, 2010; Oldfield, 2013; Reeve, 2015). Here, we monitor the trade of rosewoods or *hongmu* (litt. meaning 'red wood' in Mandarin). Collectively known as the trade in rosewoods, the list of *hongmu* species as stated by the Chinese government consists of 33 species of rosewoods and others such as Paduak, originating from several genera (*Dalbergia*, *Pterocarpus*, *Diospyros, Cassia* and *Millitia*) across the world (Treanor, 2015). Previously, rosewoods were primarily harvested for music industry as instruments (Taylor et al., 2012), however, more recently, high exploitation rates driven from demand for luxurious furniture in China

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https://doi.org/10.1016/j.forpol.2018.09.004
Received 8 June 2018; Received in revised form 5 September 2018; Accepted 5 September 2018
Available online 18 September 2018
1389-9341/ 

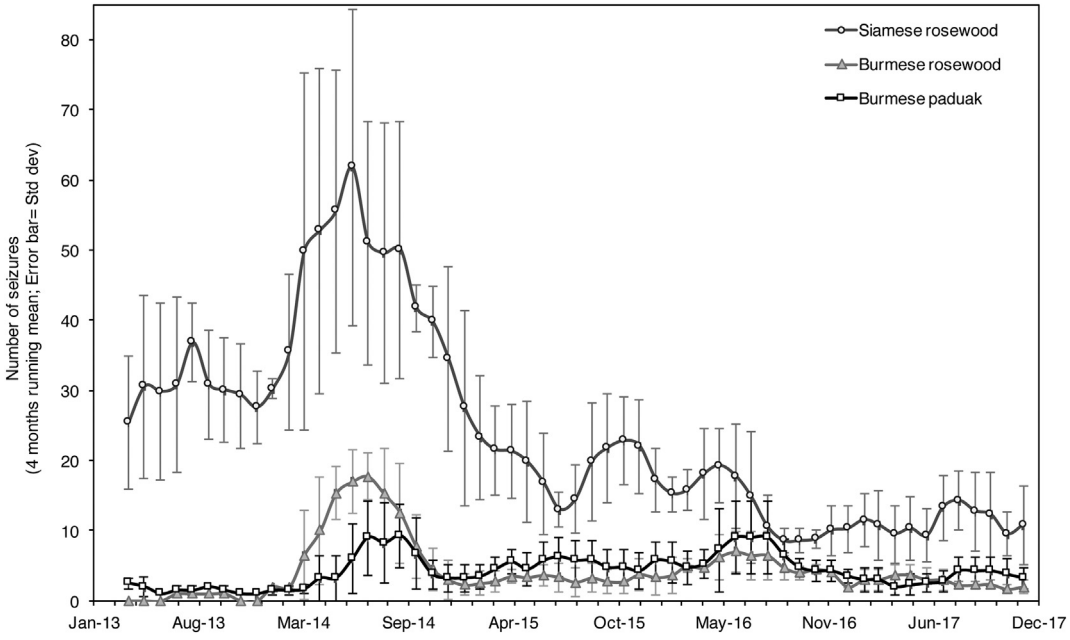


**Fig. 1.** Number of seizures (running average over 4 months) over time for 3 rosewood species from 2013 to 2017.

has spiked the monetary value of rosewood and resulted with a concerning future for species harvested for the rosewood trade (Zhang and Zeng, 2017).

Three *hongmu*-listed species, Siamese rosewood (*D. cochinchinensis*), Burmese rosewood (*D. bariensis)*, and Burmese paduak (*P. macrocarpus*) are found in Southeast Asian countries of Cambodia, Laos PDR, Vietnam and Thailand (EIA, 2015). In its range states, each country has set variable export quotas, and these three species are protected at different levels in each of these countries (EIA, 2017). With respect to international trade, two species are listed on CITES Appendix II, viz. Siamese rosewood, listed in 2013, and Burmese rosewood, listed in 2016 (CITES, 2016). An Appendix II listing is given to species which may become threatened with extinction and require monitoring and regulation (Smith et al., 2010). Burmese paduak has yet to be listed, even though it is a recognized commercially traded rosewood species (Reeve, 2015). The combination of inharmonious national legislation, porous borders and unstable governance within the region has led to the rampant and continual exploitation of rosewoods in the region (Phelps et al., 2010; Lin 2015; EIA, 2017). The effectiveness of enforcement implemented to deter the trade, whether at domestic or international level is difficult to gauge, especially considering the lack of monitoring of remaining rosewood stocks and future trade trends. This study therefore offers a timely case-study to examine domestic enforcement and the impact it has on compliances with international commitments.

In this study, online seizure reports were used to monitor the trade and evaluate the enforcement of rosewood trade in Thailand. We collected almost 2000 seizure reports over a five-year period. Data obtained from seizure reports include seizure location, suspect information, arresting agencies, relevant legislation referenced was used to establish a primary understanding of the trade patterns and law enforcement response. Given that two of the three study species are CITES-listed species, and that the monitoring period predated the time when Siamese rosewood was first CITES-listed, we take this opportunity to not only evaluate the domestic enforcement, but also the implementation of CITES. This study offers a valuable lesson in using open-sourced data to highlight the interlinked nature of regulatory policies and enforcement at domestic levels and shed light on how it may inform efforts to meet international obligations. Findings obtained can vitally inform the protection measures for the rosewood species in the region.

## 2. Methods

### 2.1. Data collection

Seizures were compiled from six online media (news) sites between January 2013 to December 2017, using search tags in Thai such as 'Siamese rosewood' (*mai phayung*), 'Burmese rosewood' (*mai chingchan*) and 'Burmese paduak' (*mai pradoo*). News agencies included *Manager* (manager.co.th), *Thairath* (thairath.co.th), *Daily news* (dailynews.co.th), *MCOT* (tnamcot.com), *Ban muang* (banmuang.co.th) and *Post today* (posttoday.co.th). The sites were selected as they were the most popular mainstream online media sources, and each site was monitored twice each year. Details of the seizures were collected where possible, for seizure date, location (district and province), number and/or volume seized, intended destination, suspect nationality, the arresting agency involved and the legislation applied to the case (cf. Siriwat and Nijman, 2018).

### 2.2. Analysis

Each seizure was treated as one unit of analysis. Raw logs and sawn logs (planks) were quantified in the same way. To predict and explain the provincial variation in the number of seizures and total number of logs seized, we used spatial and temporal factors. To evaluate the spatial trends and if there is potential for international trade, we used a distance variable of the shortest overland distance to a land border, using the district with the largest number of seizures as the centre point. To evaluate the temporal trends, overall number of seizures per month were analysed the five-year period.

All data were log-transformed prior to analysis. Statistical analysis was conducted using R version 3.2.1 (R Core Team, 2018), using simple linear (lm) model in R. The significance was accepted at $P < .05$ in a two-tailed test. Monetary values were only reported in Thai baht; these were converted to US$ (1 US$ = 32.5 Baht, January 2018; in the five-year period the range was 28.6 to 36.5 Baht).

## 3. Results

### 3.1. General overview of the rosewood trade

From January 2013 to December 2017, 1895 seizures were made, or a little more than one seizure a day. Siamese rosewood seizures accounted for most of the seizures ($n$ = 1429), followed by Burmese paduak ($n$ = 244), and Burmese rosewood ($n$ = 223). All three species showed a statistically significant decline in number of seizures over time (Fig. 1; linear regression; Siamese rosewood: t-test$_{1,59}$ = 11.42, $p \leq .05$; Burmese rosewood: t-test$_{1,39}$ = 6.69, $p \leq .05$; Burmese paduak: t-test$_{1,52}$ = 10.21, $p \leq .05$). In 60 reports, Burmese rosewood and/or Burmese paduak were cited as replacement species for Siamese Rosewood.

Seizures reported a range of 1 to 11025 logs seized. The average number of logs seized for Burmese paduak was highest among the three species at 187 logs per seizure ($n$ = 177), followed by Siamese rosewood at 97 logs per seizure ($n$ = 1293). A total of 1734 suspects were arrested (Thai = 987; Cambodian = 239; Laotian = 77; Vietnamese = 8; other nationalities = 2; no nationality given = 421). In 28% of reports (537/1896), authorities testified that suspects fled the scene.

### 3.2. Spatial patterns of rosewood seizures

Siamese rosewood seizures were concentrated in the northeast and eastern regions of Thailand, with occasional seizures in other provinces spanning a total of 45 provinces (Fig. 2). The number of seizures inversely correlated with the distance to the border ($F_{1,43}$ = 23.36, $p \leq .05$) with more cases the closer to the border. The eastern and north-eastern region, especially provinces along the Mekong River, remained key regions for the Siamese rosewood trade. This pattern was similar Burmese rosewood where seizures occurred mainly in the north and north-eastern regions; the number of seizures also statistically correlated with distance to the border ($F_{1,32}$ = 6.81, $p \leq .05$). The increasing pattern of seizures reported along the northeast border reflects similar trade paths used for both *Dalbergia* species. For Burmese paduak, more seizures were reported in the north, east, and western provinces of the country; no statistical spatial correlation was found for these seizures (linear regression: $F_{1,40}$ = 3.03, $p$ = .09).

Cases along the border were mostly within the forests between Thailand, Laos and Cambodia. In 40% of reports (751/1895) state the intended destination; there were 751 mentions of timber being transported out of Thailand, specifically to Laos ($n$ = 94) and Cambodia ($n$ = 39). China was frequently cited as the end consumer ($n$ = 114). The Mekong River region bordering Thailand and Laos was the number one region for rosewood seizures. Much longer smuggling routes also became apparent, including the export of illicit logs to Laos for certification which were then smuggled back into Thailand to be shipped off through Thailand's commercial shipping ports. Of the reports which stated export methods, 87% (351/402) identified the Mekong River as the main crossing point, 10% of seizures (39/402) passed through shipping ports or container terminals, with 3% (12/402) using shipping routes via the Gulf of Thailand. Only 5 reports explicitly stated that the timber was to be used for domestic consumption.

### 3.3. Enforcement agencies and legal regulations

From 1662 seizures which provided data on arresting authorities, multiple agencies were acknowledged and responsible for rosewood trade arrests ($n$ = 5171; Fig. 3). Seizures with single enforcement agencies responsible contributed to 14% (717/5171) of the total, whereas the remaining 86% (4454/5171) were multi-agency led seizures (see supplementary material T1). CITES management bodies or wildlife check point authorities were referred to in 35 media reports, and only one single seizure reported an international collaboration

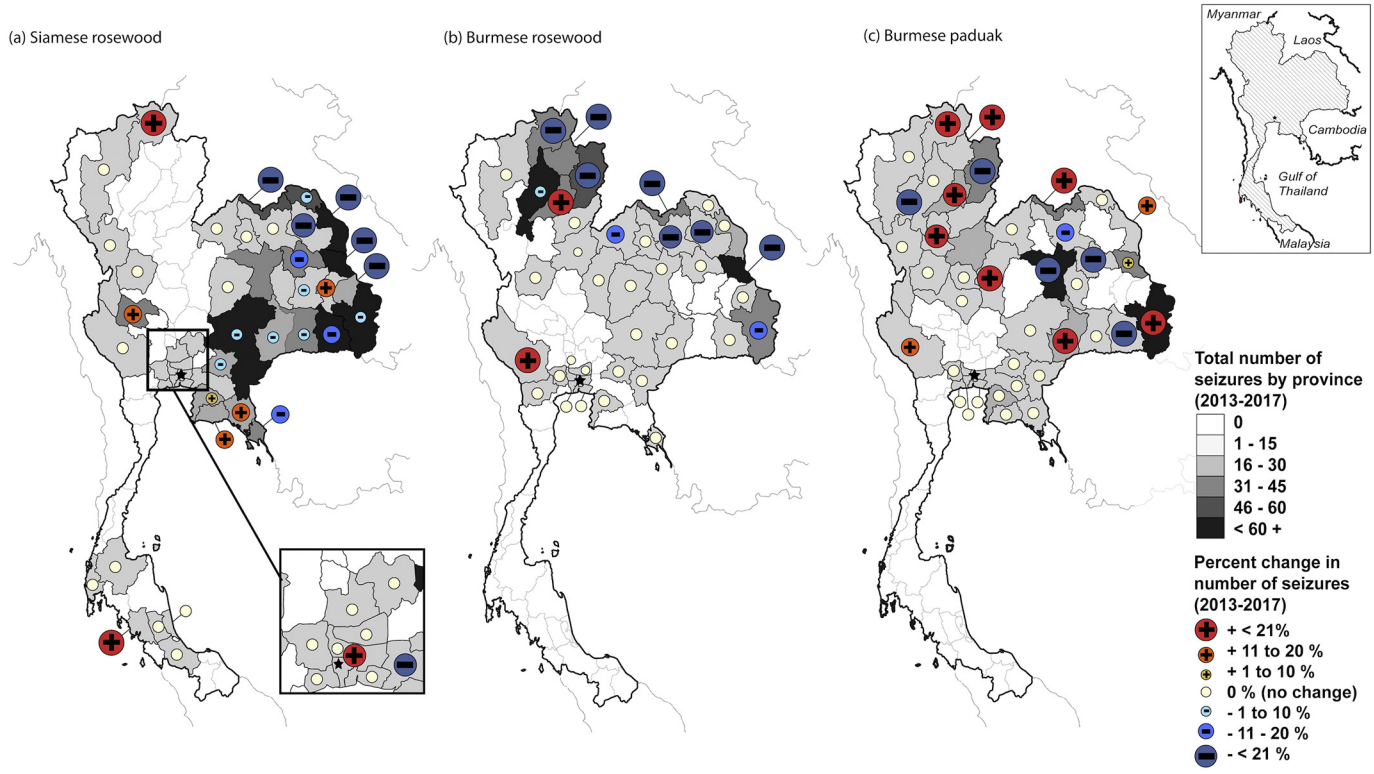


**Fig. 2.** The number of seizures for each province (base colour) mapped with the percentage change for the number of seizures over the five-year period (coloured circles) (symbols within circles indicate direction of change, + indicates an increase, - indicates decrease). (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

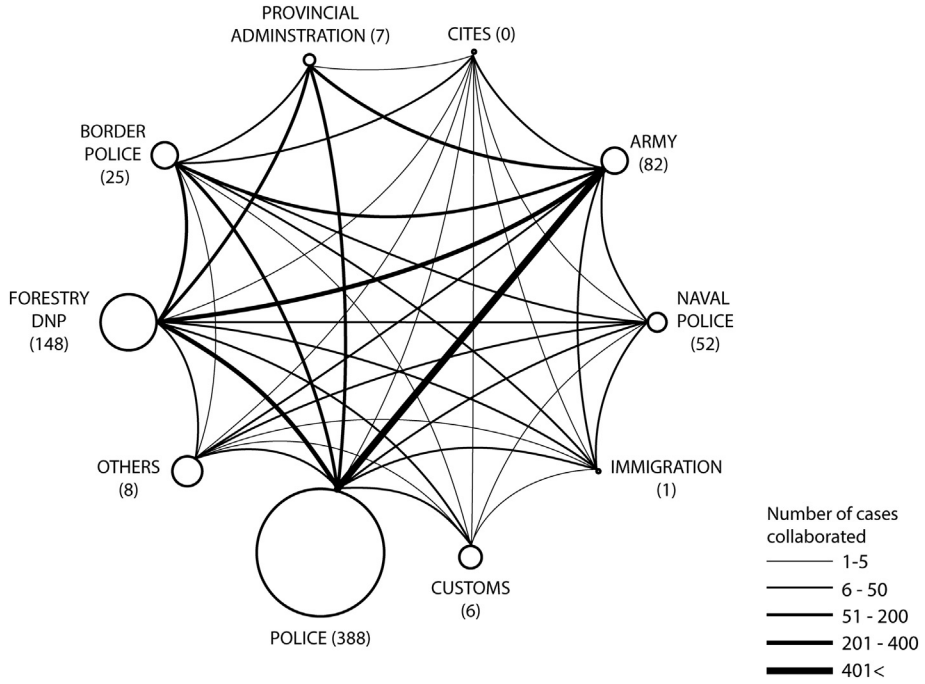


**Fig. 3.** Network of interactions between different arresting agencies involved in rosewood seizures in Thailand. Circles represent the single agency seizures, lines and thickness represent the interaction between different agencies.

**Table 1**
Specific laws within the Thai constitution as referenced by the news agencies, including description and frequency of acknowledgement.

| Legislation | Description | *n* |
|---|---|---|
| Forestry act (B.E. 2484) | Possession of over 0.20 cubic metres of Level A listed timbers, and other subsequent citations such as intention to conceal, sell and transport Level A listed timbers. Level A species are prohibited from trade unless in specially authorized | 680 |
| Chain Saw Act, (B.E. *2545*) | Regarding illegal machinery and set up of wood factories | 33 |
| Customs Laws Act (B.E. 2569) | Export of illegal contraband, fraud declaration and papers | 5 |
| National Parks Acts (B.E. 2507) | Illegal logging or illicit activity within a government protected area | 32 |
| Wildlife Protection Act (B.E. 2535) | Hunting or possession of prohibited wildlife species | 12 |
| Immigration Act (B.E. 2522) | Illegal movement of aliens across borders | 7 |
| Firearms, Ammunition, Explosives, Fireworks, and the Equivalent of Firearms Act (B.E. 2490) | Illegal possession of firearms | 13 |
| The *Drug Trafficking* Act (B.E. 2519) | Drug related charges | 18 |
| Anti-Money Laundering Act (B.E. 2542) | Money laundering charges | 6 |

between Thai and Cambodian authorities. Despite CITES regulations for rosewood trade and clear indications that the majority of seizures were of rosewood intended for international markets, only one of the media reports specifically mentioned the illegal rosewood trade as an infraction of CITES-related agreements. The media reports cited a range of laws and legal penalties from various statutes in accordance with the Thai constitution ($n$ = 834), the most frequent mention of which was 680 mentions of the Forestry Law Act (Table 1). Although there were stated arrests of 386 individuals from Cambodia, Laos, Vietnam and China, immigration laws were only mentioned 7 times.

## 4. Discussion

### 4.1. General overview of rosewood trade

The rosewood or *hongmu* trade in Thailand is present throughout the entire country, with spatial patterns which confirms the continued role of Laos and Cambodia as key players of the illicit trade. The majority of trade was clearly directed to China as an end consumer, as has been previously noted (Treanor, 2015; EIA, 2017; Siriwat and Nijman, 2018). Although the seizures of the three species decreased over the five-year period, the trade still yields significant volumes of logs being seized, averaging nearly one seizure a day over the five-year period. For Siamese and Burmese rosewood, a significant portion of seizures over the past five years occurred along the border, again underscoring the international dimension of the trade (Siriwat and Nijman, 2018). The Mekong river was found to be a common trade point as reported for other illicit wildlife transactions (Phelps et al., 2010), but also the growing role of industrial shipping ports emphasizes a way to bypass traditional routes across the Mekong river. At least a quarter of the suspects reported in the smuggling of illegal timber were non-Thai, yet there was no focus on the part of the authorities to invoke domestic immigration laws. Furthermore, it seemed that suspects, local and foreign, were often low-level actors driven by poverty; this reflects socio-economic issues which need to be further investigated and addressed to better understand the complex drivers of the trade (Oldfield, 2013).

### 4.2. Lessons on enforcement

The lack of acknowledgement of CITES in the illegal trade of these species raises a particular concern considering Thailand's key role in the trade of two CITES-listed rosewood species (Siriwat and Nijman, 2018). Legal loopholes, particularly related to standardised scientific names in

domestic Thai law has been highlighted previously (Siriwat and Nijman, 2018). In addition, laws related to the process of ensuring legality of timber and the production of timber furniture have also been highlighted as insufficient (Arjjuntr, 2015). The single case of collaboration between Thai and Cambodian authorities reflect that there is still potential for more international collaborations to combat the pathway of illegal logging. Although not all enforcement actions are necessarily the enforcement of CITES, national enforcement actions often shed light on efforts and direction the state is making to meet these international obligations.

Fundamentally, the effectiveness of CITES as a tool in providing regulatory framework for the sustainable international trade of timber funnels down to the effectiveness of local enforcement (Oldfield, 2013). Especially considering that individual countries differ in legal export allowances of rosewood logs, while realistically lacking in a legitimate system to check illegality of timbers, in combination with porous borders and unstable governance, ultimately leads to perpetuation of the illegal rosewood trade in the region (Phelps et al., 2010; EIA, 2015). For example, in 2017, Laos still maintained international exports of rosewood despite being issued a CITES export embargo for non-compliance in 2016 (To and Canby, 2017; EIA, 2017). The delay in enforcement opens up a channel for illegally sourced timber from countries like Thailand to still validly enter the international trade as long as it was exported out of Laos. Rosewood trade syndicates utilise these gaps in protection both within individual countries and on the regional scale, and have increasingly seem to shift their attention to replacement rosewood species, leading to increases in the harvest of lookalike species Burmese paduak (EIA, 2017).

All rosewood range states are signatories of CITES, however, not all countries have domestic legislation that meet the requirements for the implementation of CITES (Wei-Min et al., 2015). A CITES Appendix II listing of a species allows harvesting in limited volumes following a Non-Detriment Finding assessment (Smith et al., 2010). The problem lies in the fact that much of the available data to make these NDFs is outdated; the last surveys of natural rosewood stock inventories were conducted in the early 2000s (EIA, 2015). Furthermore, corruption and political will are crucial factors which influence enforcement of trade regulations (Vasquez, 2012). As a result, lack of recent data and loopholes in regulations and legislation allow for the (purposely) misidentification and misinterpretation, ultimately undermines the ability to effectively regulate the trade in any CITES-listed species (Reeve, 2015).

### 4.3. Recommendations

Despite the inevitable realities derived from political and economic limitations, CITES still provides one of the most robust frameworks for regulating trade of plant and animal species (Phelps et al., 2010). The establishment of a single economic community (Association of South East Asian Nations, ASEAN) is pushing the region towards expansion of infrastructure, connectivity, and telecommunications, with greatly reduced border controls, which will result in a decreased ability in controlling trade of wild fauna and flora (Rosander, 2008). Thereby, the region's priority should be to strengthen domestic legislation and adopt stricter regional measures in governance and cooperative enforcement, in order to effectively implement CITES, enforce such regulations and minimise loopholes to undermine those regulations (Zhou et al., 2016). Open communication channels, sharing of intelligence and legal strategies, monitoring of trade and non-compliance, utilisation of best practices and technical support between stakeholders, governments, NGOs, and other relevant agencies will be vital (Phelps et al., 2010).

### 4.4. Timber-specific initiatives collaborations

Media sourced seizure reports is an alternative source of data which offers real-time information on trade. However, the limitations of using seizure reports is that it addresses the issue at the intermediary stage of the supply chain, where logs have already been cut and seized. Currently, there are many other initiatives implemented globally to regulate various stages along the timber trade supply chain, especially ones which focus on legality of various stages of the train chain (Cashore and Stone, 2012). In addition to global agreements such as CITES, regional action plans such as the European Union's Forest Law Enforcement, Governance and Trade (FLEGT) as well as membership schemes from the International Timber Trade Organisation (ITTO) are existing frameworks aimed to strengthen the processes involved in legitimizing timber. Furthermore, collaborations between these initiatives, such as CITES-ITTO collaboration has shown positive results in increasing capacity and streamlining facilitation of verifications with positive results shown for initial projects of Agarwood (*Aquilaria spp.)* in Malaysia and Indonesia (ITTO-CITES, 2015). However, the successful implementation of any programme will require a solid foundation in terms of species identification and a robust legal framework to minimise loopholes for corruption and allow authorities to operate with more transparency and confidence (Ogden & Linacre, 2015; Ugochukwu et al., 2018).

## Acknowledgements

We thank the anonymous reviewer and Betty S. for their suggestions and comments.

## Conflict of interest

None.

## Role of funding source

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.forpol.2018.09.004.

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