




Gaps in CITES policy undermine conservation of threatened species by providing loopholes for illegal trade

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Rosewood, highly prized for its unique properties and coloration, is obtained from genera in several families, including Fabaceae (in particular *Dalbergia*), Meliaceae, and Proteaceae, and ebony comes primarily from species of *Diospyros* and *Euclea* (Ebenaceae); the taxonomy of most of these remains inadequate (Waeber et al. 2019). The precious timber trade prioritizes the quality of the wood over individual species, whose rarity and beauty make the wood highly sought after in the international wildlife and timber market, largely involving trade from African and Asian countries that generates more revenue than from elephant, rhino, and big cats combined (figure 1). Globally, illegal commerce in plants, animals, and their parts generates US\$71 billion–171 billion annually, making it almost as lucrative as trafficking drugs, arms, and people, and usually involves the same criminal syndicates (Anagnostou and Doberstein 2022).

The Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) is an international agreement among governments, with 184 contracting parties; only North Korea and South Sudan are not part of the convention. CITES aims to ensure that international trade in wild animal and plant species does not threaten their survival (for details, see the supplemental text). In June 2014, Singapore seized 29,434 rosewood logs worth US\$50 million that were illegally exported from Madagascar, marking one of the largest-ever seizures of CITES-protected species. Earlier that year, Kenya and Sri Lanka made similar seizures totaling 8069 rosewood logs. Despite legal proceedings and multiple trials and appeals in Singapore and Kenya, courts ruled that the logs should be returned to the shippers who had violated CITES and Madagascar's embargo on all rosewood and ebony trade. The failure of these national courts to understand the CITES status and related protections of the seized logs, along with Madagascar's direct and indirect interference, led to the failed prosecutions. It was only after the final legal determinations were made that CITES issued notifications confirming the logs were illegally exported in violation of the embargoes and were covered by

appendix II protections, but these notifications came too late to be considered during the Singapore and Kenya proceedings. In April 2022, Sri Lankan customs issued a tender for the sale of seized rosewood, without specifying the country of origin. These cases illustrate transactions violating zero-export embargoes and failed national CITES enforcement and prosecutions.

Treacherous gaps

Vigilant criminals take advantage of gaps in CITES policies and capacities, as well as national implementation, enforcement infrastructure, and legal systems, to trade rare and threatened species with little risk of criminal prosecution, jail, fines, or confiscation of seized material (Anagnostou and Doberstein 2022). Left uncontrolled, such trade will drive many species to extinction—contrary to the explicit purpose of CITES—thereby affecting global biodiversity. Criminal groups target these policy–capacity–prosecution gaps, which include inconsistencies between CITES decisions and national implementation and the varying abilities, as well as political and economic interests, of countries to implement CITES recommendations aimed at impeding illegal trade in animals and plants or their parts. The export of logs in violation of CITES and Madagascar's embargoes and the deficient management of seizures exemplify how damaging the current policy gap is, because it enables the laundering of illegally traded logs through legal resale, despite a zero-export embargo. Addressing disposal issues is critical if trade is to be controlled and the targeted species protected.

CITES seizures

Seized material of species listed on CITES appendices is subject to the laws of the country involved. Selling confiscated timber stockpiles can create new demand and encourage more illegal activity (Wilmé et al. 2020). However, despite increased international

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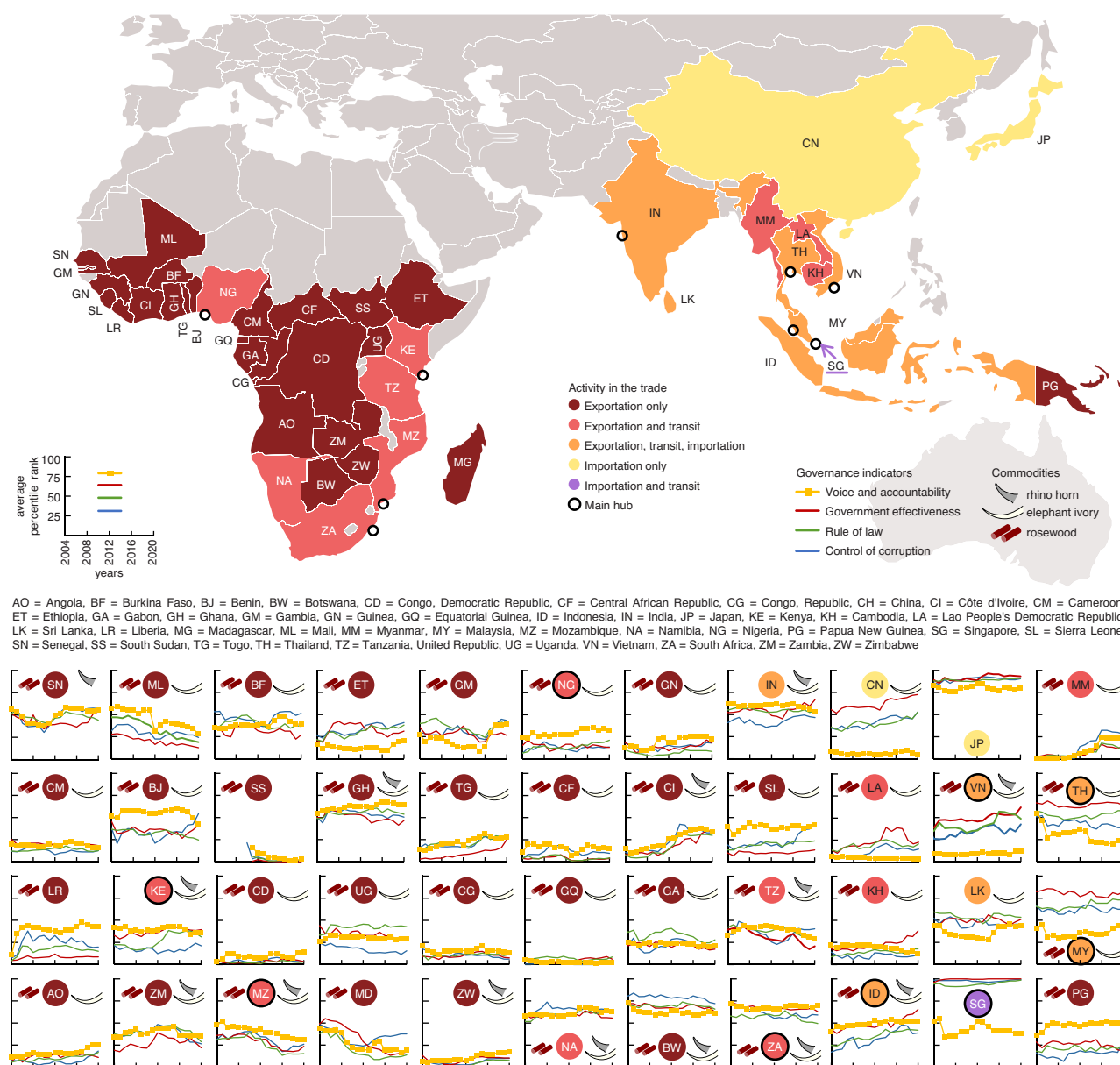


Figure 1. Countries in Africa and Eastern Asia involved in the trade of rosewood, rhino horn, or elephant ivory (map) and evolution of governance indicators from 2004 to 2020 for countries in Africa and Eastern Asia involved in the trade (graphs). During the early 2010s political crisis, the illegal trafficking of Malagasy rosewood was significantly affected by domestic enforcement capacity, exemplified by Mali's increased rosewood exportation during a period of low governance indicators and China's shift of rosewood purchases from Vietnam to Nigeria. This trade happens alongside ivory and rhino horn via enforcement gaps in major ports, with China and Vietnam being the primary demand sources for all three products. The World Wildlife Seizure database (World WISE), a global repository for wildlife seizures, records around 180,000 seizures between 1999 and 2018 involving some 6000 species from 149 countries and territories. The World WISE database gathers data from multiple sources, including CITES and allows CITES to review illegal wildlife trade patterns. Since CoP18 in 2019, CITES parties have been obligated to submit annual reports to the CITES secretariat. However, reporting is weak in some regions (e.g., Latin America, Africa), and some parties refuse to allow their data to be used for research purposes (UNODC 2020). Sources: Commodities according to <https://trade.cites.org>, www.poachingfacts.com/poaching-statistics; governance according to the Worldwide Governance Indicators, <https://info.worldbank.org/governance/wgi/>. (The online version of this image contains color.)

seizures, few traffickers are prosecuted. CITES issued guidance in 2016 on disposing of illegally traded material, but it does not adequately prevent illegal trade or ensure that disposals do not legalize wood in violation of embargos or exceed levels of trade detrimental to the species. CITES established a task force in 2019 to address illegal trade in tree species whose recommendations were adopted by the parties. However, this body did not address the disposal of seized timber or how to handle seizures exceeding quotas or violating embargoes. A new task force was created in November 2022 to provide species-specific guidance for

establishing nondetriment findings (NDF) of high-value timbers, focusing on sustainable quotas and forest inventory protocols.

CITES CoP19 actions put Malagasy rosewood and ebony at risk

The 2022 Panama CoP19 took no action regarding the 40,000 rosewood logs seized in Singapore, Kenya, and Sri Lanka, indicating that seizures are domestic matters. However, without postconfiscation measures, the logs will surely enter the illegal

rosewood trade to China. The thousands of rosewood and ebony logs stockpiled in Madagascar were also discussed at CoP19, with Madagascar directed to strengthen management of all timber stockpiles, but reference to specific actions to ensure sustainable trade were removed. Allowing Madagascar to proceed with proposed domestic commercialization of the official stockpiles could very well create a perfect laundering machine, with renewed trafficking pressure, putting remaining trees at risk. Implementation of explicit, robust control of domestic exploitation and export is imperative to prevent continued illegal trade and increased risk to rosewood and ebony species.

Malagasy rosewood is political timber; past elections have coincided with spikes in illegal trafficking from the stockpiles (Waeber et al. 2019). 2023 is another presidential election year, and the pressure to renew trafficking will increase.

Saving rosewood and ebony: Mitigating gaps in trade and implementing science-based solutions

Although the proposed solutions presented below apply to three main types of illegal trade (rosewood, elephant ivory, and rhino horn), the focus will remain on rosewood because of the vast array of source species, although there are also over 27,700 CITES-listed orchid species, most on appendix II and some on appendix I, which require different management because their trade involves living plants. Rosewood and ebony species are highly threatened (Lowry et al. 2022, Phillipson et al. 2022), making it crucial to reduce Chinese demand for these products or cease all trade, including of lookalike species. Impactful decisions are urgently needed, but until they are implemented, we suggest three measures to mitigate current gaps.

Handling of seizures

Expand the work initiated by the CITES Task Force on Illegal Trade in Specimens of Listed Tree Species to include storage, genetic sampling, and disposal of seizures of CITES-listed tree species. When illegal shipments of listed material are seized, the parties must require that they be stored in secure facilities until the species identity and country of origin are verified. When needed, the seizing party must collect samples for independent identification, although time-consuming, robust, well-informed NDFs are currently the only tool available to authorize trade of CITES-listed tree species, and NDFs must be used for any proposed disposals.

Disposal of seized logs

Currently, the disposal of seized material can occur without an NDF, under resolution conference 17.8, to facilitate the expedient recovery of storage and other costs. However, the disposal of logs exported in violation of an embargo or national quotas can result in the conversion of illegal timber into legal material, contradicting CITES directives. Before disposing of seized timber, the seizing party should be required to prepare an NDF for each species, in coordination with the scientific authority of the country of origin, to ensure that no harm to its survival will result. Furthermore, the party should conduct a legal acquisition finding assessment and ensure that disposal does not de facto legalize illegally exported timber. If a sale is contemplated, the seizing party should undertake an economic assessment to maximize revenue while minimizing increased demand. Selling large quantities of seized timber, such as Madagascar's current stockpile of rosewood and ebony, estimated at over 500,000 logs, will lead to increased de-

mand and will create pressure for further illegal exploitation, rendering ineffective the benefits of listing Malagasy rosewood and ebony species on appendix II. It is therefore imperative to halt illegal logging and trade in these precious woods permanently.

Science-based monitoring and tracking

Progress is being made on monitoring and tracking Malagasy rosewood and ebony. Species limits have been clarified, and their threat status has been assessed (Lowry et al. 2022, Phillipson et al. 2022). Identification tools have been developed for standing trees but are not yet fully available for logs or cut wood. Methods are being tested for selected Malagasy species using wood anatomical features (Sandratriniaina et al. 2021), near-infrared spectroscopy and direct analysis in real time time-of-flight mass spectrometry spectral signatures, and DNA barcoding tools, which could be complemented by convolution neural networks and chemotyping (He et al. 2018, Rocha et al. 2021). Techniques are also being developed for near real-time forest monitoring of illegal activities, although this is useful only if accompanied by effective enforcement. However, the ecology, range, and key parameters (such as population size and growth or replacement rate) of these species are poorly known, which precludes formulating well-informed NDFs. More research and development of validated databases and reference libraries are required to gain clarity and support reliable protocols for efficient and legally defensible control and enforcement.

These key points apply to all seizures, regardless of species, but the scope and consequences of resale remain largely undocumented. To combat environmental crime and effectively implement CITES, evidence-based monitoring and model legislation and decision-making must be improved. CITES must provide assistance to countries that make seizures. Further exploration of counterfactual scenarios is necessary before disposing of seized CITES-listed timber species. Reliable information and science-based decision-making are crucial for protecting species from extinction, informing sustainable management, and monitoring exploitation, trade, and stockpiles.

Supplemental material

Supplemental data are available at BIOSCI online.

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