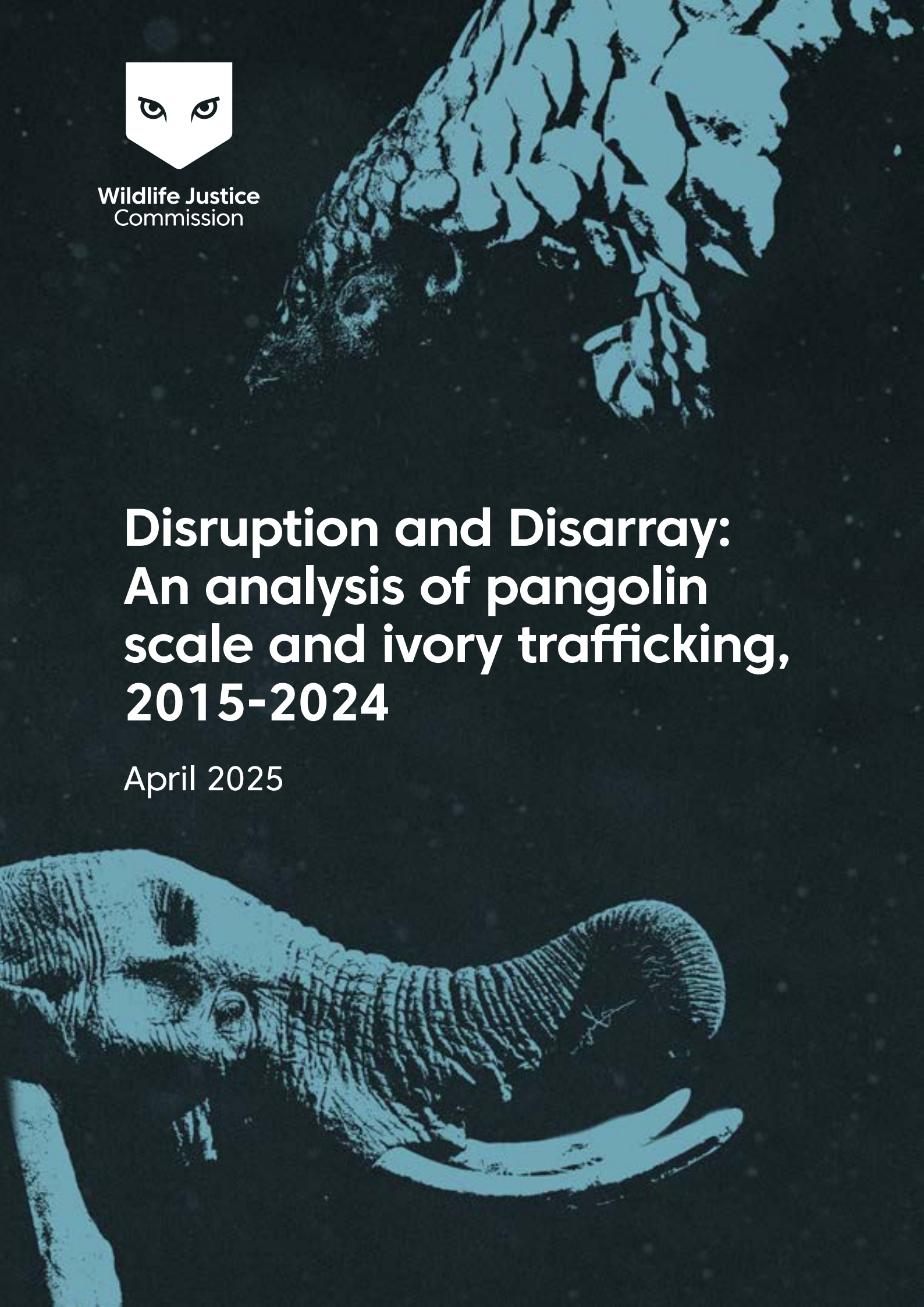
Wildlife Justice Commission

Disruption and Disarray: An analysis of pangolin scale and ivory trafficking, 2015-2024

April 2025



Acknowledgments

The development of this report was made possible with support from the Dutch Postcode Lottery, Arcadia and the Elephant Crisis Fund.

RECOMMENDED CITATION

WJC. 2025. Disruption and Disarray: An analysis of pangolin scale and ivory trafficking, 2015-2024. Wildlife Justice Commission (WJC).

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Acronyms

CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
DRC	Democratic Republic of Congo
PDR	(Lao) People's Democratic Republic
RMB	Chinese Renminbi
SAR	(Hong Kong) Special Administrative Region
UNTOC	United Nations Convention against Transnational Organized Crime
USD	United States Dollar
WJC	Wildlife Justice Commission

Executive Summary

In 2019, pangolin scales and ivory were being trafficked from Africa to Asia in extraordinary quantities. Two record-breaking pangolin scale shipments were seized just days apart in Singapore totaling more than 25 metric tons,[1] while three record-breaking ivory seizures were made in Vietnam, Singapore and China also amounting to more than 25 metric tons.[2] Rapid growth in the average shipment size pointed to the involvement of organized crime networks operating at an industrial scale, due to the significant financial capital, business infrastructure and corrupt connections required to move large shipments across continents with such frequency. Then in 2020, triggered by the global shock of the COVID-19 pandemic, pangolin scale and ivory seizures plummeted and have remained comparatively low in the years since.

The disruption was sudden and remarkably, it appears to be holding. In addition to the effects of the pandemic, recent intelligence suggests that important law enforcement efforts, fluctuations in price dynamics and changing market demands could be contributing to a substantial reduction in the illegal trade of both pangolin scales and ivory compared to the pre-COVID years.

This report presents an updated analysis of ivory and pangolin scale trafficking trends over the past decade, comparing the pre-pandemic period from 2015-2019 with the post-pandemic period from 2020-2024. It is based on reported seizure data, open-source research, and criminal intelligence and investigation findings from the Wildlife Justice Commission (WJC).

"The disruption was sudden and remarkably, it appears to be holding."

1. 12.9 metric tons of pangolin scales seized on 3 April 2019 and 12.7 metric tons of pangolin scales seized on 8 April 2019.
2. 9.12 metric tons of ivory seized in Vietnam on 26 March 2019, 8.8 metric tons of ivory seized in Singapore on 21 July 2019, and 7.48 metric tons of ivory seized in China on 30 March 2019.

Summary of key findings

Analysis period	2015 TO 2024
Pre-pandemic period	2015 TO 2019
Post-pandemic period	2020 TO 2024
Number of seizure incidents analyzed	2,201
Target commodities	Pangolin scales and elephant ivory tusks or pieces
Seizure locations	Across the globe
Types of seizures analyzed	Significant seizures, specifically multi-ton and large-scale seizures

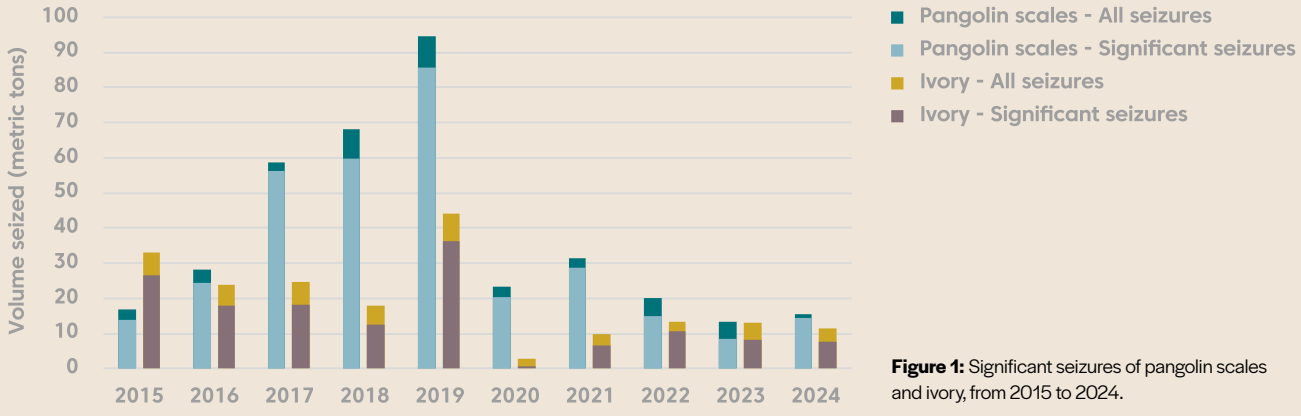


Figure 1: Significant seizures of pangolin scales and ivory, from 2015 to 2024.

- **A small number of significant seizures**[3] **comprised the majority of the volume of scales and tusks seized,** which is a strong indicator of the involvement of organized crime networks in the supply chains of these products due to the extensive resources needed to procure and move large-scale shipments.

- Since the disruption of the pandemic, there has been **a substantial decrease in the number of multi-ton seizures** and a **subsidence of the trend for combined shipments of both pangolin scales and ivory.** While this could point to organized crime networks getting better at evading detection, fewer large consignments could also indicate a lower risk appetite for criminal networks to bear the financial losses caused in the event of law enforcement interception.

- **An increased proportion of multi-ton seizures are occurring in Africa prior to export,** which could point to a greater proactive law enforcement response in African hotspots.

- **No significant pangolin scale seizures have been reported at any seaport globally for three years**[4] **or airport for more than five years.**[5] The relative absence of pangolin scale seizures at the demand side of the supply chain could suggest a diminished capacity of organized crime networks to move their goods out of Africa.

- While a **shift appears to be emerging from Nigeria to other African countries for sending ivory shipments to Asia,** persistent stockpile seizures in Nigeria suggest that it **continues to be a key export hub for pangolin scale shipments.**

- **Criminal networks appear to adopt a fluid approach to commodity choice,** diversifying their investments to take advantage of high demand and rising market prices of either product. The flexibility of networks to adapt to changes in the market and deal interchangeably with pangolin scales and ivory highlights the importance of targeting the criminal networks, rather than the product, to address this problem.

- **Pangolin scale values have declined and stabilized** at lower levels at both the supply and demand ends of the supply chain. **Ivory values declined by around 50%** across the supply chain in the pre-pandemic period, **then were relatively stable in Africa in the post-pandemic period.** Steady product prices alongside the ongoing but lower levels of product seizures could point to continued existence of market demand for both commodities.

3. The analysis in this report drills down on "significant seizures" as a subset of the pangolin scale and ivory seizure data. These are characterized as large-scale seizures that can be attributed to high-level suppliers and senior buyers acting on behalf of criminal networks, and they therefore contribute to the intelligence picture of the criminal dynamics of the major networks. Significant seizures are further defined in the Methodology section of this report.

4. A shipment of 6.2 metric tons of pangolin scales and 456 kg of ivory was seized at Tien Sa Port in Da Nang, Vietnam in January 2022: https://en.vietnamplus.vn/six-tonnes-of-ivory-and-pangolin-scales-seized-at-tien-sa-port-post220730.vnp

5. A shipment of 1,530 kg of pangolin scales was seized at Port Harcourt International Airport in Nigeria, reported in October 2019. The shipment was destined for China. Refer to: https://guardian.ng/NEWS/CUSTOMS-SEIZES-N826M-PANGOLIN-SCALES-TOMATO-PASTE-OTHERS-IN-PORT-HARCOURT/

Conclusions

The impact of the COVID-19 pandemic on the trafficking of pangolin scales and ivory from Africa to Asia cannot be overstated. It wreaked havoc on the transcontinental wildlife supply chains and upended the unsustainable trajectory of the trafficking of these commodities. Although the pandemic generated the initial shock, it is surmised that strengthened and targeted law enforcement efforts may have also contributed to fundamental change in the global wildlife crime landscape. The current intelligence picture suggests a major reduction in the trafficking of both commodities, which appears to have stabilized at relatively low levels compared to the pre-pandemic period.

However, intelligence gaps remain on the extent to which pangolin scale and ivory shipments are successfully entering supply chains in Asia, despite the apparent slowing down of seizures. Key questions include whether shipments are no longer being detected due to the use of more sophisticated concealment methodologies or changed modus operandi, or whether networks have procured better corruption settings at the receiver ports to facilitate more secure importation of goods. Limited data on pangolin population levels also means the possibility of a scarcity of product contributing to the drop in transnational trade cannot be ruled out, although the ongoing large stockpile seizures in Africa and steady pricing trends suggest this is unlikely to be the case just yet.

While the root causes of the disruption in the trafficking landscape are likely varied and complex, investigation findings indicate that proactive law enforcement efforts targeting the primary criminal networks in African hotspots with arrests and prosecutions are having an important impact. Intelligence from WJC investigations has found that fear and breakdown in trust among the networks at the supply side is resulting in an increased perception of risk and a stalemate scenario between wholesale suppliers, Asian buyers, and brokers that is thwarting their ability to do business.

Law enforcement results achieved by Chinese and Nigerian authorities have had a highly disruptive impact on the criminal landscape in a relatively short period of time, underlining the effectiveness of a consistent and targeted criminal justice approach. Several good practices and policy recommendations can be identified that should be adopted by other key countries along the supply chain to expand and sustain the current disruptive impact and reduce the risk of crime displacement to other locations.

Good practices and policy recommendations

- **A top-tier targeting strategy** to map the criminal networks and identify and target the crime bosses, financiers, and high-value linchpins who play a crucial role in the network's activities.

- **In-depth and long-term investigations** for effective penetration of the networks, to corroborate intelligence and collect robust evidence of their criminal activities.

- Use of an array of **intelligence analysis and special investigative techniques** to assemble the details of large, complex cases and build an irrefutable brief of evidence for prosecution. Such techniques include, for example, undercover investigations, covert surveillance, lifestyle analysis, and financial intelligence analysis.

- **Conducting further investigation after seizures** to identify, arrest and prosecute those responsible for supplying the product and organizing shipments. Asset forfeiture is also a powerful tool to deprive perpetrators of the proceeds of crime, as has been applied by China against high-level traffickers.

- **Involving prosecutors early in the investigation** to ensure evidence is collected lawfully and is admissible in court. Engagement with prosecutors can help shape investigative strategies so they are geared towards evidence collection.

- **International cooperation** including intelligence sharing and joint investigations with other countries connected to the criminal networks, to tackle crimes holistically across the supply chain. This can lead to further arrests and prosecutions and amplify disruption within the broader network.

- **Public-private partnerships** between law enforcement agencies and the private sector (including civil society organizations, financial institutions, the transport sector, and academia) can provide valuable technical assistance and capacity building support to assist with investigating transnational wildlife crime networks.

- **Better utilization of UNTOC tools and increased prioritization of wildlife crime** are key to ensure these crimes are tackled in an effective and enduring manner. Of most pertinence are the provisions for special investigative techniques, international cooperation, joint investigations, confiscation and seizure of proceeds of crime, and mutual legal assistance.

Introduction

Pangolins gained unfortunate notoriety as one of the most heavily trafficked wild mammals in the world when illegal trade in their scales became a global issue around 10 years ago. There are eight recognized species of pangolin, four found in Asia and four in Africa.[6] Although their meat, skin and scales have been traditionally consumed for various purposes in both regions, during the 2010s vast quantities of African pangolin scales began to be smuggled to service a booming demand in Asia.[7]

In response to the alarming magnitude of the trade, the eight known pangolin species were transferred to Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) in 2016, banning international commercial trade.[8] However, the trafficking trend continued to accelerate. The enormous volume of African pangolin scales that were seized from illegal trade globally between 2015-2019 speaks to the intensity of the exploitation of these animals during this period.[9] In 2019, global seizures of pangolin scales reached an all-time high at more than 100,000 metric tons.[10]

At the same time, 2019 also saw one of the largest volumes of elephant ivory ever seized from illegal trade, reported to be around 50 metric tons.[11] This included three record-breaking seizures of ivory in Vietnam, China, and Singapore, which together amounted to more than 25 metric tons.[12]

Elephant ivory has long been a sought-after and precious commodity in many parts of the world, sold for its artistic, investment and status value.[13] As with pangolin scales, in the global illegal trade it is predominantly sourced from poached African elephants and trafficked in large shipments mainly to Asian markets. The wave of elephant poaching that gripped Africa in the mid-2000s is believed to have peaked around 2011 and caused an estimated 30% loss in African elephant

6. Genomic analysis of pangolin scales has led to recent proposals for two new Asian pangolin species. *Manis mysteria* was identified as a potential ninth pangolin species in September 2023: https://www.pnas.org/doi/10.1073/pnas.2304096120. The potential tenth species *Manis indoburmanica* was announced in January 2025: https://indianexpress.com/article/cities/kolkata/zsi-discovers-3-4-million-year-old-species-of-pangolin-9771201/

7. UNODC (2020), World Wildlife Crime Report, pp.65-66.

8. https://news.mongabay.com/2016/09/commercial-trade-in-all-eight-pangolin-species-has-just-been-banned/

9. WJC (2020), Scaling Up: The Rapid Growth in the Industrial Scale of Trafficking of Pangolin Scales.

10. UNODC (2024), World Wildlife Crime Report, Case Study 6: Pangolin Scales, p.5.

11. According to reported data from the Elephant Trade Information System (ETIS) database, global ivory seizures in 2019 were on par with seizures in 2011 and surpassed only by seizures in 2013. Refer to CITES SC77 Doc. 63.1 (Rev.2), page 27.

12. WJC (2019), Snapshot Analysis of Ivory Smuggling, 2015-2019: Concealment, routes and transportation methods, p.2.

13. UNODC (2020), World Wildlife Crime Report, p.47.

populations in just seven years, generating an enormous supply of ivory for the illegal trade.[14] Global ivory seizures peaked two years later in 2013 at more than 60 metric tons.[15] During the following years, the illegal ivory trade appeared to be abating as elephant poaching rates slowed, domestic ivory markets closed in several countries – most notably China[16] – and the number of seizures of illegal shipments was decreasing.[17]

However, a spike in the amount of ivory seized in 2019 belied this apparent declining trend. Analysis of the seizure data suggested that fewer but much larger ivory consignments were being shipped, with the average weight of shipments more than doubling between 2015 and 2019.[18]

The WJC's analysis of the criminal dynamics for pangolin scales[19] and ivory trafficking[20] in 2019 identified important commonalities for both products: the emergence of a prominent supply chain link between Nigeria and Vietnam, the dominance of sea cargo transportation routes, and the increasing prevalence of large, mixed shipments of both commodities. Rapid growth in the average size of shipments of these products pointed to the involvement of organized crime networks operating at an industrial scale, given the financial capital, access to business infrastructure, and corrupt connections required to ship large-scale consignments.

Then in 2020, the arrival of the COVID-19 pandemic catalyzed a striking shift in the global wildlife trafficking landscape. Unprecedented border closures, lockdowns and travel restrictions across the world had severe and immediate impacts as traffickers struggled to move and deliver products.[21] Pangolin scale and ivory seizures plummeted, and they have remained comparatively low in the years since. In addition to the effects of the pandemic, intelligence suggests that important law enforcement efforts, fluctuations in price dynamics and changing market demands could be contributing to a substantial reduction in the illegal trade of both products compared to the pre-COVID years.

14. Chase et al. (2016), Continent-wide survey reveals massive decline in African elephants. https://peerj.com/articles/2354/
15. CITES SC77 Doc. 63.1 (Rev.2), page 27.
16. http://www.gov.cn/zhengce/content/2016-12/30/content_5155017.htm
17. UNODC (2024), World Wildlife Crime Report, Case Study 4: Elephant ivory, p.2.
18. Ibid.
19. WJC (2020), Scaling Up: The Rapid Growth in the Industrial Scale of Trafficking of Pangolin Scales.
20. WJC (2019), Snapshot Analysis of Ivory Smuggling, 2015-2019: Concealment, routes and transportation methods.
21. WJC (2020), Rapid Assessment of the Impact of COVID-19 on Wildlife Trafficking.

Purpose of this report

This report presents an updated analysis of ivory and pangolin scale trafficking trends over the past decade, comparing the five-year period from 2015-2019 (broadly referred to as the pre-pandemic period) with the most recent five-year period from 2020-2024 (broadly referred to as the post-pandemic period). It is based on reported seizure data, open-source research, and criminal intelligence and investigation findings from the WJC. The purpose of this report is to share up-to-date findings and provide a current assessment of the criminal dynamics and changes in the criminal landscape, to help inform law enforcement strategies and policy decision making and ensure the global response is appropriately targeted to current and future needs.

This report examines trends in both pangolin scales and ivory together due to the high rate of convergence in their supply chains. From 2017 to 2019 there was a growing trend in the inclusion of both commodities in large, combined shipments. WJC investigations have also found that many of the criminal networks operating at the upper echelons of the trade deal interchangeably with these two commodities. From a criminal intelligence perspective, it is useful to analyze pangolin scales and ivory together for a deeper understanding of how the trafficking landscape has changed and the key factors involved.

This is the first in a trilogy of WJC reports that will examine different aspects of the global pangolin scale and ivory trafficking landscape.

Scope

Analysis in this report is focused primarily on the aspects of the supply chain involving the highest levels of criminality.

I Trafficking

This middle stage of the supply chain, between the supply of commodities and distribution to demand markets, is dominated by organized crime networks due to the significant financial capital required to consolidate large enough volumes of product to ensure a profitable shipment, as well as the requisite access to business infrastructure and corrupt connections to facilitate the cross-continental movement of these shipments. The report includes only limited analysis of the upstream sourcing of scales and ivory and the downstream retail sale of these products in destination markets, as organized crime networks play less of a role at these stages.

II Scales and tusks

The analysis is concentrated on the trafficking of pangolin scales as opposed to pangolin meat, skin, claws or other body parts, or whole or live pangolins; and raw ivory tusks and pieces of tusks as opposed to carved ivory or other elephant products; as pangolin scales and ivory tusks are the primary commodities of these two species that criminal networks are trafficking internationally in large quantities.

III Africa to Asia flows

The major flows of pangolin scales and elephant ivory in the criminal supply chain are moving from Africa to Asia because greater quantities of both products can be sourced far more efficiently in Africa. The African elephant population is approximately 10 times larger, and both the males and females have tusks, compared to Asian elephants where only some males and no females grow tusks.[22] With pangolins, depleted populations of the Asian species drove the trafficking networks to turn to African pangolins in the 2010s to service the demand.[23] Although Asian pangolin scales and ivory from Asian elephants do occur in illegal trade, this report is focused on the much larger commodity flows originating from Africa that are more likely to be associated with organized crime.

IV Significant seizures

The analysis drills down on "significant seizures" as a subset of the pangolin scale and ivory seizure data. These are characterized as large-scale seizures that can be attributed to high-level suppliers and senior buyers acting on behalf of criminal networks, and they therefore contribute to the intelligence picture of the criminal dynamics of the major networks. Significant seizures are further defined in the Methodology section of this report.

22. https://www.worldwildlife.org/species/elephant
23. UNODC (2020), World Wildlife Crime Report, pp.65-66.

Methodology

I Seizure dataset collection

The seizure dataset analyzed in this report was compiled from WJC's database holdings, which are collected primarily from media articles, law enforcement press releases, court records, and other published reports. It was cross-checked with data from the Wildlife Trade Portal curated by TRAFFIC.[24] The dataset consisted of a total of 2,201 seizure incidents involving pangolin scales and/or elephant ivory tusks or pieces, occurring at any location globally, during the period from 1 January 2015 to 31 December 2024.

Although the dataset is substantial, it is limited by the fact that not all countries publicly report pangolin scale or ivory seizures, nor are there standard procedures in reporting seizures, resulting in varying levels of detail available. Some reports may also have been missed during the collation of seizure records. The seizure data is therefore not an exhaustive record of all global pangolin and ivory seizures since 2015, but nonetheless it provides a basis from which to conduct an indicative analysis of major criminal trends.

As seizure data only reveals the detected and reported instances of illegal trade where there has been law enforcement effort, it represents a small fraction of the real quantities being trafficked and must be interpreted with caution. To assist with making inferences between seizure data analysis and the realities of illegal trade, intelligence and findings from WJC investigations have been integrated throughout this report as another source of information.

II Significant seizures

The dataset was analyzed to identify "significant seizures", which are more likely to represent the work of organized crime networks. These seizures fell into two categories:

- **Multi-ton seizures:** Referring to seizures with a total weight exceeding one metric ton of either pangolin scales, ivory, or a combination of both products. Multi-ton shipments require substantial financial outlay, resilience to the financial risk posed by law enforcement interception and loss of product, and access to corrupt transport enablers and settings – all factors that point to the presence of organized crime networks.

- **Large-scale seizures:** Referring to seizures that are less than one metric ton in weight but are still considered significant from an intelligence perspective. Included in this category are land seizures of 500 kg or more that suggest large-scale consolidation of product, and air consignments of 300 kg or more, which could be attributable to major supply networks and senior buyers of organized crime networks.

Smaller seizures below these levels are deemed to represent lower-level supply chain movements or seizures prior to consolidation and are of less relevance to understanding the dynamics of organized crime networks. By omitting the smaller seizures and focusing on the subset of significant seizures, the analysis can contribute to building the intelligence picture of the major criminal networks operating in Africa and Asia.

24. https://www.wildlifetradeportal.org/

III Seizure data calculation notes

- For ivory seizure reports that specified the number of tusks or pieces but not their weight, an estimated weight was calculated based on the average across all cases in the dataset where both the number of tusks and their weight was reported. Based on this, the estimated average weight of a seized tusk was calculated to be 3.35 kg.

- The dataset omitted ivory seizure reports that involved only worked or processed ivory. For seizure reports that included a mix of raw ivory tusks/pieces and worked ivory products, where possible only the tusk portion of the seizure was included. However, a small number of mixed seizure reports where the weight of carved ivory products could not be differentiated from the weight of the tusks/pieces were included in the dataset.

- The dataset omitted pangolin seizure reports that involved whole bodies, carcasses or other non-scale body parts. For seizure reports that included a mix of pangolin products, only the portion involving scales was counted in this analysis.

IV Investigations and intelligence

Sanitized intelligence and findings from the WJC's investigations are interwoven through this report to provide context and insights into the known criminal dynamics of pangolin scale and ivory trafficking. The WJC's investigation approach is modelled on recognized and proven law enforcement methodology. It uses a combination of undercover operatives, covert surveillance, and networks of trusted informants to collect intelligence and evidence across the supply chain, from source to destination.

A team of criminal intelligence analysts analyzes data and information to guide the work of the undercover investigators in infiltrating trafficking networks and gathering evidence, and the information they unearth feeds back into the intelligence cycle. Where possible, all intelligence is verified and corroborated to ensure it is as robust and accurate as possible, and it is documented to an evidentiary standard. This rigorous approach means the WJC can support law enforcement agencies to build solid cases for prosecution and its staff and consultants are willing to testify in court on the strength of the evidence it collects.

V Price data analysis

The 'Commodity value trends' section in this report is based on analysis of a dataset of wholesale black market prices per kilogram for pangolin scales and raw ivory tusks collected between January 2015 and December 2024. The data were gathered by WJC operatives during undercover dealings with traffickers and brokers in two key countries of the supply chain, corresponding to the primary African supply and Asian demand locations. Due to the close trafficking links between these two countries, the price data is believed to be strongly correlated. Where possible, price data has also been corroborated through the analysis of phone handsets of arrested suspects. All prices are converted to USD at the time of collection to make them comparable across the supply chain.

When interpreting price data, it is important to note that wholesale prices can fluctuate depending on who is selling the product (i.e. their role in the criminal network and how close they are to the source of the product), and the quantity being negotiated. Other factors that contribute to wholesale prices include transportation costs, facilitation payments, law enforcement risk, and supply and demand dynamics. The WJC targets its investigations at subjects who are assessed as being mid- to high-level criminals, and investigators always negotiate prices to ensure as far as possible that the final price offered reflects current street values.

VI Note on terminology: price and value

In this report, the term "price" is used when referring to specific price data and offers for pangolin scale or ivory products that were collected during dealings with traffickers and brokers. When those price data are aggregated for analysis, such as determining annual average values collected at different points of the supply chain, the term "value" is used.

VII Note on referencing

A substantial portion of the information and analysis provided in this report is based on 10 years' worth of intelligence and findings from WJC investigations. Where information is drawn from any other source, it is referenced with footnotes and acknowledged as such. Any non-referenced information, inferences or interpretation should be understood as being sourced from WJC intelligence analysis.

A dramatic shift in the trafficking landscape was triggered by the COVID-19 pandemic

Timeline reference list on page 70.

PRE-PANDEMIC PERIOD

Ivory was the dominant commodity seized in large-scale quantities but major seizures of African pangolin scales increased

2015

The amount of pangolin scales seized continued to soar each year with the annual volume more than tripling between 2016 and its peak in 2019

2017

The amount of pangolin scales seized peaked and a dramatic spike in the amount of ivory seized was seen

2019

2016

The volume of pangolin scales seized surpassed that of ivory, although the number of ivory seizures was almost double that of pangolin scales

2018

The number and volume of ivory seized decreased compared to 2017, while the volume of pangolin scales seized increased

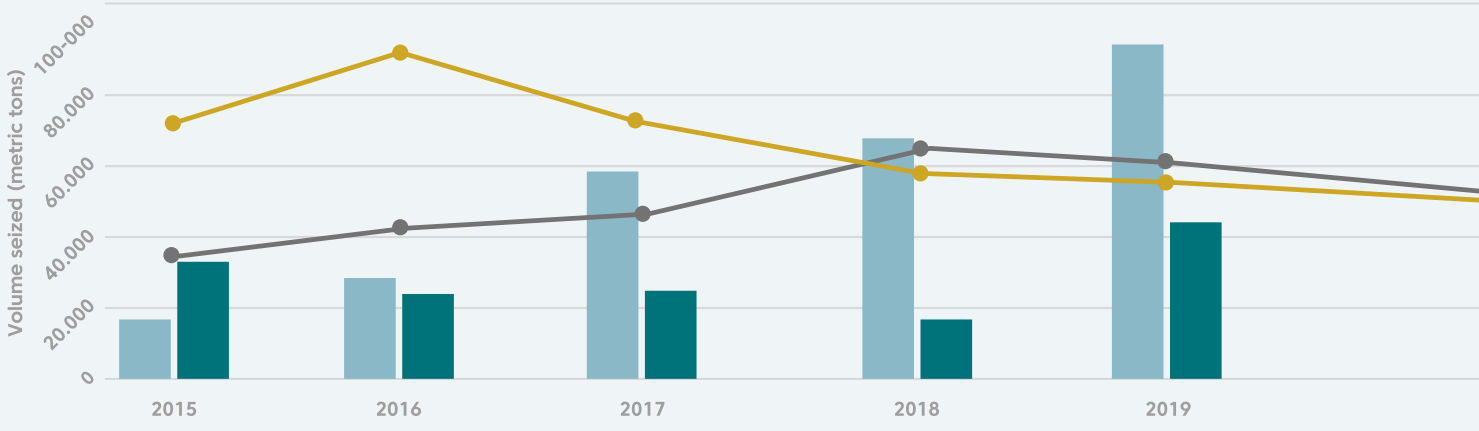


Figure 2: Global reported pangolin scale and ivory seizures. 2015-2024.

ONSET OF COVID-19

POST-PANDEMIC PERIOD

A modest increase in pangolin scale and ivory seizures was seen in 2021 compared to 2020

The number of ivory seizures increased slightly in 2023 compared to 2022 whilst pangolin scale seizures declined

2020

The onset of the COVID-19 pandemic in 2020 precipitated inmediate and striking reductions in the seizures of both commodities

2021

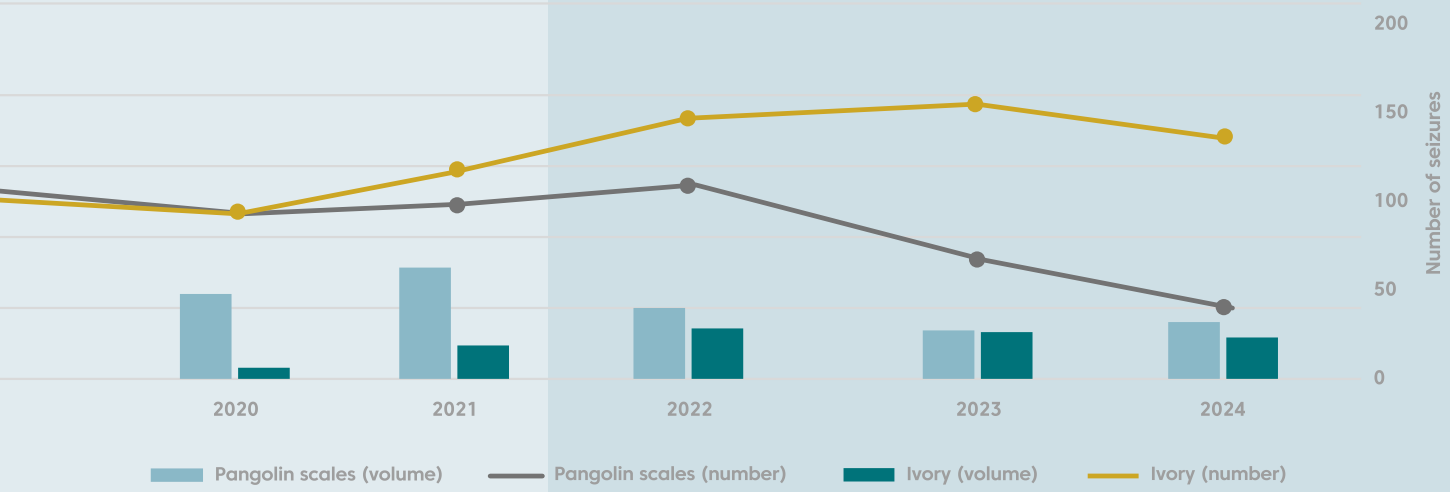
2022

Modest increase in pangolin scale and ivory seizures as well as the volume of pangolin scales, however the volume of ivory seized decreased compared to the previous year...

2023

2024

The volume of pangolin scales and ivory seized represented massive reductions, 84% and 74% respectively, compared to 2019 levels



Criminal dynamics

Big picture findings

Volume of pangolin scales seized over 10 years — MORE THAN **370 tons**

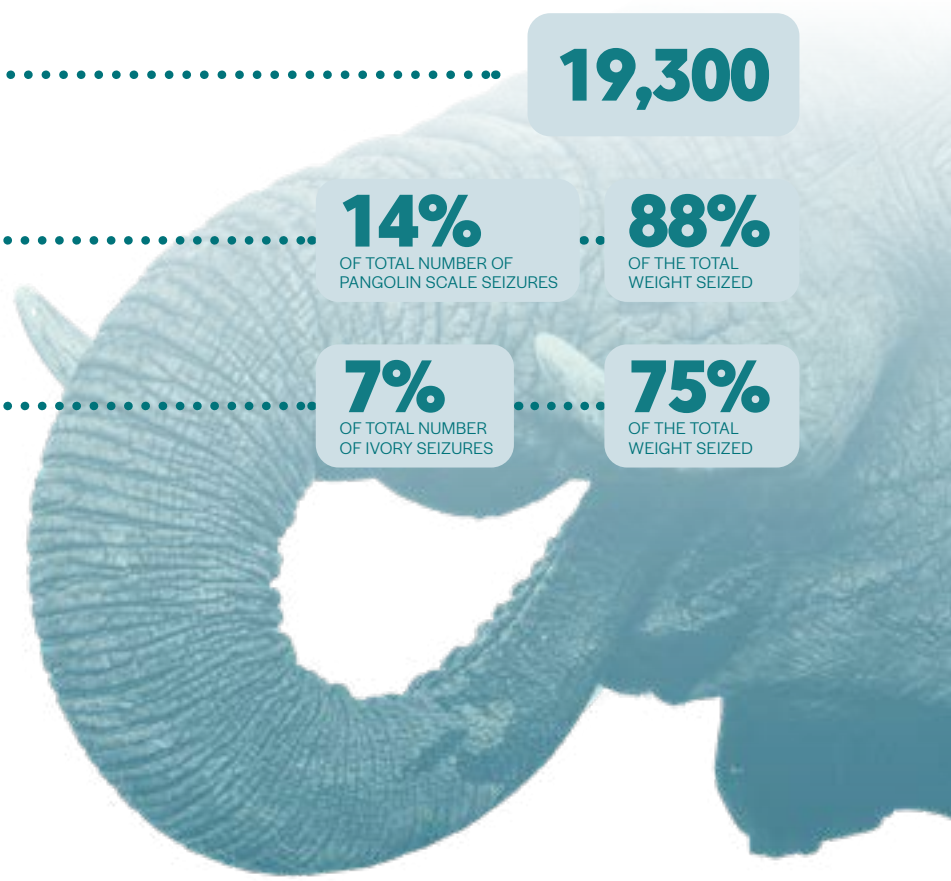
Estimated number of individual pangolins — **100,000** TO **1M**

Volume of elephant ivory seized over 10 years — MORE THAN **193 tons**

Estimated number of individual elephants — **19,300**

Significant pangolin scale seizures — **14%** OF TOTAL NUMBER OF PANGOLIN SCALE SEIZURES; **88%** OF THE TOTAL WEIGHT SEIZED

Significant ivory seizures — **7%** OF TOTAL NUMBER OF IVORY SEIZURES; **75%** OF THE TOTAL WEIGHT SEIZED



1 Dramatic shift in the trafficking landscape was triggered by the COVID-19 pandemic

During the 10 years from 2015 to 2024, more than 370 metric tons of pangolin scales were reported globally as seized from illegal trade in at least 889 incidents. This quantity of scales could potentially represent between 100,000 to one million pangolins.[25] During the same period, more than 193 metric tons of elephant ivory were seized in at least 1,348 reported incidents of illegal trade, representing an estimated 19,300 elephants.[26]

Analysis of the seizure data (Figure 2) indicates that in 2015, seizures of pangolin scales were beginning to ramp up, but ivory was the dominant commodity seized in significant quantities. By 2016, the volume of pangolin scales seized surpassed ivory, although the number of ivory seizures was almost double that of pangolin scales. Analysis of the seizure reports revealed a large number of ivory cases involving only two tusks, suggesting arrests and seizures could be occurring at or close to elephant poaching sites, while most pangolin scale seizures involved large, consolidated quantities, suggesting different law enforcement approaches between the two commodities.

From that point, the amount of pangolin scales seized continued to soar each year, with the annual volume more than tripling between 2016 and its peak in 2019. At the same time, the illegal ivory trade appeared to be reducing, both in terms of the number of shipments and the amount of ivory seized. China's domestic ivory trade ban was announced in December 2016[27] and came into effect on 31 December 2017[28] in tandem with strict enforcement measures, which may have contributed to the reduced demand and trade of ivory during this period. However, 2019 also saw a dramatic spike in the amount of ivory seized, belying the apparent declining trend, with a 146% increase in the quantity of ivory seized compared to 2018.

Following a year of record-breaking seizures of pangolin scales and ivory in 2019, the onset of the COVID-19 pandemic in 2020 precipitated immediate and striking reductions in the seizures of both commodities. The reported quantity of pangolin scales seized that year declined by 75% from 2019 figures, while an even sharper fall of 94% in the amount of ivory seized suggested a virtual halt in the cross-continental ivory trade.

25. Due to substantial variation in the weight of scales between the pangolin species, and the lack of information on the provenance of the scales or composition of species in the seizures, it is not possible to translate the volume of scales seized into an exact number of whole pangolins. A potential range has been estimated based on the average scale weights for the largest and smallest African pangolin species, defined by: Challender, D. and Waterman, C. (2017), Implementation of CITES Decisions 17.239 b) and17.240 on Pangolins (*Manis* spp.), p.94, https://cites.org/sites/default/files/eng/com/sc/69/E-SC69-57-A.pdf

26. The estimated number of elephants is based on previous estimates of a mean tusk weight of 5.45 kg between male and female African elephants, and an approximation of 10 kg of ivory per elephant, referring to: Martin, R.B et al (2012), Decision-Making Mechanisms and Necessary Conditions for a Future Trade in African Elephant Ivory, p.16, https://cites.org/sites/default/files/eng/com/sc/62/E62-46-04-A.pdf; and UNODC (2016), World Wildlife Crime Report, p.42.

27. https://www.aljazeera.com/news/2016/12/31/china-announces-ban-on-ivory-trade-by-end-of-2017

28. http://www.gov.cn/zhengce/content/2016-12/30/content_5155017.htm

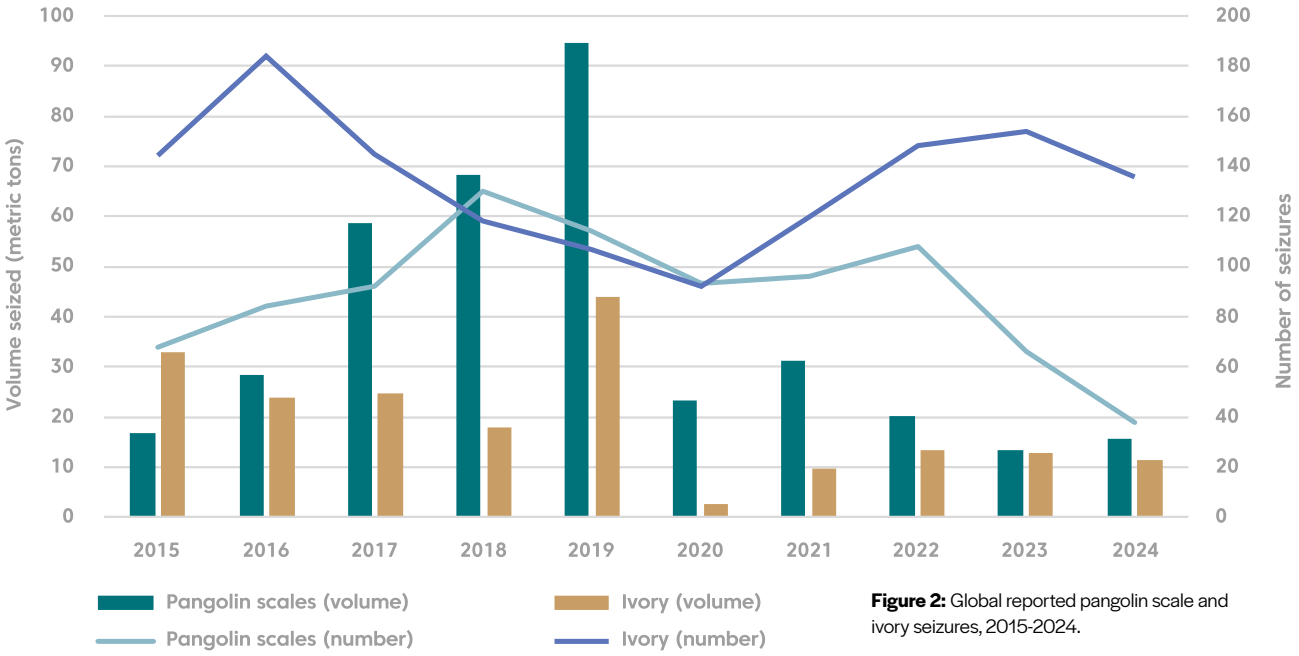


Figure 2: Global reported pangolin scale and ivory seizures, 2015-2024.

The impact of the pandemic on the trafficking of pangolin scales and ivory from Africa to Asia cannot be overstated. Intelligence from WJC investigations indicates that travel restrictions and border closures associated with the pandemic brought abrupt disruption to the organized crime networks involved in wildlife trafficking.[29] Crime bosses and their lieutenants in Asian organized crime networks were no longer able to travel to Africa, meet suppliers in person, establish new business relationships, or move money by traditional means. Prior to the pandemic, Asian organized crime networks had relied heavily on the trust and loyalty engendered from in-person dealings with brokers and transport enablers. However, the pandemic forced the criminal networks to rely on local African brokers to run operations on the supply side. A modest increase in pangolin scale and ivory seizures in 2021 suggests that criminal networks at both ends of the supply chain found workarounds to the logistical challenges and began to resume trade as pandemic restrictions lifted. However, since then, the volume of pangolin scales seized has shown a declining trend while ivory has remained relatively consistent but low compared to the pre-pandemic years.

In 2024, the volume of pangolin scales and ivory seized represented massive reductions, 84% and

29. WJC (2020), Rapid Assessment of the Impact of COVID-19 on Wildlife Trafficking.

74% respectively, compared to 2019 levels. It is notable that the total number of pangolin scale and ivory seizures remained reasonably similar in the 2020-2024 period compared to the five years prior to the pandemic, which could point to a relatively stable capacity of law enforcement to detect and intercept illegal shipments.

The seizure data paints a remarkable picture of disruption from the pre-pandemic period to the post-pandemic period. While COVID-19 was an undeniably crucial trigger for the disruption, this report presents intelligence that suggests important law enforcement efforts, fluctuations in price dynamics and changing market demands have also likely contributed to the dramatic reduction in illegal trade of both products.

II A small number of significant seizures comprised the majority of pangolin scales and ivory seized

The dataset was analyzed to identify significant seizures of pangolin scales and ivory that could be attributed to organized crime networks. These included multi-ton seizures and other large-scale seizures that potentially represent the organized supply and consolidation of product in preparation for a major shipment.[30] The resulting subset of significant seizures represents just 14% of the total number of reported pangolin scale seizures between 2015 and 2024 but makes up 88% of the total weight of pangolin scales seized (Figure 3), and 7% of the number of reported ivory seizures but 75% of the total weight of ivory seized (Figure 4). The small number of seizures accounting for the vast majority of product seized is a strong indicator of the involvement of organized crime networks in the supply chains of these products. This subset of significant seizure data is the focus for the following analysis in this report.

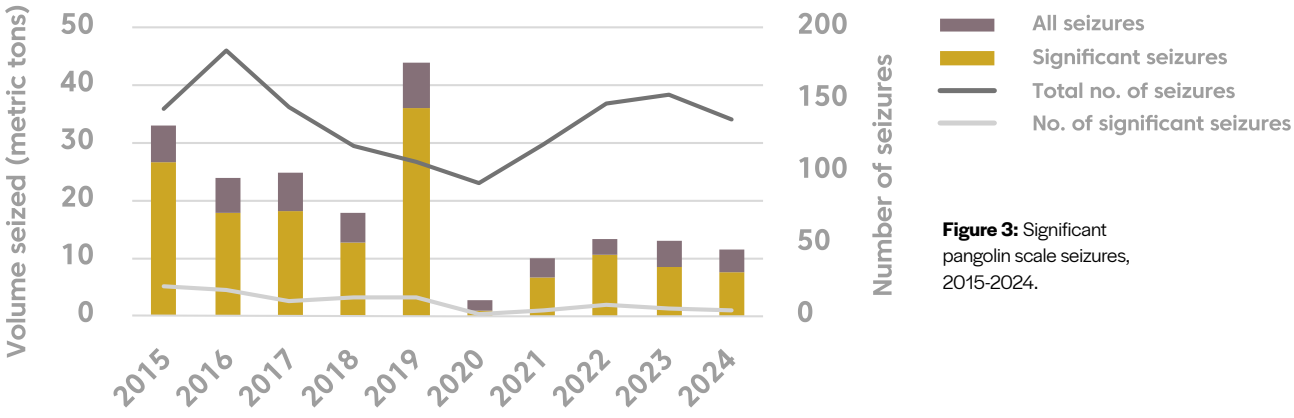


Figure 3: Significant pangolin scale seizures, 2015-2024.

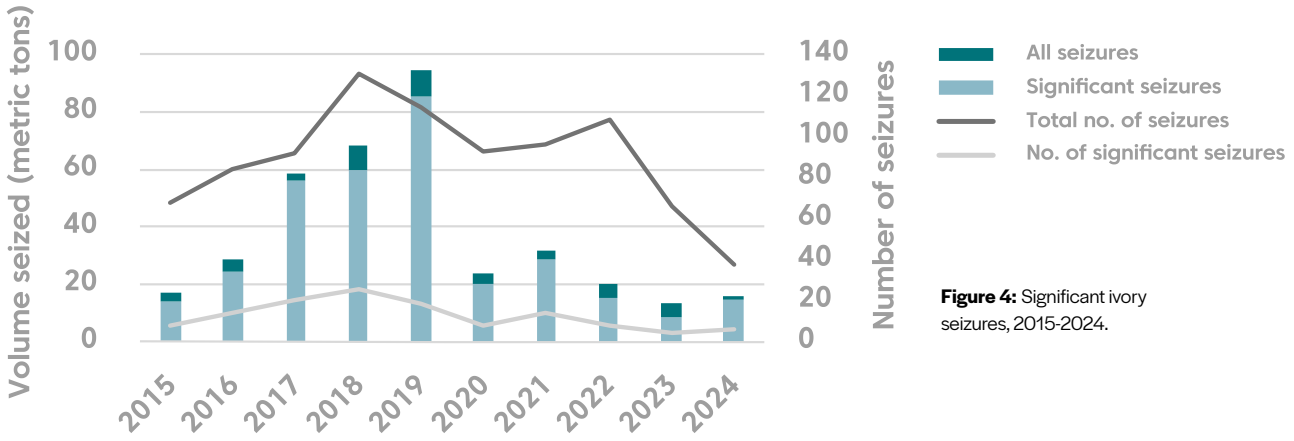


Figure 4: Significant ivory seizures, 2015-2024.

30. Refer to the Methodology section of this report for a more detailed definition of significant seizures.

Key findings for significant seizures

I Major decrease in the number of multi-ton seizures

The presence of multi-ton seizures is an important indicator to understand the capacity and confidence of organized crime networks in the illegal trade of pangolin scales and ivory. Analysis indicates that 65 multi-ton seizures occurred between 2015 and 2019, with 40 seizures involving pangolin scales and 25 seizures involving ivory. Instances of multi-ton pangolin scale seizures increased steadily during this period, suggesting the rising involvement of organized crime in this market. In 2019, there was a spike in multi-ton seizures for both commodities.

The arrival of the COVID-19 pandemic brought a sudden downturn to this trend, with 29 multi-ton seizures occurring between 2020 and 2024. This represents a 55% drop in the number of multi-ton seizures during this period compared to the previous five years. Of these, 22 seizures involved pangolin scales and seven involved ivory. The decrease in multi-ton seizures could indicate a waning capacity and confidence of organized crime groups to send large consignments of product following the disruption caused by the COVID-19 pandemic.

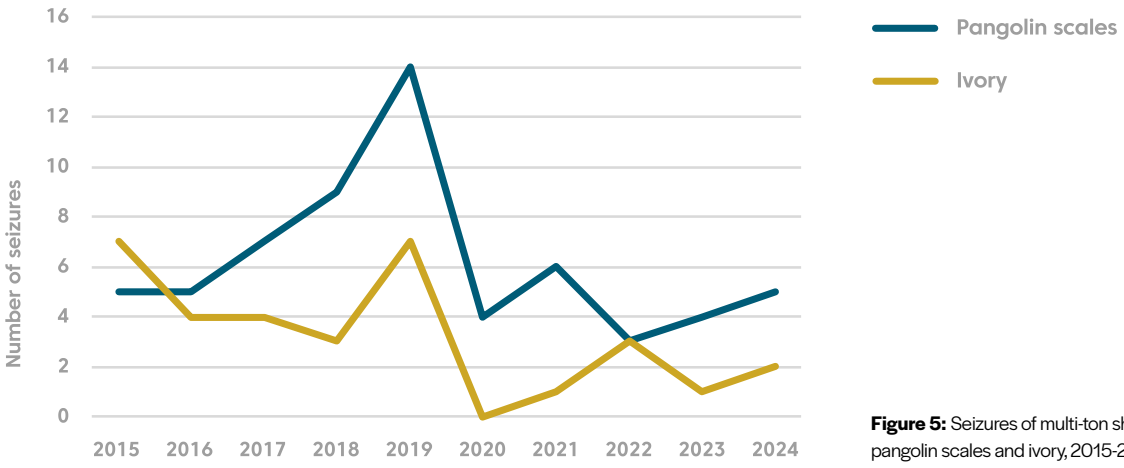


Figure 5: Seizures of multi-ton shipments of pangolin scales and ivory, 2015-2024.

II Increased proportion of multi-ton seizures are occurring in Africa prior to export

The decline in multi-ton seizures following the pandemic is even more remarkable when examined in conjunction with the location of the seizures. Prior to the pandemic, approximately 74% of multi-ton seizures occurred at seaports, with all but one of the maritime seizures being detected and intercepted at the Asia side of the supply chain. This could potentially reflect targeting efforts of customs authorities, which may tend to be more focused on inspecting imports than exports. Other notable multi-ton seizures occurred on land (18%), most of which were seizures at premises in Africa that could represent stockpile or consolidation locations. There were three reported multi-ton seizures on land in Asia, likely representing stockpile or distribution locations after successful importation.

However, from 2020 to 2024, the seizure data show two prominent shifts. Firstly, a consistent rate of multi-ton seizures of pangolin scales and ivory occurring in Africa during this period against a substantially smaller number of seizures in Asia meant that the proportion of multi-ton seizures being made in Africa increased to 48% (up from 20% in the pre-pandemic period). Secondly, the majority of multi-ton seizures in both regions were made on land (59%), with fewer occurring at seaports (41%) and none at airports. The overall decline in multi-ton seizures during the post-pandemic period combined with the increased proportion that were occurring in Africa prior to shipment could point to an increase in law enforcement effort on the African end of the supply chain. The data suggests that while large quantities of pangolin scales and ivory were still moving through Africa to primary transit and export locations, less product was progressing to the stage of leaving the continent, suggesting a diminished capacity of organized crime networks to move their goods out of Africa.

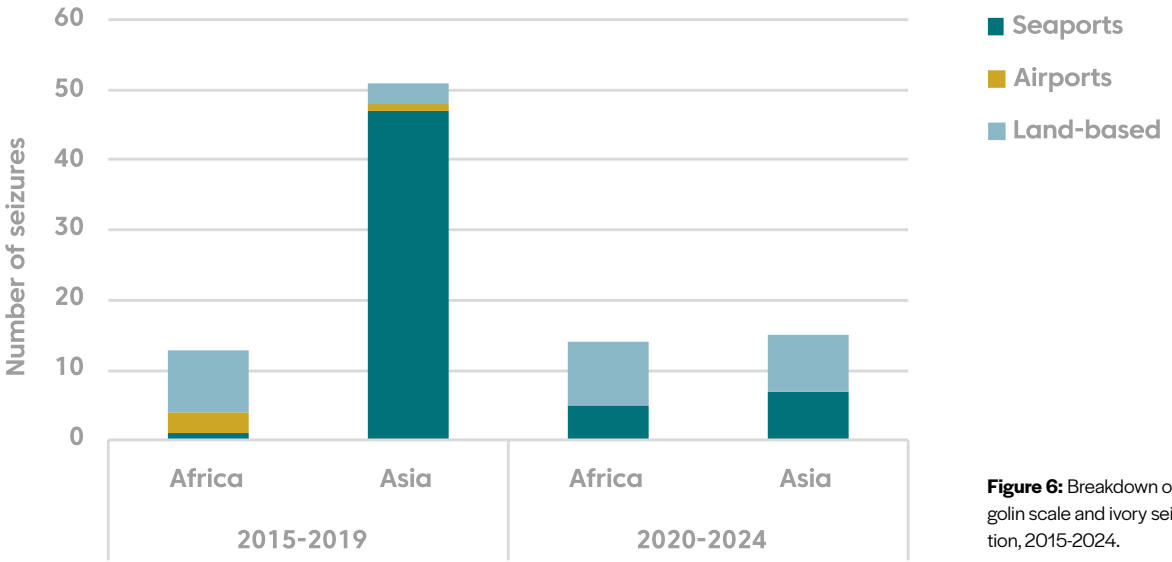


Figure 6: Breakdown of multi-ton pangolin scale and ivory seizures by location, 2015-2024.

Interestingly, in 2023 the only multi-ton pangolin scale seizures were four land-based incidents at the Asian end of the supply chain. [31] It is suspected that the scales originated from Africa, but it is not known when they arrived in Asia. They may have been part of recent shipments that had successfully evaded detection at both the African export and Asian import maritime check points. Alternatively, it is possible they could represent diversion from law enforcement stockpiles of seized contraband[32] or older stockpiles stored in Asia during the COVID-19 pandemic when traffickers were struggling to move their product across borders.[33] In 2024, the only significant pangolin scale seizures at the Asian side of the supply chain were two incidents in Indonesia, both of which were reportedly sourced from Asian pangolin species.[34]

III Average weight of pangolin scale seizures is decreasing, reversing the pre-pandemic trend

The average weight of significant pangolin scale and ivory seizures more than doubled between 2015 and 2019, with both commodities reaching their heaviest average weights in 2019 at 4.8 metric tons and 3 metric tons respectively. This period saw records repeatedly broken for the size of single shipments, with the largest reported seizures standing at 9.12 metric tons of ivory seized in Vietnam[35] (Image 1) and 12.9 metric tons of pangolin scales seized in Singapore,[36] both recorded in 2019.

The expanding size of shipments during this period points to an increased level of organized crime involvement and confidence in the market, given that larger shipments require a greater financial investment, resilience to law enforcement efforts, and access to corrupt settings to facilitate the transportation.

After 2020, the frequency of significant pangolin scale and ivory seizures reduced markedly and has remained comparatively low. Average weights of both commodities have been relatively stable since 2021 at approximately half the size they were in their peak, although they are showing a slight increasing trend. For pangolin scales, this trend is driven by an uptick in multi-ton land-based and stockpile seizures in Asia and Africa since 2023. For ivory, the trend is the result of progressively larger maritime seizures between 2021 and 2023, which could suggest that criminal networks are returning to the trade, albeit with a weakened capacity, or that new criminal networks are entering the market.

31. These included two seizures in Vietnam, one in Thailand, and one in Malaysia.

32. 1.8 metric tons of pangolin scales seized in Malaysia in July 2023 is suspected to have leaked from Customs storage of seized contraband meant for disposal: https://wildlifejustice.org/the-malaysian-anti-corruption-commission-targets-an-international-pangolin-scale-trafficking-syndicate-and-corrupt-law-enforcement-with-the-support-of-the-wildlife-justice-commission/

33. Intelligence collected by the WJC indicated several traffickers held substantial stockpiles of pangolin scales and ivory in Asia during the pandemic. For instance, in August 2020 one trafficker in Vietnam claimed to have a stockpile of 20 metric tons of pangolin scales and had buried 15 metric tons of ivory because the price was too low, and it was too dangerous to move.

34. https://cdn-www.shropshirestar.mna.arcpublishing.com/world-news/2024/11/26/indonesia-seizes-ton-of-endangered-pangolin-scales-meant-for-chinese-clients/; https://mediaindonesia.com/nusantara/691965/polda-sumut-tangkap-dua-pelaku-perdagangan-1-ton-sisik-trenggiling

35. https://e.vnexpress.net/news/news/da-nang-customs-seize-nine-tons-of-elephant-tusks-from-congo-3901434.html

36. https://www.customs.gov.sg/news-and-media/media-releases/2019-04-04-media-release.pdf

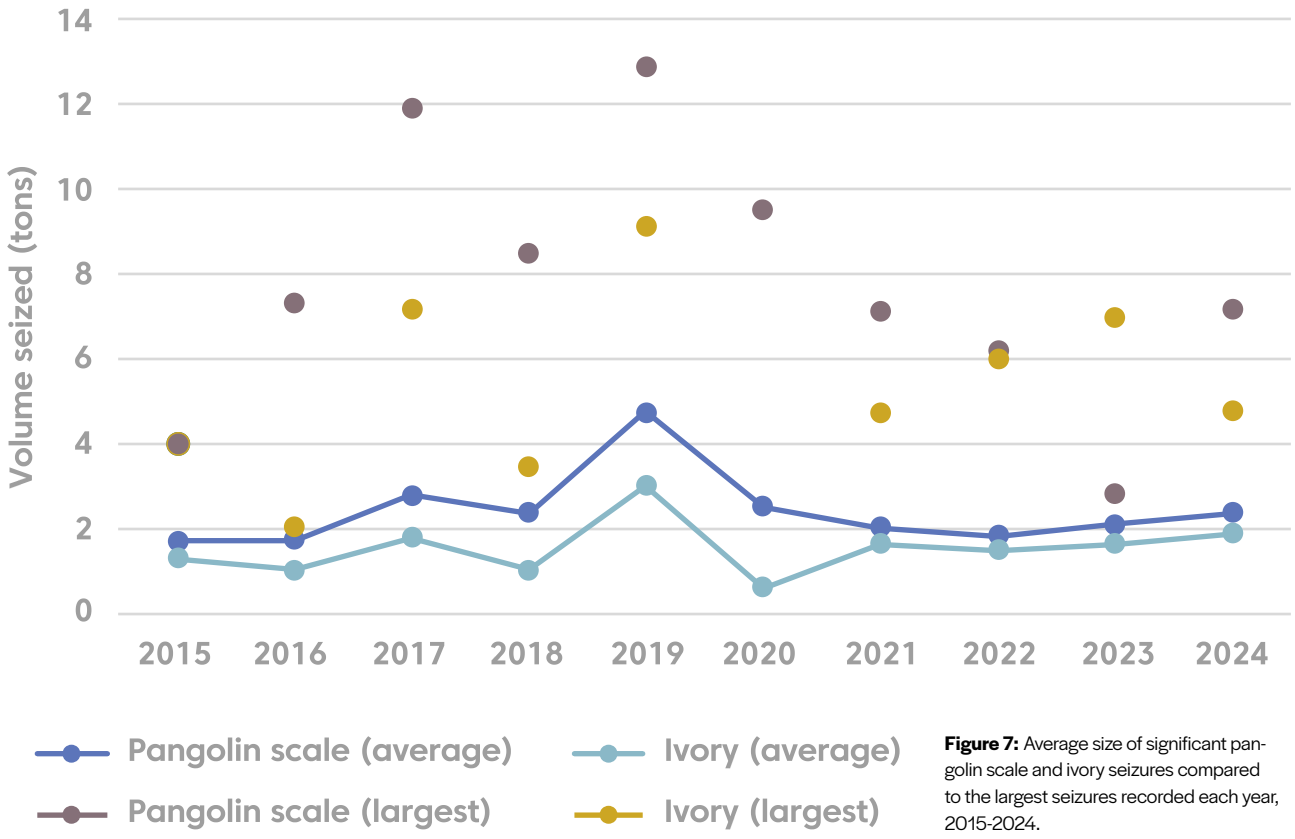


Figure 7: Average size of significant pangolin scale and ivory seizures compared to the largest seizures recorded each year, 2015-2024.

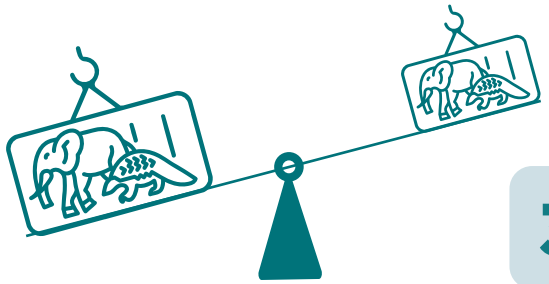
Image 1: Vietnamese authorities weighing ivory pieces as part of the 9.12 metric ton seizure at Tien Sa Port in Da Nang, Vietnam in March 2019.
Source: VnExpress International.

IV Subsidence of the trend for combined commodity seizures

2015-2019

28 COMBINED COMMODITY SEIZURES

114.5 tons



2020-2024

8 COMBINED COMMODITY SEIZURES

35.7 tons

In 2015, a trend emerged towards combined shipments of pangolin scales and ivory. In the five years up to 2019 there were 28 combined commodity seizures amounting to 114.5 metric tons of product, 70% of which represented pangolin scales and 30% ivory. This trend was most strongly observed in 2018 and 2019, with nine combined commodity seizures recorded in each year. This form of trafficking peaked in 2019 with more than 62 metric tons of pangolin scales and ivory seized in combined shipments, representing a sharp 137% increase in volume compared to the nine combined commodity seizures in 2018 and demonstrating the dominance that this form of trafficking had gained.

The trend of including both commodities in single shipments could point to criminal networks having a high level of access to two separate supply chains and the confidence of shippers to move vast quantities of both products. However, in some cases, combined commodity shipments are known to represent collaboration between trafficking networks. For example, WJC analysis of Chinese court case records and other intelligence sources relating to the combined shipment of 11.9 metric tons of pangolin scales and 8.8 metric tons of ivory seized in Singapore in July 2019 (Image 2),[37] suggests that it was a collaboration between a Vietnamese network for the ivory portion and three separate Chinese investors for varying sized portions of the pangolin scales.[38] This particular collaboration was coordinated by the shipper and likely occurred for ease of shipping logistics.

After the COVID-19 pandemic, the incidence of combined commodity shipments subsided. Only

37. https://www.customs.gov.sg/news-and-media/media-releases/2019-07-23-media-release.pdf

38. The court records were accessed on China Judgements Online: https://wenshu.court.gov.cn/

eight mixed seizures were recorded in 2021 and 2022, amounting to 35.7 metric tons of product and comprising 63% pangolin scales and 37% ivory. No significant mixed seizures were recorded in 2023 or 2024. The decline in mixed seizures in the post-pandemic period could further point to the diminished capacity and confidence of organized crime networks to make large investments of both products in single containers after the disruption of the pandemic, given the substantial losses incurred with law enforcement seizures.

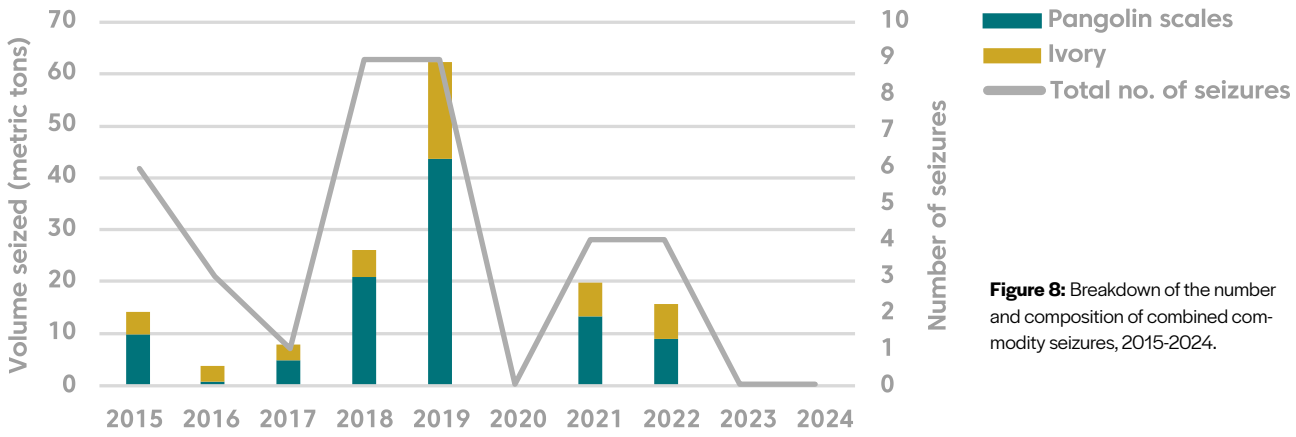


Figure 8: Breakdown of the number and composition of combined commodity seizures, 2015-2024.

Image 2: The largest combined commodity seizure containing 8.8 metric tones of ivory and 11.9 metric tones of pangolin scales, seized by Singaporean authorities in July 2019. **Source:** Jason Quah, The Straits Times.

V Criminal networks appear to adopt a fluid approach to commodity choice

Analysis identified 2017 as the year when pangolin scale trafficking began to accelerate to unprecedented levels, with a 43% increase in the number of significant seizures and a 130% increase in the quantity of pangolin scales seized compared to 2016. It is noted that the CITES Appendix I listing for all pangolin species came into effect at this time, which may account for an increase in law enforcement effort and subsequently, an increase in the number of reported seizures. However, sheer growth in the volume of scales in each seizure points more to a huge increase in demand for pangolin scales and a corresponding response from organized crime networks to service that demand.

Conversely, reported ivory seizures showed a declining trend since their global peak in 2013.[39] In 2017, the same year that pangolin scale trafficking began to surge, there was a 41% decline in the number of significant seizures of ivory compared to 2016 (although the volume of those seizures remained steady). This coincided with China's announcement of the closure of its domestic ivory market, which came into effect from the end of 2017,[40] and was followed by strict enforcement by Chinese authorities. WJC investigations during this time also witnessed falling ivory prices and a distinct wane in traffickers' interest to trade ivory, with some prominent brokers desperate to offload huge stocks of ivory.[41]

When viewed in the context of an apparently declining ivory trade, the dramatic increase in significant pangolin scale seizures in 2017 could suggest that criminal networks were shifting towards pangolin scales as the preferred commodity to ship from Africa to Asia in vast quantities. It is strongly suspected that the same Chinese and Vietnamese criminal networks that had dominated the ivory trade were diversifying their operations with pangolin scales, as opposed to new criminal networks dealing in pangolin scales rising to take the place of outgoing ivory traders.

The data suggests that combined commodity seizures emerged in 2015 as a precursor to the expansion of single commodity pangolin scale seizures (Figure 9). It is possible that the early combined commodity shipments could have represented criminal networks using their existing transport settings and methodologies to test out the end markets with small amounts of pangolin scales, prior to committing to full, multi-ton pangolin scale shipments. The development of this trend may be indicative of organized criminal networks adopting a more fluid approach to commodity choice in response to the downturn in demand for ivory and the rising demand for pangolin scales. The proliferation of combined commodity seizures in the pre-pandemic period alongside the

39. CITES SC77 Doc. 63.1 (Rev.2), page 27.

40. http://www.gov.cn/zhengce/content/2016-12/30/content_5155017.htm

41. WJC (2019), Snapshot Analysis of Ivory Smuggling: 2015-2019, p.5.

growth of single commodity pangolin scale seizures supports this hypothesis. Combined commodity seizures became dominant by 2019, representing 51% of all pangolin scales and ivory seized that year.

This trend abruptly halted in 2020, likely due to the COVID-19 pandemic. The data shows an almost complete absence of significant single commodity ivory seizures in 2020 and 2021 and a substantial contraction in the size and frequency of pangolin scale seizures. Where combined commodity seizures occurred in 2021 and 2022, the proportion of ivory to pangolin scales was higher than prior to the pandemic. Since 2022, there appears to be a new growth in ivory seizures and in 2023, the number and volume of significant ivory and pangolin scale seizures were approximately equal for the first time since the pangolin scale trafficking crisis began.[42] This is a reversal of the previous trends and could suggest another swing in the commodity preference for criminal networks is developing, with ivory regaining some popularity.

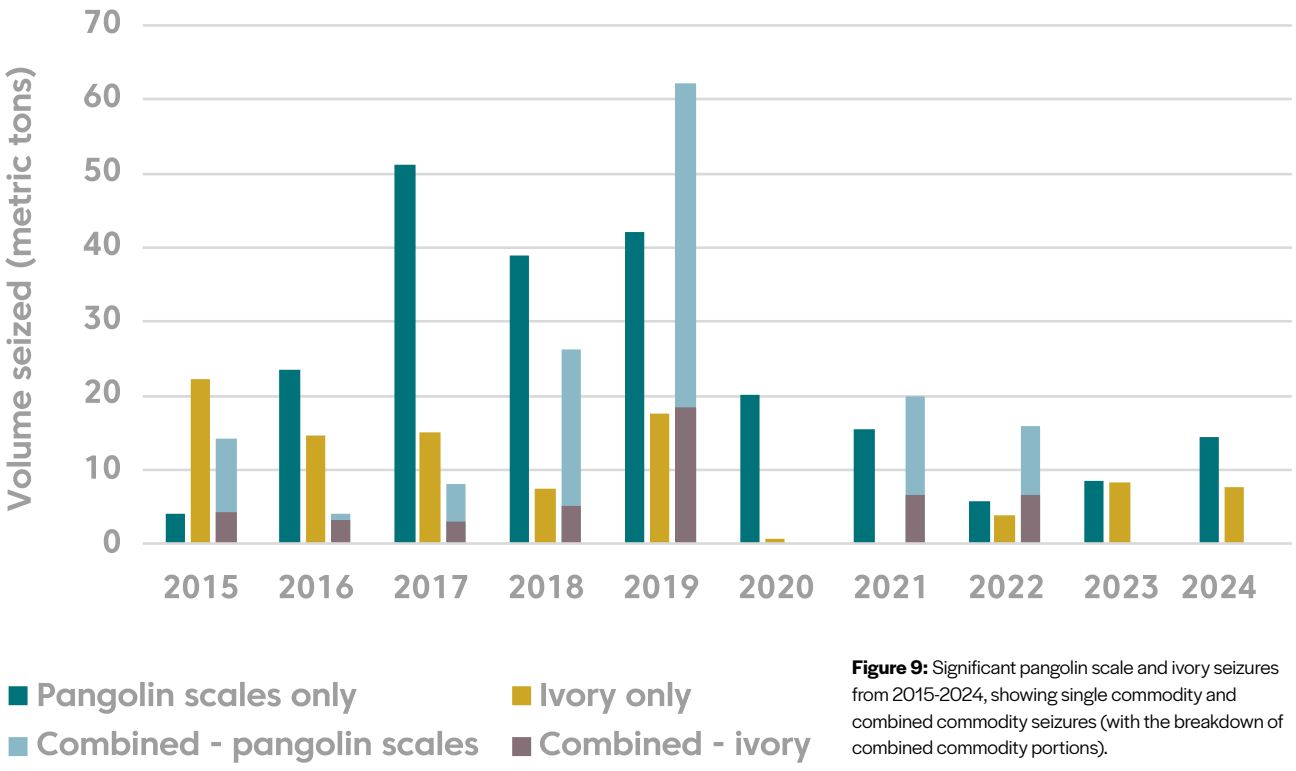
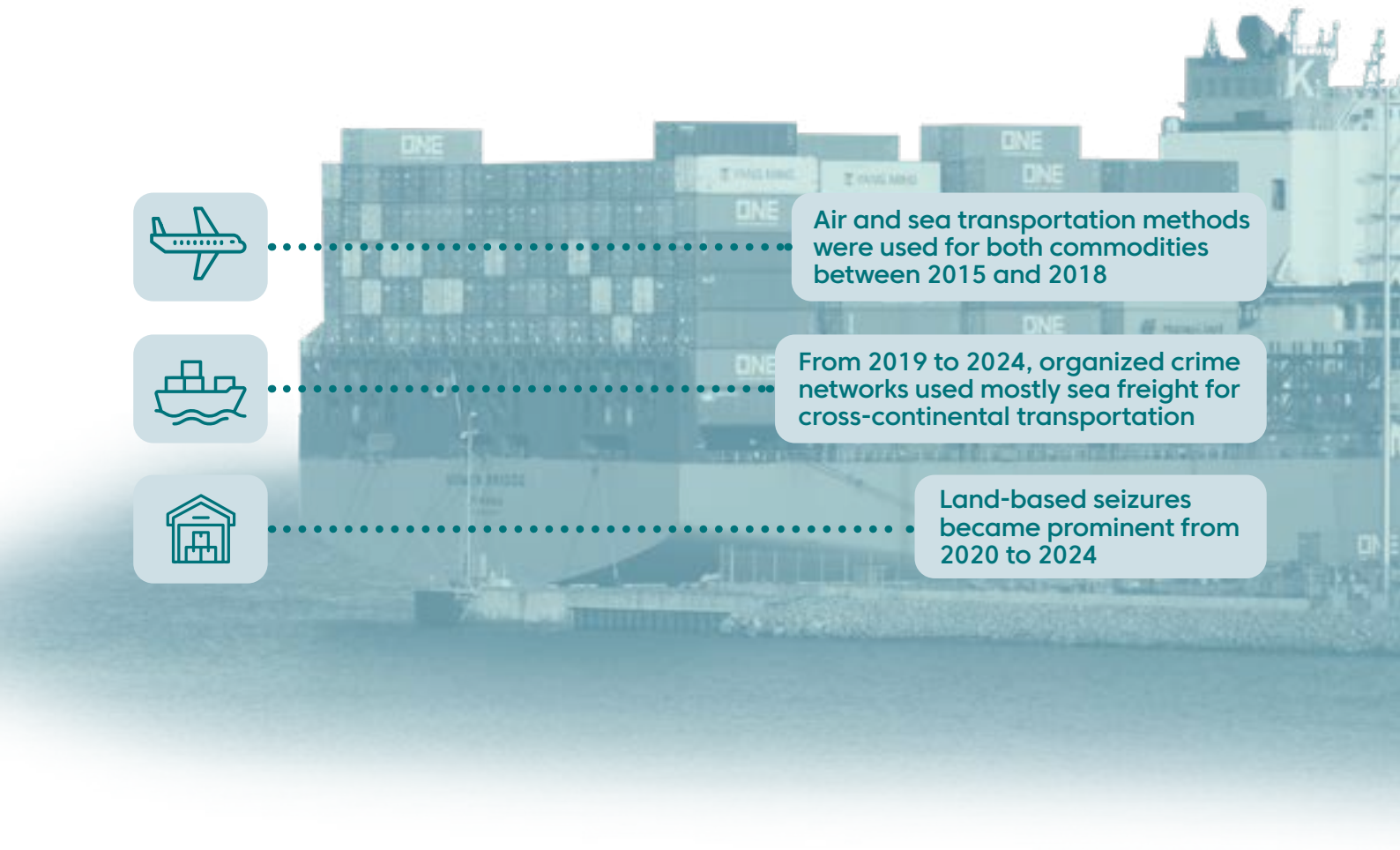


Figure 9: Significant pangolin scale and ivory seizures from 2015-2024, showing single commodity and combined commodity seizures (with the breakdown of combined commodity portions).

42. In 2023 there were four significant pangolin scale seizures totaling 8.5 metric tones, and five significant ivory seizures totaling 8.3 metric tones. Refer to Figures 3 and 4.



VI Dominance of sea transportation methods and the rise in large, land-based seizures

During the pre-pandemic period, as multi-ton seizures of pangolin scales and ivory steadily increased, so did the use of sea transportation to move them from Africa to Asia. Seizure data indicates that between 2015 and 2018, air transportation methods (primarily air cargo consignments) were just as prevalent as sea transportation for both commodities, although consignments trafficked by air were generally much smaller than those trafficked by sea.

By 2019, organized crime networks appeared to rely almost entirely on sea freight for cross-continental transportation, likely due to container ships presenting the most economical option to move the large quantities of product that were becoming commonplace at that time. The relatively short period of time in which this shift to mostly sea transportation occurred demonstrates the dynamism of organized crime networks and their ability to establish the required criminal infrastructure and connections with a diverse range of corrupt transport enablers at key export locations in Africa and import locations in Asia. For example, intelligence from WJC investigations identified instances of Vietnamese crime bosses pushing their African brokers to develop new maritime shipping settings around 2018, to increase the volume of product they could move and maximize profits. At that time, the African brokers had their main contacts at the airport, but they were able to pivot swiftly to cater to the growing demand.

Intelligence received by WJC also suggests that cooperation amongst some Asian organized crime networks was occurring during the pre-pandemic period, pooling resources to enable larger quantities of product to be purchased and shipped together. This level of cooperation provided savings by sharing the transport and facilitation costs, which in turn led to higher purchasing power for the networks to invest in larger shipments. The practicalities of this cooperative dynamic may also have contributed to the dominance of the use of sea transportation during the pre-pandemic period.

The seizure data indicates an apparent move away from the use of air transportation in the post-pandemic period. No significant seizures of pangolin scales were recorded at airports between 2020 and 2024, and only one significant ivory consignment using air transportation was seized between 2019 and 2024.[43] It is possible that the lack of reported air freight seizures could point to criminal networks improving their concealment methodologies or adjusting their settings so that shipments have passed through airports largely undetected.

Alternatively, a diminished use of air freight by criminal networks may be due to the disruption and relatively lengthy recovery period experienced by the airline industry during the pandemic.[44]

While some maritime trafficking evidently continued throughout the pandemic[45] and remains a key mode of transportation for both commodities, the data points to less frequent seizures and smaller consignment sizes than the pre-pandemic period. A key shift during the post-pandemic period was the prominence of land-based seizures, particularly static seizures at residences, warehouses, or other stockpile locations, which suggest more proactive policing efforts to identify product prior to trafficking. Since 2021, land-based seizures accounted for the majority of significant pangolin scale seizures, both in terms of the number of incidents and the amount of product seized. Land-based seizures also represented the most common point of interception for significant ivory consignments from 2020 to 2022, although none were recorded in 2023. In 2024, an equal number of significant ivory seizures were reported at seaports and land-based locations.

43. A shipment of 166 ivory tusks and pieces was seized at Dar Es Salaam International Airport in May 2023. Refer to: https://clubofmozambique.com/news/tanzania-seizes-shellfish-boxes-containing-ivory-tips-animal-parts-on-lam-plane-carta-238327/

44. Sun, X., Wandelt, S. and Zhang, A. 'A data-driven analysis of the aviation recovery from the COVID-19 pandemic', *Journal of Air Transport Management*, Vol.19, 2023, accessed at: https://www.sciencedirect.com/science/article/pii/S0969699723000443

45. Significant pangolin scale seizures were reported every year up to January 2022, while significant ivory seizures were reported every year except 2020.

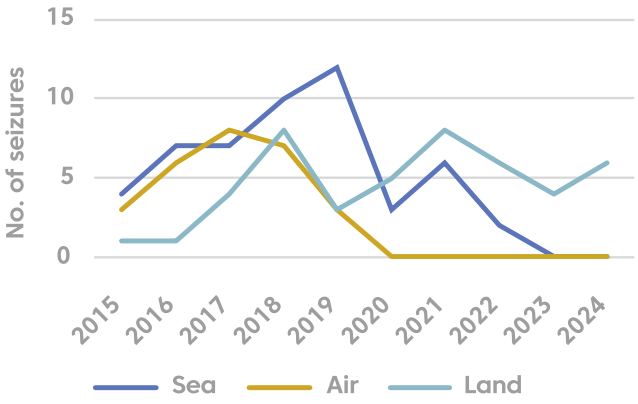


Figure 10: Breakdown of the number of significant pangolin scale seizures by transportation method, 2015-2024.

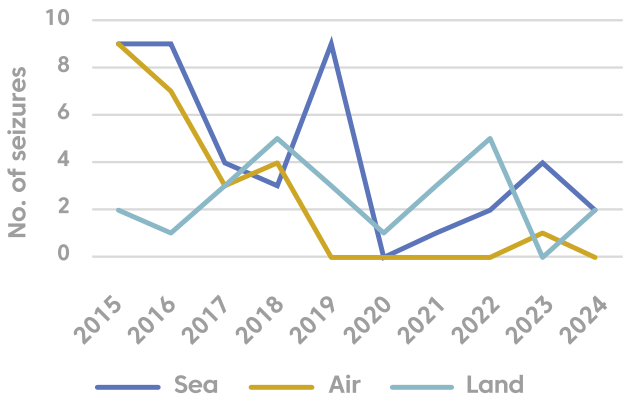


Figure 11: Breakdown of the number of significant ivory seizures by transportation method, 2015-2024.

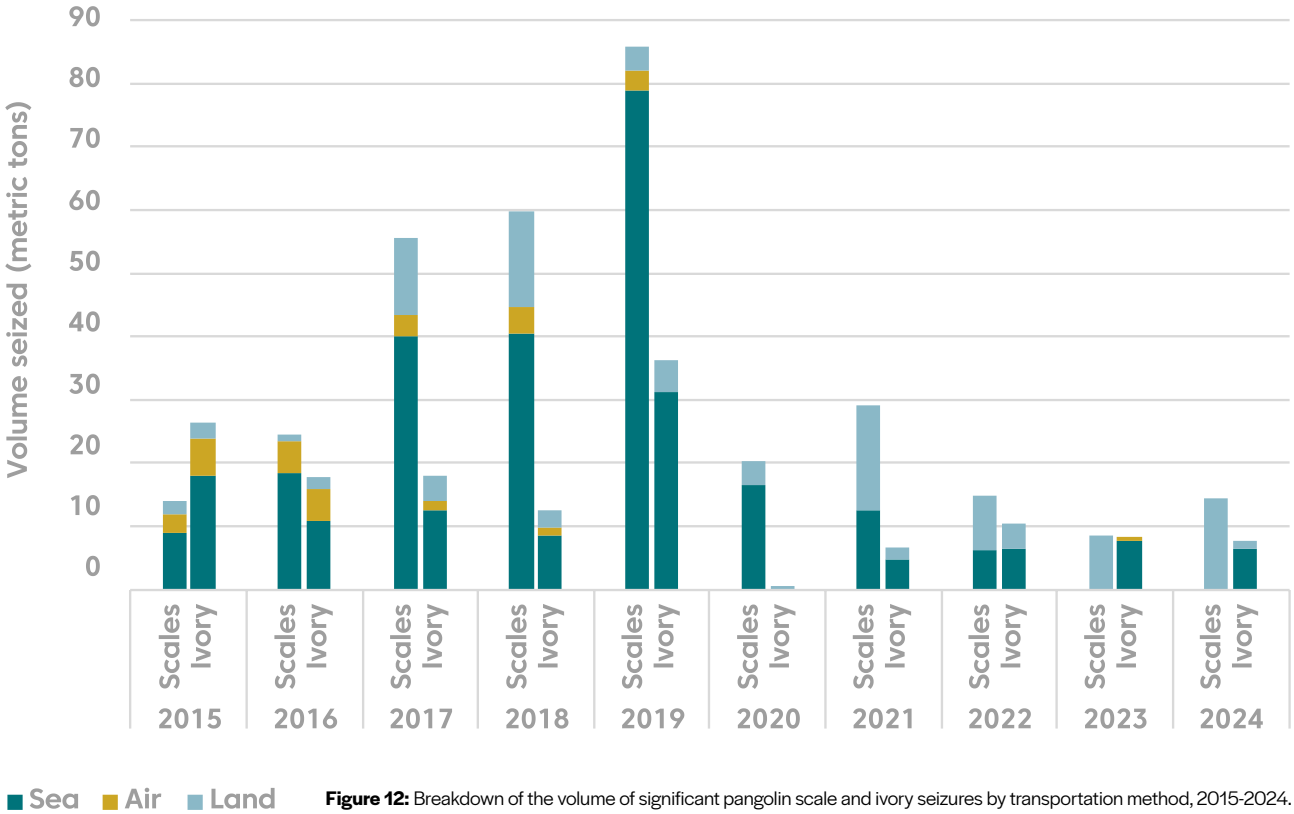
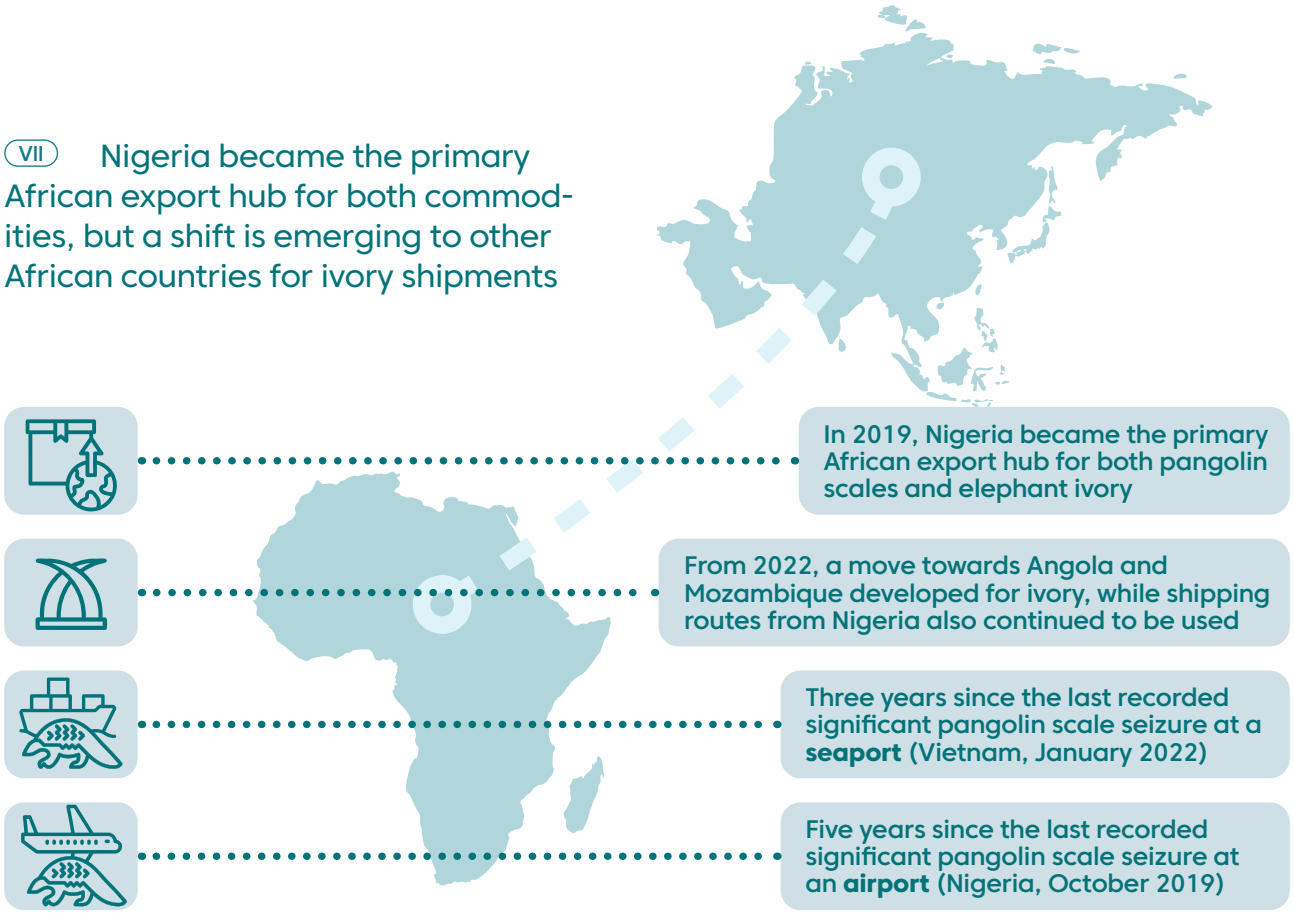


Figure 12: Breakdown of the volume of significant pangolin scale and ivory seizures by transportation method, 2015-2024.

VII Nigeria became the primary African export hub for both commodities, but a shift is emerging to other African countries for ivory shipments



The seizure data illustrates that at the beginning of the pre-pandemic period, a variety of export locations in Africa were used to smuggle significant consignments of pangolin scales and ivory to Asia. The most common export locations appearing in trafficking routes in 2015 and 2016 included Kenya, Mozambique, Nigeria, and Uganda for ivory consignments, and Cameroon, Democratic Republic of Congo (DRC), Nigeria, and Uganda for pangolin scale consignments. This suggests that Asian criminal networks had operations spread across multiple African locations. However, by 2019, this was considerably refined down to two export hubs for both commodities – primarily Nigeria, and to a lesser extent, DRC. Seizure data indicates that in 2019, approximately 70% of all significant pangolin scale and ivory seizures were shipped from Nigerian seaports.

The shift away from air transportation methods and the growing dominance of wildlife crime networks based in Lagos are two factors suspected to have contributed to the refinement of African export locations. As the Asian criminal networks grew in confidence and financial capacity and moved towards trafficking larger consignments of products, they increasingly relied on sea transportation methods. This likely narrowed the options for export locations, as considerably more corruption settings are required to successfully pass a shipping container through customs control points than to move an air consignment or air passen-

ger luggage. It is suspected that law enforcement efforts and disruption of some key criminal networks operating in East Africa[46] may have opened an opportunity for the Lagos-based organized crime networks to pivot their operations and service the needs of the Asian criminal networks running the illegal wildlife trade. Intelligence suggests the Lagos groups built reliable networks to supply pangolin scales and ivory into Nigeria, forged strong relationships with a number of corrupt transport facilitators, particularly at Apapa Port, and set up stable storage and packing facilities catering to the shipment of large-scale quantities of both commodities. These elements allowed brokers in Lagos to form profitable and enduring working relationships with the major Vietnamese and Chinese pangolin scale and ivory trafficking networks, and quickly established Nigeria as the dominant export hub for illegal wildlife trade.

According to the data, Nigeria's primacy as the main export hub in Africa for ivory shipments continued through to 2021. From 2022, a move towards Angola and Mozambique as alternative bases to consolidate ivory tusks and move shipments out of Africa appears to have developed, while shipping routes from Nigeria also continued to be used. Although no significant ivory seizures connected to Angola were reported in 2024, intelligence from WJC investigations suggests it is favored as an export location by Vietnamese criminal networks.

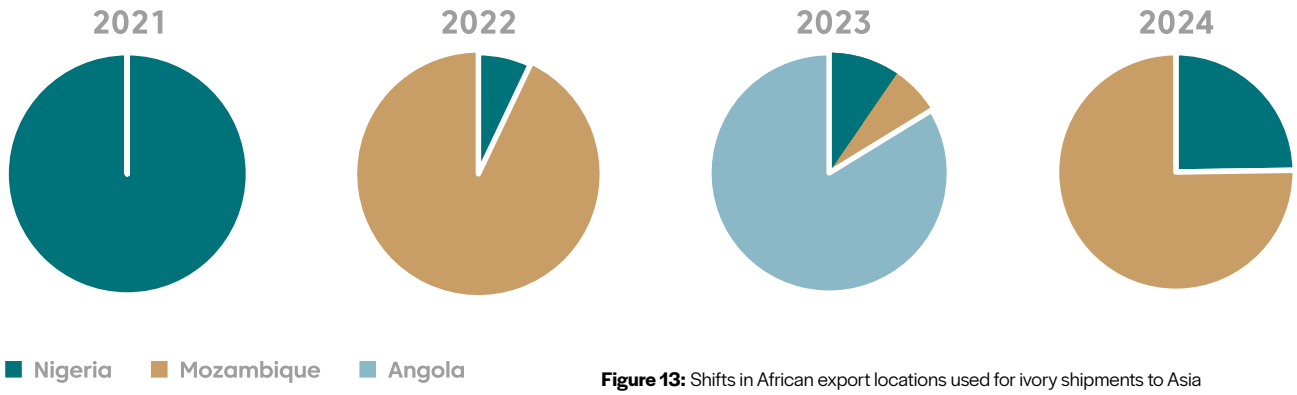


Figure 13: Shifts in African export locations used for ivory shipments to Asia according to reported seizure data, 2021-2024.

46. For example, arrests of suspected high-profile traffickers such as the "Ivory Queen" in Tanzania, Feisal Mohamed Ali, the Akasha brothers, and key members of the Kromah network: https://news.mongabay.com/2021/06/ivory-queen-denied-release-after-appeal-in-tanzania/; https://www.theguardian.com/environment/2017/aug/19/super-gangs-africa-poaching-crisis; https://elephantcrisisfund.org/bringing-down-an-ivory-trafficking-network/

(VIII) No significant pangolin scale seizures have been reported at any seaport globally for three years or airport for more than five years

The seizure data in the post-pandemic period indicates that Nigeria remains the primary African export hub for pangolin scales. The shift to other African export locations that has been observed for ivory trafficking has not yet been seen for pangolin scale trafficking.

At the time of writing, the last recorded significant pangolin scale seizure at any seaport globally occurred more than three years ago at Tien Sa Port in Vietnam in January 2022, with the shipment originating from Nigeria.[47] Meanwhile, the last recorded significant pangolin scale seizure at any airport globally occurred more than five years ago at Port Harcourt International Airport in Nigeria, in October 2019.[48] Since January 2022, all significant pangolin scale seizures have been land-based seizures and analysis found that all cases resulted in arrests, many of which

Image 3: On 8 August 2024, Nigeria Customs Service seized over 9.4 metric tons of pangolin scales and arrested four suspects in raids on two separate warehouses. **Source:** Nigeria Customs Service.

47. A shipment of 6.2 metric tons of pangolin scales and 456 kg of ivory was seized at Tien Sa Port in Da Nang, Vietnam in January 2022: https://en.vietnamplus.vn/six-tonnes-of-ivory-and-pangolin-scales-seized-at-tien-sa-port-post220730.vnp

48. A shipment of 1,530 kg of pangolin scales was seized at Port Harcourt International Airport in Nigeria, reported in October 2019. The shipment was destined for China. Refer to: https://guardian.ng/NEWS/CUSTOMS-SEIZES-N826M-PANGOLIN-SCALES-TOMATO-PASTE-OTHERS-IN-PORT-HARCOURT/

have also been prosecuted. The presence of accompanying arrests indicates progress in conducting investigations to identify those involved in supplying and trafficking products and bringing them to justice.

At the supply side in Africa, in 2022 several significant pangolin scale seizures were made at the land consolidation stage in Nigeria and at other land-based locations including DRC and Uganda. No significant pangolin scale seizures were reported in Africa in 2023. In 2024, three multi-ton stockpile seizures occurred in Nigeria (Image 3) and one significant seizure at the land consolidation stage in Liberia. Persistent large stockpile seizures in Nigeria point to continued demand for and supply of pangolin scales but also support inferences of ongoing disruption taking place at the African side of the supply chain.

At the demand side in Asia, four multi-ton land-based pangolin scale seizures were made in 2023 (Malaysia, Thailand, and two in Vietnam), implying that some consignments were successfully shipped without detection. However, there is insufficient intelligence to establish if the product had arrived in Asia in 2023, or if it was part of older stockpiles. In 2024, the only significant pangolin scale seizures in Asia occurred in Indonesia and both were reported to have been sourced from Asian pangolin species.[49]

The absence of reports of significant seizures of African pangolin scales at any seaports for three years since 2022 is a striking turnaround compared to the pre-pandemic period, when 73% of seizure incidents were recorded at Asian seaports. While this shift could point to criminal networks using more sophisticated concealment methodologies which are going undetected; given the rise in large-scale land-based seizures in Africa, it may more likely suggest a diminished capacity of the criminal networks to move their goods out of Africa.

49. https://mediaindonesia.com/nusantara/691965/polda-sumut-tangkap-dua-pelaku-perdagangan-1-ton-sisik-trenggiling; https://cdn-www.shropshirestar.mna.arcpublishing.com/world-news/2024/11/26/indonesia-seizes-ton-of-endangered-pangolin-scales-meant-for-chinese-clients/

IX Diverse concealment methodologies point to the flexibility of criminal networks to switch techniques

Timber was the most frequently reported cover load material in ivory seizures.

Nuts, seeds and beans were the most frequently reported cover load materials in pangolin scale seizures.

Analysis of the reported pangolin scale and ivory seizures revealed a diverse range of cover load commodities to conceal the illicit shipments. Timber and agricultural products such as nuts, seeds and beans were the most frequently reported cover load materials in detected shipments across the entire 10-year period from 2015 to 2024; timber being closely associated with ivory shipments and agricultural products with pangolin scales. Other popular materials included frozen seafood and meat, construction materials such as granite boards, asphalt and marble, recyclable waste such as metal or plastic scraps, charcoal, and electrical equipment.

Image 4: Cambodian authorities seized more than one metric ton of ivory, 137.6 kg of pangolin scales, and other wildlife products concealed in hollowed-out logs in December 2016. **Source:** Cambodia General Department of Customs and Excise.

The use of hollowed-out timber logs (Image 4) and boxes shaped like timber planks to conceal ivory are widespread methodologies and unlikely to represent one particular criminal network. Rather, it is suspected that concealment techniques involving timber were adopted by various African brokers representing multiple Asian criminal networks as an effective approach given the high volume of legitimate timber trade occurring from Africa to Asia.

The variation in concealment materials and techniques points to the flexibility of criminal networks to switch methodologies if one is becoming more vulnerable to detection through over-exposure. WJC intelligence indicates that cover load selection is influenced by price, availability, resale prospects, products with a pre-established trade history, and perceptions of vulnerability to search by customs authorities. For example, frozen goods and perishables are often perceived to be less likely to be searched in smaller air freight consignments, as they need to be moved quickly to prevent goods from spoiling. Intelligence also indicates that some criminal networks invest

considerable resources in mastering concealment techniques, such as conducting "dry runs" to test new routes or build legitimacy with shipments of new cover load commodities before sending shipments with wildlife products.

A recent concealment method of interest is ivory hidden in cow horn consignments shipped from Nigeria to Vietnam (Image 5). It appears to utilize a "piggyback" methodology based on cooperative relationships with legitimate cow horn companies that have a long, established business history and act as a carrier for the ivory. WJC intelligence suggests the cow horn methodology is linked to one particular criminal network which has been involved in at least three ivory seizures.

Image 5: Vietnamese authorities seized a shipment of 1.58 metric tons of ivory painted black and concealed in a shipment of farmed cow horns on 1 April 2024.
Source: General Department of Vietnam Customs.

Commodity value trends

This section presents an analysis of trends in the black market value for pangolin scales and ivory between 2015 and 2024. It is based on a dataset of wholesale prices per kilogram collected during undercover engagements with senior brokers and traffickers operating in two key countries of the supply chain, corresponding to the primary African supply and Asian demand locations. (Refer to the Methodology section of this report for more details on how the price data is collected and interpreted).

1 Pangolin scale values have declined and stabilized at low levels across the supply chain

Supply side in Africa: The average value of pangolin scales has plateaued and remained steady from 2021 to 2024

Demand side in Asia: Since 2019, pangolin scale values have declined by almost **50%**

Analysis of wholesale price data collected by the WJC during its investigations found that the average value of pangolin scales at the supply side in Africa declined by approximately 70% between 2017 and 2021, then plateaued and has remained remarkably steady for the past three years. At the demand side of the supply chain in Asia, the average value of pangolin scales also dropped by approximately one third between 2016 and 2017, but then bounced back over the next two years, returning in 2019 to similar values seen in 2016. Since 2019, pangolin scale values have declined by almost 50% in Asia, reaching their lowest levels in 2022 and remaining relatively stable up to the present time (Figure 14).

It is surmised that the high values seen at the supply side in 2017 could be due to pangolin scale trafficking being an emerging crime type in Africa at that time. With few criminal networks specializing in the trade at that time, African traders may have been able to set high prices due to the lack of competition in servicing the rising demand from Asian criminal networks. As the trade in pangolin scales soared during 2018 and 2019, intelligence indicates that networks of traders, brokers, and suppliers proliferated along all points of the African supply chain, and it is inferred that growth in market competition could have pushed prices down considerably.

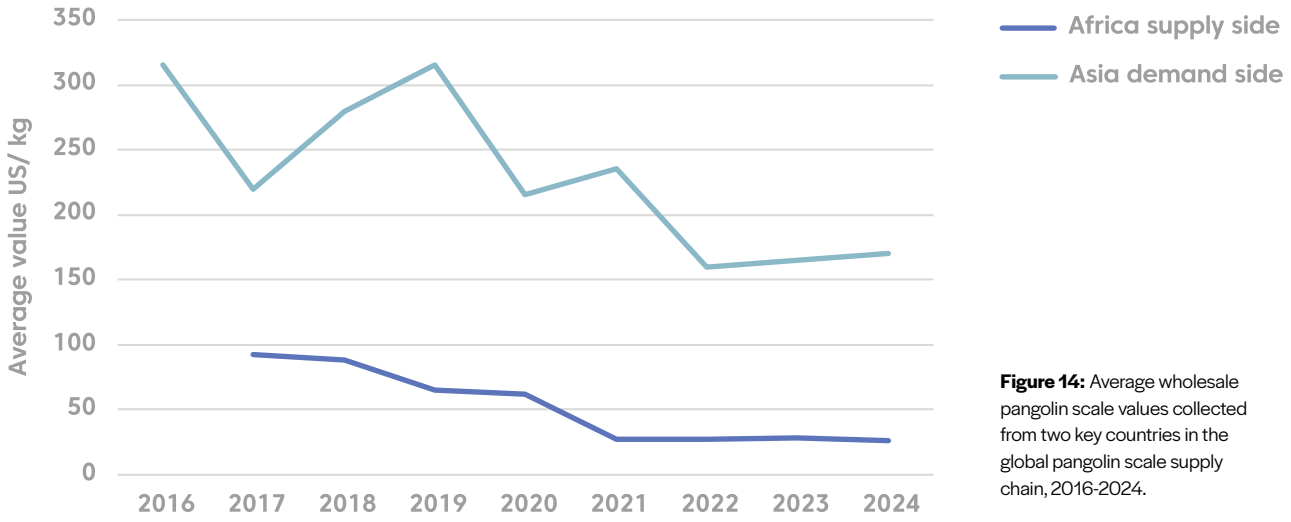


Figure 14: Average wholesale pangolin scale values collected from two key countries in the global pangolin scale supply chain, 2016-2024.

The steady pangolin scale values seen at the supply side since 2021 could point to an equilibrium between supply and demand in a competitive business environment. However, another contributing factor could be increased law enforcement attention in Nigeria since 2021, which has targeted the top tier of the supply chain and resulted in the arrests of several crime bosses, senior brokers, and major shipping facilitators.[50] Intelligence suggests these concentrated law enforcement efforts at the primary African export location have made it harder for criminal networks to move their shipments to Asia. This would be expected to push prices up, and spikes can be seen when the price data is analyzed in a monthly breakdown, but this effect could potentially be neutralized by a build-up or over-supply of pangolin scales, as the high-level disruption takes time to reverberate down to the lower supply chain levels. Several multi-ton pangolin scale seizures at warehouses and land consolidation points in Nigeria in 2024 support this thesis, evidencing the continued existence of large stockpiles that have not yet been transacted.[51] These opposing dynamics may be contributing to prices remaining consistently low at the African supply side.

Meanwhile, at the demand side of the supply chain in Asia, the increasing value of pangolin scales between 2017 and 2019 coincided with the surge in trade during that period. Considering the steady drop in the value of pangolin scales observed at the African supply side during this period, the rising value at the demand side suggests the trade became increasingly profitable for Asian criminal

50. For example: https://wildlifejustice.org/joint-operation-with-nigeria-customs-service-leads-to-four-arrests-seizure-of-839-40-kg-of-pangolin-scales-and-145-kg-of-elephant-ivory/; https://wildlifejustice.org/nigerian-authorities-arrest-8-suspects-from-major-network-trafficking-pangolin-scales-and-ivory/

51. For example, two seizures of 7.2 metric tons and 2.294 metric tons of pangolin scales seized in Nigeria in August 2024: https://wildlifejustice.org/warehouse-raids-in-nigeria-lead-to-historic-seizure-of-over-9-4-tonnes-of-stockpiled-pangolin-scales/

networks during the pre-pandemic years. It is interesting to note that product prices were apparently increasing as the availability of scales in Asia was also increasing. This is contrary to traditional supply and demand principles and raises questions as to whether the Asian market could be influenced by other factors, such as monopolization or price control tactics such as releasing product in small batches to avoid flooding the market.

Pangolin scale values in Asia dropped considerably in 2020 and continued a generally declining trend until 2022, when they reached their lowest levels at approximately half the value seen at the height of the market in 2019. Values appear to have stabilized since 2022, increasing by just a few percentage points in 2023 and 2024. Intelligence from WJC investigations suggests that high availability of pangolin scales continued in several Southeast Asian countries throughout the COVID-19 pandemic in 2020-2021, although many traffickers reported difficulties transporting product to China due to border closures and increased border security.[52] For instance, a major trafficker in Vietnam claimed to have a stockpile of 20 metric tons of pangolin scales available in Hanoi in August 2020, and other senior brokers in Asia regularly offered investigators multi-ton quantities of pangolin scales. As such, it is possible that falling product prices in Asia during the post-pandemic period could be linked to an over-supply or a lower demand for pangolin scales. The stabilized trend currently observed could indicate there is now sufficient market competition at the demand side of the supply chain to keep prices consistently low; however, it is difficult to draw any conclusions given the unclear supply and demand dynamics of pangolin scales.

52. WJC (2020), Rapid Assessment of the Impact of COVID-19 on Wildlife Trafficking.

II Ivory values declined by around 50% across the supply chain prior to the pandemic, but now appear to be relatively stable in Africa

Supply side in Africa: The average value of raw ivory declined by around 50% between 2018 and 2020, then was relatively stable through to 2024

Demand side in Asia: The average value of ivory declined consistently between 2015 and 2019, increased slightly in 2020, then dropped to the lowest average value in 2021

Analysis of wholesale price data collected by the WJC found that the average value of raw ivory at the supply side in Africa declined by around 50% between 2018 and 2020. Since then, values appear to have been relatively stable through to 2024, apart from a modest increase seen in 2022. It is suspected that this increase may in part be driven by a shift in traders' perceptions of operational risk, as the fluctuations seen in more detailed month-by-month breakdowns of price data seemingly correspond with known law enforcement actions in the location where data was collected.

At the demand side of the supply chain in Asia, the average value of ivory declined consistently between 2015 and 2019, approximately halving during this period. The value increased slightly in 2020, then dropped to the lowest average values in 2021 (Figure 15). Since then, the WJC has collected few ivory price data points at the demand side due to the distinct lack of interest among senior brokers and traffickers to trade in raw ivory. Some recent price data collected at the retail broker level in Asia between 2022 and 2024 indicates ivory values may also have stabilized at this side of the supply chain, but there is insufficient data to understand if this is also reflected at the wholesale broker level.

The declining trend in the value of raw ivory during the pre-pandemic period was observed in all Asian countries where price data was obtained between 2015 and 2019, while intelligence indicates that service fees including transportation costs and bribery payments remained relatively stable. The declining trend was also mirrored in all African supply side countries where price data was obtained and continued through to 2020.

Starting around 2018, WJC investigators witnessed Asian brokers lose interest in ivory and begin to express concern at holding on to large stockpiles of the product, particularly in Vietnam. Many Vietnamese brokers blamed the ivory ban in China as the reason why they were left holding large quantities of ivory which were difficult to sell or move. China's ivory trade ban is likely to have played an important

role in reducing the demand for ivory in China, triggering a price downturn across the entire ivory supply chain during the pre-pandemic period.

For example, in June 2019, convicted Vietnamese ivory trafficker Nguyen Van Nam stated he had 10 metric tons of ivory available in Vietnam that he had been storing for some time, unable to sell it and too dangerous to move.[53] The ivory was being offered at the low price of USD 405/kg to offload it. He indicated it was stored across several locations, including 5 metric tons close to the Cambodian border. Another ivory trafficker in November 2019 was offering 5 metric tons of ivory, one of which was said to be in storage in Vietnam, with another 4 metric tons stored in Lao PDR. This corroborates other intelligence that suggested significant quantities of raw ivory were being held in Lao PDR, with traffickers possibly considering it a safer storage or transportation location than Vietnam at that time. In August 2020, one of the top wildlife traffickers in Vietnam claimed to have buried 15 metric tons of ivory at an unspecified location because current market prices were too low, but he was facing "capital pressure" to recoup his costs. This intelligence suggests that traffickers were unlikely to be stockpiling ivory intentionally as a long-term investment product, but as a temporary measure to avoid large financial losses in the stagnating market.

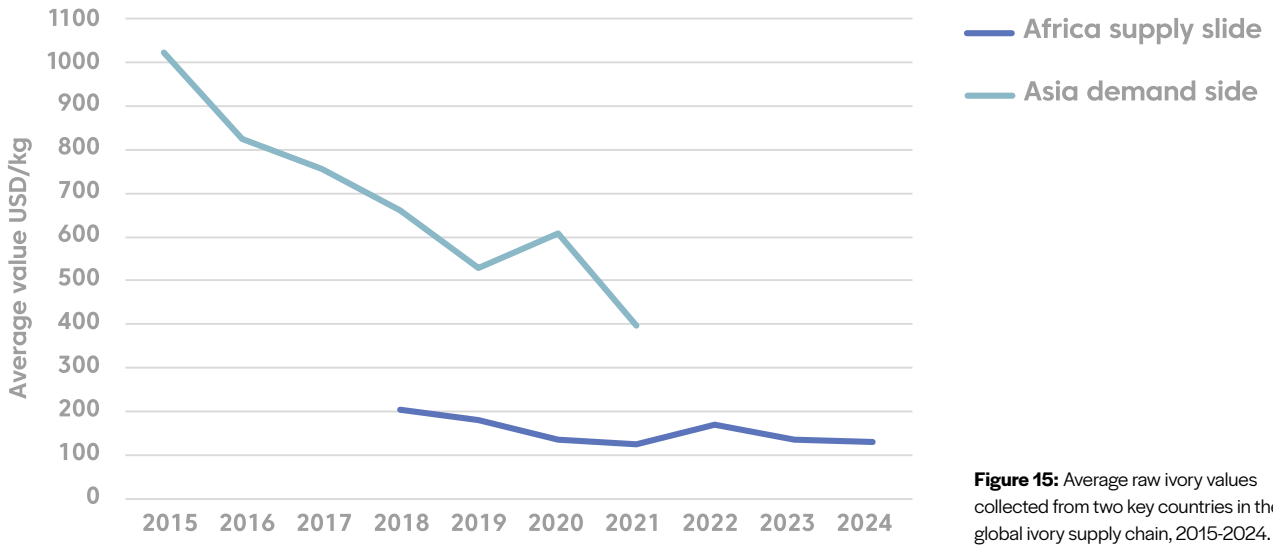


Figure 15: Average raw ivory values collected from two key countries in the global ivory supply chain, 2015-2024.

53. WJC (2022), Ah Nam: The Downfall of Vietnam's Wolf of Wall Street, p.43.

III Increased global shipping costs since the COVID-19 pandemic

2015-2019

Approximate shipping costs per container during the pre-pandemic period

USD 10,000

2020-2024

Global shipping costs tripled during the COVID-19 pandemic and remain high due to ongoing supply chain disruption

Shipping costs increased significantly around the world during the COVID-19 pandemic as congestion and inefficiencies in supply chains and maritime transportation routes caused a global shortage of shipping containers. The disruption compounded in the latter half of 2020, triggering containerized maritime freight shipping costs to triple, as well as longer delivery times and higher prices for imported goods.[54]

Intelligence collected during WJC investigations suggested that shipping costs increased from approximately USD 10,000 per container on Africa to Asia routes prior to the pandemic to USD 15,000-16,000 per container during the pandemic; while some traffickers suggested it was as high as USD 30,000. This is in line with the global reported freight increases at the time.

Post-pandemic, global shipping costs remain high due to supply chain disruption caused by the war in Ukraine.[55] The war has particularly impacted many African countries which rely heavily on oil, gas, fertilizer and grain imports from Russia and Ukraine.[56] Higher fertilizer costs in affected countries could push up the price of agricultural commodities such as seeds, nuts, and beans that have previously been popularly used as cover load materials for pangolin scale and ivory shipments, which could potentially lead to changes in concealment methodologies.

The extent to which the higher shipping costs are impacting prices at the demand side of the supply chain is unclear, as pangolin scale values have declined and then stabilized at new low levels, while no recent ivory price data at wholesale broker level has been collected. It is possible that Asian criminal networks may be absorbing the higher shipping costs in some cases with reduced profit margins.

54. U.S. International Trade Commission (2021), Executive Briefing on Trade: 'Rising Maritime Freight Shipping Costs Impacted by COVID-19', https://www.usitc.gov/publications/332/executive_briefings/ebot_greg_larocca_freight_costs_weighing_covid_pdf.pdf

55. UNCTAD (2022), 'War in Ukraine raises global shipping costs, stifles trade', https://unctad.org/news/war-ukraine-raises-global-shipping-costs-stifles-trade

56. ODI (2024), Impact of the Russia-Ukraine war on Africa: Policy implications for navigating shocks and building resilience.

IV The largest price mark-ups are applied at the demand side of the supply chain

Analysis of the average values at different stages of the supply chain allows for the calculation of the average mark-up as product moves from origin to transit locations and through to destination locations. Product value increases at every stage of the supply chain as each handler adds their own profit margins, and other costs are accumulated such as transportation fees and facilitation fees.

The estimated mark-ups for pangolin scales are illustrated in Figure 16 below, based on intelligence collected between 2022 and 2023 when prices appear to have stabilized at both ends of the supply chain. The estimated mark-ups for ivory are illustrated in Figure 17 below, based on intelligence collected in 2024. Both figures indicate that the largest mark-ups are applied by senior brokers in demand countries, which in part accounts for the shipping costs and facilitation fees that are borne by this stage. However, it also highlights the massive profit margins that could be realized at the demand side of the supply chain and are likely a key driver behind the trade.

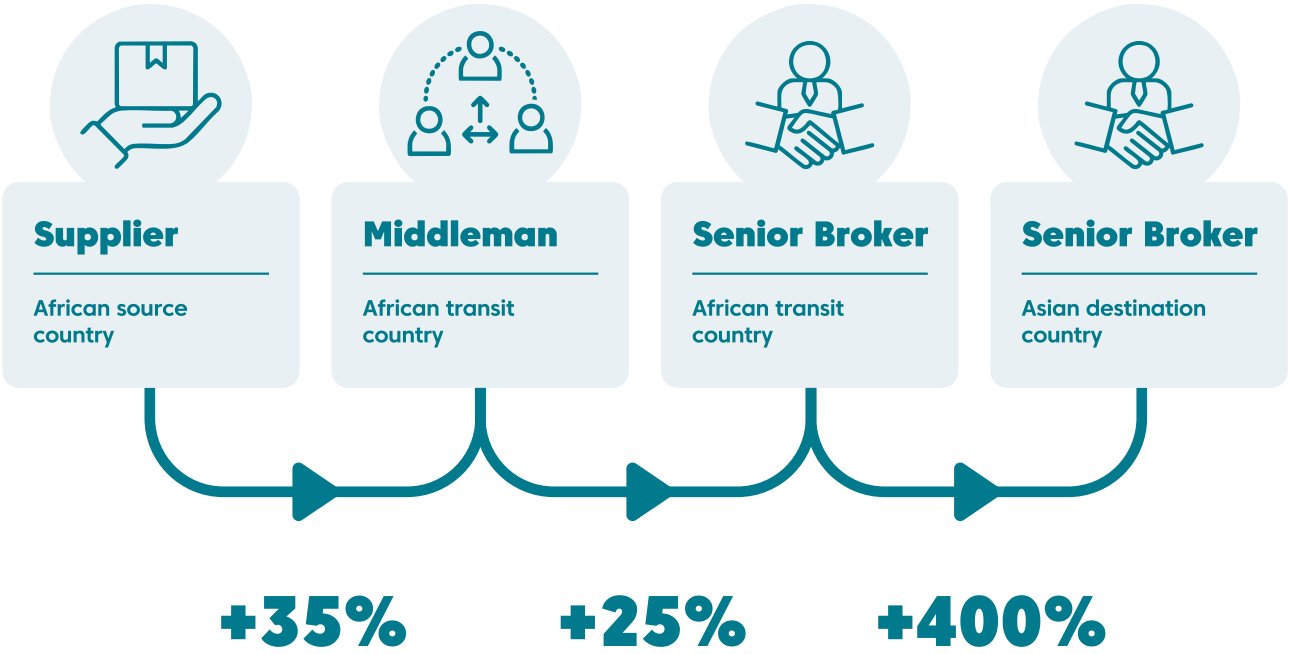


Figure 16: Estimated mark-up of pangolin scales values by key players along the supply chain.

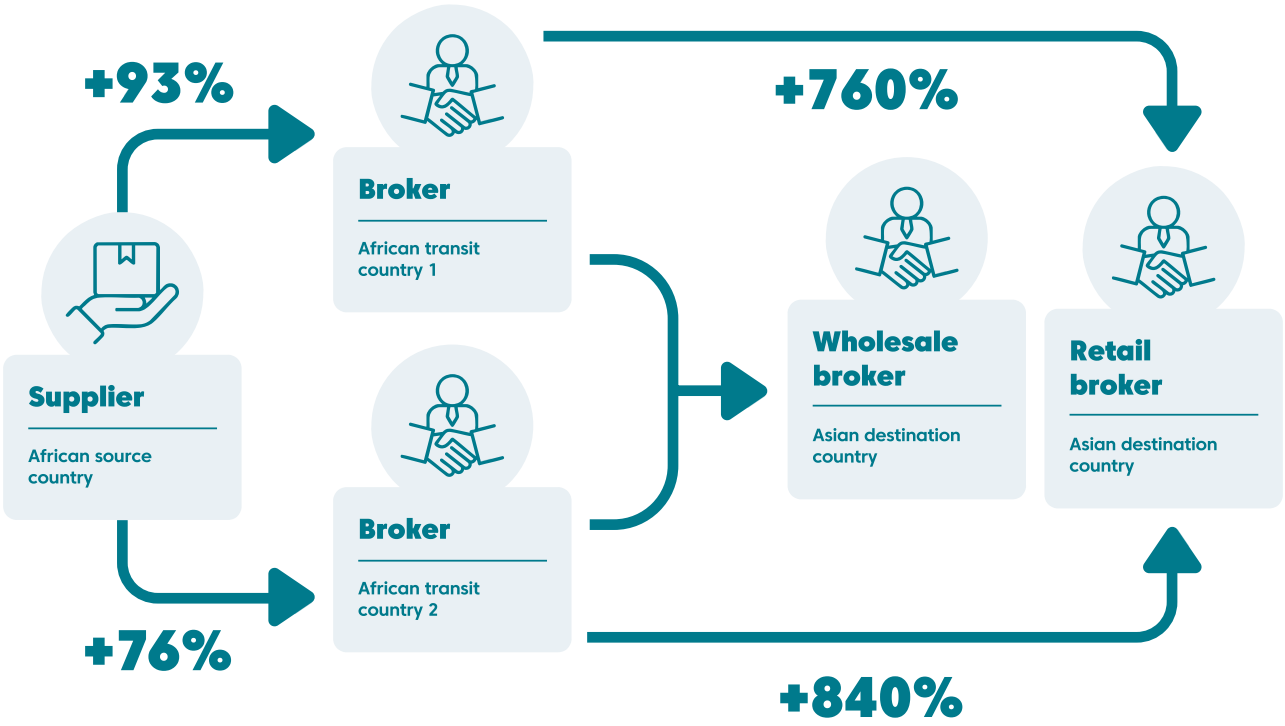


Figure 17: Estimated mark-up of ivory values by key players along the supply chain.

(V) Similarities in price fluctuation patterns between pangolin scales and ivory at the demand side of the supply chain

As previously discussed, it is suspected that from around 2017 criminal networks were diversifying their operations and shifting their preference from ivory to pangolin scales; potentially as a strategy to risk-proof their business with the incoming domestic ivory trade ban in China, or it may have been due to the higher market demand and rising prices for pangolin scales. Many of the major networks investigated by the WJC deal in both products, and they appear to adopt a fluid approach to commodity choice, possibly in response to whichever product is providing greater profit margins at the time.

A comparison of average values of both commodities at the demand side shows a pattern of inverse symmetry from 2017, with pangolin scale values trending up when ivory values are declining, and vice versa (Figure 18). Although it is not known if there is a direct correlation between the two commodities, this finding adds further weight to the hypothesis that criminal networks are trading these commodities interchangeably depending on levels of demand, risk, and profitability.

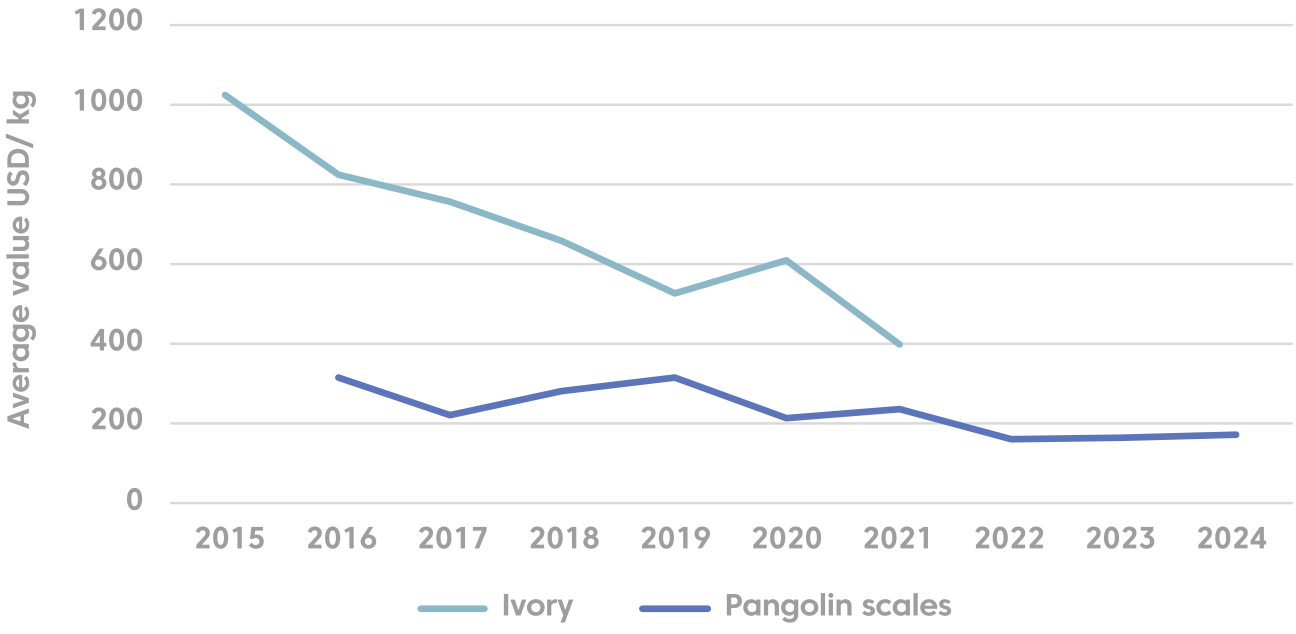


Figure 18: Comparison of average values of pangolin scales and raw ivory at the demand side in Asia, 2015-2024.

VI Estimated revenue losses due to seizures indicate financial resilience of criminal networks

Potential revenue loss that criminal networks could have incurred due to pangolin scale and ivory seizures between 2015 and 2024

USD 176.1 million

2015-2019 – **USD 146.6 million**

2020-2024 – **USD 29.5 million**

Comparing the commodity price data and the seizure data allows for an approximation of the potential revenue loss that criminal networks could have incurred as a result of the product seizures. The estimated revenue loss was calculated by multiplying the annual seizure volumes with the average annual commodity values collected at the demand side of the supply chain.[57]

During the pre-pandemic period when pangolin scale and ivory trafficking was peaking and commodity values were highest, product seizures potentially represented USD 146.6 million in lost revenue to criminal networks at the demand side of the supply chain, yet the networks were resilient enough to weather these losses with apparent ease. These losses are even more salient considering they may

57. Note that the estimated revenue losses calculated in Table 1 are based on incomplete data, as no price data was obtained in some years for ivory and pangolin scales. As such, these figures can be interpreted as the minimum estimated revenue losses.

have been borne by just a handful of networks, as intelligence suggests that a relatively small number of organized crime networks at the receiving end of the supply chain are responsible for the vast majority of the trafficking.[58] In the post-pandemic period when average values for both commodities were lower and fewer seizures were made, product seizures represented USD 29.5 million.

The total USD 176.1 million estimated lost revenue over the decade hints at how much profit the criminal networks must have been generating from successful imports and sales to buyers for it to be worth the risk and continue to be an attractive business venture. Although it is not known what proportion of actual illegal trade is represented by seizures, if a seizure rate of 10% is assumed, then the revenue generated from successful shipments across the 10-year period could potentially be as high as USD 1.58 billion.

Table 1: Estimated revenue losses due to pangolin scale and ivory seizures, 2015-2024.

	2015-2019	2020-2024	Total
Pangolin scales	USD 63.8 million	USD 17.3 million	USD 81.1 million
Ivory	USD 82.8 million	USD 12.2 million	USD 95 million

58. UNODC (2024), World Wildlife Crime Report, Case Study 4: Elephant ivory, p.7.

Criminal network structures

Criminal roles and trends

I African supply driven by Asian demand

Demand from Asia is driving the illegal wildlife trade industry in southern and western Africa. Some Asian wildlife trafficking principals have a permanent presence in Africa, while others work remotely and send their employees to Africa to organize exports. These employees often gain residency permits for three months or longer.

II African employees play crucial roles in Asian criminal networks

During recent years, the WJC has found that African facilitators and brokers play critical roles in both the Vietnamese and Chinese criminal networks operating in Africa. These roles often extend beyond sourcing products to include organizing travel and corrupt connections at seaports and airports, selecting and procuring the cover loads, and managing the storage, transport, and packing of shipments.

III Ivory processing at the African supply side

In a relatively new trend observed during investigations, some Nigerian networks have begun processing ivory on the African side of the supply chain and shipping finished products to Asia, such as jewelry, chopsticks and figurines. The carved products are easier to conceal and can be sent in smaller quantities, making it more difficult for authorities to detect.

III High-level alliances

WJC investigations have observed a trend of collaboration between Asian crime bosses to traffic significant quantities of wildlife products from Africa to Asia, bearing similarities to collaboration trends seen among high-level drug trafficking syndicates. The collaboration presents to varying degrees. At the top end are instances of multiple crime bosses co-investing in the purchase and shipment of large-scale quantities of ivory, pangolin scales or rhino horn, which are then divided for distribution once landed in Asia. The co-investment strategy enables criminal networks to purchase and ship larger consignments by pooling resources and sharing transportation costs. This strategy also mitigates risk by sharing and reducing the financial loss in the case of law enforcement detection and seizure. Mid-range collaboration presents as crime bosses sharing and activating corrupt contacts to assist each other in moving shipments or retrieving seizures, and low-level collaboration has been seen in the mutual exchange of information on safe trafficking routes or sharing contacts for African suppliers and transport enablers.

Vietnamese criminal networks

Vietnamese criminal networks appear to be made up of a core group of Vietnamese nationals centered around one or two principals and trusted local associates, often relatives, in the countries in which they conduct their business. The principal usually has the most experience and best connections to brokers in Africa, buyers in Asia, and logistics contacts at both ends of the supply chain. A second principal may also be involved as the primary investor financing most of the criminal network's activities. The principals, their lieutenants, and other associates in the wider network are believed to collaborate opportunistically to source products and organize shipments, drawing on each other's supplier and logistics contacts. The major Vietnamese criminal networks are highly mobile and financially resilient, able to operate across multiple countries and withstand the seizure of large, high-value wildlife consignments.

Chinese criminal networks

Chinese wildlife crime networks have been found to display structural and operational characteristics typical of sophisticated organized crime groups. Networks appear to be structured as a collection of hierarchically arranged members with a centralized authority. Each network member is devoted to a particular function such as financing, sourcing, logistics, and money movement. These roles are often formally defined, and continuity of network membership is evident across several years of operation.

Analysis of wildlife crime cases on China Judgements Online has identified prosecutions involving multiple generations of the same family, demonstrating the long-running and continuous nature of crime groups seemingly set up with the view of operating beyond the lifetime of individual members, with what appears to be a clear line of criminal succession from fathers to sons. Of the wildlife crime cases involving the prosecution of the heads of criminal networks, the vast majority hail from Fujian and Shuidong, which is consistent with intelligence holdings relating to dominant wildlife crime groups in China.

Nigerian criminal networks

WJC investigations have identified a high level of connectivity across Nigerian criminal networks involved in the supply and trade of pangolin scales and ivory. There are fluid, informal and temporary associations between Nigerian traders, as opposed to the longer-term relationships and structures of more traditional organized crime networks. Collaboration between traders is believed to occur on an opportunistic basis, such as drawing on and sharing each other's supply and logistics contacts. While a strict hierarchical structure has not been observed, all criminal networks investigated by the WJC appear to have a principal. The principal is generally the person in the group with the most experience and best connections to both customers in Asia and logistics contacts in Nigeria.

The core activities of the Nigerian criminal networks are the procurement of large commercial quantities of pangolin scales and ivory and facilitating the shipment of consignments from Nigerian seaports and airports to Asia. The Nigerian criminal networks appeal to the Asian criminal networks not only because they can meet the supply demands of two commodity markets, but also due to their ability to provide a one-stop shop for the vital warehousing, packing, and shipping services.

Images 6: Pangolin scales being sorted and prepared for packing in nylon sacks, May 2020. **Source:** WJC.

Law enforcement impact

As the comparison between the two five-year periods from 2015-2019 and 2020-2024 starkly highlights, the COVID-19 pandemic in 2020 was the catalyst for historic global disruption that brought about a remarkable reduction in the levels of pangolin scale and ivory trafficking. While the pandemic generated the initial shock that almost completely halted trafficking movements for a short period of time, proactive and targeted law enforcement efforts have also contributed to fundamental change in the global wildlife crime landscape. Pivotal arrests and prosecutions of high-level traffickers have occurred in several countries along the supply chains during the period of this analysis, including Vietnam,[59] Malaysia,[60] and Mozambique,[61] but this section highlights two countries whose efforts appear to be contributing the most disruptive impact: China and Nigeria.

59. Nguyen Van Nam, one of Vietnam's major ivory and rhino horn traffickers, was convicted on 16 July 2020 and sentenced to 11 years in prison. See: https://e.vnexpress.net/news/news/204-kg-ivory-haul-lands-three-traders-in-jail-4132021.html

60. Teo Boon Ching was a major Malaysian transporter who worked with many criminal networks to organize the cross-continental shipping of large wildlife consignments. He was arrested in Thailand and convicted in the United States on 19 September 2023, sentenced to 18 months in prison. See: https://th.usembassy.gov/teo-boon-ching-sentenced-to-18-months-in-prison-for-large-scale-trafficking-of-rhinoceros-horns/

61. Chabane Assuba was a Mozambican trafficker who sourced and supplied significant quantities of wildlife products including ivory and organized the cross-border movement of products for a major Vietnamese criminal network. He was convicted in Mozambique on 21 March 2024 and sentenced to 30 years in prison. See: https://www.voaportugues.com/a/avan%C3%A7os-e-retrocessos-marcam-a-luta-contra-a-ca%C3%A7a-furtiva-em-mo%C3%A7ambique-/7543511.html

China's impact on ivory trafficking

Law enforcement efforts in China have been integral in this scenario. Since its elephant ivory trade ban came into force on 31 December 2017, supported by a sophisticated and methodical investigative approach, China has taken out entire criminal networks involved in ivory trafficking. This has included top-down and multi-generational targeting within the networks, repatriating Chinese nationals from Africa to China to face prosecution for their crimes, as well as convicting foreign nationals committing crimes in China. Authorities are known to have conducted extensive, in-depth investigations involving big data and intelligence analysis, lifestyle and financial investigations, and international law enforcement cooperation.[62] It is also one of the few countries known to be applying asset forfeiture orders against high-level wildlife traffickers, which is a powerful tool to deprive criminals of the proceeds of crime.

Reforms in the criminal justice system have given higher priority to environmental crimes, including establishing more than 2,000 specialized environmental courts and trial organizations and introducing specialized teams of prosecutors to handle environmental cases.[63] Thousands of verdicts related to wildlife crimes are delivered every year and published on China Judgements Online,

Images 7-8: Ivory wrapped in plastic and concealed in custom-built wooden crates, seized by China Customs in February 2018 as part of China's largest ivory smuggling case. **Source:** China Central Television (CCTV).

62. For example, the long-running investigation of the Chen organized crime group, see: WJC (2022), Bringing down the Dragon: An Analysis of China's Largest Ivory Smuggling Case.

63. http://www.chinadaily.com.cn/a/202212/19/WS639fa731a31057c47eba4fa8.html

showing an almost 100% conviction rate and heavy sentencing which seeks to address the higher tier of organized crime.

Following the decision of the Standing Committee of the National People's Congress in 2020 to ban all wildlife trade including on online and e-commerce platforms,[64] authorities carried out a three-year enforcement crackdown. It was reported that between 2020 and 2022, police investigated 70,000 criminal cases involving wildlife, detained 90,000 suspects, and seized 1.37 million wild animals and 180 metric tons of wildlife products.[65]

These efforts demonstrate a commitment from China to disrupt wildlife trafficking networks, and the WJC's investigation findings suggest they have had a pronounced effect, particularly on the dynamics of the illegal ivory trade. It has been most evident in the widespread reluctance of Vietnamese brokers and traffickers to trade in raw ivory, the falling ivory values in Africa and Asia, and the build-up of ivory stockpiles in key countries along the supply chain. There is a distinct fear and increased sense of risk, as exemplified by an experienced Vietnamese shipping facilitator who refused a job assisting the clearance of a 6.5 metric tons shipment of pangolin scales in Vietnam after learning that it also contained 500 kg of ivory, as he felt the ivory component made it too risky.

China signals policy changes in use of pangolin scales

In November 2024, China issued a notice with measures to reduce the production and consumption of pangolin-based medicines, including limiting the annual quota of pangolin scales for medicinal use to 1 metric ton.[66] This is reported to be a substantial decrease from previous quotas.[67] The notice also encourages research and development on alternatives to pangolin-based ingredients, in line with an earlier proposal submitted to the National People's Congress in March 2024 that called for the urgent development of artificial ingredients as alternatives to rare species used in traditional medicine products, including pangolins.[68] These measures signal policy changes that could have great potential to reduce demand and trade in pangolin scales.

64. https://www.gov.cn/zhengce/zhengceku/2020-01/26/content_5472280.htm
65. http://global.chinadaily.com.cn/a/202302/25/WS63f94a28a31057c47ebb0cf8.html
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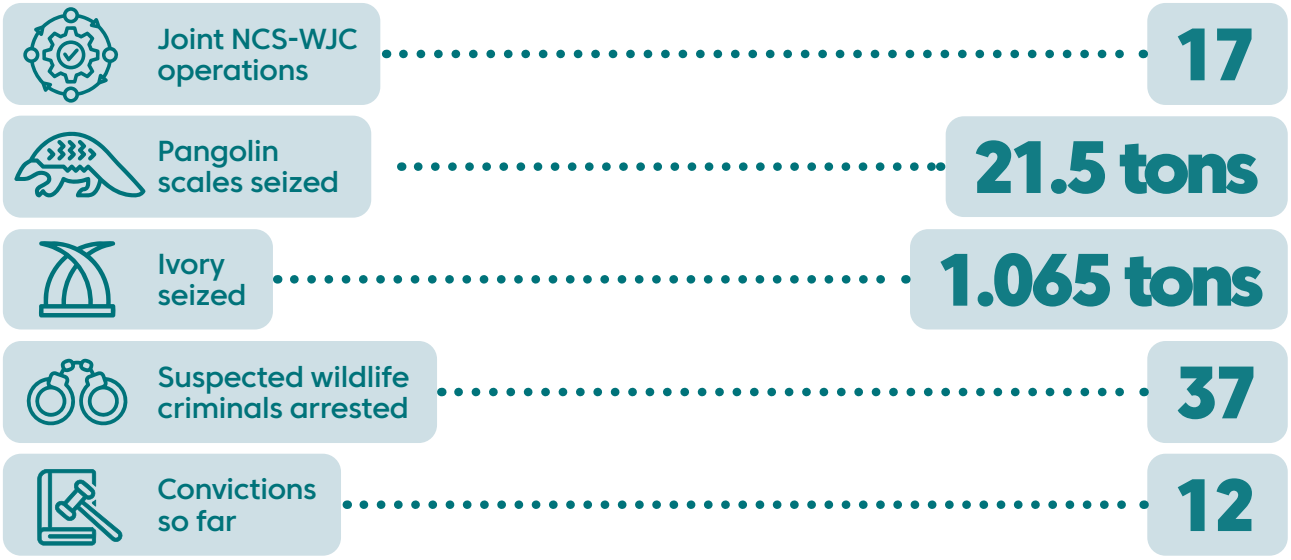
Nigeria's impact on pangolin scale trafficking

Following Nigeria's rapid rise to become the dominant hub for criminal networks consolidating and exporting major ivory and pangolin scale shipments from Africa to Asia, Nigerian authorities responded with a proactive law enforcement approach targeting the major criminal networks operating in the country. Various international organizations and non-governmental organizations have provided technical assistance and capacity building support to help Nigeria turn the situation around, including the WJC.

The WJC commenced a partnership with Nigeria Customs Service (NCS) in July 2021, providing ongoing intelligence analysis support, mentoring for conducting undercover investigations and using other special investigative techniques, and evidentiary assistance for prosecutions. This technical assistance aimed to systematically penetrate three primary criminal networks – one Guinean/Nigerian, one Malian/Nigerian, and one Vietnamese - which were identified from seizure analysis as being responsible for trafficking many metric tons

Images 9-11: Nigeria Customs Service arrested three suspects involved in a major criminal network and seized a stockpile of 7,137 kg of pangolin scales and 870 kg of ivory in July 2021. **Source:** Nigeria Customs Service.



of ivory and pangolin scales from Nigeria to Vietnam. Through long-running intelligence-led investigations and joint operations, the NCS-WJC partnership targeted the crime bosses and other high-value individuals playing key strategic roles in the networks, such as transport facilitators and corrupt contacts.

Since the partnership began, 17 joint operations have been conducted resulting in the arrests of 37 suspected wildlife criminals and the seizure of 21.5 metric tons of pangolin scales and 1.065 metric tons of ivory. WJC technical assistance has contributed to 94% of all pangolin scales reported as seized in Nigeria during this time.[69] These landmark results have so far achieved 12 convictions, including that of a Vietnamese crime boss; his two lieutenants; and the two principal shipping facilitators used by Lagos-based organized crime networks.

Current intelligence indicates that the law enforcement pressure and consistent arrests and prosecutions have severely disrupted the ability of Lagos-based organized crime networks to ship significant quantities of ivory and pangolin scales from Apapa Port to Asia and are contributing to notable changes in the criminal dynamics on the ground. The networks are in turmoil, with a culture of fear and distrust permeating all points of the supply chain. Wholesale suppliers are refusing to show proof of goods or make deals without full or substantial down payments; Asian buyers are unwilling to provide payments to brokers without proof of quality and quantity of goods; and brokers are left without the significant funds needed to obtain goods for shipping and pay the increasing fees to transport enablers. Several major traffickers who are wanted for arrest in Nigeria have fled and are believed to be hiding out in other countries in the region.

69. At the time of writing (January 2025), 23 metric tons of pangolin scales have been reported as seized in Nigeria since July 2021, of which WJC technical assistance contributed to 21.582 metric tons.

The fear and distrust are also evident in the increasingly sophisticated tradecraft being employed, even at mid-levels of criminality. For example, targets have begun setting complicated tests during their dealings with undercover operatives, requiring operatives to prove themselves before, during, and after meetings. They are taking counter-surveillance measures, such as traveling to and from meetings using public transport. In online communications, use of the "view once" feature to send photos, videos and voice messages that can only be opened one time, and the "disappearing message" feature that automatically deletes messages after a set period of time, are becoming general practice.

The increase in proactive pangolin scale stockpile seizures in Nigeria and other locations in Africa, along with the absence of any significant pangolin scale seizures at seaports or airports globally for more than three years, suggests a diminished capacity among the criminal networks to move shipments out of Nigeria.

These changes in the crime dynamic are evidenced by the shift in perceptions among the Lagos trafficking community, with wildlife trafficking in Nigeria now viewed as a high-risk criminal activity, akin to more traditionally high-risk crime types such as the illicit drug trade.

Things have change a lot here. The risk in it now is very high.

FEB 2022

No job now, other people ruined Lagos. I worked for 10 years without problem but, no job now.

OCT 2022

Boss is afraid. We are afraid. You know this business is just like a drug business. In drug you risk yourself and also the product.

JAN 2024

Many people all leaving the business now. They are changing the business to another country, Nigeria too much problem now. Nobody want to business in Nigeria again.

JUL 2022

This business no good. Everyone is scared of Lagos job.

APR 2023

You know that this business is not like before and people are really after us.

FEB 2024

Crime displacement

When law enforcement action effectively targets key crime areas and they become too "hot" to use, criminal activity will displace to other locations or use different methods that present a lower risk of detection. With the proactive and public policing of pangolin scale and ivory trafficking networks in China and Nigeria contributing to these crimes increasingly being viewed as a high-risk criminal enterprise, it is likely that spatial and tactical displacement will occur in response.

Intelligence and seizure data analysis suggests that while Nigeria continues to be an important African export hub for wildlife trafficking, criminal networks are moving towards alternative locations. Angola and Mozambique appear to be emerging

or re-emerging as favored bases to consolidate and move ivory shipments. It is noteworthy that both locations are already established export locations for rhino horn shipments. New intelligence also suggests that pangolin scale supply and trade routes could be shifting into Ghana and Liberia.

To neutralize the threat of crime displacement, law enforcement approaches must be coordinated and intelligence-led across the supply chain. As the China and Nigeria examples illustrate, the most disruptive impacts are accomplished by targeting law enforcement efforts at the criminal network level, with a focus on the top-tier and linchpin positions. Special investigative techniques, joint operations, and international cooperation are crucial but under-utilized tools in such an approach. All countries along the supply chain need to step up their efforts to avoid the potential displacement of crime to other locations or other criminal groups rising to fill the void.

Conclusion

Analysis shows that the intelligence picture has changed considerably over the past decade as pangolin scale trafficking rates grew exponentially, peaking in 2019 alongside a major spike in ivory trafficking, before plunging suddenly in 2020. In this scenario, the impact of the COVID-19 pandemic on the trafficking of pangolin scales and ivory from Africa to Asia cannot be overstated. Border closures, travel restrictions, and disruptions in global shipping and logistics wreaked havoc on the transcontinental wildlife supply chains and upended the unsustainable trajectory of the trafficking of these commodities.

In the post-pandemic period, pangolin scale and ivory trafficking both appear to have stabilized at relatively low levels and have shown consistency in trends since 2022. A substantial decrease in multi-ton seizures, subsidence of the trend for combined commodity shipments, and the decline in pangolin scale and ivory values across the supply chains all signal a significant slowing down in the trafficking of both commodities since the COVID-19 pandemic. The rise in large, land-based stockpile seizures in Africa points to continued demand but also supports conclusions of ongoing disruption at the supply side of the supply chain as a result of more proactive and targeted policing efforts. Together, these findings could indicate a lower risk appetite or weakened capacity of organized crime networks to move shipments out of Africa.

However, intelligence gaps remain on the extent to which pangolin scale and ivory shipments could be successfully entering supply chains in Asia, despite the apparent reduction in trade. Key questions include whether shipments are no longer being detected due to the use of more sophisticated concealment methodologies or changed modus operandi such as sending smaller consignments, or whether networks have procured better corruption settings at the receiver ports to facilitate more secure importation of goods. A lack of data on pangolin population levels also means the possibility of a scarcity of product contributing to the drop in transnational trade cannot be ruled out, although the ongoing large stockpile seizures in Africa and steady pricing trends suggest this is unlikely to be the case just yet.

While the root causes of this remarkable disruption are likely varied and complex, investigation findings indicate that proactive law enforcement efforts targeting the primary trafficking networks in African hotspots with arrests and prosecutions are having an important impact. Fear and a breakdown in trust among the networks at the supply side is resulting in an increased perception of risk and a stalemate scenario that is thwarting their ability to do business.

These changes in the criminal dynamics and illegal trade volumes provide a glimmer of hope in the outlook for pangolins and ele-

phants. A slowing down in the cross-continental trafficking of their scales and tusks may bring some reprieve for these species, and if it can be sustained, perhaps even a chance for recovery. Recent African elephant surveys at some sites have recorded small population increases and fewer carcasses from illegal killings, indicating that a waning ivory trade could be enabling elephant populations to begin recovering in some areas.[70] Although so little is known about the status of pangolins,[71] it is hoped that a decline in the trafficking of their scales has not arrived too late.

70. UNODC (2024), World Wildlife Crime Report, Case Study 4: Elephant Ivory, pp.3-4.
71. UNODC (2024), World Wildlife Crime Report, Case Study 6: Pangolin Scales, p.4.

Good practices and policy recommendations

The law enforcement results achieved by Chinese and Nigerian authorities are compelling examples of the difference that a consistent and targeted criminal justice approach can have on the wildlife trafficking landscape. To push forward with this momentum and prevent the risk of crime displacement to weaker or perceived "lower risk" locations, it is imperative that other countries along the pangolin scale and ivory supply chains also step up their efforts to address wildlife crime. In this regard, several good practices and policy recommendations can be drawn from the findings of this report.

- **A top-tier targeting strategy** has been the cornerstone of Nigeria's approach, using intelligence analysis to map the criminal networks and identify and target the crime bosses, financiers, and high-value linchpins who play a crucial role in the network's activities. Intelligence analysis can also identify opportunities for tactical and strategic interventions.

- **In-depth and long-term investigations** are required for effective penetration of the networks, to corroborate intelligence and collect robust evidence of their criminal activities. Tackling organized crime at the highest levels demands an investment of time and resources, but it has a much higher pay off in affecting real change in the criminal landscape.

- Use of an array of **intelligence analysis and special investigative techniques** is essential to assemble the details of large, complex cases and build an irrefutable brief of evidence for prosecution. Undercover investigations, covert surveillance, data extractions and analysis from seized mobile phones, lifestyle analysis, and financial intelligence analysis are all valuable techniques that were used by both China and Nigeria to piece the evidence together and develop strong cases.

- **Conducting further investigation after seizures** to identify those responsible for organizing shipments and supplying the product. The financial resilience of organized criminal networks means that large-scale product seizures on their own are not a sufficient deterrent, but arrests and prosecutions of the high-level traffickers and organizers are likely to have a much greater disruptive impact. Even more powerful is the use of asset forfeiture to deprive perpetrators of the proceeds of crime, as has been applied by China against high-level traffickers.

- **Involving prosecutors early in the investigation** is essential to ensure evidence is collected lawfully and is admissible in court. The use of special investigative techniques often requires the approval of a senior law enforcement officer, prosecutor or a judge, and can be a legal minefield without expert legal guidance. Prosecutors also are responsible for presenting the evidence before the court

and their engagement can help shape investigative strategies to ensure they are geared towards evidence collection.

- **International cooperation** such as intelligence sharing and joint investigations is vital to tackle these crimes holistically across the supply chain, due to the transnational nature of wildlife crime and crime displacement. International cooperation is required to identify and further investigate network members located in other countries along the supply chain who are involved in sourcing, supplying, transporting, and distributing product. Intelligence from investigations in Nigeria was shared with other countries connected to the criminal networks including China, Vietnam, and Mozambique, and in some instances, this led to further arrests and prosecutions in those countries.

- **Public-private partnerships** between law enforcement agencies and the private sector (including civil society organizations, financial institutions, the transport sector, and academia) can provide valuable technical assistance and capacity building support to assist with investigating transnational wildlife crime networks. The NCS-WJC partnership demonstrates the positive results and impact that can be achieved through a collaborative approach, with WJC's technical assistance contributing to 94% of all pangolin scales seized in Nigeria since July 2021. Such partnerships should be encouraged to share knowledge, identify targets, and strengthen efforts to address wildlife crime challenges.

- This report makes clear the involvement of organized crime networks in ivory and pangolin scale trafficking, and that wildlife crime is a transnational and serious crime. The United Nations Convention against Transnational Organized Crime (UNTOC) provides the international legal framework and tools to address wildlife crime at this level. **Recognizing and treating wildlife crime as a serious crime as defined by the UNTOC** (i.e. an offense punishable by a maximum penalty of at least four years imprisonment) enables governments to apply the tools and mechanisms contained within the Convention. Of most pertinence are the provisions for special investigative techniques, international cooperation, joint investigations, confiscation and seizure of proceeds of crime, and mutual legal assistance, which as the report findings showcase, are fundamental to combat wildlife crime at the highest levels. **Better utilization of UNTOC tools and increased prioritization of wildlife crime** are key to ensure these crimes are tackled in an effective and enduring manner.

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