

ADDRESSING ROOT CAUSES FOR FUTURE PANDEMICS: ELIMINATING HIGH-RISK COMMERCIAL TRADE IN WILDLIFE

NAOMI DOAK¹, LISA FARROWAY², SIMONE HAYSOM³, LUCY KEATTS¹, SHAMINI JAYANATHAN OBE⁴, LI LISHU¹, BRUCE OHR⁵, MARY RICE⁶, AND SCOTT ROBERTON¹

¹WILDLIFE CONSERVATION SOCIETY, ²WORLD BANK GROUP, ³GLOBAL INITIATIVE AGAINST TRANSNATIONAL ORGANIZED CRIME, ⁴ARCTURUS CONSULTANCY LTD., ⁵INTERNATIONAL WILDLIFE TRUST, ⁶ENVIRONMENTAL INVESTIGATION AGENCY

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Executive Summary

Zoonotic diseases originating in wildlife represent most emerging infectious diseases in humans. Increased human contact with wildlife has massively accelerated the risk of the emergence of new viral pathogens and subsequent human disease. The commercial trade of live wildlife heightens the risk of disease transmission to humans. The risk of human exposure to zoonotic pathogens increases exponentially as live animals advance along the commercial wildlife trade supply chain, which harbors prime conditions for the transmission of novel viruses.

Existing recommendations and the current response by the policy community lack the urgency required to mitigate this mounting, ongoing threat to global health. The COVID-19 pandemic has demonstrated the global devastation that zoonotic spillover events can cause. Currently, most investments seek to improve the hygiene and sanitation of the commercial wildlife trade; however, such measures have low chances of success and are unable to protect communities against the spread of novel viruses, which are unknown to us and often do not reveal symptoms in their wildlife hosts. The cost of preventing further pandemics over the next decade is an estimated 2% of the financial damage caused by COVID-19 and prevention has the potential to save millions of lives.

Experts have identified three strategic approaches to eliminating high-risk commercial wildlife trade, and two collective approaches to improving the global response to these risks more broadly. Investments should focus on ending the highest-risk elements of the commercial trade in wildlife and, in so doing, eliminate those interfaces along the supply chains of certain species and products that contain the highest risks for the creation, emergence, and transmission of pathogens. This would have additional benefits to wildlife populations, food security, and livelihoods of Indigenous Peoples and Local Communities (IPLCs) and reduce profits to criminal groups. The three recommended strategic approaches are: i) Reform national legislation to prohibit the highest-risk parts of legal wildlife supply chains; ii) reduce overall demand and consumption of wildlife; and iii) strengthen criminal justice systems to effectively prevent illegal wildlife trade. Of these recommendations, reducing the demand and consumption of wildlife will have the most significant impact on reducing the risk of zoonotic spillover to humans and requires driving behavioral change. Reducing demand and consumption requires investments in state-led interventions that apply best practices in behavioral science, psychology, and social marketing.

While many of these actions require government coordination, philanthropy can play a key role in advancing this agenda. Focusing on the three strategic approaches identified, philanthropy can play a

critical, targeted role in these efforts by supporting development of stronger advocacy tools and strengthening key civil organizations working across these strategic approaches. Philanthropy, governments, and NGOs working in this space must also recognize that effectively dismantling and/or reforming highly profitable legal or illegal systems of wildlife trade requires larger, more systemic, and better coordinated approaches over a sustained period of time. This kind of systemic societal and governmental change will require leadership from the philanthropic sector that fosters learning and explicitly considers both successes and failures to be conducive to supporting best approaches to making this change.

There is an urgent need to significantly scale up our efforts to prevent and reduce the risks of future pandemics from the commercial wildlife trade. The amounts invested to date are insufficient not only when you consider the potential costs of a pandemic, but also the illicit profits being made, which rank among the highest of transnational criminal activities, alongside narcotics, humans, fake goods, and weapons. We hope this paper provides direction for that increased effort.

Background

Over two-thirds of human emerging infectious diseases (EID) are zoonotic, and over 70% have origins in wildlife. The frequency of EID events has risen significantly in recent decades, driven by factors that increase contact between wildlife, humans, and domestic animals¹. A vast diversity of viruses have been identified in free-ranging and traded wildlife, with many more predicted. Mammals and birds pose a greater risk for spillover leading to human disease, epidemics, and pandemics than other terrestrial animals^{2,3}, and are estimated to harbor 1.5 million viruses. Of these, around 700,000 likely endanger human health².

Zoonoses originating from wildlife represent a significant threat to global health, security, and economic growth. The most devastating pandemics in human history - the Black Death (in the 1300s), Spanish influenza (1918), and HIV/AIDS - all resulted from an initial zoonotic spillover from wildlife⁴. Genomic analysis indicates that SARS-CoV-2 evolved naturally in wild *Rhinolophus* bats and, while exact events surrounding COVID-19's spillover might never be elucidated, overwhelming evidence points to a zoonotic event occurring from wildlife traded in the Huanan market in Wuhan, China⁵. African rodents are the suspected natural reservoir for Monkeypox, with outbreaks in the Western Hemisphere related to the exotic pet trade, international travel, and introduction from endemic regions⁶.

Wildlife trade and the emergence of zoonotic pathogens

Wild animals are commonly traded and used around the world for meat, pets, fur/skins, traditional medicine, or display in private zoos/collections. A wide range of animal species are sourced from around the globe, including those trapped in the wild or sold from captive-breeding facilities. Increased human contact with wildlife traded in this way has massively accelerated the risk of the emergence of a new viral pathogen and subsequent human disease^{8,9}.

The commercial wildlife trade and its associated markets, encompassing formal and informal, legal and illegal trade, are all recognized mechanisms for zoonotic disease emergence^{10,11,12}. Animals in the wildlife trade host approximately three-quarters of all known zoonotic viruses and associated diseases¹³, and the

wildlife trade supply chain provides the perfect conditions for the creation of novel viruses. The capture, transport, and containment of wild animals induces stress, injury, and illness and compromises immune systems. The multiple stressors inhibit animals' immune responses and allow for amplified shedding of pathogens. Stress also leads to increased excretion of saliva and voiding of urine and feces, all of which facilitate the shedding of viruses¹⁴.

Genetic change in viruses is driven by several mechanisms, including recombination, which occurs when two or more viral genomes co-infect the same host cell and exchange genetic segments¹⁵. Trade, particularly in live animals, creates super-interfaces along the value chain, co-mingling species from many different geographies and habitats that would never have otherwise come into contact. Re-assortment, realignment, and exchange of viral components among a diversity of wildlife species creates new viruses, and sometimes, one of these novel viruses can enter and multiply in a human cell, causing infection^{16,17}. These novel viruses may then gain the ability to transmit between humans, laying the foundation for a potential pandemic.

A recent study in Viet Nam¹⁸ found that the prevalence and diversity of coronaviruses in traded wild rodents increased along the supply chain from capture sites to markets, from markets to restaurants, highlighting the increasing risk of pathogen transmission and novel viral emergence along the wildlife trade chain (See <http://data.predict.global/>). Similarly, a study following the outbreak of SARS in 2003 showed high rates of SARS-CoV infection among masked palm civets (*Paguma larvata*) at an animal market compared with those on farms, a finding attributed to trading activities, overcrowded conditions, and mixing of various animal species¹⁹.

Mounting evidence indicates substantial human health risks from the trade in live wildlife^{20,21,22, 23,24}. A wide range of emerging pathogens, including SARS-CoV-2-related coronaviruses²⁵, have been detected in animals along both legal and illegal wildlife trade supply chains in China, Viet Nam, and multiple other countries where humans harvest, trade, and consume wildlife^{8, 17-38}. These include novel viruses that cause no symptoms in their wild hosts and which would not be detected by traditional targeted surveillance efforts. The WHO/ OIE/ UNEP 2021 guidance document on the public health risks associated with the sale of live wild animals of mammalian species in food markets notes that wildlife, in contrast to livestock, cannot at present be adequately assessed for potential health risks³⁹.

From source (where the animal is killed or captured) to market (where it is consumed or sold for other purposes), the wildlife supply chain involves conditions that present an elevated risk for the emergence, amplification, and transmission of zoonotic pathogens. These conditions can potentially cause outbreaks, epidemics, and pandemics, as evidenced by Ebola, SARS, SARS-CoV-2, HIV, Monkeypox, squirrel bornaviruses, and influenza A subtypes, among others, and include:

- Multiple distinct species of wildlife stored, transported, or housed in close proximity to each other and to domestic animals, facilitating the exchange and sharing of viruses.
- Wild animals frequently transported and held in conditions where vermin, people (traders, customers, vendors), and fomites pass close to cages/enclosures and animal excretions, exposing them to potential pathogens.
- Animals transported and marketed alive are highly stressed and much more prone to shed pathogens.

- Husbandry conditions along trade chains tend to be poor and/or inappropriate to the species, leaving animals in a stressed, weak, and immuno-compromised state.
- Exchange and introduction of animals to the same or adjacent enclosures normally occurs without any or adequate quarantine.
- Large numbers of people are potentially exposed in urban and peri-urban markets where the crowding together of live wildlife and fresh meat from varied species, close to people and other animals, provides the perfect conditions for recombination, sharing, and shedding of viruses and other pathogens and their transmission to humans.
- The slaughter and preparation of animals often takes place near cages with live animals, free-roaming domestic animals, and in an un-hygienic manner, further spreading and sharing potential pathogens.
- Traded wildlife species are estimated to harbor hundreds of thousands of as-yet-unknown viruses, which oftentimes cause no symptoms in infected wild animal hosts and evade most traditional targeted animal food systems surveillance or animal epidemic prevention efforts. Wildlife cannot be adequately assessed for potential emerging health risks.

Subsistence use of wildlife by Indigenous Peoples and Local Communities (IPLC)

From a public health perspective, while the hunting, consumption, and local sharing of wildlife parts by Indigenous Peoples and other rural residents can lead to zoonotic disease spillover, it represents a lower risk, both to the people in direct contact with these wildlife products and for more wide-spread outbreaks and pandemic emergence⁴⁰, with a relative lack of high-risk factors. Once a live animal enters a commercial supply chain, the risks of viral emergence and transmission increase exponentially through the conditions listed above.

Strategic investment focus

The COVID-19 pandemic has demonstrated the global devastation that one spillover event can cause. There is too much at stake to allow current high-risk wildlife trade practices to continue. A recent analysis⁴¹ showed that the cost of preventing further pandemics over the next decade by protecting wildlife and forests would equate to just 2% of the estimated financial damage caused by COVID-19. A comparison of mortality and economic costs of emerging viral zoonoses to the costs of three key pandemic prevention actions - reduced deforestation, better management of wildlife trade, and increased surveillance - found these interventions would cost less than 1/20th the value of lives lost each year, with substantial cobenefits⁴². The profits – legal and illegal – generated from the commercial trade in wildlife are negligible in comparison to the economic and social devastation that we have witnessed and continue to witness.

Certain recommendations advanced by the policy community, while somewhat helpful, represent a business-as-usual approach likely to offer little return on investment. Improving capacity to detect viruses that have pandemic potential in the commercial wildlife trade is a valid means to increase the evidence base that has already established the prevalence of viruses in different species along the trade chain. However, it is almost impossible to know which one will evolve to make the jump to humans – until it has – and so this is not a practical preventative measure. Similarly, increasing investments that aim to reduce

the risk of spillover events by improving hygiene and sanitary measures of the commercial wildlife trade are likely to have a low chance of success. This approach would benefit from understanding the challenges met despite the billions of dollars invested in the relatively well-regulated and understood poultry supply chains to reduce H5N1 outbreaks^{43,44} – which still suffer ongoing outbreaks across Asia. While increased hygiene and sanitation are important, they provide little impetus toward mitigating the risk of an unknown zoonotic-origin pathogen such as SARS-CoV-2.

The next pandemic cannot be prevented by focusing on known pathogens or sanitary measures; bold multi-disciplinary and trans-sectoral action is needed. As a tightly interconnected, single global community, we can no longer afford to trade and consume wild mammals and birds as we currently do. In this paper, we recommend that investments should focus on ending the highest-risk elements of the commercial trade in wildlife and, in doing so, eliminate those interfaces along the supply chains of certain species and products that promote the creation, emergence, and transmission of pathogens. This would have additional benefits for wildlife populations, food security, and livelihoods of IPLCs and reduce profits to organized crime groups.

Solution Space

We propose three overarching strategic approaches that will eliminate commercial trade in wildlife that is high-risk:

1. Purge *legal* wildlife supply chains of their highest-risk parts through national legal reform

The first strategic approach we present is legislative reform to prohibit the types of *legal* wildlife trade that present the highest risk of zoonotic pathogen emergence and transmission to humans.

In the wake of the global COVID-19 pandemic, several coalitions were formed that brought together hundreds of civil society groups, academics, and donors around a single policy advocacy objective. Some of the primary coalitions and their recommendations were:

- The [Preventing Pandemics at the Source](#) Coalition (PPATS) of 20 non-profit organizations and academic partners providing analyses and guidance to raise awareness, reform policies, and support solutions to prevent future pandemics. PPATS recommends, “shutting down or strictly regulating wildlife trade and markets that risk contributing to zoonotic spillover, particularly commercial trade in birds and mammals for food, pets, and medicine, much of which is for the luxury market. This should be done while respecting the rights, culture, and nutritional needs of Indigenous Peoples and local communities.”
- [End Pandemics](#), an informal alliance of 42 civil society organizations, private sector companies, and many individuals who have come together in a global campaign and to share solutions. They recommend, “Prohibiting commercial trade and consumption of wild animals.”
- [#EndTheTrade](#), a campaign-based coalition initiated by Re:Wild, WCS, and WildAid that gathered 264 endorsements from local and international civil society groups for its declaration calling for governments to enact suitable legislation to permanently end commercial trade and sale of terrestrial wild animals for consumption.
- The World Health Organisation (WHO), the World Organisation for Animal Health (WOAH), and the United Nations Environment program (UNEP) issued a joint [Guidance document](#) to reduce public

health risks associated with the sale of live wild animals of mammalian species in traditional food markets. Its recommendation: “Suspend the trade in live caught wild animals of mammalian species for food or breeding purposes and close sections of food markets selling live caught wild animals of mammalian species as an emergency measure unless demonstrable effective regulations and adequate risk assessments are in place.”

- The Oxford Martin Programme on the Illegal Wildlife Trade and the Interdisciplinary Centre for Conservation Science, University of Oxford issued a [Position statement](#) on managing wildlife trade in the context of COVID-19 and future zoonotic pandemics that recommended the “prevention of illegal, unsustainable, unhygienic, and high-stress use of domestic and wild animal species.”

In the last two years, we have witnessed debate across countless webinars and press releases, and in peer-reviewed and grey literature between members of these coalitions and others on the legislative responses that governments should take to prevent future pandemics. These have contributed to a narrative that there is no agreement on a way forward across civil society. In fact, there are significant areas of consensus:

- *Some legal wildlife trade practices must change:* There is near total consensus across all coalitions, non-government organizations, and inter-government organizations on the need to restrict or prohibit wildlife trade practices which may lead to zoonotic pathogen spillover. We did not identify any organization publicly advocating for legal wildlife trade practices that pose a risk of pathogen spillover to continue in their current form.
- *National and global policy reforms should target the aspects of commercial trade that present the highest risk of zoonotic pathogen emergence and transmission.* All positions recognize that levels of risk vary with the taxonomic group being traded, how it is traded (i.e., live, dead, dried, product, derivative), and at different points along the supply chain (e.g., from the forest to a wildlife farm or wholesale market).
- *Respect the rights, culture, livelihoods, and nutritional needs of Indigenous Peoples and local communities.* All coalitions and other publicly available NGO or academic institution position papers highlight the need for any policy reforms that prohibit certain forms of commercial trade in wildlife to respect the rights, culture, and nutritional needs of Indigenous Peoples and local communities.
- *Pandemic prevention through wildlife trade reforms alone will not be effective.* There is total consensus that strategies must address the other primary drivers of zoonotic spillover and transmission, namely, food systems, deforestation, land use change, and livestock production.

The primary issues still under debate are to what extent the precautionary principle is warranted and defining what constitutes a risky or high-risk practice or taxonomic group that could drive zoonotic pathogen spillover or transmission, namely:

- *Which taxonomic groups present the highest risk:* This includes those advocating to only prohibit trade in species in which known zoonotic pathogens have been detected; those advocating to include certain orders of mammals where zoonotic pathogens are known (i.e. Rodentia, Chiroptera, Primate and Carnivora); and those recommending restrictions at the Class level for both Mammals and Birds, given the uncertainty over which orders or species can host novel pathogens and the predicted number of as-yet unknown zoonoses in these groups.

- *Which end uses present the highest risk:* This ranges from those focusing on only commercial trade for human consumption to those concerned with all forms of commercial trade, regardless of end use.
- *Which type of traded product presents the highest risk:* This ranges from those advocating for a focus on only live or recently killed animals to those in favor of a prohibition on all product types.

The sector needs to recognize the significant levels of consensus and present a more unified front to Governments on where change is needed. There is a shocking lack of progress across the globe on national policy reform on wildlife trade practices, with only China making any significant legislative changes.

In addition, while the wildlife conservation civil society sector has considerable experience in providing technical support to policy and legislative reform on wildlife conservation issues, there is insufficient expertise in advocacy and a lack of robust partnerships with the public health sector that must be addressed to launch and mobilize successful advocacy campaigns.

2. Reduce the demand and consumption of wildlife that poses an elevated risk for future pandemics

Reductions in the demand and consumption of high-risk taxa of wild animals (the core driver of the supply chain) will have the most significant impact on reducing spillover risk. Significantly increased investments are required for informed behaviour change interventions, particularly those that target urban consumers of wild animals.

In addition to the benefits of reducing public health risks and conservation threats, reducing urban consumer demand for wildlife can have a net positive impact on most Indigenous Peoples and Local Communities (IPLCs). Lower demand reduces economic incentives to those supplying the trade, leaving more wildlife for rural families who rely on wildlife as a primary source of food and cultural identity.

To reduce the consumption of wildlife, state-led interventions that apply best practices in behavioral science, psychology, and social marketing are needed. Inherent to these scientific-based approaches is that they do not always involve public communications campaigns, which have in recent years become synonymous with reducing consumer demand. In addition, any investments must include rigorous monitoring and evaluation of intervention impact on behaviors, extending past metrics of campaign reach to more robust methods that can determine if the intervention is having the desired impact on behavior. There is growing capacity amongst non-governmental organizations to work on such solutions, but more effective and sustainable results will be achieved at scale if efforts are directed at building the capacity for behavioral interventions by state institutions (e.g., the Behavioral Insights Unit under development at Sun Yat Sen University in China with support from the Wildlife Conservation Society and the Behavioral Insights Team).

We also propose consideration of psychological mass persuasion using social media, which targets messages using individual characteristics or personalities, rather than broad demographic profiles. Similar techniques have been successfully utilized by political campaigns and are increasingly used by governments and the corporate sector alike. As far as we are aware, they have not yet been employed in

conservation or related public health fields and may enable us to better target messaging for greater impact.

3. Strengthen criminal justice systems to effectively prevent illegal trade in wildlife

The *illegal* trade of wildlife presents one of the highest risks of zoonotic pathogen spillover and transmission. Actions under our first proposed strategic approach, if successful, will prohibit more types of wildlife trade. There remains significant work to be done to strengthen criminal justice responses of Governments in eliminating the illegal trade in wildlife and we present several focal areas for the coming years:

- Targeted advocacy to raise political priority to tackle high-risk, illegal wildlife trade

The last decade has seen numerous political statements and declarations of commitment from governments and regional and global bodies to end wildlife trafficking, but in most cases, these have amounted to negligible impact on the ground. Rather than providing a platform for further declarations, which often lead to minimal action, more focused advocacy work is required to influence governments to adopt sustained actions with a wider impact. For example: Increasing state allocation of resources (budget and human) to different agencies at various levels tackling wildlife trafficking, upgrading legal mandates of agencies to remove obstacles in investigations and prosecutions, applying integrity measures (e.g., public asset declarations) for officers to prevent corrupt practices, and creating performance incentives at a national/sub-national level for collaboration on CWT actions.

- Adopt longer-term, holistic approaches to establishing technical and leadership capacity of the law enforcement, criminal justice sector

Despite significant investments over the last decade in capacity building, there remains a huge lack of competency in the skills to counter-wildlife trafficking in the criminal justice systems of almost all countries. Short-term training courses and ‘sensitizations’ of large cohorts of criminal justice actors must be recognized as having limited impact in building knowledge and competencies.

We must evolve the traditional model of training thousands of officers each year in short, one-off courses towards professional, long-term initiatives to establish capacity and commitment within law enforcement and criminal justice agencies. A holistic approach must be adopted to enhancing criminal justice capacity in general - to fight all crimes, not just wildlife crimes. In the absence of specialist courts (the resourcing of which is outside the reach of most jurisdictions), investigations all land in the same bottleneck of often overloaded and under-resourced prosecution and court systems. Enabling prosecution and courts, particularly in source and transit countries, to function in a more transparent, accountable, and efficient way would mitigate corruption in the criminal justice pathway and ensure that investigations bear fruit in the form of convictions and deterrent sentencing. Such an approach could enable the piloting of initiatives in the criminal justice sphere with a smaller number of officers (at the leadership and frontline levels in strategically important agencies), and courts that are located in high-priority geographies. It could also foster investment in developing capacity over a number of years through the adoption of key policy, practice directions, formal training, and on-the-job mentoring. There must be adoption of performance

management criteria within the relevant agencies to ensure the application of the ensuing technical and leadership skills that can enable inter-agency cooperation. This will ensure sustained, institutional change relevant to more than wildlife crime.

- Incentivize inter-agency coordination at domestic and transnational level

At a domestic and transnational level, there remains insufficient coordination between agencies working to prevent wildlife crimes. There are several underlying obstacles to this, including insufficient trust between officers, insufficient resources to pursue a transnational case, and a lack of performance incentives for working across agencies or borders.

In the short-medium term, there remains a critical role for NGOs and Intergovernmental Organizations to play in facilitating connections and developing trust between officers and agencies – not as an alternative to utilizing formal mechanisms but to incentivize their use. For maximum impact, NGOs and Intergovernmental Organizations should encourage and facilitate the building of cases that target the command-and-control elements of wildlife trafficking rings. Such cases should be filed by agencies and governments with existing capacity to prosecute them, but – where possible and ensuring this doesn't compromise such cases – with the involvement and engagement of less capable agencies in order to share best practices and exemplify what can be achieved.

In the medium-longer term, work needs to be done to build support from countries for more effective models of enforcement or judicial cooperation that overcome the challenges with current domestic inter-agency platforms and bilateral (e.g., MLATs) and multilateral approaches (e.g., UNTOC). For example, establishing permanent coordinating bodies (e.g., EUROJUST). Such models should support qualifying investigations (or at the very least defray costs associated with cooperation among agencies and countries) and incentivize investigators, prosecutors, and their supervisors to pursue these cases. In addition, we must ensure these new mechanisms are linked to One Health coordination bodies to feed into strategic priority planning and actions of those bodies.

We also recommend the formation of time-bound, multi-agency collaborations or task forces that focus on a specific objective or crime problem. Crucially, these task forces should bring together individuals from government, non-government organizations, and academia who bring capabilities and experience to address all relevant aspects of the specific crime problem. (These could include, for example, intelligence gathering, information sharing, investigations, and prosecution to take cases from inception through trial and sentencing.) Membership should be limited, especially at the start, and reinforced with a vetting process that ensures the integrity of personnel assigned to the task forces; this will be essential in combatting corruption, the compromising of ongoing investigations, and loss of trust. Ideally, the task force should occupy a specific, individual location, with task force members having connectivity and access to their organizations' information and all necessary approvals and processes for sharing information in place to enable effective collaboration.

- Reduce corruption

Enforcement of anti-wildlife trafficking laws in many developing nations is gravely undercut by corruption, especially when it comes to prosecuting the leaders and organizers of wildlife trafficking networks who may have substantial resources and political cover.

The greatest protection against corruption is a mixture of internal accountability mechanisms and external oversight. The former can be partially achieved through mechanisms such as truly independent anti-corruption agencies, vetting, public asset declarations, and whistle-blower protections, but also requires creating the right incentives and institutional cultures around integrity. Media and civil society often play a crucial role in processes of external oversight, including bringing transparency to government actions, conducting initial investigations (particularly for transnational criminal networks), and monitoring courts and their treatment of corruption cases. They can also advocate for states to establish the aforementioned internal mechanisms. Greater resources and support are needed for media and civil society groups to play this role, as well as adequate resourcing – such as for legal assistance and evacuation – to help mitigate the risks they face in doing so.

Discussion

In this paper, we present three major strategic approaches that together would end the highest-risk elements of the commercial trade in wildlife and, in doing so, significantly reduce the risks of future pandemics. They can also have additional benefits for wildlife populations, food security, and livelihoods of IPLCs and reduce profits to organized crime groups. These approaches include reforming national legislation to prohibit the highest-risk parts of legal wildlife supply chains, reducing the demand and consumption of wildlife, and strengthening criminal justice systems to effectively prevent illegal trade in wildlife.

In addition to the three strategic approaches we outline above, there are other aspects of our collective approach to addressing the high-risk elements of commercial trade in wildlife that should be improved.

- Problem Solving Mindset

A shift is needed in how we approach this issue towards a problem-solving mindset. This would entail a more evidence-based, scientific approach to how we design interventions and how we monitor the impacts of those interventions to identify what works and, just as importantly, what is not working. We must change how we approach learning from projects and grants. The current dynamic commonly sees only progress and successes highlighted, with failures and lessons more commonly kept quiet in the fear it would affect future fundraising. Donors, governments, and NGOs alike must accept that reducing high-risk trade in wildlife is not going to be solved in a 2-year grant, and that making mistakes is a critically important part of how we improve. Donors play a central role in this shift and can create the space and culture of openly accepting and learning from failures in a far more assertive manner. Such a shift would also require acknowledging that measurement of appropriate metrics may take time, and allow for this rather than default to measuring surface level indicators that do not always reflect the real situation (e.g., reporting only on the number of seizures or prosecutions does not indicate a drop in criminal activity).

- Longer-term thinking

Greater efforts are needed to develop the capacity and commitment of national staff of NGOs, local CSOs, and academic institutions in countries heavily affected by illegal and high-risk commercial trade in wildlife. This does not mean short, one-off training programs, but rather a longer-term commitment to building capacity within criminal justice systems through surgical interventions in relation to prosecution, speedy

trial and sentencing, and in developing CWT leadership of individuals (desperately lacking at present, given the scale of this problem).

There is a need to significantly scale up our efforts to reduce the risks of future pandemics from the commercial wildlife trade. The amounts invested to date are insufficient not only when you consider the potential costs of a pandemic but also the illicit profits being made, which rank amongst the highest of transnational criminal activities, alongside narcotics, humans, fake goods, and weapons. We hope this paper provides some direction for that increased effort.

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