Trading Tactics: Time to Rethink the Global Trade in Wildlife

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Simple Summary: The Covid-19 outbreak has brought about fresh and intensified scrutiny of the wildlife trade, which substantively involves commerce in exotic pets. In response, there have been calls for trade bans involving key components of the global commercial wildlife trade, and some major policy decisions involving trade bans have ensued. Yet, these actions have been criticised, largely based on concerns that they risk exacerbating poverty, undermining human rights, damaging conservation incentives, and otherwise harming sustainable development and conservation efforts. Instead, many critics propose improved regulation of the status quo, with the intention of nurturing a legal, sustainable, safe, humane, and equitable wildlife trade. Here, we provide a countering view that draws attention to: (1) why the risks presented by the wildlife trade (to animal welfare, biodiversity, public health, and financial security) are manifold, and cannot be treated with complacency; (2) why the goal of a legal, sustainable, safe, humane, and equitable wildlife trade is misleading and unachievable; and (3) why moving towards an end to the commercial trade in wildlife should be our ultimate and more ambitious goal. We hope to stimulate further discussion on this issue both within the sustainability research and policy domains, identifying a path towards consensus on how best to protect wildlife, people, and planet.

Abstract: The Covid-19 outbreak has brought about fresh and intensified scrutiny of the wildlife trade, which substantively involves commerce in exotic pets. In response, major policy decisions involving trade bans have ensued, with calls for similar such action to be applied across the trade chain. Yet, these measures have been criticised, largely based on concerns that they risk exacerbating poverty, undermining human rights, damaging conservation incentives, and otherwise harming sustainable development and conservation efforts. Instead, many critics propose improved regulation of the status quo, with the intention of nurturing a legal, sustainable, safe, humane, and equitable wildlife trade. Herein, we provide a countering view that outlines how the risks presented by the wildlife trade are becoming increasingly recognised as being both manifold and severe; and raise concerns that the goal of a well-regulated wildlife trade is becoming increasingly exposed as a mirage. We conclude that while pursuing the United Nation’s Sustainable Development Goals (with their focus on poverty alleviation, food security, public health, and conservation) is enduringly vital, a flourishing wildlife trade is not. Given that the exploitation of wildlife, including for the pet trade, has been identified as one of the dominant drivers of biodiversity loss, emergence of zoonotic infectious disease, animal suffering, and financial instability, perpetuating the concept of utilising a regulated wildlife trade as the default approach to protect people and planet is in urgent need of re-evaluation.

Keywords: animal welfare; conservation; COVID-19; pandemics; wildlife trade
1. Introduction

The Covid-19 outbreak, thought to have originated from the trade in wildlife [1–3], has brought about fresh and intensified scrutiny of this global phenomenon [2,4]. In response, major policy decisions involving wildlife trade bans have ensued; China has decided to ban the consumption of wild animals for food to safeguard people’s lives and health [5,6], and Vietnam has launched a new taskforce committed to reforming policies to prohibit the commercial trade and consumption of wild birds and mammals [7]. More widely, there have been calls for similar such action to be applied across the trade chain [8,9].

Yet, these calls for trade bans involving key components of the global commercial wildlife trade (including for exotic pets, in addition to luxury goods and food, entertainment, and traditional medicine) have been criticised as being neo-colonial and/or naïve, largely based on concerns that they risk exacerbating poverty, undermining human rights, damaging conservation incentives, and otherwise harming sustainable development and conservation efforts [10,11]. Instead, many critics propose improved regulation of the status quo, with the goal being a legal, sustainable, safe, humane, and equitable wildlife trade [10,12–15].

Herein, we outline a countering view that draws attention to: (1) why the risks presented by the wildlife trade (to animal welfare, biodiversity, public health, and financial security) are manifold, and cannot be treated with complacency; (2) why the goal of a legal, sustainable, safe, humane, and equitable commercial wildlife trade (being distinct from non-commercial trade such as animal rescue, conservation, and subsistence purposes) is misleading and unachievable; and (3) why moving towards an end to the commercial trade in wildlife should be our ultimate and more ambitious goal. We hope that we can stimulate further debate on this issue, identifying a path towards consensus on how best to protect wildlife, people, and planet.

2. Risks Presented by the Wildlife Trade Are Manifold, and Cannot Be Treated with Complacency

In light of recent evidence, there are growing concerns that the negative impacts of the wildlife trade are being ignored, downplayed, and treated with a lack of urgency.

2.1. Biodiversity Risks

The trade in wildlife for exotic pets, in addition to luxury goods and food, entertainment, and traditional medicine, is now so substantial that it represents one of the most prominent drivers of vertebrate extinction risk globally [16]. Trade of wild animals to meet the demands of growing local and global markets was also ranked among five key drivers of harmful ecosystem change in the most recent global assessment of biodiversity and ecosystem services [17]. Wildlife trade also puts entire ecosystems at risk by facilitating the introduction of species to new regions, where they can compete with (or outcompete) native species for resources and alter ecosystems [18], and contribute to biodiversity loss via pathogen emergence [19,20]. Furthermore, genetic pollution of wild populations, leading to the erasure of genetically distinct populations, can occur as part of “sustainable” captive breeding and trading processes if effective management is not in place [21].

2.2. Public Health Risks

Similarly, with regards to global public health, we again ignore the negative impacts of wildlife trade at our peril, as wild animal species are thought to be the source of at least 70% of all zoonotic emerging infectious diseases [22] and can provide opportunities for the inadvertent movement of pathogens across global boundaries [23]. Studies have warned that the stream of new emerging zoonotic diseases of public health concern is likely to continue at an ever-increasing rate under current conditions, calling the trade of wild animals a “perfect microbial storm” for pathogenic disease [24]. Furthermore, international wildlife trade brings infectious diseases to a global scale, amplifying the potential consequences of disease outbreaks and presenting a wider threat to more people (in addition
to ecosystems and economies) than may otherwise have occurred if they were restricted to localised regions [23].

2.3. Animal Welfare Risks

Wildlife trade also bears substantial negative consequences for animal welfare because the potential for suffering (relating to both physical and mental domains) exists at each stage of the trade chain, including capture, captive breeding, transport, slaughter, and private ownership [25,26]. Too often, there is a failure to acknowledge that vertebrates (and some invertebrates) are generally considered sentient [27–30], which can lead to both extreme overt impacts, and more subtle chronic impacts on their well-being [28]. This oversight, in turn, exacerbates the aforementioned public health risk because wild animals often experience compromised immune systems when subject to debilitating captive conditions [31]. In combination with scenarios that allow for cross-species transmission (e.g., through close proximity to other species during transport or trade), the issue of a stress-related compromised health state can further amplify disease emergence risks [32].

2.4. Financial Security Risks

The wildlife trade can act as a valuable source of financial income for hunters, farmers, exporters, and vendors alike [33–35]. However, even if the intrinsic value of wildlife is discounted (i.e., the value that wildlife possesses in its own right, as opposed to the instrumental or “resource” value [36]), a painfully topical question is whether the income generated from the legal trade in wildlife (estimated to be worth billions of US dollars globally per year) offsets the full longer term economic costs of its operation. For example, when considering the financial impacts of zoonotic diseases alone, the monetary costs associated with pandemics (which potentially may be measured in trillions of dollars annually [37]) can far outweigh the financial benefits implied by the wildlife trade (which potentially may be measured in billions of dollars annually [38]). Furthermore, evidence suggests that too often only a relatively small proportion of the economic benefits of commercial wildlife trade reaches the poorest local communities [39], yet these beneficiaries (and other marginalised communities around the world [40]) are likely to bear the greatest economic burden and suffer the slowest economic recovery during fallout from a zoonotic disease outbreak [41,42].

3. The Goal of a Well-Regulated Wildlife Trade Is a Mirage

Fully evidenced case studies of sustainable, safe, and humane wildlife trade are the rarity rather than the norm, and there are growing concerns that, overall, the challenges involved are insurmountable.

3.1. Sustainability

A predominant approach adopted by some conservationists and policy makers has been the belief that sustainable use of wildlife is necessary to prevent biodiversity loss [43]. Here, the implication or hope appears to be that commodification and commercialisation enables nature to pay for its continued existence, whilst bringing benefits—both financial and social—particularly to those living in close proximity to wild populations [44]. However, there are increasing concerns that this status quo as a default approach is not tenable, particularly given that the systemic lack of scientific data on the status of wild populations, and ineffective management and monitoring of trade, impairs current sustainability efforts [45–48]. In particular, commonly applied “sustainable solutions”, such as commercial captive breeding and ranching of wild animals, are not always as sustainable as intended, given they may only be appropriate for a limited number of wild animal species that fit certain specific criteria [21,49,50].
3.2. Public Safety

Efforts to reduce the biosecurity risks associated with the global wildlife trade face substantial challenges. Risk of zoonotic disease transmission is inherent in every step of the wildlife trade chain, from source to final destination [51–53]. Although biosecurity protocols can help to lower the risk of zoonotic disease introduction, current surveillance systems for wildlife are universally inadequate for detection of clinical disease or pathogen presence [54–56]. Asymptomatic carriers and unidentified emerging pathogens can evade even highly sophisticated disease surveillance [57]. Infected animals can also go undetected because the large volumes of wildlife imported globally each year render it challenging and costly to effectively screen all individuals [55]. Furthermore, given the novel nature of emerging diseases, it is challenging to target surveillance to detect diseases that are not yet known.

3.3. Legality

When considering calls to improve wildlife trade regulation, it is critical to consider that legal and illegal trade are not always easily distinguishable, and a close complex relationship exists between these markets [58]. Wildlife trade can be legal, illegal, or a combination of both, depending on how a species is classified as it moves throughout the market chain [59]. Legal wildlife trade can also be difficult to monitor due to unintentional mistakes, such as inadequate record keeping [60,61], and mislabelling of species [59]. This creates opportunity for crossover and intentional fraudulent activity, such as when legal operations, including wildlife farms, act as “cover” to launder poached wildlife [62]. Similarly, criminal networks are known to seek influence over legally operating wildlife industries [49], and previous attempts to sustainably manage some aspects of legal trade have failed due to their involvement [63].

3.4. Humane Trade

Global understanding, attitudes, and ethical standards are evolving to the extent that, in some markets, the negative impact on the lives of individual wild animals being exploited commercially is becoming increasingly socially and culturally unacceptable [64]. However, currently there is no overarching body to regulate or address the impacts of the global supply of wildlife on animal welfare [65,66], and although a number of international entities and corporations could play an influential role, it is not always immediately clear where responsibility lies [66,67]. A fundamental question is (again when placing the intrinsic value [36] of wild animals aside) whether the conditions of the wildlife trade can be improved, from source to final destination, to a degree that enables wild animals to thrive, rather than merely survive, during the trade chain whilst still generating a financial profit.

3.5. Equitability

It is important to note that wildlife trade can cause environmental injustice that burdens the very same communities who rely on wildlife for livelihoods [16]. Indigenous peoples and local communities are facing growing threats from resource extraction, commodity production, mining, and transport and energy infrastructure, with various consequences for local livelihoods and health [17]. Among the local indicators developed and used by indigenous peoples and local communities, 72% show negative trends in nature that underpin local livelihoods and well-being [17]. Data show some communities perceive harvesting wildlife for export as a sporadic, unreliable, and risky source of income [68], and case reports of infectious diseases demonstrate that direct interaction with wild animals for farm workers can place them at a heightened risk of zoonotic disease transmission [69]. In addition, in some cases, wages are so low they manage only to keep families above the extreme poverty line [69].
4. Moving Towards an End to the Wildlife Trade, the Case for a More Ambitious Goal

Caution must be taken to ensure that our ultimate goal remains a safe, sustainable, and humane planet, rather than an economically robust commercial wildlife trade.

4.1. Aiming High

Wildlife trade is an immense and multifaceted industry that involves a vast array of animals (in addition to plants and fungi) [70]. Although some of these transactions represent luxury products for the world’s elites [71], others have nutritional and medicinal significance for some of the world’s most vulnerable people, especially in developing countries [58]. For others, wildlife serves as casual captive ornaments, status symbols, or exotic pets. Yet it is the United Nation’s Sustainable Development Goals (with their focus that includes poverty alleviation, food security, public health, and conservation [72]) that are enduringly vital and must be pursued, not a booming wildlife trade. Given that the exploitation of wildlife has been identified as one of the dominant drivers of biodiversity loss, emergence of zoonotic infectious disease, animal suffering, and financial instability [16,73,74], perpetuating the concept of utilising a regulated wildlife trade as default approach to protect people and planet is in urgent need of re-evaluation.

4.2. Benefits of Bans

Specifically, trade bans apply a more cautionary approach that effectively removes the current onus from the conservationist to prove trade is unsustainable [75] (which may come too late—if at all—to prevent associated extinctions and loss of income) [76], removes opportunities for legal trade to operate as a cover for illegal activity [77], maximises the chances of preventing the spread and emergence of zoonotic disease [78], reduces species invasion risk [79], and ameliorates current or removes future negative animal welfare impacts incurred throughout [25]. In addition, there is also increasing evidence that the punitive consequences of illegal trade may be far more likely to change consumer attitudes towards their intention to purchase wildlife, rather than discouragement focused on the negative impacts such behaviour would have on animal welfare and conservation [80]. Irrespective of the rationale for why they have been established, the reality is that wildlife trade bans exist at a local, provincial, federal, national, and international level across the globe, and are relied upon in scenarios where the negative impacts have been deemed unacceptable by the public and legislators (as is true of legislation pertaining to other illegal activities in society in addition to wildlife trade) [81].

4.3. Bans in Practice

Although the effectiveness of wildlife trade bans has been contested (e.g., [10,11,82]), there are numerous examples of bans in current operation that demonstrate their practical value. For instance, in terms of conservation benefits, overall the EU ban on imports of wild-caught birds in 2005 is thought to have effectively reduced trade and biological invasion risk globally [79,83]. Similarly, Pain et al. [84] reported that the US ban on imports of birds (on the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Appendices I and II) has had a positive impact on parrot conservation in the Neotropics. Furthermore, national bans (on taking birds from nests for the international pet trade) are also considered to have significantly increased parrot nest success across diverse geographical locations and political-economic conditions (including in Africa, Asia, and Australia) [84]. Therefore, it is perhaps unsurprising that many non-governmental organisations (NGOs) and academic researchers have also recommended commercial wildlife trade bans as a preferred conservation measure in relation to a range of taxa across a variety of trade scenarios (e.g., [48,85–87]). For example, Ferretti et al. [88] projected that a blanket ban on shark fin trade in the US would have a considerable positive conservation impact, Marshall et al. [48] proposed a ban on the international reptile trade to reduce the pressures on wild populations, and, more broadly, Frank and Wilcove [47] warned that the lack of bans on international wildlife trade poses a serious threat to species extinction.
4.4. Challenges of Bans

Effective application of trade bans is not without its challenges, and caution must be taken to avoid any unintended negative impacts. However, arguably, trade bans are no different to other efforts towards improving the wildlife trade in this regard. In particular, in order to prevent the rerouting of legal trade flows, trade bans should be global and incorporate all sourcing methods, including animals that have been wild caught or otherwise sourced from commercial captive breeding facilities [78]. To prevent any subsequent illegal trade activity or opportunities for corruption [85], wildlife trade bans should also be accompanied with effective enforcement (including appropriate sentences and the political will to implement them) [89], in addition to well-designed mass media campaigns to reduce consumer demand, and otherwise secure public support [80]. To prevent any damaging impacts on wildlife protection efforts (including potential for intentional killing of wild animals due to human–wildlife conflicts [90]), human development goals, or human rights [10], collaborative arrangement that gives agency to local communities and stakeholders while incorporating global perspectives will enable a multi-faceted and versatile approach [91], for example, a phased shift away from a financial dependence on the wildlife trade.

5. Conclusions

A re-evaluation of the current modus operandi for the global wildlife trade is urgently required. In response to COVID-19 (and increasing recognition of the other severe threats presented by the global wildlife trade), it is now critical for the global community to re-consider whether the concept of utilising a regulated commercial wildlife trade (being distinct from non-commercial trade such as animal rescue, conservation, and subsistence purposes) as a default mainstream approach to protect people and planet remains a wise endeavour to be actively pursued. Together, we must ensure that our ultimate goal is a healthy civilisation that is in harmony with, and engages responsibly within, our planetary boundaries. Yet, this goal will be no easy task. Rather, as with efforts to tackle other global challenges, such as climate change, it will require bold and progressive thinking, along with the fortitude to engage proactively with all stakeholders across all levels of engagement, including those who are profiting financially, or otherwise resistant to consider a shift away from the detrimental aspects of the status quo.

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References

1. Zhang, T.; Wu, Q.; Zhang, Z. Probable Pangolin Origin of SARS-CoV-2 Associated with the COVID-19 Outbreak. *Curr. Biol.* 2020, 30, 1346–1351. [CrossRef] [PubMed]
2. Aguirre, A.A.; Catherina, R.; Frye, H.; Shelley, L. Illicit Wildlife Trade, Wet Markets, and COVID-19: Preventing Future Pandemics. *World Med. Health Policy* 2020, 12, 256–265. [CrossRef] [PubMed]
3. Zhou, P.; Yang, X.-L.; Wang, X.-G.; Hu, B.; Zhang, L.; Zhang, W.; Si, H.-R.; Zhu, Y.; Li, B.; Huang, C.-L.; et al. A pneumonia outbreak associated with a new coronavirus of probable bat origin. *Nature* 2020, 579, 270–273. [CrossRef] [PubMed]
4. Petrovan, S.; Aldridge, D.; Bartlett, H.; Bladon, A.; Booth, H.; Broad, S.; Broom, D.; Burgess, N.; Cleaveandle, S.; Cunningham, A.; et al. Post COVID-19: A Solution Scan of Options for Preventing Future Zoonotic Epidemics. OSF. 2020. Available online: osf.io/5px3g/ (accessed on 20 October 2020). [CrossRef]
5. Zhou, Z.-M.; Buesching, C.D.; MacDonald, D.W.; Newman, C. China: Clamp down on violations of wildlife trade ban. *Nature* 2020, 578, 217. [CrossRef]
6. Yang, N.; Liu, P.; Li, W.; Zhang, L. Permanently ban wildlife consumption. *Science* 2020, 367, 1434. [CrossRef]
7. Walzer, C. COVID-19 and the Curse of Piecemeal Perspectives. *Front. Vet. Sci.* 2020, 7, 582983. [CrossRef]
8. Coalition to End The Trade. 2020. Available online: https://endthetrade.com/ (accessed on 21 October 2020).
9. World Animal Protection. COVID-19: Health Risks and Wildlife Markets—The Need for a Permanent Global Ban on Wildlife Markets and a Highly Precautionary Approach to Wildlife Trade. 2020. Available online: https://cdn.bats.org.uk/news/Open-letter-WHO-Wildlife-Trade-and-Covid-19-FINAL.pdf?mtime=20200406111959&focal=none (accessed on 1 October 2020).
10. Roe, D.; Dickman, A.; Kock, R.; Milner-Gulland, E.J.; Rihoy, E. Beyond banning wildlife trade: COVID-19, conservation and development. *World Dev.* 2020, 136, 105121. [CrossRef]
11. Ribeiro, J.; Bingre, P.; Strubbe, D.; Reino, L. Coronavirus: Why a permanent ban on wildlife trade might not work in China. *Nature* 2020, 578, 217. [CrossRef]
12. Borsky, S.; Hennighausen, H.; Leiter, A.; Williges, K. CITES and the Zoonotic Disease Content in International Wildlife Trade. *Environ. Resour. Econ.* 2020, 76, 1001–1017. [CrossRef]
13. Borzée, A.; McNeely, J.; Magellan, K.; Miller, J.R.B.; Porter, L.; Dutta, T.; Kadinjappalli, K.P.; Sharma, S.; Shahabuddin, G.; Aprilynayati, F.; et al. COVID-19 Highlights the Need for More Effective Wildlife Trade Legislation. *Trends Ecol. Evol.* 2020, 35, 1052–1055. [CrossRef]
14. Yuan, J.; Lu, Y.; Cao, X.; Cui, H. Regulating wildlife conservation and food safety to prevent human exposure to novel virus. *Ecosyst. Health Sustain.* 2020, 6, 1741325. [CrossRef]
15. Challender, D.W.S.; Harrop, S.R.; MacMillan, D.C. Understanding markets to conserve trade-threatened species in CITES. *Biol. Conserv.* 2015, 187, 249–259. [CrossRef]
16. Díaz, S.; Settele, J.; Brondizio, E.S.; Ngo, H.T.; Agard, J.; Arneth, A.; Balvanera, P.; Brauman, K.A.; Butchart, S.H.M.; Chan, K.M.A.; et al. Pervasive human-driven decline of life on earth points to the need for transformative change. *Science* 2019, 366, eaax3100. [CrossRef] [PubMed]
17. Brondizio, E.S.; Settele, J.; Díaz, S.; Ngo, H.T. IPBES Global Assessment Report on Biodiversity and Ecosystem Services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services; IPBES Secretariat: Bonn, Germany, 2019.
18. Smith, K.F.; Behrens, M.; Schloegel, L.M.; Marano, N.; Burgiel, S.; Daszak, P. Reducing the Risks of the Wildlife Trade. *Science* 2009, 324, 594–595. [CrossRef]
19. Smith, K.M.; Zambrana-Torrello, C.; White, A.; Asmussen, M.; Machalaba, C.; Kennedy, S.; Lopez, K.; Wolf, T.M.; Daszak, P.; Travis, D.A.; et al. Summarizing US Wildlife Trade with an Eye Toward Assessing the Risk of Infectious Disease Introduction. *EcoHealth* 2017, 14, 29–39. [CrossRef]
20. Greenberg, D.A.; Palen, W.J. A deadly amphibian disease goes global. *Science* 2019, 363, 1386–1388. [CrossRef]
21. Auliya, M.; Hofmann, S.; Segniagbeto, G.H.; Assou, D.; Ronfot, D.; Astrin, J.J.; Forat, S.; Koffivi, K.; Ketoh, G.; D’Cruze, N. The first genetic assessment of wild and farmed ball pythons (Reptilia, Serpentes, Pythonidae) in southern Togo. *Nat. Conserv.* 2020, 38, 37–59. [CrossRef]
22. Jones, K.E.; Patel, N.G.; Levy, M.A.; Storeygard, A.; Balk, D.; Gittleman, J.L.; Daszak, P. Global trends in emerging infectious diseases. *Nature* 2008, 451, 990–993. [CrossRef]
23. Karesh, W.B.; Cook, R.A.; Bennett, E.L.; Newcomb, J. Wildlife Trade and Global Disease Emergence. *Emerg. Infect. Dis.* 2005, 11, 1000–1002. [CrossRef]
24. Brown, C. Emerging zoonoses and pathogens of public health significance–An overview. *Rev. Sci. Tech. Off. Int. Epizoot.* 2004, 23, 435–442. [CrossRef]
25. Baker, S.E.; Cain, R.; Van Kesteren, F.; Zomers, Z.A.; D’Cruze, N.; Macdonald, D.W. Rough Trade: Animal Welfare in the Global Wildlife Trade. *BioScience* 2013, 63, 928–938. [CrossRef]
26. Grant, R.; Montrose, V.; Wills, A. ExNOTic: Should We Be Keeping Exotic Pets? *Animals* 2017, 7, 47. [CrossRef] [PubMed]
27. Lambert, H.; Carder, G.; D’Cruze, N. Given the Cold Shoulder: A Review of the Scientific Literature for Evidence of Reptile Sentience. *Animals* 2019, 9, 821. [CrossRef] [PubMed]
28. Proctor, H. Animal Sentience: Where Are We and Where Are We Heading? *Animals* 2012, 2, 628–639. [CrossRef] [PubMed]
29. Wallach, A.D.; Bekoff, M.; Batavia, C.; Nelson, M.P.; Ramp, D. Summoning compassion to address the challenges of conservation: Compassionate Conservation. *Conserv. Biol.* 2018, 32, 1255–1265. [CrossRef]
30. Van Huis, A. Welfare of farmed insects. *J. Insects Food Feed* 2019, 5, 159–162. [CrossRef]
31. Godoy, S.N.; Matushima, E.R. A Survey of Diseases in Passeriform Birds Obtained from Illegal Wildlife Trade in São Paulo City, Brazil. *J. Avian Med. Surg.* 2010, 24, 199–209. [CrossRef]
32. Greger, M. The Human/Animal Interface: Emergence and Resurgence of Zoonotic Infectious Diseases. *Crit. Rev. Microbiol.* 2007, 33, 243–299. [CrossRef]

33. ’t Sas-Rolfes, M.; Challender, D.W.; Hinsley, A.; Verissimo, D.; Milner-Gulland, E.J. Illegal Wildlife Trade: Scale, Processes, and Governance. *Annu. Rev. Environ. Resour.* 2019, 44, 201–228. [CrossRef]

34. Coad, L.; Fa, J.E.; Abernethy, K.; Van Vliet, N.; Santamaria, C.; Wilkie, D.; El Bizri, H.R.; Ingram, D.J.; Cawthorn, D.; Nasi, R. Towards a Sustainable, Participatory and Inclusive Wild Meat Sector; Center for International Forestry Research: Montreal, Canada, 2018.

35. Pattiselanno, F.; Apituley, J.R.M.; Arobaya, A.Y.S.; Koibur, J.F. Short Communication: Using wildlife for local livelihood—Experiences from the Bird’s Head Peninsula, West Papua, Indonesia. *Biodiversitas* 2019, 20. [CrossRef]

36. Pattiselanno, F.; Apituley, J.R.M.; Arobaya, A.Y.S.; Koibur, J.F. Short Communication: Using wildlife for local livelihood—Experiences from the Bird’s Head Peninsula, West Papua, Indonesia. *Biodiversitas* 2019, 20. [CrossRef]

37. Piccolo, J.J. Intrinsic values in nature: Objective good or simply half of an unhelpful dichotomy? *J. Nat. Conserv.* 2017, 37, 8–11. [CrossRef]

38. Chapman, B. Coronavirus could Deliver $8.8 Trillion Hit to Global Economy without Government Intervention, Bank Says. The Independent. 2020. Available online: https://www.independent.co.uk/news/business/news/coronavirus-global-economy-impact-gdp-covid-19-a9516806.html (accessed on 1 October 2020).

39. TRAFFIC. Legal Wildlife Trade. Available online: https://www.traffic.org/about-us/legal-wildlife-trade/ (accessed on 1 November 2020).

40. Randolph, D.G. Preventing the Next Pandemic: Zoonotic Diseases and How to Break the Chain of Transmission; UNEP: Nairobi, Kenya, 2020.

41. Buheji, M.; da Costa Cunha, K.; Beka, G.; Mavri´ c, B.; do Carmo de Souza, Y.L.; da Costa Silva, S.S.; Hanafi, M.; Yein, C.T. The Extent of COVID-19 Pandemic Socio-Economic Impact on Global Poverty. A Global Integrative Multidisciplinary Review. *Economics* 2020, 10, 213–224. [CrossRef]

42. Sumner, A.; Hoy, C.; Ortiz-Juarez, E. Estimates of the Impact of COVID-19 on Global Poverty; UNU-WIDER: Helsinki, Finland, 2020.

43. Convention on Biological Diversity. Customary Sustainable Use: Summary of Key Activities and Decisions under the Convention; UNEP: Nairobi, Kenya, 2020.

44. Spenceley, A.; Snyman, S.; Eagles, P.A. Guidelines for tourism partnerships and concessions for protected areas: Generating sustainable revenues for conservation and development. In *Report to the Secretariat of the Convention on Biological Diversity and IUCN*; IUCN: Gland, Switzerland, 2017.

45. Kindsvater, H.K.; Dulvy, N.K.; Horswill, C.; Juan-Jordá, M.-J.; Mangel, M.; Matthiopoulos, J. Overcoming the Data Crisis in Biodiversity Conservation. *Trends Ecol. Evol.* 2018, 33, 676–688. [CrossRef] [PubMed]

46. Conde, D.A.; Staerk, J.; Colchero, F.; da Silva, R.; Schöley, J.; Baden, H.M.; Jouvet, L.; Fa, J.E.; Syed, H.; Jongejans, E.; et al. Data gaps and opportunities for comparative and conservation biology. *Proc. Natl. Acad. Sci. USA* 2019, 116, 9658–9664. [CrossRef]

47. Frank, E.G.; Wilcove, D.S. Long delays in banning trade in threatened species. *Science* 2019, 363, 686–688. [CrossRef] [PubMed]

48. Marshall, B.M.; Strine, C.; Hughes, A.C. Thousands of reptile species threatened by under-regulated global trade. *Nat. Commun.* 2020, 11, 4738. [CrossRef]

49. Tensen, L. Under what circumstances can wildlife farming benefit species conservation? *Glob. Ecol. Conserv.* 2016, 6, 286–298. [CrossRef]

50. D’Cruze, N.; Harrington, L.A.; Assou, D.; Green, J.; Macdonald, D.W.; Ronfot, D.; Hoinsoudé Segniagbeto, G.; Auliya, M. Betting the farm: A review of Ball Python and other reptile trade from Togo, West Africa. *Nat. Conserv.* 2020, 40, 65–91. [CrossRef]

51. Mermin, J.; Hutwagner, L.; Vugia, D.; Shallow, S.; Daily, P.; Bender, J.; Koehler, J.; Marcus, R.; Angulo, F.J. The Emerging Infections Program FoodNet Working Group Reptiles, Amphibians, and Human *Salmonella* Infection: A Population-Based, Case-Control Study. *Clin. Infect. Dis.* 2004, 38, S253–S261. [CrossRef]

52. Nijman, V. An overview of international wildlife trade from Southeast Asia. *Biodivers. Conserv.* 2010, 19, 1101–1114. [CrossRef]
53. Hammer, A.S.; Quaade, M.L.; Rasmussen, T.B.; Fonager, J.; Rasmussen, M.; Mundbjerg, K.; Lohse, L.; Strandbygaard, B.; Jørgensen, C.S.; Alfaro-Núñez, A.; et al. SARS-CoV-2 Transmission between Mink (Neovison vison) and Humans, Denmark. Emerg. Infect. Dis. 2020, 27. [CrossRef] [PubMed]

54. Oude Munnink, B.B.; Sikkema, R.S.; Nieuwenhuijse, D.F.; Molenaar, R.J.; Munger, E.; Molenkamp, R.; van der Spek, A.; Tolma, P.; Rietveld, A.; Brouwer, M.; et al. Transmission of SARS-CoV-2 on mink farms between humans and mink and back to humans. Science 2020, eabe5901. [CrossRef] [PubMed]

55. Watsa, M. Wildlife Disease Surveillance Focus Group Rigorous wildlife disease surveillance. Science 2020, 369, 145–147. [CrossRef] [PubMed]

56. Karesh, W.B.; Dobson, A.; Lloyd-Smith, J.O.; Lubroth, J.; Dixon, M.A.; Bennett, M.; Aldrich, S.; Harrington, T.; Formenty, P.; Loh, E.H.; et al. Ecology of zoonoses: Natural and unnatural histories. Lancet 2012, 380, 1936–1945. [CrossRef]

57. Chisholm, R.H.; Campbell, P.T.; Wu, Y.; Tong, S.Y.C.; McVernon, J.; Geard, N. Implications of asymptomatic carriers for infectious disease transmission and control. R. Soc. Open Sci. 2018, 5, 172341. [CrossRef]

58. Broad, S.; Mulliken, T.; Roe, D. The Nature and Extent of Legal and Illegal Trade in Wildlife; Earthscan Publication: London, UK, 2003; pp. 3–22.

59. Lockwood, J.L.; Welbourne, D.J.; Romagosa, C.M.; Cassey, P.; Mandrak, N.E.; Strecker, A.; Leung, B.; Stringham, O.C.; Udell, B.; Episcopio-Sturgeon, D.J.; et al. When pets become pests: The role of the exotic pet trade in producing invasive vertebrate animals. Front. Ecol. Environ. 2019. [CrossRef]

60. Symes, W.S.; McGrath, F.L.; Rao, M.; Carrasco, L.R. The gravity of wildlife trade. Biol. Conserv. 2018, 218, 268–276. [CrossRef]

61. Harfoot, M.; Glaser, S.A.M.; Tittensor, D.P.; Britten, G.L.; McLardy, C.; Malsch, K.; Burgess, N.D. Unveiling the patterns and trends in 40 years of global trade in CITES-listed wildlife. Biol. Conserv. 2018, 223, 47–57. [CrossRef]

62. Livingstone, E.; Shepherd, C.R. Bear farms in Lao PDR expand illegally and fail to conserve wild bears. Oryx 2016, 50, 176–184. [CrossRef]

63. Carpenter, A.I.; Robson, O.; Rowcliffe, J.M.; Watkinson, A.R. The impacts of international and national governance changes on a traded resource: A case study of Madagascar and its chameleon trade. Biol. Conserv. 2005, 123, 279–287. [CrossRef]

64. Macdonald, D.; Jacobsen, K.; Burnham, D.; Johnson, P.; Loveridge, A. Cecil: A Moment or a Movement? Analysis of Media Coverage of the Death of a Lion, Panthera leo. Animals 2016, 6, 26. [CrossRef] [PubMed]

65. Sekar, N.; Shiller, D. Engage with animal welfare in conservation. Science 2020, 369, 629–630. [CrossRef]

66. Scholtz, W. ‘Ethical and humane use’, intrinsic value and the Convention on Biological Diversity: Towards the reconfiguration of sustainable development and use. Rev. Eur. Comp. Int. Environ. Law 2020. [CrossRef]

67. Bowman, M. Conflict or compatibility? The trade, conservation and animal welfare dimensions of cites. J. Int. Wildl. Law Policy 1998, 1, 9–63. [CrossRef]

68. Robinson, J.E.; Griffiths, R.A.; Fraser, I.M.; Raharimala, J.; Roberts, D.L.; St. John, F.A.V. Supplying the wildlife trade as a livelihood strategy in a biodiversity hotspot. Ecol. Soc. 2018, 23. [CrossRef]

69. Tappe, D.; Meyer, M.; Oesterlein, A.; Jaye, A.; Froesch, M.; Schoen, C.; Pantechev, N. Transmission of Armillifer armillatus Ova at Snake Farm, The Gambia, West Africa. Emerg. Infect. Dis. 2011, 17, 251–254. [CrossRef]

70. Fukushima, C.S.; Mammola, S.; Cardoso, P. Global wildlife trade permeates the Tree of Life. Biol. Conserv. 2020, 247, 108503. [CrossRef]

71. Phelps, J.; Biggs, D.; Webb, E.L. Tools and terms for understanding illegal wildlife trade. Front. Ecol. Environ. 2016, 14, 479–489. [CrossRef]

72. United Nations. The Sustainable Development Goals Report 2019; United Nations Publications: New York, NY, USA, 2019.

73. Bradshaw, G.A.; Schore, A.N.; Brown, J.L.; Poole, J.H.; Moss, C.J. Elephant breakdown. Nature 2005, 433, 807. [CrossRef]

74. Paquet, P.C.; Darimont, C.T. Wildlife conservation and animal welfare: Two sides of the same coin. Anim. Welf. 2010, 19, 177–190.

75. Krieps, C.L. Sustainable use of endangered species under CITES: Is it a sustainable alternative. U. Pa. J. Int’l Econ. L. 1996, 17, 461.
76. Schneider, J.L. *Sold into Extinction: The Global Trade in Endangered Species*; ABC-CLIO: Santa Barbara, CA, USA, 2012.

77. Sung, Y.-H.; Fong, J.J. Assessing consumer trends and illegal activity by monitoring the online wildlife trade. *Biol. Conserv.* 2018, 227, 219–225. [CrossRef]

78. Can, Ö.E.; D’Cruze, N.; Macdonald, D.W. Dealing in deadly pathogens: Taking stock of the legal trade in live wildlife and potential risks to human health. *Glob. Ecol. Conserv.* 2019, 17, e00515. [CrossRef]

79. Reino, L.; Figueira, R.; Beja, P.; Araújo, M.B.; Capinha, C.; Strubbe, D. Networks of global bird invasion altered by regional trade ban. *Sci. Adv.* 2017, 3, e1700783. [CrossRef]

80. Thomas-Walters, L.; Cheung, H.; Lee, T.M.; Wán, A.K.Y.; Wang, Y. Targeted values: The relevance of classical Chinese philosophy for illegal wildlife demand reduction campaigns. *People Nat.* 2020. [CrossRef]

81. Rivlin, G. *Understanding the Law*; Oxford University Press: Oxford, UK, 2012.

82. Bonwitt, J.; Dawson, M.; Kandeh, M.; Ansumana, R.; Sahr, F.; Brown, H.; Kelly, A.H. Unintended consequences of the ‘bushmeat ban’ in West Africa during the 2013–2016 Ebola virus disease epidemic. *Soc. Sci. Med.* 2018, 200, 166–173. [CrossRef]

83. Cardador, L.; Tella, J.L.; Anadón, J.D.; Abellán, P.; Carrete, M. The European trade ban on wild birds reduced invasion risks. *Conserv. Lett.* 2019, 12, e12631. [CrossRef]

84. Pain, D.J.; Martins, T.L.F.; Boussekey, M.; Diaz, S.H.; Downs, C.T.; Ekstrom, J.M.M.; Garnett, S.; Gilardi, J.D.; McNiven, D.; Primot, P.; et al. Impact of protection on nest take and nesting success of parrots in Africa, Asia and Australasia. *Anim. Conserv.* 2006, 9, 322–330. [CrossRef]

85. Santos, A.; Satchabut, T.; Trauco, V.G. Do Wildlife Trade Bans Enhance or Undermine Conservation Efforts? *Appl. Biodivers. Perspect. Ser.* 2001, 1, 1–15.

86. Ban Animal Trading; EMS Foundation. Plundered: South Africa’s Cold-Blooded International Retile Trade. 2020. Available online: https://emsfoundation.org.za/category/investigations/ (accessed on 1 October 2020).

87. Donnelly, P. *Nevada Bans Destructive Commercial Reptile Collection*; Centre for Biological Diversity: Tuscon, AZ, USA, 2017.

88. Ferretti, F.; Jacoby, D.M.P.; Pfleger, M.O.; White, T.D.; Dent, F.; Micheli, F.; Rosenberg, A.A.; Crowder, L.B.; Block, B.A. Shark fin trade bans and sustainable shark fisheries. *Conserv. Lett.* 2020, 13. [CrossRef]

89. Wyatt, T. *Wildlife Trafficking: A Deconstruction of the Crime, the Victims, and the Offenders*; Springer: Cham, Switzerland, 2013.

90. Rai, J. Displacement versus Co-existence in Human-Wildlife Conflict Zones: An Overview. *J. Geogr. Environ. Earth Sci. Int.* 2019, 1–16. [CrossRef]

91. Melo, V. Collaborative Efforts for Sustainable Development: Surveying the Literature on Multi-Stakeholder Initiatives to Realize the Sustainable Development Goals; CSO: The Hague, The Netherlands, 2018. [CrossRef]

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