

SUMMARY REPORT



A WEBINAR TO COMMEMORATE WORLD ENVIRONMENT DAY,
FRIDAY THE 5TH OF JUNE 2020

BIODIVERSITY AND COVID-19: CAN WE PREVENT FUTURE OUTBREAKS?



BACKGROUND

- The webinar was developed and organised by the Nigeria Program of the Wildlife Conservation Society (WCS) in collaboration with the European Union.
- The event was hosted by the European Union using WebEx and was moderated by Kurt Cornelis, Head of Cooperation to the Delegation of the European Union to the Federal Republic of Nigeria and to the ECOWAS Commission.
- The webinar was widely advertised using social media and email. Over 400 people from 51 different countries registered online for the webinar. Roughly 200 people participated during the event itself.

Five speakers made presentations during the webinar:

Speaker 1: Sharon Ikeazor, Honourable Minister of State, Federal Ministry of Environment.

Title: *Upscaling Conservation and Protection of Biodiversity in an era of COVID-19*

Speaker 2: Dr Chris Walzer, Executive Director Health, Wildlife Conservation Society (WCS).

Title: *COVID-19 and zoonotic emerging infectious diseases: revisiting human-wildlife interfaces and wild places*

Speaker 3: Iroro Tanshi. Small Mammal Conservation Organization (SMACON) and University of Benin.

Title: *Protect Bat Populations and Habitat to Prevent Outbreaks.*

Speaker 4: Charles Emogor. University of Cambridge, UK.

Title: *COVID-19: Pangolins are Victims not Villains.*

Speaker 5: Dr Chikwe Ihekweazu. Director of Nigeria Centre for Disease Control (NCDC).

Title: *Exploring Linkages between COVID-19 Response Activities in Nigeria and Biodiversity*

This report is a summary of the five presentations and includes a section on the question and answer session at the end of the webinar together with some recommendations for next steps.

INTRODUCTION

The webinar was introduced by Kurt Cornelis, Head of Cooperation to the Delegation of the European Union to the Federal Republic of Nigeria and to the ECOWAS Commission. World Environment Day takes place every year on 5 June. It is the United Nations' flagship day for promoting worldwide awareness and action for the environment. Over the years, it has grown to be the largest global platform for environmental public outreach and celebrated by millions of people in more than 150 countries. The foods we eat, the air we breathe, the water we drink and the climate that makes our planet habitable all come from nature. Yet, these are exceptional times in which nature is sending us a message: To care for ourselves we must care for nature. It's time to wake up. To take notice. To raise our voices. It's time to build back better for People and Planet. This World Environment Day, it's Time for Nature.

As a result of the COVID-19 pandemic there is heightened public interest in the risk factors that lead to such events. The commercial wildlife trade and associated commercial wildlife markets for human consumption have been widely recognized as a major risk factor. A recent report by the Wildlife Conservation Society looks at the broader issues of ecosystem integrity and ecosystem degradation. The degradation of ecosystems is often linked to the commercial wildlife trade but also results in various other processes that affect zoonotic disease transmission. Declines in the integrity of ecosystems have been linked to increased risk of emerging infectious disease outbreaks that originate in wildlife, including HIV, SARS, MERS and Ebola. Four key findings were identified in the report:

1. Degradation has significantly altered ecological systems worldwide and continues to expand into new areas. The degradation placed on ecosystems has meant Earth has entered a human-dominated geological era termed the Anthropocene and as a result we are increasingly witnessing catastrophic global events.
2. The majority of emerging infectious disease threats are zoonotic, originate from wildlife, and often cause major social and economic impacts. Since 1940, more than 335 emerging infectious disease outbreaks were reported worldwide, and the rate of outbreaks is increasing. More than half of these outbreaks originated in wildlife, and the frequency is increasing. Scientists estimate that there are 700,000 viruses not yet discovered in mammals and birds that are predicted to have zoonotic potential (potential to cross from animals to humans).
3. Ecological degradation increases the overall risk of zoonotic disease outbreaks originating from wildlife. The key "ingredients" that accentuate the risk of an emerging infectious disease spillover event (when a pathogen jumps between an animal and humans) are activities (e.g., land conversion, creation of new habitat edges, wildlife trade and consumption, agricultural intensification) in or linked to areas of high biodiversity that elevate contact rates between humans and wildlife species.
4. Degradation of ecosystems also has complex effects, feedback loops, and some notable negative impacts on many other aspects of human health, including: the prevalence of endemic zoonotic diseases, the prevalence of vector-borne and water-borne diseases; air quality; nutrition; mental health; and access to traditional medicines; as well as effects on human health through the impacts of climate change. These all in turn can contribute to local and transnational conflicts over natural resources and undermine local and international security.

SPEAKER 1

Sharon Ikeazor, Honourable Minister of State, Federal Ministry of Environment

Title: *Upscaling Conservation and Protection of Biodiversity in an Era of COVID-19*

It is a pleasure to join the World today to mark this Year's World Environment Day. I am happy to see that the world has gradually started adapting to the changes posed to it by the COVID 19 pandemic. This pandemic has shown us more than ever the importance of our biodiversity and the need to upscale our conservation strategies. The Theme of this year for World Environment Day is very apt as we recover from COVID 19 and realize that our solutions are staring us in the face which is to **Restore**, **Conserve** and **Protect** our Biodiversity. Biodiversity is the foundation for life and there are a mirage of benefits amongst which are: livelihoods and sustainable development, improvement and delivery of food security, increase in job opportunities for local communities. Some will say that a lot has been done but I will want to point out that more needs to be done to Up-scale the protection and conservation of our Biodiversity. A clear understanding is needed, of the fact that Biodiversity is the cradle of life on earth and covers millions of species, from plants, animals, fungi and bacteria and the Ecosystem is the baseline that holds all of this together. Human interaction with the Ecosystem must remain balanced or else we risk disrupting nature and face the consequence as we are seeing with the COVID 19 Pandemic. Therefore, to prevent future pandemics, we must Restore, Conserve and Protect our Biodiversity. As we know COVID-19 is not the first zoonotic disease to threaten human health and survival and it may not be the last. In the past we've had SARS, MERS, Ebola, Avian flu, H1N1 influenza etc. At least 60% of known human infectious pathogens have emerged from animals, with the majority of recently emerging pathogens originating from wildlife. A sustainable management of biodiversity resources can mitigate the transmission of zoonotic diseases. Illegal Wildlife trade is a billion dollar industry that is driven by consumer demand for traditional medicines, bush-meat, trophies; live exotic pets, and foods, involves the geographic movement of animals worldwide. Preserving and protecting intact ecosystems and their endemic biodiversity lessens human-animal contact, the onset of new pathogens, and the prevalence of infectious diseases. Conservation of biodiversity must therefore be high on national agendas as it is the most effective, and the most cost-effective way to prevent future outbreaks that endanger human lives and threaten livelihoods. In its resolution, the third session of the United Nations Environment Assembly (UNEA -3) of the United Nations Environment programme (@UNEP) recognises that biodiversity loss is a health risk multiplier, and that human, animal, plant and ecosystem health are interdependent. It therefore emphasizes the value of the "One Health" approach, an integrated approach which fosters cooperation between environmental conservation and the human health, animal health, and plant health sectors.

The Nigerian Government has taken steps in Conservation and Protection of Biodiversity. Some of which are completed and ongoing are:

- Intervention programme by the Department of Forestry in collaboration with Guinness Nigeria on afforestation/reforestation of 5,000 hectares of land over five years in six states.
- Intervention programmes by the Ministry through the Great Green Wall Agency (NAGGW) which include implementation of the 25 million trees pledge made by Mr. President.

- Implementation of the National Ivory action Plan (NIAP) which aims to curb illegal trafficking of elephant and manage stockpiling of the seized tusk
- Survey on the existing elephants in the Nigerian territory (Ongoing)
- Awareness and sensitization campaigns in communities where existing elephants in Nigeria are found (Completed)
- Capacity building of the Judiciary and Law enforcement agencies on Illegal Wildlife Trade (IWT) and speedy disposal of cases of violators (Completed)
- Collaboration with United Nations Office on Drugs and Crime (UNODC) on accessing data on Illicit Wildlife Trade in the Country with the use of modern technology. Fingerprints machines have been distributed to Nigerian Customs Service
- Collaboration with Wildlife Conservation Society and Nigerian Conservation Foundation in educating the populace on need to conserve endangered species e.g Vulture, Pangolin, Manatee etc.
- Collaboration with Wildlife Conservation Society on implementing conservation of primates in Cross-River State.
- Awareness & sensitization of forest communities in protecting and preventing biodiversity loss.
- African Rosewood tree program between Nigeria, Benin & Togo to ensure sustainable management & that utilization (trade) of the species is not detrimental to survival in the wild (ongoing).
- Establishment of animal rescue centres in FCT, Kano and Lagos states
- Establishment of Sustainable Management of selected critical wetland ecosystem and strengthening of community livelihood in Hadejia, Jigawa State and Nguru, Yobe State

Next steps we plan to undertake are:

- Sustenance of the ongoing campaign against the spread of COVID- 19 and other outbreaks and engaging in more aggressive awareness creation at the national, sub-national and community levels.
- Valuation of our biodiversity resources as its contributes to our GDP Encouraging farmers in forest-based communities to practice climate smart agriculture (CSA) through REDD+
- Need for stricter enforcement of policy, laws and regulations on Illegal Wildlife Trade, deforestation and over-exploitation of biodiversity.
- Leveraging on knowledge of indigenous people & communities living in Key Biodiversity Areas.
- Provision of alternative livelihoods to communities to reduce human impact on biodiversity.

I will like to acknowledge conservation efforts of two Nigerian women conservationists Rachel Ikemeh and Iroro Tanshi, but not forgetting all other Conservationist especially WCS and NCF

Finally, as a Government, we remain committed to safeguarding nature by ensuring our environmental laws are updated and enforced. This is the best time to unite and find ways to live in harmony with one another and with Nature.

SPEAKER 2

Dr Chris Walzer, Executive Director Health, Wildlife Conservation Society.

Title: *COVID-19 and zoonotic emerging infectious diseases: revisiting human-wildlife interfaces and wild places*

What do we know? Zoonoses are diseases that move between animals and humans. Emerging Infectious Diseases [EID] are dominated by zoonoses and 72% of all zoonotic EIDs originate in wildlife. EID frequency is increasing including HIV, EBOLA, H1N1, SARS, NIPAH, HENDRA, H7N9. Across 25 high-risk viral families, there are estimated to be 1.7M unknown viruses about 700k of which likely have the potential to infect humans. For every known coronavirus, there are thousands of unknown coronaviruses circulating in wildlife.

What do we need to understand? Coronaviruses move both ways. Such viruses have been increasing in frequency over the last 50 years and indeed there is new Ebola outbreak in the DRC this week. This is not unnatural, we ourselves harbour viruses as do livestock and wildlife. These viruses mutate and can be shared randomly, spillover events occur when viruses are transferred from wildlife to humans and vice versa. SE Asia live markets cannot be compared to anything in Africa. Up to 100 species are housed together, and they are alive. This is rarely seen in Africa. These conditions allow viruses to exchange and recombine into new viruses. Today COVID-19 is a human to human transmitted disease and animals are no longer involved in the spread. However, the ancestral host of the SARS-CoV2 virus is a horseshoe bat species. High rate of recombinations allow these bat coronaviruses to evolve quickly. At the present, we do not know if an additional intermediary or amplification host was involved in the spillover event. To date there is no evidence that it is a pangolin or any other species. Alternatively, bats do and could in this case have infected humans directly resulting in a cryptic evolutionary phase in humans during which the necessary traits for human to human transmission developed.

It is not about bat-soup, civets or pangolins. We ourselves have enabled viruses to spill over into humans. It is about the interface between humans and wildlife and these contacts are increasing. Markets in SE Asia are super-interfaces, perfect for creating new viruses.

Trade of wildlife along the food value chain increases the chance of spillovers. Through habitat destruction and deforestation we are creating more edges for viruses from wildlife to spillover to humans. In 2019 WCS helped frame the **Berlin Principles on One Health**. These principles recognize and take action to retain the essential; health link between humans, wildlife domesticated animals and plants, and all nature; and ensure the conservation and protection of biodiversity which, interwoven with intact and functional ecosystems, provides the critical foundation infrastructure of life, health and well-being on our planet. A One Health framing in addressing and mitigating spillover events [and other health issues] is essential due to the interrelatedness of the multiple drivers.

What do we need to do now? We need to live safely with bats. We need to empower indigenous peoples and local communities, meet their protection and nutritional needs, and value their knowledge.

- Permanently ban the commercial trade in wildlife for consumption.
- Strengthen efforts to combat trafficking of wild animals within countries and across borders.
- Work to change dangerous wildlife consumption behaviours, especially in large urban centres.

SPEAKER 3

Iroro Tanshi. Small Mammal Conservation Organization and University of Benin.

Title: *Protect Bat Populations and Habitat to Prevent Outbreaks.*

Over 1,400 bat species are known across the globe, about 300 species from Africa, and over 100 from Nigeria – one of the most bat species-rich countries in Africa. Bats in Nigeria either feed on two types of food: a) fruits and nectar, aka plant-visiting bats or fruit bats; b) insects, small mammals, birds and frogs, aka insect-eating and animal-eating bats. As feed at night, they provide many ecosystem services that are critical to human survival. For example, plant-visiting bats pollinate flowers of the *Parkia* tree – source of the popular ‘dawa dawa’ used in soups and disperse the shea tree from which shea butter is derived. Similarly, insect-eating bats devour agricultural pests, reducing the costs of farm produce.

Like most wildlife and domestic species, bats are suspected reservoir hosts for zoonotic viruses – cause infectious disease in humans. Contrary to popular opinion, bats are not special as reservoir hosts, but rather it is a numbers game. Bats have been implicated in some emerging infectious diseases, yet the exact role that they play in transmission of viruses to humans is poorly understood. Scientists continue to investigate whether viruses are transmitted directly from bats to humans or other intermediate hosts. Bats have been blamed for COVID-19, due to 96% similarity between the Sars-Cov2 virus (responsible for COVID-19) and another virus that was isolated from horseshoe bats years ago. A recent study has shown that both viruses separated between 40-70 years ago, as the drums were beating for Nigeria’s independence or the civil war. Whether other hosts were involved in the transmission of the virus to humans, remains unknown.

Scientists advise that there is a non-trivial risk of spill-overs from wildlife to humans when we encounter infected animals. Therefore, it is pertinent to avoid risky behaviors that increase the likelihood of human exposure and thus the potential for spill-over events. We know that habitat destruction increases human-wildlife contact raising the risk of zoonotic outbreaks. Furthermore, the potential for spillovers increase when multiple novel wildlife contact happens. Thus, deforestation and wildlife trade create the perfect condition for interaction between species that were never previously in contact, raising spill-over risk. It is now widely accepted that humans are culpable in the virus outbreak and spread that led to the current pandemic – COVID-19. Therefore, it behoves humans to interact safely with all wildlife.

The Nigerian government has demonstrated leadership by developing a One Health Strategic Plan. From a wildlife perspective, the effective implementation of this strategy depends on understanding the ecological links between wildlife and the role they play in disease dynamics. This goes beyond viral surveillance and aka “virus hunting” as is currently presented in the strategic plan. It requires carefully designed field-based research that involves multiple wildlife species and socio-ecological investigations into human-wildlife interactions. This type of research is a critical complement to Nigeria’s transparent human epidemiological operations that will help detect and prevent future outbreaks

SPEAKER 4

Charles Emogor. University of Cambridge, UK.

Title: *COVID-19: Pangolins are Victims not Villains.*

The current coronavirus pandemic has helped increase levels of awareness of the world's most trafficked wild mammal – the pangolin. However, conservationists fear that their purported links in the origin and spread of COVID-19, which is responsible for the growing public awareness, might result in further demonization of pangolins. Thus, the need to address this and consider ways to prevent possible future zoonotic disease outbreaks.

Pangolins, the world's only scaly mammal are restricted to Africa and Asia. They prey exclusively on ants and termites and have no known natural predators. However, their populations are declining rapidly due to overexploitation for their meat and scales for food and traditional medicines, respectively. Between 2000 and 2013, approximately 1 million pangolins were said to have been killed for the global illegal wildlife trade, with Nigeria playing a preeminent origin/transit role (Heinrich et al., 2017). Andersen et al. (2020)'s suggestion of pangolins being an intermediary in the origin of SAR-CoV-2 (the strain of coronavirus that causes COVID-19) is one of the numerous studies that highlight the negative ramifications of ill human relationships with the natural world. They reported that Malayan pangolins (*Manis javanica*) might have helped transfer the virus from the horseshoe bat (*Rhinolophus affinis*) to humans as although bat coronaviruses are ~96% identical to SARS-CoV-2, its spike diverges in the RBD (Reception Binding Domain). This means bat coronaviruses couldn't bind efficiently to humans, thus requiring an intermediary, which might have been Malayan pangolins as since some pangolin coronaviruses exhibit strong similarity to SARS-CoV-2 in the RBD. Please see article for details.

Care must be taken to interpret these findings, however, as they are currently inconclusive, requiring further evidence of the roles of pangolins and bats. Nonetheless, it is clear that the overexploitation of wild animals could have detrimental effects on humans. For example, commercial wildlife trade which usually involves mixing different wild animals during transport could result in the transfer of fluids between them, creating novel diseases and spill-overs. Additionally, ecological degradation such as deforestation also has the potential to increase the overall risks of zoonotic disease outbreaks originating from wildlife.

The theme for this year's World Environment Day, 'Time for Nature' is indeed a timely reminder as the current pandemic has further highlighted the links between the natural world and public health/wellbeing (including the economy). It is thus time for us to readdress our relationships with nature and act to save threatened wildlife and wild places. I thus recommend the following for consideration and adoption in Nigeria: a) abolish high-risk activities such as the commercial wildlife trade that involves indiscriminate contact with wildlife materials; b) invest in research on high-risk interface zones (e.g. wildlife markets) to identify species that could pose a high risk to public health and c) focus efforts on local communities, foster their inclusion in conservation projects and ultimately improve their livelihoods through conservation. Given the times we live in and the drastic impacts COVID-19 has had on society, protecting ecological integrity should be the priority of all local, national and regional governments, to avoid future zoonotic outbreaks.

SPEAKER 5

Chikwe Ihekweazu. Director of Nigeria Centre for Disease Control (NCDC).

Title: *Exploring Linkages Between COVID-19 Response Activities in Nigeria and Biodiversity*

In the midst of a global pandemic, the Nigeria Centre for Disease Control (NCDC) is trying to limit the public health impact of COVID-19 in the country despite the increasing number of cases being recorded. Currently, the epicentre of the disease in Nigeria is Lagos. This is mainly due to the influx of return travellers to the country earlier this year through the international airport in Lagos. Although our collective vulnerability to emerging diseases had been talked about for years, we were all caught unawares by the sheer scale of COVID-19.

I took over as Director General of the NCDC four years ago, and since then various diseases have re-emerged. In 2017, the first cases of monkey pox were recorded in Nigeria after 30 years; the largest documented outbreak of the West African clade to date. In the same year, Nigeria also recorded an outbreak of yellow fever which was the first in 16 years. Over the last four years, there have been increasing cases of Lassa Fever too. This year, we had the highest number of Lassa fever cases on record. It is no mere coincidence that these things are happening. We have enhanced our surveillance systems and diagnostic architecture for the prompt detection of infectious diseases in the country.

Nigeria has a tropical climate and a large human population, with one of the highest human densities in the world. These conditions make Nigeria vulnerable for the re-emergence and spread of zoonotic diseases. Through the Ministry of Health, NCDC has developed strong links with the Ministry of Agriculture and the Ministry of Environment and together, we launched the “One Health” strategy¹ in 2019. This strategy integrates human, animal and environmental health management for improved health security in the country. Furthermore, the Presidential Task Force on COVID-19 is also mobilising efforts across different sectors including the Ministry of Health and the Ministry of Environment. We are all working closely together, especially now as we ease restrictions across the country.

The emergence of new viruses is inevitable therefore, the NCDC is working hard at both national and state levels to not only respond to the ongoing global pandemic, but also to prepare for the future. Nigeria is a complex country, but the health security of its citizens is not the responsibility of federal government alone, we need state governments and local governments to also play their part and be accountable in this regard. Some states in Nigeria are performing well, but not all. Nonetheless, we continue to support states to address identified gaps towards strengthening them for their health security.

We are better prepared to deal with COVID-19 than we were earlier in the year. Importantly, we are learning so that we can effectively respond to the pandemic and future public health emergencies. As knowledge on COVID-19 evolves, we continue to seek better understanding of a number of complex issues including transmission and vulnerability to the disease and, explore options for addressing them through collaboration with partners.

¹ See link on our website https://ncdc.gov.ng/themes/common/docs/protocols/93_1566785462.pdf

QUESTION AND ANSWER SESSION

The following questions and comments were received during the webinar and three additional questions were sent later by email.

Question for Charles. What are the pangolin's scales taken for?

Answer. Pangolin scales like rhino horn, have no proven medicinal value, yet they are used in traditional Chinese medicine to help with ailments ranging from lactation difficulties to arthritis. The scales typically dried and ground up into powder, which may be turned into a pill.

Comment to Charles. Not all pangolin scales are from Nigeria, most exporters use Nigeria for transit.

Question for Charles. What exactly can be done to stop the smuggling of pangolin scales?

Answer. We need to establish a special wildlife crime unit within the Nigeria Customs Service and ensure that all cases are prosecuted fully to act as an effective deterrent to future offenders. We also need more training and better awareness of the problem of IWT for customs officials at our borders.

Question for Charles. What is the role of poverty and corruption in the illegal trade of wild animals?

Answer: Poverty is indeed a critical driver in the illegal trade of pangolins, especially at the local community level as local people are easily lured from their subsistence hunting practices to poach for commercial purposes. Unfortunately, they also earn very little compared to what these materials are worth when they progress the supply chain. This, however, creates an opportunity for change through increased awareness and the recognition of those living around the frontiers of wildlands as custodians of biodiversity, rather than an opposing force. I am not sure of the role of corruption in the illegal trade of pangolins but like other sectors, this is likely the case.

Question to Iroro. Bats are really really misunderstood in Nigeria. Do we have any form of bat monitoring programmes in Nigeria and can you tell me if there are NGOs you know of that focus on bat conservation? In Your presentation, you said human should stay clear from survey of bats, is there no other effective method for carrying out such surveys without contact, for instance the use of special cameras?

Answer. Lots of information here: <https://www.pangolinsq.org/> and the IUCN Bat Specialist Group website: <https://www.iucnbsg.org/>

That's exactly right. Bats are probably the most misunderstood. Our NGO Small Mammal Conservation Organisation (SMACON) conducts population monitoring with the help of volunteers at different sites across the country. Adesuwa, here is a quick read about some of the work that we do at SMACON <https://conbio.org/groups/sections/africa/act/priorities-for-conserving-bats-in-nigeria>

Comment to Iroro. That was a good presentation! Thanks for mentioning Afi Mountain Wildlife Sanctuary as a critical bat site that needs attention that will complement the work that WCS is doing up there.

Excellent presentations by Iroro and Charles. We must maintain a balanced ecosystem, to live well.

Question to Iroro. I think misinformation contributes to these perceptions/persecutions of bats. What approach do you use in this monitoring? Does this include the social-traditional dimensions as well?

Answer: Our work at SMACON involves examining the human-bat interface often in the context of socio-traditional systems. This work is currently ongoing and will advance our knowledge of the drivers of such human behaviors that endanger the survival of wild bat populations.

Comment to the Hon. Minister from Fatima Kazim. You speak about the government's initiative and the afforestation strategy to protect and enhance biodiversity in Nigeria. That is maintaining biodiversity habitats and minimise the causes of climate change. Might I suggest that this should be extended to cities through making tree planting mandatory for city communities?

Question to Iroro Tanshi. Aside population monitoring, how is your organisation working to change the negative perception about bats in Nigeria?

Answer: There is a huge amount of work to be done in this regard. Education and more education!

Question to WCS. The commercial trade of wildlife for consumption is still allowed in China, as now many wildlife are now classified as livestock or aquatic animals. So the commercial trade of wildlife are still permitted. What does WCS think of this issue?

Answer: WCS believes that all commercial trade in wildlife should be banned. I believe that the commercial trade of wildlife in China is gradually being banned and we encourage Nigeria to consider similar measures.

Question to WCS. How do you transition from relying on donors for financial self-sustainability for conservation projects? Is it possible?

Answer: Good question. No, in the short to medium-term conservation projects will need to continue to rely on funding from donors. In the long-term we need to aim for more sustainable conservation projects, either through tourism or other mechanisms.

Question to Charles Emogor. Is there any clue to the destinations of the seized pangolin scales? We need to know the source and destinations.

Answer: There is evidence that most of the trafficked pangolins are destined for Asia, particularly China and Viet Name. Please see Heinrich et al's paper cited in my brief and also: Ingram, D. J., Cronin, D. T., Challender, D. W. S., Venditti, D. M., & Gonder, M. K. (2019). Characterising trafficking and trade of pangolins in the Gulf of Guinea. Global Ecology and Conservation, 17, e00576.

<https://doi.org/https://doi.org/10.1016/j.gecco.2019.e00576>

Comment from Asuquo Okon: Current evidence (seizure data) suggests the pangolin scales are destined for Asia particularly China and Viet Nam. Their origin is not really known but countries including Nigeria, Cameroon, Gabon and CAR stand out. Many of the conditions that have facilitated spillover in China are also pervasive in Nigeria (bushmeat markets and extensive wildlife trade).

Question for Honourable Minister. Other than the government strategy of afforestation and reforestation, what is government doing to keep existing forest, standing and intact? Any specific work relationship with state government to manage existing forest... knowing that state government manage a great chunk of our forest that house wildlife?

Question from Asuquo Okon. How do public health and environmental sectors plan to work together to block these demonstrated pathways for spillover and prevent outbreaks in Nigeria? Is bushmeat and wildlife trade in areas of high biodiversity (e.g. Cross River) part of NCDCs One Health Strategic Plan?

Answer: Developing critical research into wildlife linkages under Nigeria's One Health Strategic plan is a crucial next step to understanding, detecting and prevent future zoonotic outbreaks. With all the factors at play in human-wildlife interaction in Nigeria, the next pandemic may well arise here, so we need to ensure that this does not happen.

Comment to Iroro Tanshi. You could also work with local NGOs who are into environmental conservation education to create more awareness about bats.

Email Question from Ameh Gideon to NCDC Director. In line with the One Health approach, what is being done to raise awareness about conservation of biodiversity in Nigeria?

Answer: the Federal Ministry of Environment and some NGOs are helping to raise awareness of the importance of biodiversity conservation in Nigeria. However more needs to be done to raise awareness of the possible dangers surrounding the illegal wildlife trade and the consumption of bushmeat, especially in urban centres.

Email Question from Ameh Gideon to Hon. Minister. Ma, you mentioned animal rescue centres in FCT, Kano and Lagos. What activities do these centres carry out presently?

Answer: the rescue centres in FCT, Kano and Lagos are currently being developed.

Email question from Mikail Muhammed to NCDC Director. Cases about zoonotic diseases that has to do with wildlife reservoirs does your organization involves the specialist of conservation medicine/wildlife health in a decision making? Thanks

Answer: NCDC collaborates with the Ministry of Environment as well as NGOs such as WCS in this regard. In the future we hope to develop capacity within NCDC to better understand, detect and prevent future zoonotic outbreaks.

Dear Kurt, thanks a lot for organizing this very interesting and rich exchange. Thanks to all the speakers. We'd like to let the EUD know, from DEVCO C2, that you can count on our support, be it in terms of support to programming, desk support, technical assistance, sector analysis... The links between COVID and biodiversity have capitalized much of our attention these past weeks, and the attention paid to the topic in delegations is really welcome!

RECOMMENDATIONS/NEXT STEPS

"No one discipline or sector of society holds enough knowledge and resources to single-handedly prevent the emergence or resurgence of diseases while maintaining and improving the health and well-being of all species in today's globalized world. No one country can reverse the patterns of land-use change, marine degradation, carbon release, soil degradation, environmental pollution, and species extinctions that, if left unmitigated, undermine the health of people and wildlife. Intensive work within each discipline is essential to develop expertise." —The Berlin Principles, 2019

The only effective, practical and cost-efficient way to significantly reduce the risk of a future zoonotic pandemic caused by viral spillover from wildlife to humans is to stop all commercial trade in wildlife, particularly of birds and mammals, for human consumption.

Governments across the globe need to permanently close markets that commercially trade in wildlife for human consumption. Further efforts need to be made to fully understand and evaluate the risks of the commercial pet trade, in terms of disease transmission and risks to public health, and to act accordingly. Rigorous enforcement of existing laws, regulations, and international treaties that deal with wildlife trade and markets is critical and necessary, but this is simply not enough. The conditions for viruses to emerge and be transmitted to humans occur in legal and sustainable trade and markets with common species as much as in illegal and/or unsustainable trade and markets. Policies focused on protected species, illegal practices, and wildlife trafficking are vital from a conservation perspective, but will fail to prevent future zoonotic pandemics. A new paradigm is needed if we are to avoid a pandemic such as the one we are experiencing today.

To avoid future zoonotic outbreaks, the creation and management of effective protected areas, providing global access to health care; and mitigating disease risks associated with domestic animals. A One Health approach, optimizing human health and ecological integrity, can be used to find solutions for different landscapes.

In addition to lowering disease spillover risk, avoiding environmental degradation has many related benefits, including: climate change mitigation; climate change adaptation and environmental resilience; maintenance of watersheds and rainfall patterns; biodiversity conservation; enhancing food security, protection of the homelands, livelihoods and cultures of indigenous peoples and local communities; and conflict mitigation, stabilization and security.

Developing critical research into wildlife linkages under Nigeria's One Health Strategic plan is a crucial next step to understanding, detecting and prevent future zoonotic outbreaks. With all the factors at play in human-wildlife interaction in Nigeria, the next pandemic may well arise here, but we are responsible to prevent that from happening.

SELECTED REFERENCES, LINKS TO PRESENTATIONS AND RELEVANT WEBSITES

Presentation by Iroro Tanshi: <https://www.smacon-africa.org/bats-and-covid-19>

Presentation by Charles Emogor:

<https://drive.google.com/file/d/1hVxt1cHKZrdpvz60FjNpXJu2tpJvgkYN/view?usp=sharing>

IUCN (2019) Conserving Nature in a time of crisis: Protected Areas and COVID-19

<https://www.iucn.org/news/world-commission-protected-areas/202005/conserving-nature-a-time-crisis-protected-areas-and-covid-19>

IUCN Pangolin Specialist Group website <https://www.pangolinsg.org/>

IUCN Bat Specialist Group website <https://www.iucnbsg.org/>

SMACON <https://www.smacon-africa.org/>

SMACON efforts in Nigeria <https://conbio.org/groups/sections/africa/act/priorities>

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SELECTED FEEDBACK ON TWITTER

@sharon_ikeazor Thank you WCS_Nigeria & @EUinNigeria for the invitation, this has been my most interesting webinar, you put together a great team ,pangolin & bat experts' presentations were very enlightening @IroroTanshi @CEmogor & having the disease control gurus @Chikwe_I & Chris Walzer

@EUinNigeria Interesting webinar on the relationship between #biodiversity & outbreak of pandemics; organised by the @WCS_Nigeria & @EUinNigeria. Participants reminded us that we should listen to the signals given by nature. Stop the trade in wildlife species for human consumption.

@Chikwe_I An honour to join the Minister of State @FMEnvng @sharon_ikeazor & other colleagues to discuss biodiversity & #COVID19 at webinar convened by @WCS_Nigeria. We must strengthen our collaboration across human, animal & environmental health sectors to prevent future outbreaks.

@sharon_ikeazor A great discussion. Biodiversity loss is a health risk. Emphasis on the 'One Health' approach for cooperation between environmental conservation & human health, animal health & plant health.

@NCDCgov Today we recognise the importance of biodiversity in preventing disease outbreaks like #Lassafever & #monkeypox. Lets #TakeResponsibility to keep our wildlife and natural environment healthy & clean, in order to protect our health.

@FMEnvng Preserving and protecting intact ecosystems and their endemic biodiversity lessens human-animal contact, the onset of new pathogens, and the prevalence of infectious diseases.

@WCS_Nigeria Wonderful webinar today to discuss links between wildlife trade and coronavirus. We combined the experience of @sharon_ikeazor @TheWCS and @Chikwe_I with the youth and enthusiasm of @IroroTanshi and @CEmogor. Thanks @EUinNigeria @NCDCgov & @FMEnvng for your support.

John E. Scanlon AO @JohnEScanlon Wonderful to see the 'One Health' approach being promoted Minister @sharon_ikeazor. Thank you for sharing @EUinNigeria

Sagan Friant @saganfriant Yesooo! The forces that facilitated spillover of #coronavirus(es) in China are pervasive in Nigeria: high biodiversity, poorly regulated #wildlifetrade, many (of my favorite) humans etc. Protecting wildlife protects people #OneHealth. The time is now. We are ready @CREHPNigeria

@sharon_ikeazor As we celebrate #WED2020 I salute the conservation efforts of two great Nigerian women conservationists: Rachel Ikemeh & Iroro Tanshi @IroroTanshi @SWNigerDelta

@IroroTanshi @WCS_Nigeria supports young local conservationists! A truly timeless legacy for local conservation through strengthening hardcore local capacity while protecting Nigeria's at risk biodiversity.

@pangolino_org It is indeed #TimeForNature as 'time is running out' for most species e.g. #pangolin. We need nature-friendly societies and must reconnect our values with biodiversity to save species & landscapes from further degradation.

@adesuwagreen Currently listening to HMS @sharon_ikeazor speak. She just said preserving & protecting our ecosystem is a priority this government has to undertake.

@Ayokutours Very educating & sensitizing webinar. Knowledge filled with information for future readiness combining field people @IroroTanshi and @CEmogor with administrative and governmental plan/intervention from competent @sharon_ikeazor and practical contribution of renowned NGO @WCS_Nigeria.

@IroroTanshi What an opportunity to share thoughts about future pandemics. Many thanks to @WCS_Nigeria and @EUinNigeria for convening such a distinguished panel. Enjoyed sharing with @sharon_ikeazor @Chikwe_I and @CEmogor. Fine moderation by Mr Cornelis @EUinNigeria

<https://www.dailytrust.com.ng/2020-world-environment-day-million-voices-rise-against-nature-abuse-by-humans.html>

ACRONYMS

EU	European Union
NCDC	Nigeria Centre for Disease Control.
SMACON	Small Mammal Conservation Organization
WCS	Wildlife Conservation Society.

ACKNOWLEDGEMENTS

Many thanks to the Delegation of the European Union to the Federal Republic of Nigeria and ECOWAS for hosting the webinar and for their support, particularly Temitayo Omole, Montse Pantaleoni and Kurt Cornelis.

We are grateful to all five speakers for accepting the invitation to make short presentations: Sharon Ikeazor, Dr Chris Walzer, Iroro Tanshi, Charles Emogor and Dr Chikwe Ihekweazu.

Thanks to Kurt Cornelis for being such a wonderful moderator throughout.

Iroro Tanshi and Charles Emogor for their inputs and advice during the planning of the webinar.

Francis Odinakachukwu Okeke, GIS and Database Manager for WCS produced the flyer and facilitated online registration.

Adebunmi Adetokunbo of the European Union for his logistical support for the WebEx event.

Deborah Anumenechi, Personal Assistant to the Honourable Minister of State, Federal Ministry of Environment.

Priscilla M Achakpa, Executive Director, Women Environmental Programme.

Ore Akomolafe of the Nigeria Centre for Disease Control.

APPENDIX 1: FLYERS USED TO ADVERTISE WEBINAR



SPEAKERS AND AGENDA

Sharon Ikeazor Hon. Minister of State, Federal Ministry of Environment <i>Upscaling Conservation and Protection of Biodiversity in an Era of COVID-19</i>	Chris Walzer Exec. Director Health, Global Conservation Programs, Wildlife Conservation Society <i>COVID-19 and Zoonotic Emerging Infectious Diseases: Revisiting Human-Wildlife Interfaces and Wild Places</i>	Iroro Tanshi Lecturer, University of Benin & Director, Small Mammals Conservation Organization <i>Protect Bat Populations and Habitat to Prevent Outbreaks</i>	Charles Emogor Ph.D Student (Zoology), University of Cambridge <i>COVID-19: Pangolins are Victims, not Villains</i>	Chikwe Ihekweazu The Director, Nigeria Centre for Disease Control <i>Exploring Linkages Between COVID-19 Response Activities in Nigeria and Biodiversity</i>	Moderated by: Kurt Cornelis Head of Cooperation, Delegation of the European Union to the Federal Republic of Nigeria and to the ECOWAS Commission