

Additional Questions Answered

Biodiversity Loss and Wildlife: Preventing the Next Pandemic

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Q: Is "informal" market the same as the American equivalent of a community farmer's market? I couldn't quite understand the "wet market" description?

Grace Ge Gabriel: So-called "wet markets" are food markets where you can buy fresh meats, fish, vegetables, and perishable goods. They are like seafood markets or farmers markets. In many parts of the world where supermarkets are not prevalent, the majority of the people rely on these informal markets for affordable daily food. Some sell live animals, slaughtered on customers' request. Some unfortunately also sell wildlife. In this case, Chinese CDC experts collected 585 environmental samples from the Wuhan Huanan Seafood Wholesale market, where 31 of the 33 positive samples came from the section of the market where wild animal trading concentrated.

http://www.xinhuanet.com/english/2020-01/27/c_138735677.htm

Q: Is it time to draw the line between the formal and informal wildlife trade as well as legal vs illegal wildlife trade as viruses cannot distinguish between them?

Dominic Travis: Identifying or quantifying – and thus controlling 'informal trade' is almost impossible since it is by nature not defined or regulated. [Here's a paper](#) discussing one approach to this.



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Q: Regarding hotspots of biodiversity being a target for emergent diseases, how do we balance that with promoting the protective effects of biodiversity in attenuating disease spread?

Dominic: The Dilution Hypothesis is still just that – we had all hoped that the theory of protection through support of biodiversity was a key to this problem. However, this does not hold up over different scales of space and time, which makes it a ‘maybe, under some conditions’ help. So, we are stuck for now talking about the fact that trends in biodiversity hold for both larger and microbial fauna. However, this is only for wildlife derived parts of this conversation. There is evidence that a lot of the total risk comes from domestic animals and our use of antibiotics, etc. So, we need to foster a holistic approach and not just focus on one sector.

Q: What role does the destruction of natural habitat and humans’ expanding colonization of natural land play in the spread of diseases?

Dominic: This is a DRIVER of the contact rate between species, which allows for the potential release and spread of disease from one host to another. So, actions that INCREASE contact (frequency and type) results in inherently more risk of spillover. However, there are a lot of assumptions in there and we don’t know the likelihood of things happening given that contact – they are infrequent but we know they can matter as we are experiencing today.

Q: What explains the increasing prevalence of zoonotic diseases?

Dominic: It is a factor of what potential disease exists in which animals/humans/environment, the rate and quality of contact between humans and animals, and the susceptibility of the potential new host. So, coronavirus’ live naturally in bats, we do things to increase contact with them like catch them, bring them to markets and/or eat them, and because we have no immune protection to a new virus, we have no defenses. There are a lot of other factors about whether one gets sick given exposure and/or the potential to spread as well.

Q: Is it possible to have a safe wildlife trade? How?

Dominic: It is possible to design safer systems for legal/formal/declared trade. We design safer food systems all the time – those usually come with other less predictable risks/consequences as well that will have to be dealt with. Zero risk does not exist with any food or animal product.



Q: Do we need a global agency or sub agency to monitor markets tightly if we hope to prevent a repeat?

Dominic: Thinking of wild meat as food products and including them in the discussion of food safety would help.

Q: Why is animal welfare rarely regarded as a serious reason for breaking with the traditions or cultures that lead to biodiversity loss and the origin of pandemics?

Dominic: Good question, this requires a less anthropocentric viewpoint.

Q: Having worked in wildlife conservation in Africa, I am familiar with the challenge of enforcement. What are your thoughts on the possibility of passing and enforcing laws in developing countries that regulate the taking of wildlife, to include wildlife that is not currently endangered?

Dominic: I think you will see these discussions increase – at least for a while. However, you will know that policy development and enforcement are difficult, even for high priority (endangered species). Look at the work CITES does and the differential successes. People have always relied upon nature for services and this is unlikely to change – the question is can we add better sustainability and safety components?



Q: What is the role of the human population in relation to wildlife? Would fewer humans reduce the loss of wildlife, deforestation, and imbalances in natural ecosystems? What happens as populations increase, as is predicted to occur in the next few decades? Thanks!

Dominic: This is loaded with inequities and issues of justice, etc. and is not my expertise. However, I will say we have control over HOW we interact with nature, no matter how many of us there are – this is a choice we control to some extent. Although many have less choice, which is a huge part of the conversation.

Q: What dangers do you foresee for bats from their identification as the likely source of the new coronavirus?

Dominic: I would like to state that maybe people will stay more away and let them eat malarial mosquitoes and pollinate plants, but there will be backlashes in places I am sure, just like with rabies.

Q for Grace: Are there people in China who depend on bushmeat for protein? Sounds like the demand in China (and therefore the appropriate regulations) may be very different in China from in Africa.

Grace: The consumption of “exotic wild taste” in China is very much driven by the desire to demonstrate wealth and define status, not by the necessity for protein. For the past forty years, the government had encouraged “captive breeding of wildlife” for commercial trade, as part of its economic policy. Now, with the ban on transport, trade and consumption of wild animals, the government is developing compensation measures for phasing out the captive breeding industry.

Q: Is there any role your panelists can see for state legislatures in America to assist with this issue of wildlife trade/loss of biodiversity?

Dominic: We have conducted studies with/for the CDC and the Department of Homeland Security, and we made recommendations for border security in this area, as well as how to engage different ethnic and immigrant communities about their cultural choices. We hope our science helps give policymakers options and information. We are involved in some advisory groups for the U.S. government as well.



Q: Imposing additional bans without due support to enforcement and compensatory mechanisms would likely drive activities underground, making regulation even more difficult and potentially further accelerating exploitation. The unsustainable exploitation of wildlife either for consumption or other uses must stop, animal welfare standards must improve, and known high-risk species for zoonotic disease emergence should be closely regulated and ultimately should not be traded for food. We must reset our relationship with nature. How can we ALL work together to conserve nature and preserve ecosystem services?

Dominic: THAT IS the question of the day, isn't it? I think the IPBES (UN working group) is currently trying to think about this more than previously.

Grace: To ban or not ban wildlife trade ultimately is the decision of the individual government. In China's case, trade bans have been very effective. Since China banned ivory trade in 2017, we have seen a significant drop in ivory price and trade volume. At the same time, there has been an increase in enforcement actions and penalties for illegal trade. Trade bans, combined with vigorous enforcement and meaningful penalties can also stigmatize consumption, thus supporting demand reduction efforts.

Q: How can community involvement improve wildlife conservation?

Dominic: Local people must be INCLUDED as core stakeholders, their values, needs and agendas respected, and they must be included in solutions – they must have agency in this area.



Q: It reminds me of Mad-Cow Disease. Which was a factory farming related issue. Now we're seeing a similar prion-based disease (chronic wasting disease) plaguing our deer populations. The driftless region close to home here in Minnesota is one of the epicenters. I wonder if they can comment on their thoughts on this along with other wildlife diseases here in the US. Perhaps even Lyme disease and the increase in cases that we have seen. How do we get out ahead of these?

Dominic: Getting ahead of emerging diseases means predicting the unknown future – best we can do is understand what is out there and create systems for early identification. CWD is a prion disease like BSE/Mad Cow and scrapie in sheep, and other rare human diseases. HOWEVER, it is not thought to be a result of factory farming, NOR IS IT CURRENTLY CONFIRMED TO BE ZONOTIC. However, CDC does advise AGAINST eating meat from positive animals (hunters). Please see the [MNPRO center](#) or [CIDRAP](#) websites at UMN for more information – the University of Minnesota is one of the leading research institutions in this area.

Q: There have been some reports of wildlife trafficking moving online — onto platforms like Facebook. Are you concerned about new avenues for trafficking if markets or other physical spaces are closed?

Dominic: YES – google [TRAFFIC](#) for these discussions.

Grace: IFAW together with WWF and TRAFFIC have initiated the Coalition to End Wildlife Trafficking Online. <https://www.endwildlifetraffickingonline.org/> Over 30 online companies from around the world have tightened their policies to restrict online wildlife trade, support enforcement and awareness raising. Some of them also use technology to curtail cyber wildlife crime, such as Baidu, the largest Chinese language search engine, using AI to filter illicit wildlife trade. <https://global.chinadaily.com.cn/a/202004/25/WS5ea3b253a310a8b24115187b.html>

Todd Reubold: Ensia published an op-ed on this topic a while back that you might be interested in: [Opinion: Calling all hackers — endangered wildlife needs you](#)



Q: How would a vegan or vegetarian diet help the spread of disease and how likely is it that more people could adopt this kind of diet in different countries? Seems like plant-based protein for food should be part of the solution too. Interested in people's perspectives on this thought.

Dominic: Food is one component of wildlife trade, and the most intimate type of contact and risk of exposure to disease. Not eating meat would reduce risk, but not to nothing. More would be needed to be done.

Q: Given the risks of industrial animal agriculture, both in terms of disease spread and climate change, is there a role the government could take to incentivize safer, more sustainable agriculture? The U.S. Farm Bill, for example, continues to support large livestock producers while offering relatively little support for perennial grains (for example).

Dominic: This is very complex, but the Ag industry is embracing the modern version of 'sustainable' more every day due to both demand and the need to think more long term. Their current activities are aimed at maximizing production now, but adding time and longevity to that measure is changing things slowly – there will be changes upcoming I am sure due to the damage the industry is suffering in this crisis. In the end they are optimizing between demand, market value, safety and efficiency.

Q: How big a role do you see the loss of biodiversity in causing a loss of potential molecular candidates for modern medicine? For example, nanobodies (antibodies with no light chain) are being evaluated for use as a vaccine for Covid-19, yet these nanobodies only exist in Sharks and Camelids. Yet, Sharks are being decimated for shark-fin soup and sport fishing.

Dominic: When things disappear, they are no longer discoverable and I believe nature provides more solutions than anything else – see Sean Connery and Medicine Man movie.



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Q: What might be said about future possibilities for cultured meat, as is being pursued now by organizations such as Memphis Meats? Biologically it is real meat, that could replicate local tastes for specific species of meat, but would be completely sterile and zoonosis free.

Dominic: This one is less about science than consumer demand and preference – solve that and this will be a start in my opinion. We will have to hack our way through the GMO discussion and the vast lack of science based knowledge in this area I am sure.

Q: What ways can people in the healthcare research industry work with and support the wildlife conservation community?

Dominic: Discuss the connections – our healthcare industry is at the verge of collapse because of wildlife trade at the moment – you CANNOT ignore the connections – we must learn to ask WHY three more times to each question – in that sense, 6-year-olds have it right, lets quit telling people to not ask questions!

Q: How does our more "human-centered" approach to biodiversity protection impact a more "biocentric" consciousness which is also very important for biodiversity protection?

Dominic: This simple, 'single lens', view of the world, choosing one set of values over others, – is how we got here – I encourage a more complex but enlightened approach. We cannot reduce everything to bite sized pieces – literally.

Q: Mega-diverse zones may represent a higher risk for disease spillover, but researchers have also pointed out that the more diverse an ecosystem, the more it offers protection from spillovers. It is as if biodiversity works as a web that bars diseases from escaping nature and passing into human communities. Could you clarify how that works?

Dominic: The dilution effect is an entire semester – we had hoped that this would become a theory after early Lyme (and other disease) studies showed that trend. However, this does not hold up over differing environmental conditions, size and scale. The jury is still out. Dr. Tilman from the University of Minnesota is a leading researcher in this area and reading his stuff is enlightening.



Q: This is a general question looking forward to solutions to such pandemics. I would like to know the panelists views on the One Health approach that could help in controlling issues before they become pandemics. Should there be more international cooperation to get more countries to adopt a One Health framework in the nature of the Climate Change resolutions?

Dominic: YES, Complexity and cooperation are hard, more time consuming and more expensive. This is not always the solution. However, this WAY of thinking (systems, transdisciplinarity, team based science) requires competency to work well and be efficient. We are working on developing more programs to foster this as an effective approach every day. The University of Minnesota is on the forefront of teaching One Health/Ecosystem Health and Planetary Health – all related ideas.

Q: In the arctic with ice melting do you see the release of new pathogens being a key risk?

Dominic: Good question – Dr. Declan Schroeder at the University of Minnesota’s College of Veterinary Medicine studies microbiology in extreme environments and this would be a great question for him. We know there are environmentally adapted microbes everywhere since they are literally the building blocks of complex life.

Q: I want to start by saying thank you for this conversation! This is something I feel passionate about, even though my profession and experience is in youth programming. I believe there is an opportunity for change by bringing awareness and understanding of this very topic to our youth, in a way that they understand and can learn from. What guidance or resources do you have for someone such as myself who is not well versed in this subject, but feels personally passionate about wanting to learn more and share that understanding with our next generation of leaders?

Dominic: Thanks and good for you! I love the Millennium Ecosystem Assessment documents for starters – they are free and downloadable. I will look to others to provide meaningful refs., but all these wonderful nature series are doing a pretty good job as well of messaging the connectedness.



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