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Transdisciplinarity, tempocoupling, and the role of culture in zoonosis research

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Abstract

Non-technical summary. The general public became familiar with the term and definition of zoonosis during the COVID-19 pandemic. Because of the pandemic, several responses to mitigate zoonotic risk has been put forward. Often cited are stricter biodiversity conservation and wildlife protection but there are also suggestions to educate people who traditionally consume wildlife for food. This implicit condemnation of culture also manifested explicitly in the form of racism especially against Asians during the height of the pandemic. If the world is to avoid a pandemic, it also needs to work against Orientalism and ensure research is inclusive, equitable, and just.

Technical summary. The COVID-19 pandemic widely introduced the term and definition of zoonosis to the general public. More than just a knee-jerk reaction, stricter biodiversity conservation and wildlife protection are now seen as essential strategies in mitigating zoonotic risks while some researchers have called for education campaigns that should discredit ingrained cultural practices such as wildlife consumption. This implicit condemnation of culture may have been initially confined to research papers but it eventually manifested as explicit racism in everyday life during the height of the pandemic, highlighting the need to decolonize Western scientific views on pandemic prevention and to refrain from Orientalism. This Intelligence Briefing makes the case for the inclusion of history and culture as necessary elements in zoonosis research alongside a critical reflection of transdisciplinary approaches. Emphasizing epistemic humility and authentic interest to learn from other actors such as Indigenous communities on the frontlines of human-wildlife interfaces, this Intelligence Briefing recommends the Future Earth Health Knowledge-Action Network to stay the course toward promoting approaches that are 'transdisciplinary, multi-scalar, inclusive, equitable, and broadly communicated' in zoonosis research.

Social media summary. History and culture are necessary elements of zoonosis research alongside transdisciplinary approaches.

The COVID-19 pandemic widely introduced the term and definition of zoonosis to the general public. People became aware that wildlife can be potential hosts of infectious bacteria and viruses. Early on, two mammalian species were singled out as sources of SARS-CoV-2, with bats as the reservoir and pangolins as the intermediate host alongside discovery of a wet market in Wuhan (China) as the epicenter of COVID-19 (Andersen et al., 2020; Lam et al., 2020). While research on the definitive sources of SARS-CoV-2 is still ongoing as of this writing, there is now a broader consensus on previous scientific advice to implement zoonotic surveillance as a pandemic risk mitigation plan (Morse et al., 2012; Wu, 2023; Xiao et al., 2021). More than just a knee-jerk reaction, stricter biodiversity conservation and wildlife protection are now seen as essential strategies in mitigating zoonotic risks; corollary to these are restrictions on wildlife use such as consumption albeit in a culturally-sensitive manner (Alonso Aguirre et al., 2019; Dobson et al., 2020). Indeed, some researchers from high-income countries have called for 'wisely directed education campaigns that aim to discredit ingrained cultural beliefs' in order to discourage wildlife consumption in China (Ribeiro et al., 2020). Recommendations such as these, on the one hand, recognize the social-ecological nature of zoonosis while blaming social systems and its cultural beliefs, on the other hand. This implicit condemnation of culture may have been initially confined to research papers but it eventually manifested as explicit racism in everyday life during the height of the pandemic. This eventually prompted United Nations Secretary General António Guterres to make a global appeal to 'end the virus of hate' against Chinese and other Asians due to China being the epicenter of COVID-19 (HRW, 2020). Several researchers also weighed in against the neocolonial and paternalistic recommendations being put forward by peers. This highlighted the need to decolonize Western scientific views on pandemic prevention and to refrain from Orientalism or the 'corporate institution for dealing with the Orient – (…) making statements about it, authorizing views of it, describing it, by teaching it, settling it, ruling over it: in short, (…) a Western

style for dominating, restructuring, and having authority over the Orient' (Pagani-Núñez, 2020; Said, 1978; Schneider et al., 2021). Apart from this, historical dynamics in low-income and middle-income countries where colonial medicine enabled vaccine clinical trials abuse impacted vaccination as a pandemic response (Mutombo et al., 2022). It, therefore, becomes necessary to incorporate diverse knowledge and perspectives and respect historical dynamics and cultural practices in order for pandemic prevention to be transdisciplinary (Jahn et al., 2012).

1. Zoonosis and transdisciplinarity

The issue of zoonosis is loaded with social and ecological entanglements that require both interdisciplinary and transdisciplinary approaches. Transdisciplinarity has become more mainstream in recent years, with the International Science Council commissioning a discussion paper to closely look at the approach (ISC, 2023). This is a welcome development in signaling to the often more 'powerful' hard sciences to work with the social sciences, just as Future Earth has been advocating through its Global Research Networks in the past years (Malmer et al., 2019). The Future Earth Health Knowledge-Action Network (KAN), launched right before the onset of the COVID-19 pandemic in 2019, developed a research agenda that calls for research approaches that are 'transdisciplinary, multi-scalar, inclusive, equitable, and broadly communicated' (Ebi et al., 2020). One example of a transdisciplinary approach in zoonosis was the PREDICT project under the United States Agency for International Development (USAID) Emerging Pandemic Threats (EPT-1) Program that worked in 20 countries in Africa, Asia, and Latin America. PREDICT engaged a wide range of actors from government, scientific institutions, and local groups for emerging infectious disease (EID) surveillance, diagnosis, viral evolution, and ecological driver identification (Kelly et al., 2017). Indeed, there is no lack of papers mentioning how current zoonotic risk prevention measure are atomistic that mostly focus on ecological systems, rendering social systems as an afterthought and instead suggesting that a systems approach is necessary where zoonosis is tackled at a social-ecological interface (Schneider et al., 2021). In the prevailing narrative on zoonosis, people especially those directly interacting with wildlife are inconvenient antagonists to wildlife species. However, these very same people could become convenient sources of local knowledge when it comes to implementing transdisciplinary approaches, underlining the need for inclusion of ethics and justice in transdisciplinarity to avoid the pitfall of tokenism and using people as a means to an end. Therefore, being reflexive and seeing people as an end in themselves could bring an appreciation toward efforts to understand how and why people interact with animals in and how these are important in the prevention and control of zoonoses (Friant et al., 2022). Indigenous peoples whose human-wildlife interaction date back thousands of years have accumulated a huge store of knowledge about animals through the centuries and have closely integrated this knowledge in their cultural heritage (Alves & Souto, 2015). More than just being causes of zoonosis (as was the case for COVID-19), culture should also be seen as a repository of solutions. Taboos such as in the Idu Mishmi community of Northeast India have been shown significantly reduce wild meat consumption, which has been identified as a zoonotic pathway (Nijhawan & Mihu, 2023). Beyond the individual level is the collective influence of culture that can play a role in the risk of zoonosis: wild meat consumption can be either a cultural practice or a cultural taboo (Ortega et al., 2022). There is, therefore, a case to be made for culture and history to become integral elements of zoonosis research.

2. Integrating culture and history in zoonosis research

The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) thematic assessment on the sustainable use of wild species highlighted how wild species are not only central to livelihoods of many IPLCs but also to their identities and cultural expressions (Fromentin et al., 2022). The cultural aspect of human-wildlife interaction can pave the way toward examining the historical, economic, sociological, anthropological and environmental aspects of the relationships between humans and wild species like the bats or pangolins found in the wet market in Wuhan (Alves & Souto, 2015). Medical anthropologists have been questioning the role of culture in zoonotic transmission (Keck & Lynteris, 2018), with culture again seen as a cause rather than a solution, but if a step back is taken and judgment is postponed, it can be seen that culture is useful as an archive because culture also evolves alongside economic, environmental, and political changes. By recognizing culture as dynamic and ever-evolving, we avoid perpetuating static cultural stereotypes while at the same time promote recognition of generational or individual human agency in determining social structures. Within the realm of zoonosis research, this requires the expertise of historians (through archival research) and even archeologists (through excavations) in unraveling historical human-wildlife interactions (e.g. Peters & Schmidt, 2004). Working together with anthropologists, historians, and archeologists, zoonosis researchers can understand worldviews and values attached to human-wildlife interaction and understand the context (e.g. socio-political, economic, or environmental) where changes to human-wildlife interactions occurred. This highlights the importance of 're-engaging with multiple dimensions of time' where extended timescales from the past and into the future are considered in backcasting and forecasting in zoonotic risk surveillance and management (Satterwhite et al., 2016). The concept of shifting baseline, mostly used in ecology, could be expanded to not only account for changing wildlife species abundance through time but also for evolving human-wildlife interactions (Hanazaki et al., 2013; Pauly, 1995).

3. Using the concept of tempocoupling in zoonosis research

The concept of 'telecoupling' is a useful framework to understand how distant interactions such as international trade and land use changes are interconnected and create feedback across multiple scales (Hull & Liu, 2018). Telecoupling explains how demand for pangolin from upper-middle-income countries such as China has driven illegal trade in a lower-middle-income country like Nigeria (Omifolaji et al., 2020). Nevertheless, there are also interconnections on a temporal scale where effects echo through time. These are often discussed in research dealing with 'historical' impacts or dynamics, which could explain persistent social-ecological phenomena. In order to capture this and incorporate temporal feedback, the term 'tempocoupling' can expand the telecoupling concept and could be especially useful for problem definition and unearthing sustainability solutions from the past (Matias, 2020). We have to be mindful that not all societies move at the same pace and this is why E.F. Schumacher in his nominal book 'Small is Beautiful' proposed the idea of

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intermediate technologies, which are more productive than indigenous ones but is significantly cheaper than the highly-capital intensive technologies of modern industry. E.F. Schumacher (1973) emphasized the need for innovations and technologies to be appropriate and suited to local conditions; a reminder from half-a-century ago to move away from blanket paternalistic solutions that are often pushed as necessary innovations. Therefore, when creating present zoonotic risk mitigation plans, it is important to take a look back and learn how previous communities adapted to zoonotic risk or zoonotic episodes. In the pursuit of transdisciplinarity in zoonosis research, we must exercise epistemic humility and sincerely believe that we can also learn from actors such as Indigenous peoples and local communities who have since been infantilized and seen as people who needs to be taught how to handle wild species; they have long been interacting with these species, who are we mostly living within four-walled offices or laboratories to tell them how to do so?

4. The pursuit of social-ecological justice in conservation of potential zoonotic host species

'Ang hindi marunong lumingon sa pinanggagalingan ay hindi makakarating sa pinaroroonan.' (A person who does not know how to look back at where they came from will never get to their destination.) – this is a quote often attributed to Dr. Jose Rizal (1861–1896), the national hero of the Philippines, which is one of the countries hosting endemic pangolin species. All eight known pangolin species in the world (four species from Asia and four species from Sub-Saharan Africa) are listed under Appendix I of the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) or the most endangered CITES-limited animals and plants. With most efforts toward conservation being regulatory top-down or 'command and control' policies, it is not surprising that these are failing such as in Southeast Asia (Blair et al., 2017). The same can be said for West and African states such as in Nigeria where there was an increased frequency of pangolin poaching incidents despite the CITES regulation (Omifolaji et al., 2020). Conservation policies fail to take into consideration that the complexity of wildlife trade, in part, stems from traditional uses and cultural values relating to wildlife and wildlife products (Blair et al., 2017). In the case of the Philippine pangolin *(Manis culionensis)*, it is now illegal to collect these animals but from a historical perspective we see that it has not always been the case. There are indigenous rights to wildlife collection enshrined in law, but Indigenous peoples in the Philippines were still included in the blanket ban on hunting of the Philippine pangolin. In the La Amistad Biosphere Reserve in Costa Rica, protected area regulations heavily restrict wildlife hunting, which is part of traditional food access (Sylvester et al., 2016). As a powerful index of social, political, and economic inequality, 'illegality' and 'illegalization' should be investigated not in opposition to, but alongside studies of the state, power, ethics, and the law. Moreover, power dynamics also influences which actor is openly 'named and shamed' similar to how the indigenous Palaw'an and Tagbanua groups were called poachers in a feature article on the environmental website Mongabay (see Abano, 2019). As pointed out by Thomas and Galemba (2013), social marginalization of people, places, and practices is often part of what makes 'illegality' come to seem like an objective, even commensensical, attribute. On the flip side, there are also 'command and control' policies that cause further endangerment of species such as the mass culling of bats such as in Australia, Mauritius, and Thailand purportedly to minimize fruit depredation (Florens & Baider, 2019; O'Shea et al., 2016). Top-down policies should be challenged; we should do away with instantly labeling actors as law breakers especially the downstream ones who are on the frontlines directly interacting with nature and wildlife. By adopting judgment, we automatically assign bias that may render us blind to distal underlying factors influencing potential zoonosis. If we go back to the research agenda of Future Earth's Health KAN that aims to promote research approaches that are 'transdisciplinary, multi-scalar, inclusive, equitable, and broadly communicated,' we find that these are essential in moving toward the next decade of sustainability research and innovation. To be (1) transdisciplinary is to see every relevant actor as partners and equals in designing, implementing, and communicating research projects; to be (2) multi-scalar is to consider distant scales such as in telecoupling (geographical scales) and tempocoupling (temporal scales) in the past and in the future for zoonotic risk monitoring and surveillance; to be (3) inclusive and equitable is to approach zoonotic research reflexively where positionalities, privilege, and power are duly acknowledged and both technical and traditional knowledge are respected; and to (4) communicate research broadly, we should aim to speak to all rungs of society and to contribute to culturally-appropriate local education (Matias et al., 2018). In sum, the research agenda of Future Earth's Health KAN can be seen as one of the strategic catalysts for promoting zoonosis research that is genuinely transdisciplinary, holistic through space and time, and just.

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