

## Zoonoses and biodiversity: do we need to rethink environmental health governance?

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**The number of zoonosis epidemics is on the rise, fuelled by industrial farming practices, deforestation and the loss of traditional habitats. There is an urgent need to rethink health policy from a multi-disciplinary and collaborative perspective. We need a fresh approach to environmental health governance if we wish to attack both the causes and consequences of epidemics in an effective manner.**

Over the past few decades, we have witnessed an upsurge in epidemics linked to zoonotic diseases due to parasitic infections whose agents are transmitted naturally from animals to humans. Health crises are coming thick and fast and, as in the case of Covid-19, they may be accompanied by social and economic crises. There is a definite correlation between the rise in epidemics and the spectacular growth in international trade.

Nevertheless, a major pandemic was foreseeable and had been predicted. Indeed, the World Health Organisation labelled it "Disease X" and listed the potential infectious agents that could cause it, but without really exploring the socio-ecological conditions that could underpin its potential emergence. While it is important to prepare through effective bio-monitoring or by cataloguing all wild animal viruses, this is not enough to prevent the emergence of zoonoses or to make conditions in general less pandemic-friendly.

**BIODIVERSITY CRISES AND ZOOSES EPIDEMICS**

The large number of zoonoses epidemics is generally correlated to the crisis in biodiversity, which is in turn being driven by industrial farming practices, deforestation and the loss of traditionally managed habitats.

Intensive farming in particular is reducing biodiversity and leading to more zoonoses. Between 1960 and 2016, the global pig population jumped from 500 million to 1.5 billion while the chicken flock grew from 5 billion to 22 billion. By reducing natural habitats to make way for productive livestock, the relentless growth in livestock farming is making it easier for microbial agents to move from animals to humans.

Deforestation and industrial crop farming are also fuelling the emergence and spread of zoonoses epidemics. Those countries most affected by the growing number of epidemics are those witnessing significant increases in deforestation or in the rate of land use conversion to cash crop plantations.

The biodiversity crisis is distorting the interactions that are essential for ensuring that ecosystems work properly and continue to provide quality ecosystem services. The disappearance of their predators and competitors reduces the regulation of natural reservoir animals, host microbes and their vectors. This in turn knocks out the ecosystem service that regulates the transmission of diseases. This leaves habitats with greatly depleted and much less complex diversity, bereft of ecological resilience as well as resilience to epidemics.

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## **ENHANCING OUR UNDERSTANDING OF HEALTH EMERGENCIES AND CRISES**

We should note from the outset that human health crises — despite being of animal origin and linked to the way in which we conceive of our relationship with nature — can unfortunately never be managed by biomedical experts alone. Here again, our experience of Covid-19 has highlighted the disconnect between how a health emergency is managed and an effective understanding of the processes that culminated in the global health crisis in the first place. If we are to be more effective, we need to step up our analysis of this disconnect and this starts by identifying three levels of involvement: biological, epidemiological and political.

Identifying the origin of an infectious agent is the task of biologists. SARS-CoV2 is actually a beta coronavirus whose natural reservoir is a species of insectivorous bat, and potentially an as yet unknown intermediate host. Research at this level ranges from virology to immunology and infectiology and helps to catalogue all potentially emerging viruses and develop new diagnostic applications and treatments.

Epidemiology, the second level of analysis, focuses on how the infectious agent is transmitted between animals, between animals and humans, and then between humans. This transmission always takes place within an ecological, social and economic context, i.e., a biodiversity crisis, trafficking in wild animals, deforestation, increase in intensive farming, urbanisation, globalisation of trade, etc. This is all about understanding how a virus that was circulating in bat populations somewhere in Asia came to be present throughout the entire human population just a few months later.

The third level of analysis is political and focuses on the management of the health crisis. It highlights how the epidemic is perceived by society as a whole, by healthcare stakeholders and by political decision-makers. Having been declared a health crisis, the epidemic generates a (bio)political response along with quarantine measures, lock-downs, screening tests and treatments. These measures will affect how we emerge from the crisis and the lessons learned as well as how to

prepare for new crises. Unfortunately, each new health crisis leads to an increase in biosecurity measures to the detriment of treating the causes of the emergence and spread of the epidemics themselves.

## **PREPARING FOR OR AVOIDING THE NEXT ZOOSES-PANDEMIC**

Epidemics and emerging zoonoses are a symptom of a breakdown in our relationships with both wild and domestic animals. The “One Health” approach remains too focused on bio-monitoring and biosecurity, with little consideration given to the health of ecosystems (despite being sponsored by UNEP and UNESCO). The WHO backed “Health in All Policies” approach has been insufficiently deployed, which accounts for the absence of dialogue and the dearth of inter-sector initiatives during health crises.

Revegetating our food could become a key public health objective. Dieticians tell us that replacing some animal proteins by vegetable proteins helps to reduce the incidence of cardiovascular and autoimmune disease. Reducing meat consumption will have a beneficial impact on the environment, deforestation and biodiversity loss while also reducing zoonotic health risks. Global health can then be tied back to local and regional ecological and sanitary health.

## **IDENTIFYING AND GOING BEYOND DISCIPLINARY AND SECTOR-BASED BOUNDARIES**

A new approach to health and the environment requires identifying disciplinary and sector-based boundaries and ways of breaking them down. This means collaborative health policies devised jointly by communities of citizens, scientists and administrators within a new “Environmental Health governance framework.

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We need to get beyond traditional approaches to “educating” citizens, communities, practitioners and decision-makers to a shared understanding of the knowledge, representations and values adhered to by the different stakeholders. Traditional expertise needs to be replaced by cross-cutting expertise that includes both scientific know-how and forms of knowledge that draw upon the experience of people as well as that of government departments. Our ability to avoid future zoonoses-related health and social crises will depend on this new approach, which closely links health to the environment.