

COVID-19, ZOOBOTICS AND THE ENVIRONMENT

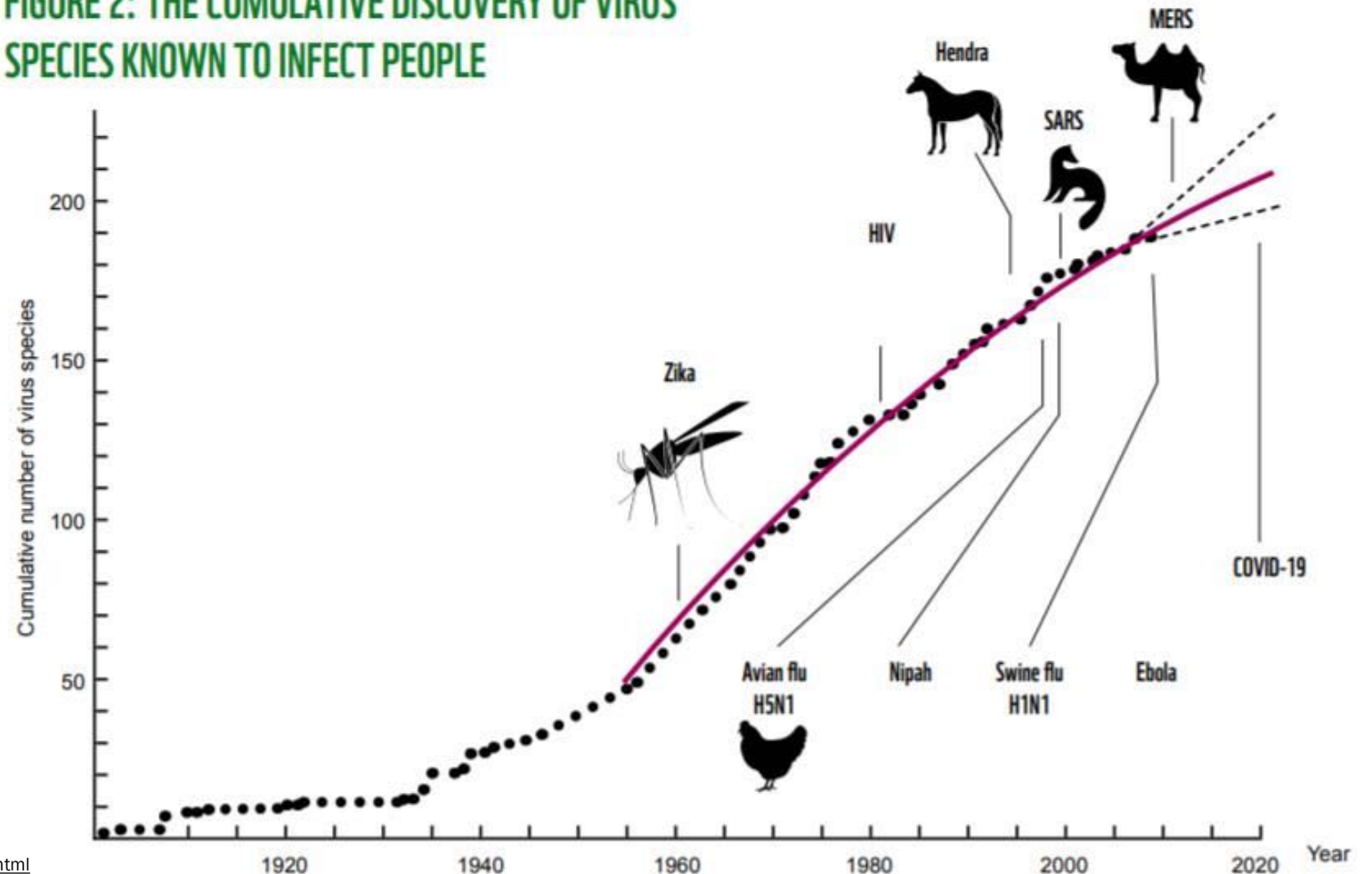
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THE RISE OF ZOO NOTIC DISEASE

- COVID-19 is just one example of the rising trend of zoonotic diseases – diseases that have jumped from animal hosts into the human population.
- 3 out of every 4 new or emerging infectious diseases in people come from animals.
- The frequency of zoonotic disease outbreaks may have more than tripled in the last decade.

FIGURE 2: THE CUMULATIVE DISCOVERY OF VIRUS SPECIES KNOWN TO INFECT PEOPLE

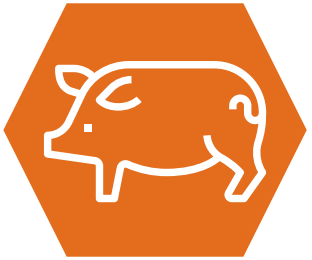


1. US Centers for Disease Control. www.cdc.gov/onehealth/basics/zoonotic-diseases.html
2. The Rockefeller Foundation–Lancet Commission on planetary health [https://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736\(15\)60901-1.pdf](https://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736(15)60901-1.pdf)
3. Jones et al. “Global trends in emerging infectious diseases.” (2008)

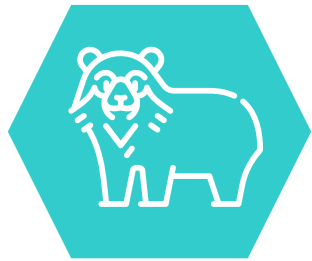
WHY ARE ZOOONOTIC DISEASES INCREASING?



Irrigation increases habitats for some vectors and year-long water supply allows some organisms to survive normally-dry seasons.



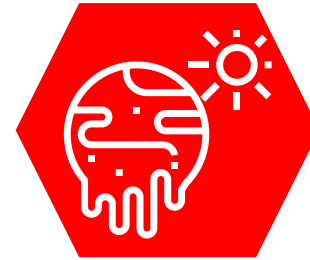
Agricultural Intensification means livestock, wildlife & people in greater contact; biodiversity loss allows pathogens, vectors & hosts to thrive.



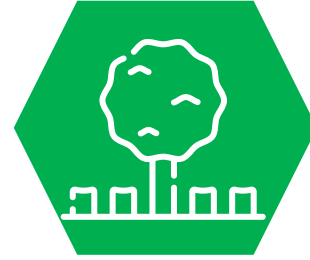
Wildlife trade and consumption drives more contact with high-risk wild species & more potential for crossover via other animals in wildlife markets.



Urbanization means poor sanitation, contaminated water supplies, lack of ventilation, and proximity to vectors and their breeding sites.



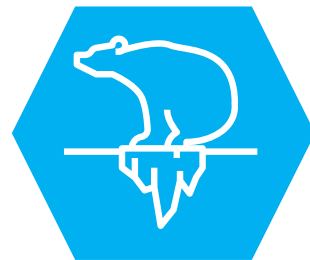
Climate Change-induced temperature and precipitation changes will change disease risk, particularly for vector-borne diseases.



Deforestation leads to contact with new animals & pathogens; biodiversity loss favours some pathogens; forest clearing allows mosquitoes to breed.



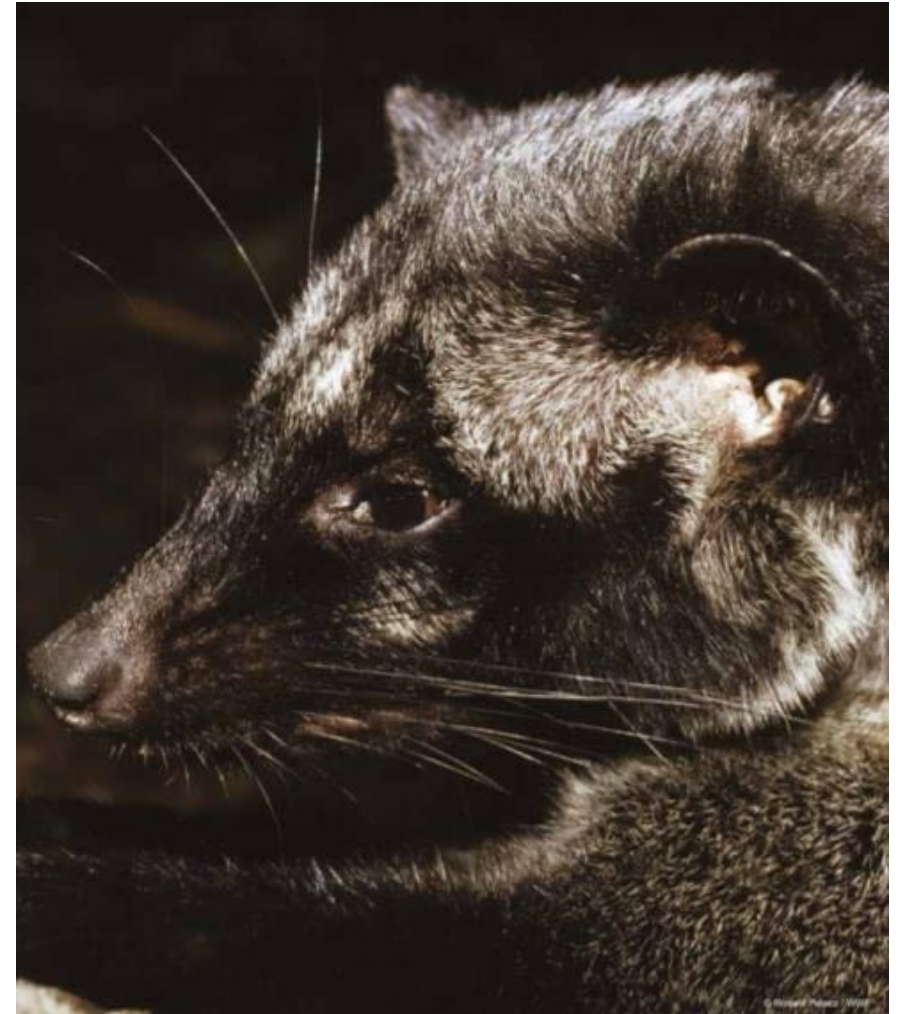
Marine pollution caused by human and agricultural waste causes outbreaks of gastrointestinal illness through seafood harvest & coastal recreation.



Ocean Warming favours bacterial pathogens of which *Vibrio cholera* is the most well known.

CASE STUDY 1: SARS VIRUS

- In 2002, the SARS-CoV virus spread from an animal host and infected humans in the Guangdong province of southern China.
- The virus rapidly spread to 26 countries and resulted in more than 8,000 cases in 2003 and 700 deaths (9%).
- The initial outbreak is likely due to human contact with infected palm civets and raccoon dogs in a **wildlife market** in Guangdong province.
- Several early SARS patients in Guangdong were involved in selling or preparing wildlife for consumption, while civets were directly responsible for transmission to humans in a Guangzhou restaurant where six SARS-CoV-positive civets were caged.



1. The Rockefeller Foundation–Lancet Commission on planetary health
2. WWF “COVID 19: Urgent call to protect people and nature” 2020

CASE STUDY 2: EBOLA VIRUS

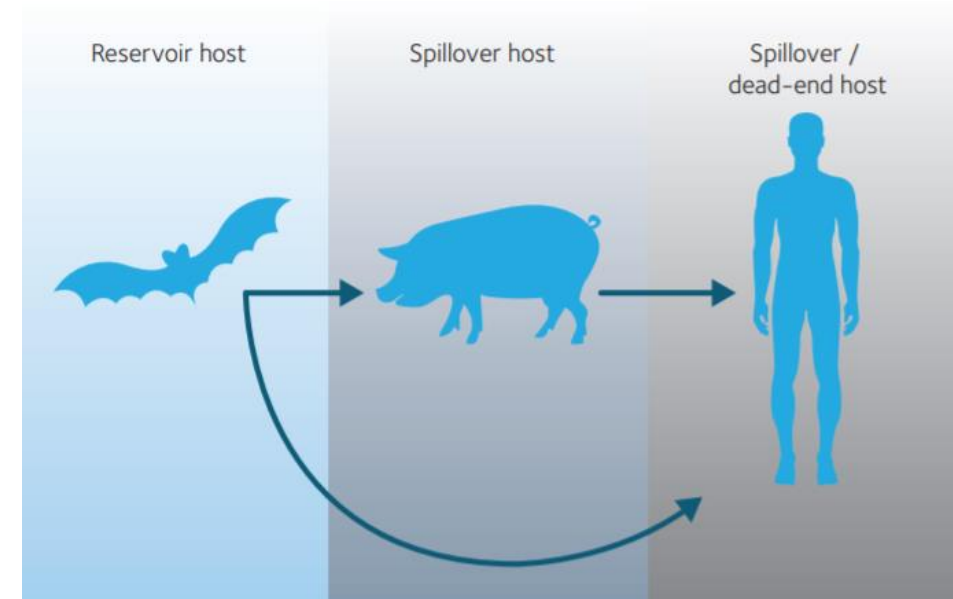
- Over the last 20 years, there have been numerous Ebola outbreaks in West and Central Africa. The virus is highly infectious and often fatal, with a mortality rate of around 50%.
- The largest recent outbreak started in Guinea in 2014 and then moved to Sierra Leone and Liberia. 11,325 people died.
- Many researchers have directly linked **deforestation** in West and Central Africa to an increased likelihood of Ebola outbreak.
- Researchers believe this increases contact between humans and potential Ebola host species, such as fruit bats and primates, leading to greater potential for transmission.



1. The Rockefeller Foundation–Lancet Commission on planetary health
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CASE STUDY 3: NIPAH VIRUS

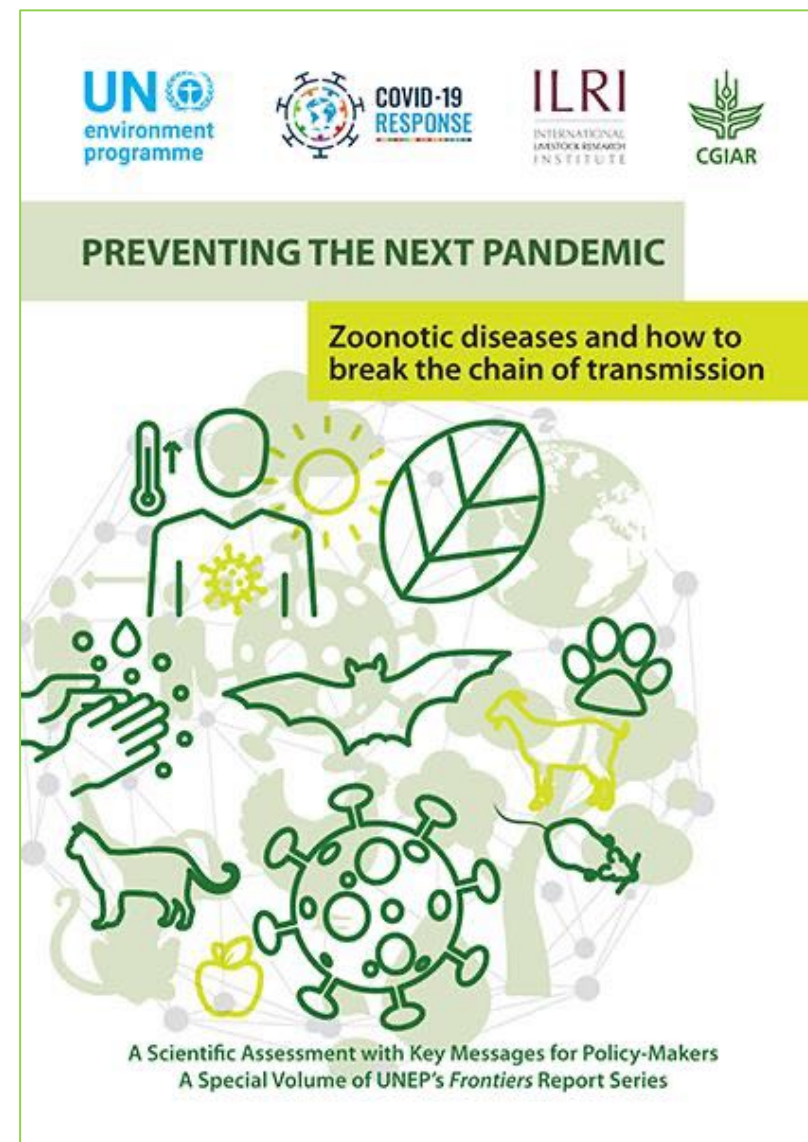
- Nipah virus is highly fatal in humans, with a mortality rate of 40-75%.
- An outbreak in Malaysia in 1998-99 caused 265 cases of encephalitis and 105 deaths. One million pigs were culled, driving the Malaysian pig industry to near collapse. Subsequent outbreaks in Bangladesh and India led to 260 more deaths.
- The initial infection of pigs was likely from fruitbats, large populations of which migrated to mango orchards due to **deforestation** of their native habitat.
- Mango trees were planted alongside pig farms, allowing the jump from fruitbats to pigs. **Agricultural intensification** allowed the jump from pigs to humans and further spread occurred when infected pigs were moved between farms across the country.



1. The Rockefeller Foundation–Lancet Commission on planetary health
2. WWF “COVID 19: Urgent call to protect people and nature” 2020

TO PREVENT FUTURE PANDEMICS, UNEP RECOMMENDS:

- Investing in interdisciplinary approaches, including **One Health**
- **Expanding research** into zoonotic diseases
- Include **full-cost accounting of societal impacts of disease** in decision-making
- **Raising awareness** of zoonotic diseases
- **Strengthening monitoring & regulation** of zoonotic diseases & food systems
- **Incentivizing sustainable land management** & developing options for food security & livelihoods that do not rely on habitat and biodiversity destruction
- **Improving biosecurity and control,**
- **Supporting sustainable management of landscapes and seascapes** to enhance co-existence of agriculture and wildlife
- **Strengthening capacities among health stakeholders** in all countries
- Using the **One Health approach** in land-use and development planning, implementation and monitoring



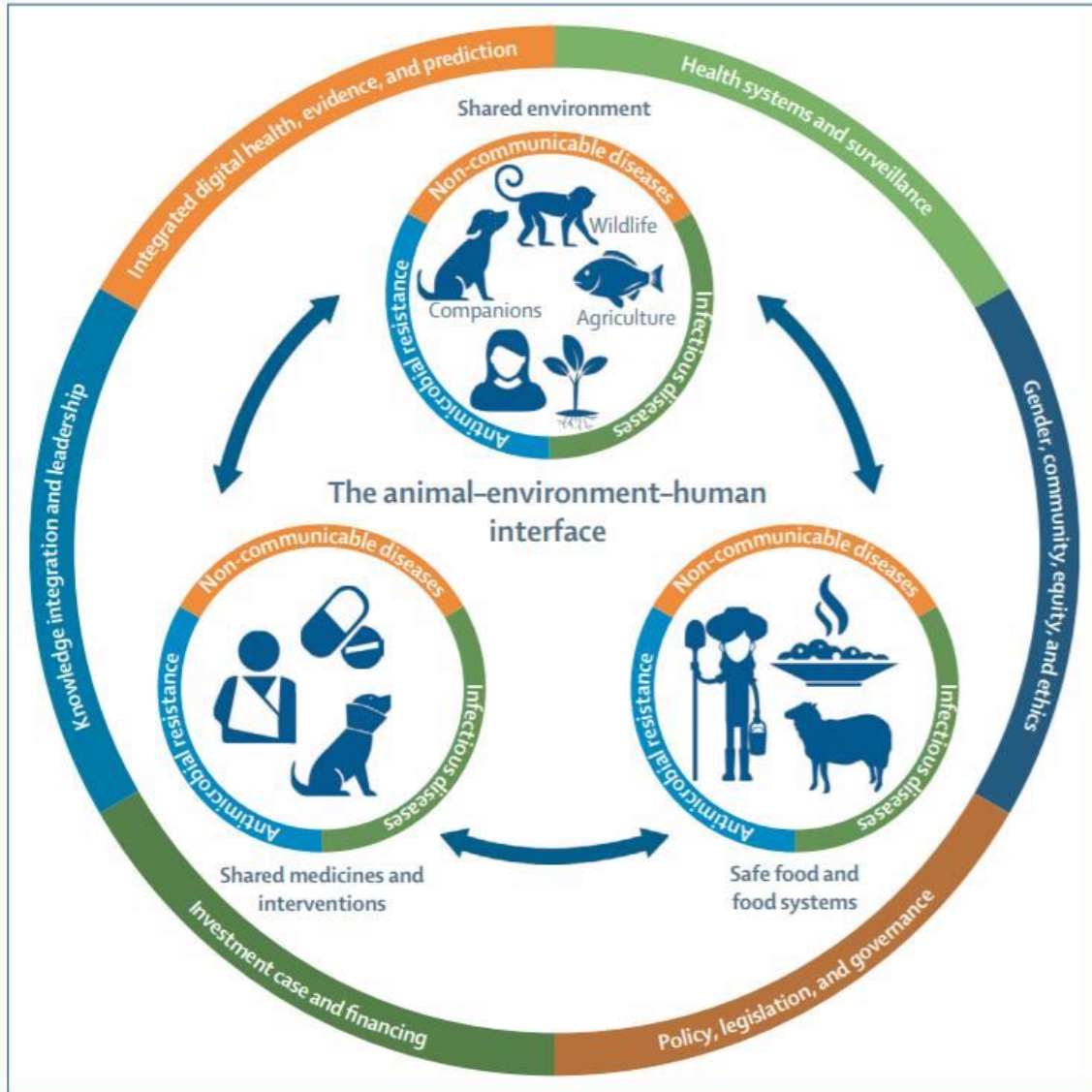


Figure: Approach of The Lancet One Health Commission

THE ONE HEALTH APPROACH

- One Health' involves multiple sectors work together, across human, animal, and environmental health sciences to achieve better public health outcomes.
- It is particularly relevant to food safety, the control of zoonotic disease, and combatting antibiotic resistance.
- The One Health concept has been recognized and promoted by the UN, the G20, and WHO, among others.