CLIMAT ACADEMY®
The Scientific Supplement

Chapter Six

Who Is Responsible? - One Health

Summary

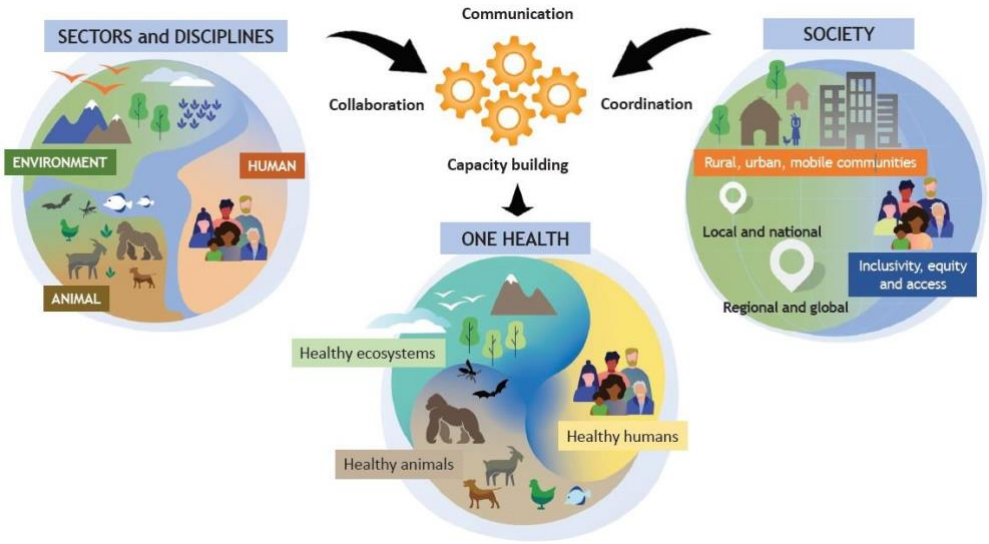
This supplement presents “One Health” as an integrated way of thinking about people, animals and ecosystems. It argues that health problems cannot be understood in isolation because disease, contamination and ecological disruption are tightly connected. Using recent international cooperation between organisations such as WHO, FAO, OIE and UNEP, the text shows how the idea has gained urgency in the context of Covid-19 and other global risks. It also illustrates how environmental change, including deforestation and pollution, can alter disease dynamics and create new pathways for human harm. The supplement’s message is that health has an ecological geography: environmental stress, biodiversity loss and land-use change can destabilise both natural systems and human wellbeing. This broadens the chapter’s discussion of responsibility by showing that climate and sustainability issues are not only economic or political. They are also deeply biological, medical and social, demanding a systems view rather than narrow, siloed responses.

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ONE HEALTH

At a time when the world has been confronted with the Covid-19 pandemic, many scientists are calling for the creation of an international expert group on global health.

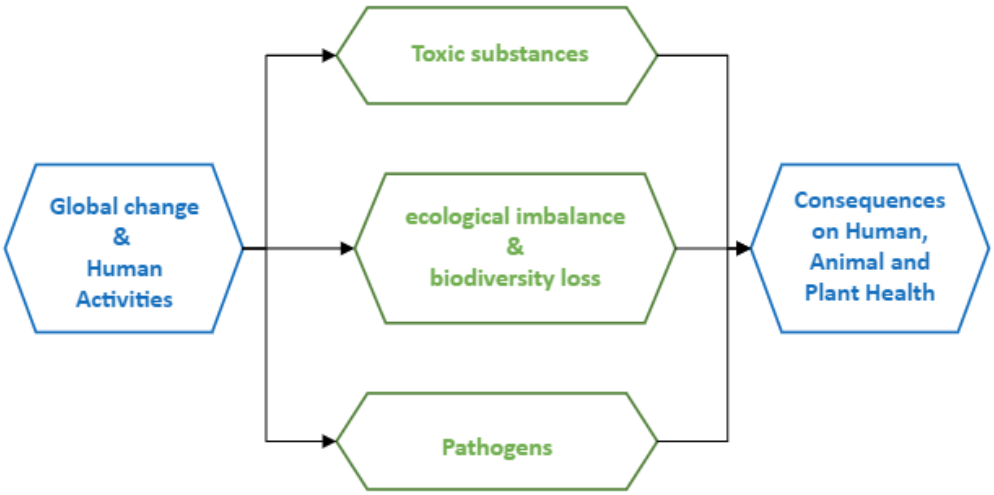
Similar to what exists for climate (IPCC) and biodiversity (IPBES), this new body would implement the "One Health" principle, which is an integrated and unifying approach to balancing and sustainably optimising the health of people, animals and ecosystems.



In December 2021, the Food and Agriculture Organization of the United Nations (FAO), the World Organisation for Animal Health (OIE), the United Nations Environment Programme (UNEP) and the World Health Organization (WHO) agreed to coordinate their work.

As Senegalese Professor Lamine Gueye, a neurologist and director of the international Environment, Health and Society research laboratory, points out, "All diseases have an ecological, environmental, societal and geographical determinism" [(1)] . In so doing, he defines an ecology of health, notably by including in his work the effects of environmental contamination on human health.

The two examples presented highlight the complex interactions that have led to problematic health situations according to an organisation schematised below:



(1) World Health Organization : (2021b, décembre 1). Tripartite and UNEP support OHHLEP's definition of « One Health » . WHO. https://www.who.int/news/item/01-12-2021-tripartite-and-unep-support-ohhlep-s-definition-of-one-health

(2) Ollivier, T. (2022b, juillet 2). « L'écosystème influence l'évolution des maladies » . Le Monde.fr. https://www.lemonde.fr/afrique/article/2022/07/02/l-ecosysteme-influence-l-evolution-des-maladies_6133088_3212.html

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Nipah virus and deforestation

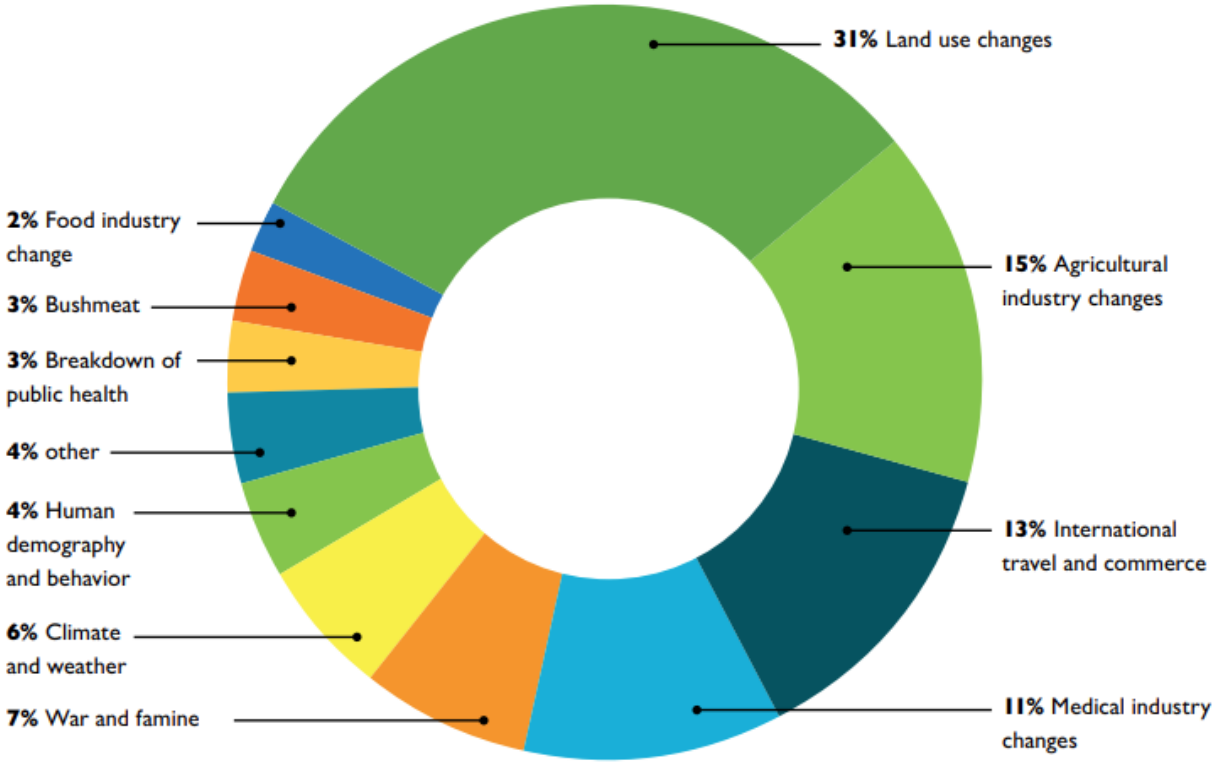
The development of palm oil cultivation has required massive drainage of wetlands and industrial-scale forest exploitation. This land modification has made the rainforest vulnerable to fire. In 1997, as the El Niño phenomenon caused an intense drought, the island of Borneo was ravaged by the largest forest fires in history. The loss of biodiversity was immense. But an unexpected health consequence took more than 6 years of research to be identified.

A few months after the fires, respiratory infections appeared in pig farms in Malaysia and Singapore. A first death in humans was reported in 1999 in the town of Sungai Nipah, Malaysia. This became known as the Nipah virus. This was followed by 105 deaths among the population, each victim having a more or less close link with pig farms. It was therefore decided to massively slaughter the pigs.

In pigs, only 10 to 15% of cases show symptoms, and the virus is highly contagious. In humans, symptoms appear in most cases, the mortality rate reaches 40%, but contamination remains low.

The link between fires and the emergence of this new viral infection will be established when researchers look at frugivorous bats of the Pteropus type. Some of these bats (frugivorous bats) have escaped the fires and have been forced to seek new food sources, including mangoes growing near pig farms. Nipah virus was identified in the urine, saliva and faeces of the bats. Direct contact with these bat excretions or infected pigs allows transmission to humans. The term zoonosis is used to describe this human disease originating from an animal virus. Bats are then defined as the carriers of the virus.

Changes in land use are recognised as a major factor in the emergence of new diseases



Changes in the environment have resulted in unprecedented contacts between humans and certain wild species, which at the same time favour the inter-species transmission of pathogens. Recent work is currently attempting to understand why the loss of biodiversity is accompanied by an increase in infections by breaking the species barrier.

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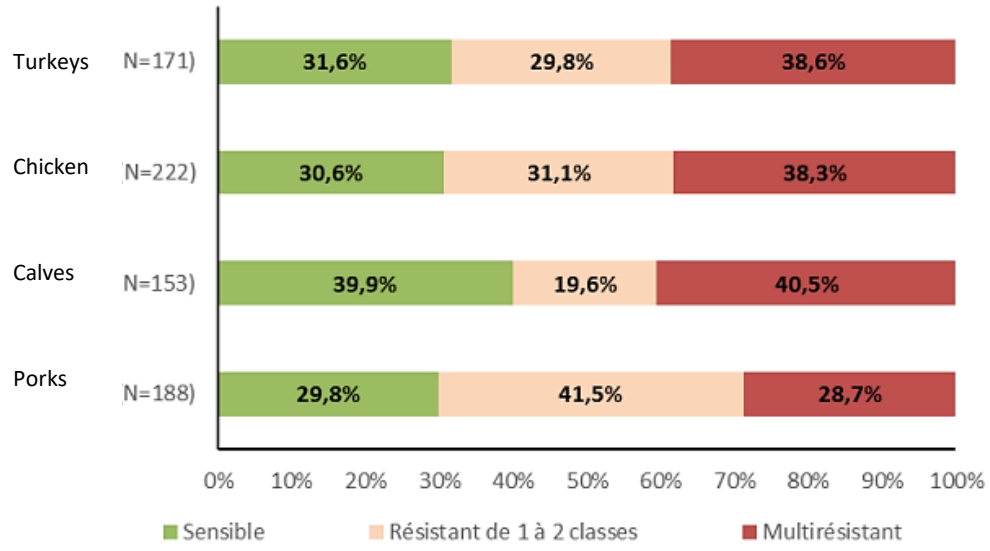
Roadmap Programme - Antibiotic Resistance

The four-year (2019-2023) European Roadmap programme aimed at 12 countries (10 European countries plus Vietnam and Mozambique) aims to deploy solutions to reduce the use of antibiotics in animal farming practices. [2]

The specificity of this programme lies in its interdisciplinary approach. It mobilises researchers in biology, veterinary medicine, zoology, social sciences and economics, as well as professionals from the animal production sector. National, European and international policy makers complete the panel of speakers.

The excessive use of antibiotics in livestock farming is a major concern for human health. Indeed, bacterial resistance to veterinary antibiotics lead to the emergence of resistances that will be transmitted to humans. In 2016, economist O'Neill estimated that antibiotic resistance could become the leading cause of death in the world by 2050.

The same bacteria can infect humans and animals. The same antibiotic molecules can also be used for therapeutic treatment. Thus, when a strain of bacteria becomes resistant to a veterinary antibiotic, human medicine loses effectiveness and faces difficulties in treating the infection. National and European surveillance networks (EARS-Vet) particularly monitor bacteria responsible for zoonoses such as Escherichia coli.



Total susceptibility and multiresistance of Escherichia coli isolated at slaughter in food-producing animals in 2019-2020 in France (Anses 2021) [3]

Establishing the countless interactions between the environment and human health is a scientific challenge, but is now essential in a world that has been profoundly transformed by human activities.

The concept of "one health" implies interdisciplinary communication and a permanent dialogue between the actors in the field and the public authorities. With a more direct implication on human health, "One Health" illustrates the importance of a science of complexity and the need for a holistic understanding of the consequences of human activities.

[2] Project (roadmap-h2020.eu)

[3] Anses. 2021. LNR Résistance antimicrobienne - Surveillance de l'antibiorésistance des bactéries zoonotiques et commensales isolées chez les animaux producteurs d'aliments et leurs denrées, bilan 2014-2020. Fougères et Ploufragan-Plouzané-Niort, Anses. 54 p.

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