

Editorial

ONE HEALTH AND SUSTAINABILITY: TWO SIDES OF THE SAME COIN

The recent occurrence of multiple pandemics, including COVID-19 and Mpox in people, and H5N1 influenza in farmed and wild animals, has put One Health firmly on the political agenda. However, One Health has meant different things to different people, often focussed on infectious disease and often with an anthropocentric bias. In response to this, in 2022 the recently-convened One Health High Level Expert panel, of which I was a member, developed a definition of One Health which is holistic, disease agnostic and which aims to equally protect the health and wellbeing of humans, domestic animals, wildlife, cultivated and wild plants and ecosystems (<https://www.who.int/publications/m/item/one-health-definitions-and-principles>).

A driver for a One Health approach is a realisation that the occurrence of disease threats, be they infectious or non-infectious, are almost always a result of human choices and activities. While it is easy to see links between chemical pollution and toxicity, or the hunting of wildlife for food leading to novel pathogen exposure, links between many human activities and infectious disease outcomes are not always so apparent. Many wildlife species become less abundant or disappear altogether from human-modified habitats, while others persist or increase in abundance. Pathogen prevalence in the latter can increase as these animals directly or indirectly interact with each other more frequently than when there was a higher species richness. Such survivors in human-modified habitats tend to be species that have an evolutionary history of co-existence with people and, not surprisingly, they are more likely

to harbour zoonotic pathogens than the species that are lost.

Biodiversity loss has been identified as a major driver of infectious disease emergence in people and other animals (Mahon et al., 2024), and habitat loss is the primary driver of biodiversity loss. Agriculture is the major driver of habitat loss: of all habitable land on our planet, 49% is used for agriculture, of which 78% is used to produce livestock (for housing and, predominantly, for growing animal feed) while only 22% is used to produce plant crops directly for human consumption (Figure 1, Benton et al., 2021). When one considers that humans obtain 63% of our protein needs and 82% of our calories from crops, and taking into account that plants can provide all the nutrients required by people, animal production is a very inefficient way of producing food. Yet, per capita consumption of meat has been increasing rapidly with global economic growth (Figure 2), while the human population has quadrupled in size over the past 100 years. This growing demand for meat and dairy, combined with the inefficiency of turning plants into animal products (Benton et al., 2021), has resulted in a situation where we farm 3.1 billion hectares more than we would if we didn't eat animal products - and that takes into account the land required to grow enough food crops to ensure adequate nutrition for a planet of 8 billion people (Poore & Nemecek, 2018). It is rather sobering to think that we have destroyed natural habitats covering an area the size of the USA, European Union, Australia and China combined through choice rather than through necessity.

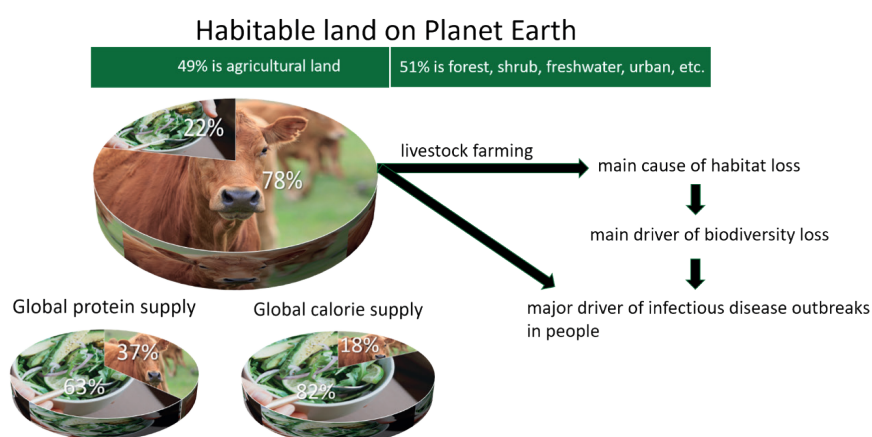


FIGURE 1: Graphic demonstrating inefficiencies in the way we use land to produce food, and some of the ways this results in increased infectious disease threats to people (percentages shown are from Benton et al., 2021).

Per capita meat consumption by type World, 1961 to 2023

Per capita meat consumption is broken down by types of meat, and is measured in kilograms per person per year.

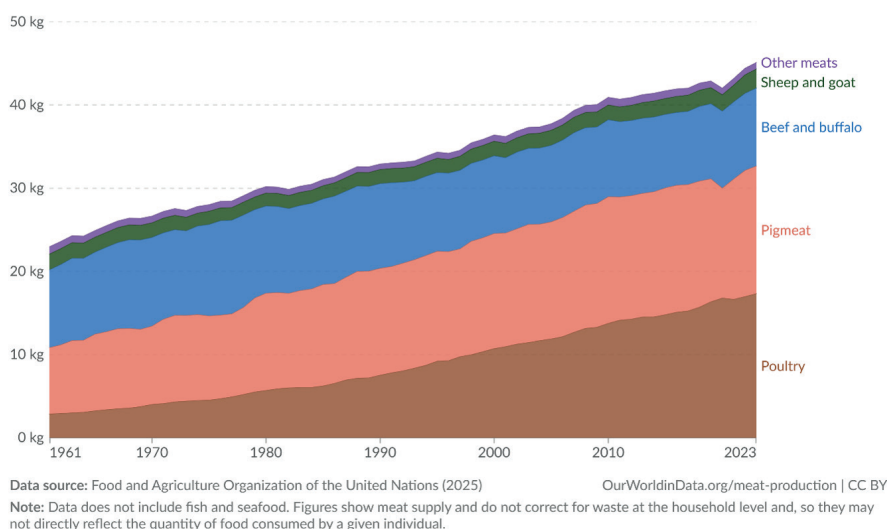


FIGURE 2: The per capita consumption of meat by humans has increased markedly over recent decades, approximately doubling over the past 60 years. Figure obtained from <https://ourworldindata.org/grapher/per-capita-meat-consumption-by-type-kilograms-per-year>.

In addition to its impact on disease emergence and occurrence through biodiversity loss, livestock production is the most frequent source of endemic zoonotic disease (Desvars-Larrive et al., 2024). For example, campylobacteriosis, which is primarily contracted from poultry products, is the most frequently reported cause of bacterial gastroenteritis in the developed world. Even when zoonotic diseases are contracted from plant products, the origin of the pathogen often is farm animal manure used to fertilise the crops. And while the intensification of livestock production may lead to increased food conversion efficiencies, it also enables the emergence and spread of new infectious disease threats, such as antimicrobial resistant strains of bacteria and highly pathogenic variants of viruses. For example, the H5N1 highly pathogenic avian influenza virus originated in intensively farmed geese in southern China.

Reducing demand for animal products can reduce habitat loss, biodiversity loss and human infectious disease emergence and occurrence. Less meat and dairy in our diets will also reduce non-infectious disease threats to people, including heart disease, type 2 diabetes and certain cancers (Papier et al., 2021). Reducing the consumption of animal products decreases other harms to people and our planet, including those mediated through scarcity-weighted freshwater abstraction, eutrophication, acidification and greenhouse gas emissions (livestock production produces more CO₂ equivalent greenhouse gas emissions than all transportation globally) (Poore & Nemecek, 2018), while increasing our food security.

For a sustainable planet, a One Health approach is required, and if we want to adopt One Health practice, we need to embrace sustainability, including in the way we produce our food. Surely if we could choose from scratch, we would eschew such an inefficient, wasteful and harmful way of feeding humanity as meat and dairy production. A frequent retort to pleas to reduce meat and dairy con-

sumption is that it disrespects long-held cultural norms. However, human cultures can change dramatically and rapidly (e.g. see <https://www.youtube.com/watch?v=2w-MOuWDwdJE>), and the per capita consumption of meat only markedly increased over recent decades (Figure 2). Our food systems are now completely unsustainable and un-One-Healthy. If we do not radically change them and reduce our consumption of animal products, we not only risk our own health but the future of our planet and of humanity.

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