

Science for Environment Policy

Link between biodiversity and human disease

Preserving biodiversity seems to reduce the emergence and spread of human diseases in many cases, according to an investigation into the links between biodiversity and human health. It concludes that there is mounting evidence indicating that preserving ecosystems in their natural state generally decreases the occurrence of infectious diseases.

Changes in biodiversity that affect species involved in hosting or transmitting human diseases inevitably affect the incidence of these diseases. Changes that affect the diversity of the pathogens themselves, including bacteria and viruses, are also important. Climate change often further aggravates the situation.

According to the researchers, who drew their conclusions from an assessment of available evidence from the recent literature, biodiversity loss can affect disease transmission in three ways: through changes to the number of hosts, or vectors (organisms such as mosquitoes that transmit disease from one species to another); through changes to host, vector or parasite behaviour; and through changes to the condition of a host or vector that may affect their ability to infect.

For instance, there are examples of studies suggesting that the incidence of malaria, Lyme disease, West Nile fever, and schistosomiasis (also known as bilharzia or snail fever) can increase under the influence of human-induced biodiversity loss. Although biodiversity loss can reduce the number of hosts for a disease, such as the number of opossums (an American marsupial) in the case of Lyme disease, this has knock-on effects that still very often lead to an increase in the prevalence of the disease.

In the Lyme disease example, the opossum is a poor host because the animals groom and kill the ticks that carry the disease. Because they absorb pathogens but are poor at transmitting them, they act as 'buffers', deflecting the disease away from white-footed mice, which are better hosts. Therefore, if opossums are in decline, the incidence of Lyme disease should increase, although due to the complex interactions between different species in real communities, it is difficult to prove this is the case.

The authors of the study say that, although there is still much to learn about the links between biodiversity and human health, the connections are clear enough to make local, regional and global efforts to protect biodiversity a matter of urgency. Necessary actions include: managing biodiversity to reduce disturbances to species involved in transmitting disease; avoiding overuse of antimicrobials, which upset the natural balance of microbial diversity and can encourage drug-resistant pathogens; and monitoring areas where land use change is causing biodiversity loss. They also note that researchers should be wary of confusing geographic differences in biodiversity – natural variations related to location – with changes induced by people, such as those caused by deforestation. They say policy instruments can deal more easily with human-induced change.

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