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ONE HEALTH ATLAS

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In the scientific literature, human health and animal health are the main two pillars of the One Health concept (Figure 1). The third pillar, ecosystem health, is less often taken into account. Plant health is rarely mentioned and cultivated plant health even less so, despite a very recent spike, mainly from French teas (Figure 2).

Yet there are clear interactions between (crop) plant health and the other pillars. Agroecological crop protection (ACP) is the application of agroecological principles to crop protection (Figure 3). With its three dimensions (scientific, agronomic and social) and its underpinnings (prioritizing pest and disease prevention, promoting biodiversity and fostering soil health), ACP positively impacts the health of crops, soils, agroecosystems and food systems. ACP also has a positive impact on the health of ecosystems in general, contributing to the reduction of biodiversity erosion, to climate change adaptation and mitigation, to human and animal health, and to animal welfare.

In addition, recent studies have shown that ACP reduces the risk of viral zoonotic diseases and infectious fungal diseases (mycoses) and has variable effects on other human infectious diseases (Figure 4). Thus, ACP represents a special link between agroecology, which aims to provide healthy agriculture and food systems, and One Health, which aims for the overall health of living communities.

As in Figure 4, the “plant health” sphere should be systematically added to the other three spheres that are generally the only ones found in illustrations of One Health in the literature. Similarly, the scientific work related to plant health must also be taken into account in the description and development of the One Health concept (as reflected in Figure 1 in the early 2020s).

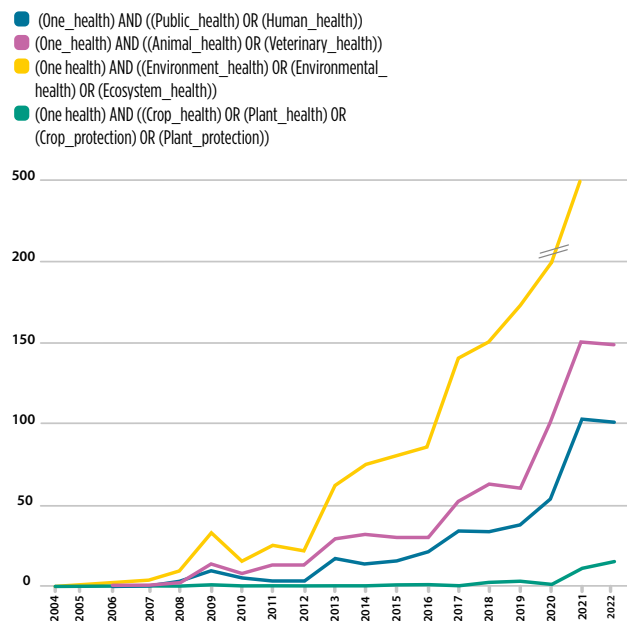


Figure 1. Evolution of the number of publications linking One Health and each of the four types of health (human, animal, ecosystem and plant). Searches on the WoS Core collection (<https://www.webofscience.com/wos/woscc/ba-sic-search>) for the terms shown in parenthesis, from 2004 (date when the One Health concept appeared) to 2022.

References

- Ratnadass A., Deberdt P.** 2021. Pratiques de protection des cultures en agroécosystèmes tropicaux et risques de maladies humaines et animales d'origine bactérienne. *Cahiers Agricultures*, 30, 42. <https://doi.org/10.1051/cagri/2021028>
- Ratnadass A., Deguine J.-P.** 2021. Crop protection practices and viral zoonotic risks within a One Health framework. *Science of the Total Environment*, 774, 145172. <https://doi.org/10.1016/j.scitotenv.2021.145172>
- Ratnadass A., Sester M.** 2023. Crop protection practices and risks associated with human fungal infectious diseases: a One Health perspective. *Cahiers Agricultures*, 32, 7. <https://doi.org/10.1051/cagri/2022036>



Figure 2. Global interest in the search term “plant health” based on Google Trends data (2004–2022). Data source: Google Trends (<https://trends.google.com>), accessed in 2023.

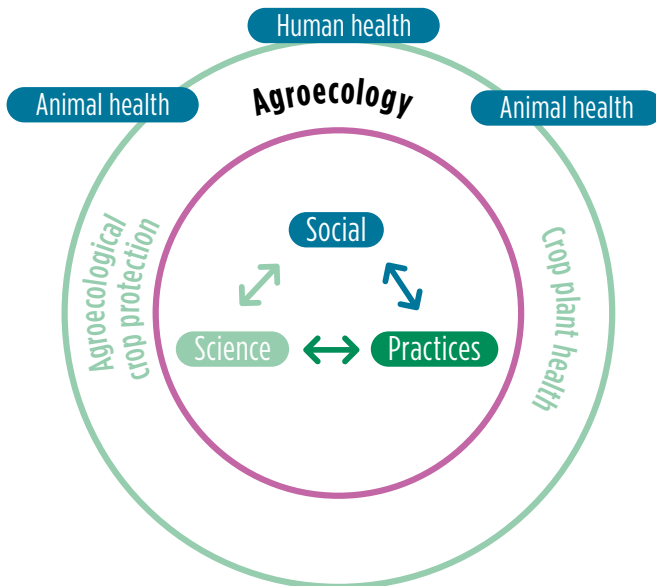


Figure 3. Agroecological crop protection: a consistent place within the agroecology approach and the One Health concept and a special link between them.

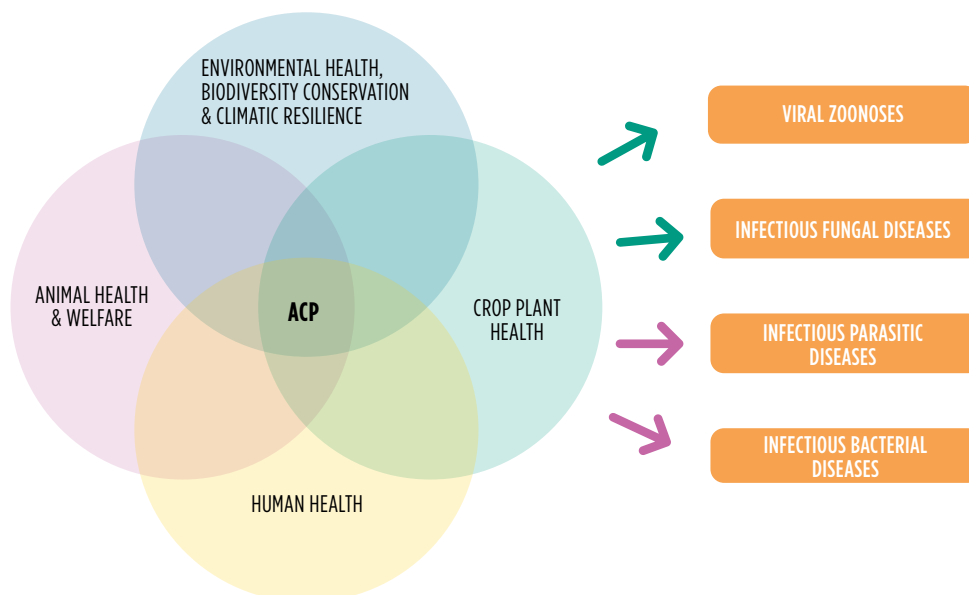


Figure 4. The four components of One Health and the effect of agroecological crop protection (ACP) on human diseases, namely viral zoonoses, infectious fungal diseases, infectious parasitic diseases and infectious bacterial diseases. Green arrows: reduction of disease risk; purple arrows: mixed impact on disease risk.