1 Introduction and Evolution of One Health, Ecohealth and Planetary Health

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Contents

 Principles of One Health for a better planet (eds B. Häsler, A. Tvarijonaviciute and S. Savić)
DOI: 10.1079/9781800623002.0002

Chapter Overview

Elevator pitch

Health is not confined to individual beings, but encompasses the delicate balance of ecosystems, animals, humans and plants. This chapter helps you to understand the meaning of One Health. We also take you on a journey through time, tracing the roots of the One Health approach and looking at how it has evolved dynamically to tackle complex and interconnected issues of sustainability and balance, including health. We explain how One Health and Ecohealth are related and how they have changed over time, and where convergence points are where they deviate.

Book objectives the chapter relates to

☑ 1. Understand what One Health and Ecohealth mean
☑ 2. Think in a One Health and Ecohealth way
☐ 3. Apply One Health and Ecohealth in their professional and personal life
☐ 4. Know how to share One Health and Ecohealth knowledge
☐ 5. Integrate One Health and Ecohealth knowledge actively
☑ 6. Acquire or enhance core One Health competencies

One Health competencies covered

☐ 1. Effective communication
☑ 2. Collaborative and resilient working
☐ 3. Systems understanding
☑ 4. Transdisciplinarity
☑ 5. Social, cultural and gender equity and inclusiveness
☑ 6. Collective learning and reflective practice
☑ 7. One Health concepts
☐ 8. Theoretical and methodological pluralism
☐ 9. Harnessing uncertainty, paradox and limited knowledge

After having worked through this chapter, you will be able to understand what One Health and Ecohealth mean and how they have evolved over time.

Learning outcomes

1. Understand what One Health problems are and how the One Health approach can be useful to tackle them.
2. Comprehend the meaning of the terms One Health and Ecohealth, their similarities and differences.
3. Highlight the moments in history when the concepts of One Health and Ecohealth gained public recognition.
4. Evaluate critically how One Health and Ecohealth changed over time and what communities they are speaking to.

Summary

The realization that the health of people, animals and the environment are connected has been pivotal to human survival since time immemorial and is sustained in the present day by Indigenous Peoples around the world and communities whose health and wellbeing is directly connected to the natural world. Within modern science, however, it has only been in the last several decades that integrated approaches to health have gained formal recognition and begun to shape policy and practice domains around the world. In this chapter, you will explore the emergence and evolution of One Health and learn about and reflect on the contemporary understanding of One Health. We highlight the importance of participatory and transdisciplinary work rooted in systems thinking and the power of using these approaches to address global health challenges such as malnutrition, disease emergence or pandemics. The evolution of One Health within the context of the development of complementary and synergistic approaches such as Ecohealth and Planetary Health is presented. You will look at their similarities and differences and consider the contributions that the various orientations can make to strengthening health and wellbeing around the world. Because it is important to understand where we have been and what has led to where we are today, we also present a historical timeline of the development of One Health and Ecohealth and highlight key events that fostered sharing, collaboration and transdisciplinary work in service of addressing interconnected human, animal and ecosystem health challenges.

1.1 Health, Disease and One Health

The **One Health approach** recognizes that the health of humans, animals, plants and the environment[1] is closely linked and interdependent within the environments they share and shape across time and space (Adisasmito *et al.*, 2022; RSC, 2022).

While there are a variety of ONE HEALTH definitions, notions of **health** more broadly are also varied. For example, individualized notions of health generally refer to the overall **wellbeing** and harmonic functioning of an individual's (whether animal or human) physical, mental and behavioural states and the degree to which they can lead a fulfilling life within their species-specific context. Health goes beyond the absence of disease or illness and includes the presence of positive factors that contribute to quality of life, equity and wellbeing. Health in humans and non-human animals[2] (subsequently called animals in this book) can be conceptualized at the level of individuals or populations. However, definitions of intersubjective health, for example the relational production of health across human–animal interactions, is less often formally defined. Moreover, a definition of health for animals as an intrinsic state of being remains poorly defined. Furthermore, when extending the definition of health to the **ecosystem** the notion of individuality is de-centred and the functioning of the unit as a whole is foregrounded. For example, the health of the ecosystem can be defined as 'the extent to which the environment is able to function, maintain biological and chemical processes, and adapt to change or cope with the impacts of human activity' (FAO *et al.*, 2022).

To understand **HEALTH** and wellbeing, it is important also to understand the continuum of states of being that include **pathological states or disease**, which are terms used to describe a deviation from normal physiological functioning in an individual, leading to a disturbance in its health and wellbeing. Disease refers to a specific condition or disorder that adversely affects structure or function, resulting in recognizable signs, symptoms, and often a negative impact on the individual's overall wellbeing (Boorse, 2011). Diseases can manifest in various ways and are caused by a wide range of factors, including infectious agents (such as bacteria, viruses and parasites), genetic mutations, environmental factors, poor diets, and a combination of these factors. Some diseases are acute, have a sudden onset and a relatively short duration, while others are chronic, persisting over a longer period. The term disease is not commonly used to describe the health of ecosystems or **environment** in the same way it is used for individuals or populations. Ecological systems can, however, experience disruptions, imbalances and degradation that are analogous to diseases in living organisms. Significant disturbances that lead to a decline in the functioning of ecosystems and the environment and the communities they sustain include **biodiversity** loss, pollution, resource depletion and **climate** change (Dornelas, 2010).

There are differences in how different **disciplines** and practitioners conceptualize health and tackle disease or disturbances. Paradigmatically, the differences can be attributed to the historical and disciplinary perspectives that have shaped how to view health. For example, human health has traditionally been the primary focus due to the centrality of humans in society (except in Indigenous communities). Medical science and healthcare have evolved to prioritize human wellbeing, resulting in a robust framework for measuring and addressing human health issues. Similarly, veterinary medicine acknowledges that animals, like humans, have their own physiological, behavioural and health-related needs that require specialized knowledge and care. However, as our understanding of ecological systems and interdependencies has grown, an increasing need has emerged to address complex health challenges that transcend traditional boundaries, prompting the development of One Health and **Ecohealth** and other integrated approaches to health, which recognize the links between humans, animals and plants within the ecosystems.

A One Health problem is a multifaceted challenge that transcends the boundaries of the health of humans, animals, plants and the ecosystems. When it involves multiple species, complex interactions between humans, animals and the environment, shared determinants (including social factors), and interconnected systemic influences and necessitates collaborative, holistic solutions, then the use of a One Health approach is indicated. One Health problems include: **zoonotic diseases** (where **pathogens** are transmitted between animals and

humans in both directions); antimicrobial and anti-parasitic resistance; food safety; vector-borne and neglected tropical diseases; climate change; pollution; biodiversity loss; food system crises; non-communicable diseases; and malnutrition. Finding optimum solutions for many of the most important health challenges facing humanity has proven to be difficult. Effective solutions to some of these challenges remain elusive for many reasons, including their complex or wicked nature, siloed approaches to addressing these problems, and our lack of a complete understanding of them. Integrated approaches to health offer concrete ways to advance thinking, practice and policy formation.

- **Complex problems** involve multiple interconnected causes, factors, variables, components and effects that cause their complex nature. These factors cannot be understood and analysed individually or linearly as they interact in nonlinear ways, making them difficult to predict or control. They require creativity, collaboration and critical systems thinking to solve them.
- **Wicked problems** are challenging because of their ill-defined (with no clear starting and ending point) and dynamic nature. They can have multiple possible solutions, yet, given their complexity, efforts to solve them tend to produce unintended consequences and **trade-offs** that vary across contexts (Waltner-Toews, 2017).

(One) Health problems can be expressed differently across different scales (e.g. individual, community, population, ecosystem and global scale), temporal dimensions (short, medium, long term; future generations), geographic boundaries (local, national, international), populations and **sectors** (biotic and aniotic environment, humans, animals), and perspectives (e.g. **ecocentric**, **anthropocentric**). It is these characteristics and the dynamic interconnections that make it difficult to understand them comprehensively.

Integrated approaches to health, like One Health or Ecohealth, constitute holistic approaches that consider the interconnected aspects of health including social, economic, environmental, biological and spiritual factors. They involve collaboration among diverse people, including Indigenous knowledge holders, medical professionals, veterinarians, ecologists and policy makers in collaboration with communities, to address complex health challenges. Some authors researching the history and development of One Health conclude that while 'there are movements towards the broader integration of different disciplinary conceptualizations of health, the associated complexity – biological, geophysical and social – remains a challenge' (Assmuth *et al.*, 2020). Yet, by recognizing the intricate relationships between humans, animals, plants and the environment, an integrated approach to health can emphasize the importance of understanding and mitigating the factors that contribute to health issues across multiple dimensions, ultimately leading to healthier populations, ecosystems and global **sustainability**. Integrating the needs, values and opinions of multiple disciplines, sectors and **stakeholders** can prove difficult owing to the complexity of their structures and dynamics, but the urgency and necessity to respond to many emerging and re-emerging health challenges underscores that it is imperative to invest in learning how to do this work well. A growing number of scholars and practitioners, therefore, are advocating for 'investing in a transdisciplinary approach that connects disciplines and communities engaged in coproduction, co-interpretation and co-utilization of knowledge' (see Chapter 3 for more information on **transdisciplinarity**). These authors propose the term 'transdisciplinary health' to signify the need for broad integration across fields and the study of dynamic interaction across research, practice and society as a whole on all scales that range from (and link) the local to global (Assmuth *et al.*, 2020).

Learning questions 1: Think of a One Health problem relevant to your context.

1. Why is it a One Health problem?
2. What kind of One Health problem is it?
3. For whom is it a problem?
4. Is this problem complex or wicked, and if so, in what ways?
5. Who needs to be involved in the attempt of solving it?
6. What are some possible solutions to the problem and how will you know once you have solved the problem?

Example answer: Below is an example answer from a Western Balkan country in Europe. Please note that your One Health problem may be very different depending on the context / your situation as such; please view this as an example from one particular context.

The One Health problem relates to increased spreading of vector-borne diseases in humans and animals in the region. This is due to two factors: (i) the number of vectors is rising in the region (ticks, mosquitoes, sand flies) due to change of climate conditions or, in other words, higher temperatures during summer and longer period of vector activity; (ii) people and animals (mostly pets) are often travelling from and to the region, and in that way increase the possibility of contact with pathogens in vectors. Some diseases are endemic for this region such as Lyme disease, dirofilariasis, West Nile, and some are emerging such as canine leishmaniasis, ehrlichiosis, anaplasmosis, babesiosis and tick-borne encephalitis. Most of these diseases are zoonotic and therefore can be found in humans and animals, but all of them are transmitted by a vector. That is why this is a One Health problem involving human health, animal health (domestic, pets and wildlife) and environment. However, this issue is not systematically investigated at the country or regional levels, but is left for single cases to be resolved, even though reported cases are found in both humans and animals. People and animals (mostly pets) travelling more and more contributes to the problem; this is linked to economic and transport development. When combined with the increasing vector presence, which cannot be resolved, this issue becomes a complex problem. The solution is neither simple nor easy and involves commitment of public health, animal health, environment control, preventive measures and public awareness. The problem would be considered under control if there were no outbreaks of the diseases either in humans or in animals and if preventive measures would be applied in humans and animals, with complete public awareness on how to behave in environments with persisting vectors.

In the next section, the meaning and evolution of One Health and Ecohealth will be introduced to you in more detail.

1.2 The Meaning of One Health

1.2.1 Contemporary understanding of One Health

One Health originated as a formal concept in the mid-1900s with the recognition of the interconnectedness of humans, plants, animals and the influence of the environment they live in, with the key being the importance of collaboration between sectors. It gradually gained attention in the health, science and ecological fields, and in the early 2000s expanded into a commonly used approach to address various interconnected health problems. The One Health approach is used in most health sectors around the world and has gained substantial momentum during the past decade. Ever evolving, it is now a commonly used noun and approach to tackling some of the world's most complex health problems at all levels of society and government, including the UN's **Sustainable Development Goals** (SDGs) (see Chapter 15).

One Health has been defined as an:

> integrated, unifying approach that aims to sustainably balance and optimise the health of people, animals and ecosystems. This recognises that the health of humans, domestic and wild animals, plants, and the wider environment (including ecosystems) are closely linked and interdependent. The approach mobilises multiple sectors, disciplines and communities at varying levels of society to work together to foster wellbeing and tackle threats to health and ecosystems, while addressing the collective need for clean water, energy and air, safe and nutritious food, taking action on climate change, and contributing to sustainable development.
>
> (Adisasmito *et al.*, 2022)

This definition, developed by the One Health High-Level Expert Panel (OHHLEP), was welcomed by the Quadripartite for One Health, i.e. the Food and Agriculture Organization of the United Nations (FAO), the United Nations Environment Programme (UNEP), the World Health Organization (WHO) and the World Organisation for Animal Health (WOAH) and used in their One Health Joint Plan of Action (OH JPA). The OH JPA expresses the joint commitment of the four organizations towards One Health and promotes the mainstreaming of One Health around six interconnected action tracks with objectives, activities and deliverables, namely: (i) enhancing One Health capacities to strengthen health systems; (ii) reducing the risks from emerging and re-emerging zoonotic epidemics and pandemics; (iii) controlling and eliminating zoonotic, neglected tropical and vector-borne diseases; (iv) strengthening the assessment, management and communication of food safety risks; (v) curbing the silent pandemic of antimicrobial resistance (AMR); and (vi) integrating the environment into One Health.

Another definition of One Health is that 'One Health is a collaborative, multisectoral, and transdisciplinary approach, working at local, regional, national, and global levels to achieve optimal health and wellbeing outcomes recognising the interconnections between people, animals, plants and their shared environment' (One Health Commission, 2022). Another one says that 'One Health is people interested in protecting human, animal and environmental health, coordinating, collaborating and communicating to achieve the best health outcomes for our planet' (CDC, 2022). One Health is also seen as a framework to understand the interconnectedness of development problems and to achieve transformative outcomes such as better food, improved ecological services and reduced disease risks (Habib *et al.*, 2022). However, the OHHLEP definition is the broadest and most all-encompassing so far and explicitly integrates the environment. It comes with a set of underlying principles:

1. Equity between sectors and disciplines;
2. Sociopolitical and multicultural parity (the doctrine that all people are equal and deserve equal rights and opportunities) and inclusion and engagement of communities and marginalized voices;
3. Socioecological equilibrium that seeks a harmonious balance between human–animal–environment interaction and acknowledging the importance of biodiversity, access to sufficient natural space and resources, and the intrinsic value of all living things within the ecosystem;
4. Stewardship and the responsibility of humans to change behaviour and adopt sustainable solutions that recognize the importance of animal welfare and the integrity of the whole ecosystem, thus securing the wellbeing of current and future generations; and
5. Transdisciplinarity and multisectoral collaboration, which includes all relevant disciplines, both modern and traditional forms of knowledge and a broad representative array of perspectives.

(Adisasmito *et al.*, 2022)

These five underlying principles form an important element of the One Health definition and summarize essential characteristics that One Health practitioners should strive for. Their application and the resulting effects would ideally form part of One Health monitoring and evaluation frameworks and activities (see Chapter 12 on **evaluation**).

Learning questions 2: Have a look at the underlying five principles of the One Health definition and note for each what they mean for One Health. Do you know what the different terms mean? What are potential implications of these principles for One Health?

Example answer:

1. Equity refers to the concept of fairness, justice and impartiality in the distribution of resources, opportunities and benefits within a society or community. It involves ensuring that everyone has an equal chance to succeed, regardless of their background, identity or circumstances. Equity goes beyond mere equality, recognizing that different individuals and groups may require different levels of support or accommodations to achieve truly equal outcomes (Hirschhorn *et al.*, 2021). Equity between disciplines or sectors refers to the fair and just treatment of different fields of study, professions or sectors within an organization, community or society. It involves ensuring that no discipline or sector is favoured or disadvantaged over others, and that resources, opportunities and recognition are distributed fairly and without bias. This is particularly challenging in One Health, because of the unequal resource availability. For example, the global health expenditures in 2020 were estimated at US$9 trillion (approximately 11 % of global GDP) (WHO, 2023), whereas the expenditures for biodiversity loss were about US$95 billion (OECD) and the animal health expenditures a fraction of that (TEEB, 2018; WHO, 2018, 2023). In comparison, while the human biomass is smaller than those of the other sectors, because of an entrenched existing imbalance in how the value of human and animal life is perceived, equity between sectors is hard to achieve. See also Chapter 8 on social determinants, Chapter 9 on **gender** and Chapter 15 on SDGs.

2. Socio-political and multicultural parity refers to achieving fairness, equality and representation in terms of social, political and cultural aspects within a diverse society. It encompasses creating a balance in power, influence and opportunities for individuals and groups from different backgrounds, ensuring that all voices are heard and valued in decision-making processes and societal structures. It includes giving a voice also to

disadvantaged, disempowered and marginalized groups, which requires the establishment of participatory engagement processes, which is linked to transdisciplinarity (Chapter 3).

3. Socio-ecological equilibrium refers to a state of balanced and harmonious interaction between humans, animals and the environment within an ecosystem. This concept recognizes the intricate interdependencies and relationships that exist among these components and emphasizes the importance of maintaining this balance for the wellbeing of all living beings. It values biodiversity, equitable access to resources, and the intrinsic worth of all life forms and emphasizes sustainability, stewardship and a holistic perspective to ensure that interactions within the ecosystem are responsible, inclusive and supportive of long-term wellbeing. There are very wide and often diverging views on which living beings have intrinsic values and what the magnitude is of such value. Consequently, moving towards a common value understanding is a major challenge in One Health. See Chapters 10 and 11 for more information on **systems**.

4. Stewardship highlights the human responsibility to modify their behaviour and adopt sustainable practices that prioritize animal **welfare** and the overall health of the ecosystem. By doing so, this approach aims to ensure the wellbeing of both present and future generations, reflecting a commitment to preserving the environment and its inhabitants for the long term. See Chapter 7 on biodiversity and conservation and Chapter 13 on One Health economics (including **valuation**).

5. Transdisciplinarity (Chapter 3) refers to going beyond the boundaries of individual disciplines to address complex problems and challenges. It involves collaboration and integration of knowledge from multiple people, communities and sources of knowledge to gain a comprehensive understanding of a particular issue. It commonly spans multiple groups in society to have a holistic and synergistic collection of perspectives and knowledge that allows for a deeper exploration of problems that cannot be adequately addressed by a single discipline alone. Because of epistemic differences in knowledge this requires an awareness of and application of **knowledge integration** (see Chapter 4 on knowledge integration).

Ideally, One Health constitutes a local, national and global transdisciplinary and practical effort to elevate the health and long lasting of the environment, animals and humans through the principles above and by looking at ecological and other relationships (Coker *et al.*, 2011; Currier and Steele, 2011; Calistri *et al.*, 2012; Buse *et al.*, 2018; Trinh *et al.*, 2018). It calls on the collaboration of researchers, biologists, academics, veterinarians, ecologists, doctors, anthropologists, physicians, zoologists, demographers, agencies, governments and other professionals to promote health (including the health of nature) and sustainability and mitigate interconnected health risks (Day, 2011; Ruscio *et al.*, 2015; Destoumieux-Garzón *et al.*, 2018; Keune *et al.*, 2022). These collaborations can take place in different settings and multiple ways, e.g. disease control, research, policy, funding, community engagement and environmental health movements (Day, 2011; Kingsley and Taylor, 2017).

Because of the many connections between humans and domestic or wild animals and the similarities of the human and animal medical professions, One Health started with collaborations across the human and animal health sectors mainly around medically influenced topics like zoonoses, foodborne disease issues and antimicrobial resistance (AMR). These topics for many are still considered as the priorities of One Health and are the focus of many studies happening at the human–animal–environment interface. There has, however, been an effort in recent years to broaden the One Health concept to include not only central considerations of animal and human health, but also ecology, climate change, agriculture, biodiversity and other social determinants of health (Lerner and Berg, 2017). It has also expanded to include exploration into chronic non-infectious diseases, ecotoxicology and health in built environments (Destoumieux-Garzón *et al.*, 2018; Mackenzie and Jeggo, 2019). A subset of scholarship in the One Health field has further involved recommendations for holistic health interventions that are grounded in several bodies of knowledge, and do not solely rely on purely allopathic (conventional or Western medicine) assumptions (Kingsley and Taylor, 2017). Increasingly, the One Health approach challenges the 'reductionism of biomedical approaches by locating human and animal health within their wider ecological context' (Harrison *et al.*, 2019). To apply the One Health approach practically, researchers must be aware of the relationship between species, groups and ecosystems, as this will 'result in better science' (Lerner and Berg, 2015). As such, several

scholars have noted an opportunity to work across the fields of One Health, Ecohealth and **Planetary Health**. The One Health approach has opportunities to work with Ecohealth and Planetary Health approaches, which when consolidated create increased collaborations by 'uniting and strengthening human, animal and environmental health, environmental management, natural resource management, and Indigenous local knowledge' (McFarlane *et al.*, 2019). The similarities and differences between these approaches are explored in Section 1.2.2.

Learning questions 3: One Health has been conceptualized visually in a variety of ways, changing as it has shifted and expanded over its lifespan. Have a look at Figures 1.1, 1.2, 1.3 and 1.4 provided below. They were all developed to depict One Health. How well do they convey the meaning of One Health? Do they resonate with you and why / why not?

Example answer: One Health is often pictured as three entities including: (i) human health, (ii) animal health and (iii) ecosystem, environment or plant health overlapping at the intersection (Figs 1.1 and 1.3). The use of the term environmental health can still be seen in many depictions even though it refers to an anthropocentric[3] concept, namely as the branch of public health 'concerned with studying and regulating factors in the environment that affect human health and disease and those with alleviating detrimental effects; often attributive; (also) the general condition of the natural environment' (FAO *et al.*, 2022). More recent illustrations use the term environment. As One Health has evolved, it has grown to take on a much larger focus incorporating all aspects of health, social, economic and ecological wellbeing including climate change issues, challenges with sustainable urbanization, human migration / climate refugees, and infectious diseases (novel and classic) of humans, animals and plants while recognizing the effect socio-economic status has on all of these factors (Day, 2011). The idea of balance in a **socio-ecological system** is depicted in the right-hand side of Fig. 1.3 where human health, animal health and environment health are embedded within the One Health realm, further highlighting the importance of interconnectedness and dependence. The illustration from Chidawanyika *et al.* (2023) puts the plant health separately from environment in the One Health circle with interconnections between animals, humans, plants and environment, thereby emphasizing

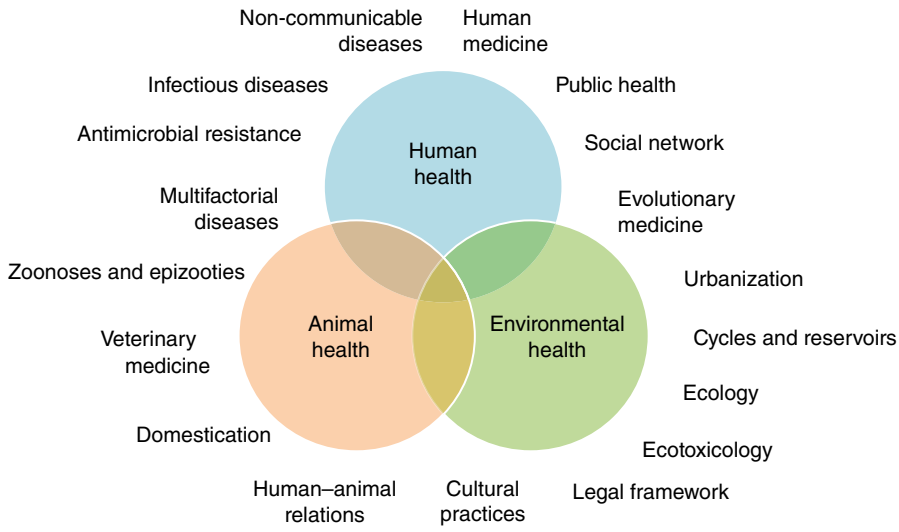


Fig. 1.1. A three-health Venn diagram of synergies and collaboration between animal, human and environmental health in the One Health approach. From Destoumieux-Garzón *et al.* (2018), unmodified (CC BY 4.0 DEED: https://creativecommons.org/licenses/by/4.0/).

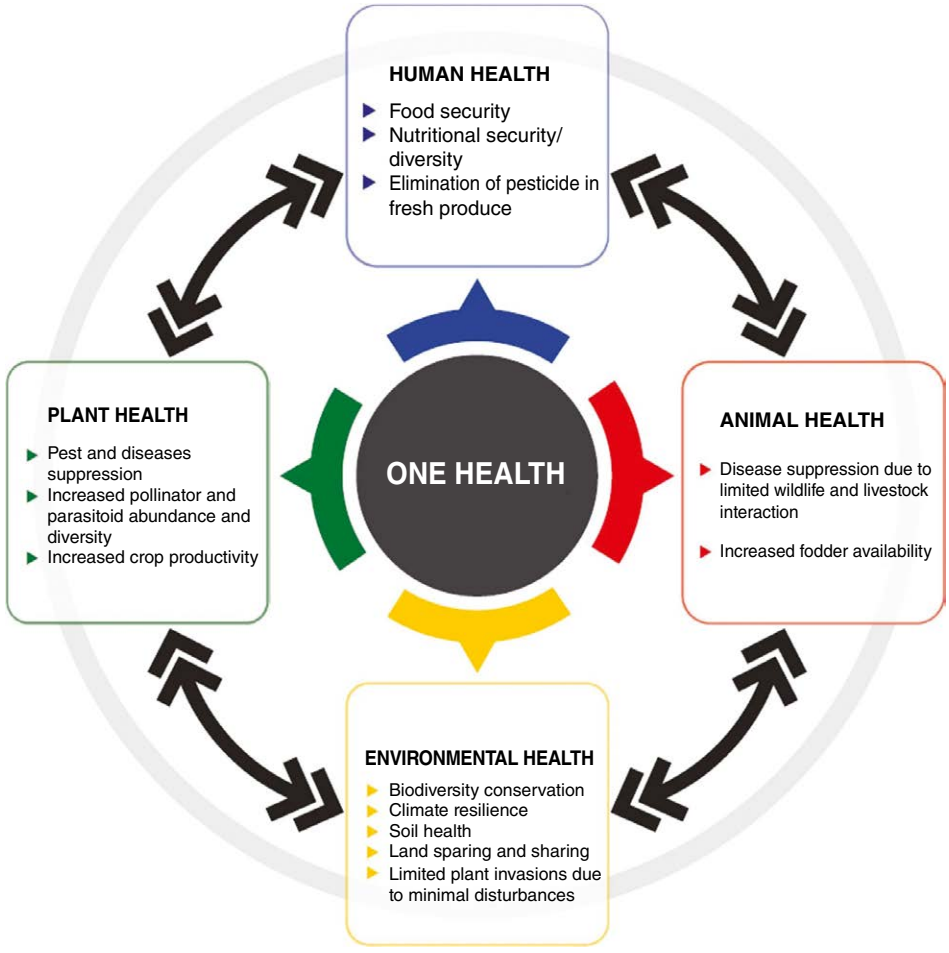


Fig. 1.2. Provisions of the sustainable vegetable integrated pushpull technology (VIPPT) in alignment with the One Health approach. From Chidawanyika *et al.* (2023), unmodified (CC BY 4.0 DEED: https://creativecommons.org/licenses/by/4.0/).

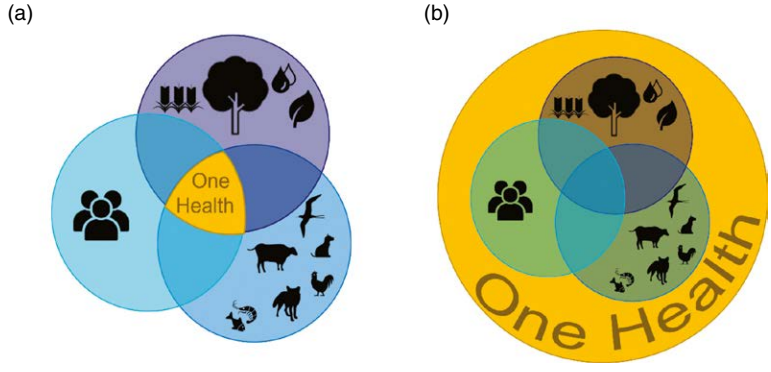


Fig. 1.3. Two streams of One Health that depict (a) a medically oriented stream focusing on the problems at the interfaces, and (b) a socio-ecological balance-oriented stream. From Laing *et al.* (2023), unmodified (CC BY 4.0 DEED: https://creativecommons.org/licenses/by/4.0/).

the importance of the plant health as an equal point within One Health (Fig. 1.2). The OHHLEP illustration in Fig. 1.4 has several of the common elements seen in the other figures, but also embeds working principles of communication, coordination, capacity building and collaboration as well as key principles around inclusivity, equity and access.

An awareness of the environment, animal and human health dimensions of One Health problems is not enough. One Health researchers and practitioners need to be able to recognize 'traps' or 'silos', to identify interconnections and interactions between the dimensions of the problems they work on, and they need specific skills to foster meaningful collaboration and co-production of knowledge between experts, institutions and stakeholders that represent differing paradigms. Global collaborations within the various human- and animal-related health and environmental science fields have led to strengthened relationships between fields, and a more elaborate approach for addressing critical needs (Calistri *et al.*, 2012; Lerner and Berg, 2015). This is particularly important when tackling global challenges that span multiple scales, including sectors (Calistri *et al.*, 2012). As explained by Hueffer *et al.* (2019), One Health's 'proactive, interdisciplinary, constructivist, and collaborative approach promise[s] earlier detection of risks and threats, as well as more effective responses, in part by engaging community level stakeholders in all stages of the process'. Moreover, One Health collaboration can enable the development of common understanding and values, the ability to recognize and deal with trade-offs, and the capacity to develop systems understanding and more sustainable solutions; more information on these topics is provided in Chapters 10–13 where we look at the One Health project life cycle.

Systems approaches are increasingly used to study One Health systems; you will find many examples and references throughout the book. Members of the Network for Evaluation of One Health proposed an integrative systems approach to evaluate One Health initiatives based on four elements that are: '(i) the definition of the initiative and its context; (ii) the description of the theory of change with an assessment of expected and unexpected outcomes; (iii) the process evaluation of operational and supporting infrastructures (the "One Health-ness"); and (iv) an assessment of the association(s) between the process evaluation and the outcomes produced' (Rüegg *et al.*, 2018a, b). Wernli *et al.* (2017) used a systems approach to propose a monitoring and evaluation framework to evaluate progress in the implementation of actions against AMR. Majowicz *et al.* (2018) used causal loop diagrams to map non-traditional stakeholders with whom to

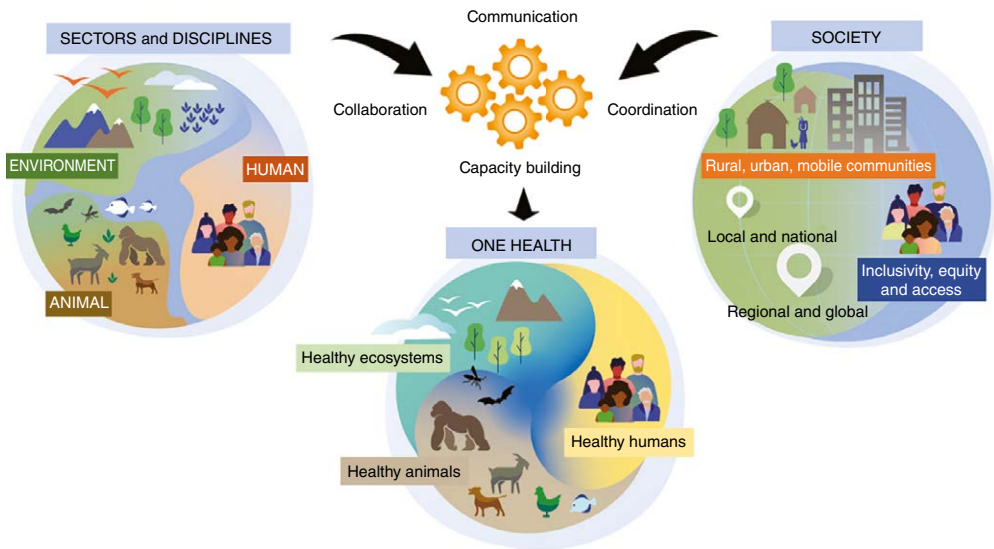


Fig. 1.4. Sectors, disciplines and society coming together in a process of communication, collaboration, coordination and capacity building to achieve healthy ecosystems, humans and animals through One Health. From Adisasmito *et al.* (2022), unmodified (CC0 1.0 DEED: https://creativecommons.org/publicdomain/zero/1.0/).

engage, when mitigating AMR in foodborne pathogens. A systems dynamic approach has been used to understand the relationship between various disciplines in the One Health context (Xie *et al.*, 2017). These examples underline the growing importance of systems thinking for One Health (see Chapter 10 for more information on systems approaches).

Wallace *et al.* (2015) extended the perspective of One Health to include the socio-economic perspective more clearly, in what they termed 'Structural One Health'. They criticized the earlier One Health concept for omitting to address fundamental structural political and economic causes underlying collapsing health ecologies highlighting different characteristics of different health approaches and interventions. Structural One Health involves analysing and addressing social, economic, environmental and political determinants of health that impact both human and animal populations. It recognizes that health outcomes are influenced not only by individual behaviours or biological factors but also by broader societal structures and systems. By addressing structural determinants such as poverty, inequality, environmental degradation and access to healthcare, Structural One Health aims to promote **health equity** and sustainable development while addressing complex health challenges at their roots (Wallace *et al.*, 2015).

1.2.2 Other integrated approaches to health

Although sometimes used as synonyms, the terms One Health, Ecohealth, Planetary Health, **One Welfare** and One Wellbeing represent different concepts linked to the same foundational values. There is some controversy around the similarities and differences of these terms; these aspects are explored in Chapter 2. While for some people these integrated approaches essentially have the same aims and work in a very similar way, others differentiate them based on their historical roots, disciplinary influences, and their **ANTHROPOCENTRIC** (humans at the centre of importance), **ZOOCENTRIC** (special focus on animals and their welfare, including ethics), **BIOCENTRIC** (values all living beings, including animals, and considers their intrinsic worth and rights; recognizes the importance of non-human life forms and ecosystems), or **ECOCENTRIC** (prioritizes the wellbeing of entire ecosystems and the environment as a whole) priorities.

The various integrated approaches to health do not necessarily result in identical definitions of nature and linkages with human health, nor in common framing of challenges and remedies, even if they share rather similar integrative and holistic new notions (Keune and Assmuth, 2018). One example concerns nature-related health effects: one community of experts mainly focuses on nature-related health benefits, and the other mainly on risks that the environment poses to health (Keune and Assmuth, 2018). This may result in different views for practice: either a plea for nature-based solutions as a path to a better future, or treating nature as an extreme danger to human health from which yet unknown threats could emerge and should be avoided. Mutsaers (2015) illustrates the biosecurity framing as 'intervene in the conditions of emergence of the future, before one may be besieged by nature's own act of emergence', out of which, next to development of vaccines, also ethically, culturally and practically harmful interventions may result, like preventative culling of wildlife and domestic animals. In line with One Health concepts such as those from OHHLEP, a balancing of perspectives is needed.

Because different integrated health approaches speak to different communities, which can facilitate successful collaboration and advancement of the field, we are looking here briefly at similarities and differences of One Health, Ecohealth and Planetary Health. For a more detailed description of the historical roots of these approaches, their convergence and divergence and epistemic difference, please refer to Chapter 2.

1.2.2.1 Ecohealth

Ecohealth, or eco (systems) approach to health, is a field based on the premise that human health and wellbeing are dependent on that of the environment (Lebel, 2003). The foundation of Ecohealth is primarily credited to the Canadian International Development Research Centre (IDRC), which supported transformative initiatives in human and ecosystem health with an early recognition that human health is inexorably linked to the environment.

The Ecohealth framework is described as an ecosystem research approach to human health, utilizing an integrated, applied and participatory action methodology (Charron, 2012). It offered a new perspective to managing health in the way ecologists approach problems by relating to natural and environmental resources

and also integrating the many anthropogenic components: social, economic and cultural factors (Feola and Bazzani, 2001). This method of solving problems specifically involves those within the community (action–participatory). Six principles guide Ecohealth research, namely systems thinking, transdisciplinary research, participation, sustainability, gender and social equity, and knowledge to action (Charron, 2012). Ecohealth strives to promote the sustainable health of humans and animals through the acquisition of healthier ecosystems and by breaking down the compartmentalization of various policy agendas that are classically in place with an emphasis on integration (Charron, 2012). A basic tenet of Ecohealth is that human and animal health and wellbeing cannot be sustained in a resource depleted, contaminated and socially unstable planet (Lebel, 2003; Charron, 2012). Ecohealth practitioners, therefore, often engage in bottom-up activities that promote sustainable ecosystem health, foster social stability and promote the sustainable and equitable coexistence of humans, animals and the environment. Ecohealth tends to be informed by a constructivist epistemological position, whereby knowledge is considered to be socially constructed. Ecohealth typically recognizes that research is an exercise in knowledge creation (Charron, 2012; Vansteenkiste, 2014), and that researchers themselves are active participants in the generation of subjective 'truths' (Charron, 2012). In this view, knowledge and what is 'true' is considered flexible, temporal and contextually situated. Ecohealth's leaning towards ***constructivism*** (people actively create their own understanding and knowledge by building on their experiences and interactions with the world around them) is informed by its transdisciplinary nature, and in particular its tendency to draw not only on the natural sciences, but also on the humanities and social sciences with a goal of creating more just and sustainable solutions (Charron, 2012). More on this topic can be found in Chapter 2.

1.2.2.2 Planetary Health

Planetary Health is an emerging field that focuses on the intricate connections between the health of human populations, the health of ecosystems, and the health of the planet as a whole, all through an anthropocentric lens. While Planetary Health also emphasizes the importance of addressing global challenges such as climate change, loss of biodiversity and pollution in a comprehensive and collaborative manner, it highlights and addresses these issues in how they affect human health. This concept was initially mainstreamed in 2015 with a target audience of 'health professionals' and since has grown in popularity and notoriety with common mention in popular scientific publications. It calls for an integrated approach that considers social, political and economic factors, and acknowledges that solutions to these challenges must be found collectively across disciplines, sectors and nations. It is important to highlight the clear difference between the previous two approaches (One Health and Ecohealth) and Planetary Health: the first two wholly recognize and appreciate an intrinsic value in ecosystem and animal health, while Planetary Health places limited value on inherent values of other systems. Although some discussions in Planetary Health relate to animal health, it is only through their contribution to human health and disease, such as transmission of disease to humans and as commodities (Lerner and Berg, 2017). More on Planetary Health can be found in Chapter 2. The Commission on Planetary Health provided the original definition:

> the achievement of the highest attainable standard of health, wellbeing, and equity worldwide through judicious attention to the human systems – political, economic and social – that shape the future of humanity and the Earth's natural systems that define the safe environmental limits within which humanity can flourish. Put simply, planetary health is the health of human civilization and the state of the natural systems on which it depends.
>
> (Whitmee *et al.*, 2015)

1.2.2.3 Complementarity

The One Health approach is in a reciprocal relationship with Ecohealth. More specifically, One Health's economic analysis components and emphasis on animal health can enrich Ecohealth, and Ecohealth's focus on environmental degradation and over-development can be similarly emphasized by the One Health approach (Harrison *et al.*, 2019). While these two are similar, Ecohealth reminds us of the importance of place-based approaches to problem solving where a ground-up strategy is developed through an equity and

sustainability lens. Planetary Health combines both top-down and bottom-up approaches, but has an underlying anthropocentric philosophy, while Ecohealth leans towards ecocentrism and One Health strives for cross-sectorial equity for the purpose of health. All three have experienced a common driver despite arising from different backgrounds and disciplines. One Health originated mainly from a medical perspective, drawn from similarities and common challenges, while Ecohealth was mainly oriented by ecology and conservation actions and Planetary Health driven by the desire to safeguard people and the planet. The creativity to address perceived threats and problems manifested in similar holistic approaches, with a different starting framework but aimed at generating integrated practices and participatory resolutions. They all appeal for paradigm shifts based on the complexity of problems that can only be tackled by multisectoral and collaborative efforts. All concepts and approaches are constantly evolving as their scope of activity and transdisciplinarity also broadens to address the constantly arising health and evolving sustainable issues.

With the environment, systems thinking and participatory aspects more commonly being integrated into One Health, there is an increasing convergence with other integrated approaches to health. None the less, the historical roots continue to influence the character of One Health. The remainder of the book focuses on One Health concepts and **core competencies**. Given the increasing convergence and the need to be equipped to tackle complex or wicked problems through collaboration, transdisciplinarity (for more details, see Chapter 3) and systems thinking, many of the competencies described in the book will also be directly relevant to other integrated approaches.

Learning questions 4: For the One Health problem that you described above in Learning question 1, reflect on the following:

1. What perspective did you use (ecocentric, anthropocentric, zoocentric, biocentric)?

2. What stakeholders (e.g. government officials, implementer, scientists) may be needed to tackle the problem?

3. What perspectives might they bring to the table?

Example answer: Below is an example answer provided from the same region from Learning question 1 in relation to the One Health problem already described previously. Please note that your experience might be different, as it is context-specific and personal.

The chosen perspective was anthropocentric and zoocentric owing to the fact that people and animals are actually in danger of getting sick. The anthropocentric component is probably stronger; an outbreak in humans that is usually seen as 'more important' or 'more visible' than when it occurs in animals. The main drivers of disease reduction are the concern about public health and the associated data that show the negative health impacts on people. Fortunately, activities conducted for reducing vector-borne diseases in humans imply preventive measures in animals, thereby benefiting the animals too. Considerations of costs are a crucial aspect of control. At the moment, all costs of possible preventive measures for animals are from the animal owner's budget. If those costs would be covered from the local government budget, a lot more animals would be likely to receive treatment. Also, if more biological measures were undertaken for vector control that would result in a long run with fewer vectors present. Stakeholders integral to addressing this One Health problem ideally encompass a diverse range of expertise: local government officials, healthcare professionals as well as animal health professionals, environmental scientists, entomologists, green space designers, media and citizens. For example, scientists advocate for an increase in public awareness, presenting the facts about pathogen presence and vector movement, while citizens have an important role in control of disease by reporting every contact with vectors or illness in animals. Collaboratively, these stakeholders navigate the intricate web of factors linking human health, animal wellbeing, environmental integrity and socio-economic considerations, forging comprehensive strategies to mitigate the One Health problem.

1.3 Connections and Synergies Between One Health and Ecohealth – Historical Evolution

Holistic health approaches have been used in practice across various cultures throughout history, e.g. by **Indigenous Peoples** around the world, as stewards of the

diverse landscapes and ecosystems that make up this planet since time immemorial. Rooted in traditional knowledge, Indigenous Peoples have supported diverse ecosystems through reciprocal relationships, well before terms like One Health, Ecohealth and Planetary Health were coined. It was not, however, officially or publicly recognized as an approach until recent history. The anthropocentric point of view, with the main principle of human existence has dominated other cultures which were in harmony with nature, but they had less economic power. We have included a historical timeline in the following pages of this chapter to highlight important points in One Health and Ecohealth evolution.

One early record of the principle of One Health is from the Fourteen Rock Edicts, which were tall pillars or large stones placed near roads throughout India around 300 BC (see Point of Interest; Fig. 1.5). Historically, insights of interconnection and health are found in Western philosophy and the development of allopathic medicine and public health. Yet, over the centuries, these holistic insights have been replaced by atomized notions of the body and specialisms focused on discrete systems. This approach has lost touch with the notion of interrelated health that can be found in the original writings of the Greek physician Hippocrates (460–367 BC). In his work 'On Air, Waters and Places, ('Aere, Aquis et Locis'), he identified and described the interdependence of public health with the environment and how all forms of illness had natural causes (Francis Adams, 1849; Miller, 1962). This innovative work appeared during a time when most people attributed diseases to the wrath of gods and superstitions. After that, Aristotle (384–322 BC) introduced the concept of comparative medicine to studies of various epizootic diseases of humans and other animal species, maintaining an integrity with the ecosystem written in a series of books. Later, this material was translated and published in Zurich (1551–1558) and in 1587 became an encyclopaedic 'An Inventory of Renaissance Zoology' by Swiss physician, naturalist, bibliographer and philologist Conrad Gessner (1516–1565). Gessner was a medical doctor and professor at the Carolinum in Zurich, the precursor of the University of Zurich. Nearly 2000 years later, Giovanni Maria Lancisi (1654–1720), an Italian physician, veterinarian and a pioneer epidemiologist, initiated epidemiological strategies to control and prevent diseases such as quarantines, drainage of swamps and vector protection through management for prevention of rinderpest and human malaria. In 1712, Claude Bourgelat, the founder of the first veterinary school of medicine in Lyon, France, established in Europe the interaction between

Fig. 1.5. Point of Interest: the Rock Edicts of Ashoka. The Fourteen Rock Edicts are large stones or tall pillars with regulations placed near roads from the reign of King Ashoka (ca 304–232 BC) in India. They provided messages as reminders to the people of how they should adhere to certain principles: '...everywhere has Beloved-of-the-Gods, King Piyadasi, made provision for two types of medical treatment – medical treatment for humans and medical treatment for animals. Wherever medical herbs suitable for humans or animals are not available, I have had them imported and grown. Wherever medical roots or fruits, I have had them imported and grown. Along roads I have had wells dug and trees planted for the benefit of humans and animals' (Dhammika, 1993). From Ankur Panchbudhe (on flickr.com), unmodified (CC BY 2.0 DEED, https://creativecommons.org/licenses/by/2.0/).

animal and human health and subsequently known as public health. In the 19th century, the pathologist Rudolf Virchow, MD (1855) studied *Trichinella spiralis* in swine and recognized the similarities with the disease in people; he coined the term zoonosis and later William Osler, MD (1870) declared his interests in connections between human and veterinary medicine.

In 1947, James H. Steele founded the Veterinary Public Health Division at the Centre for Disease Control. He recognized the connection between health in animals and public health. The Veterinary Public Health Division was particularly important during that time as public health was dealing with zoonotic diseases such as rabies, brucellosis, salmonellosis, Q fever, bovine tuberculosis and leptospirosis. This was the entry door for veterinary medicine into public health.

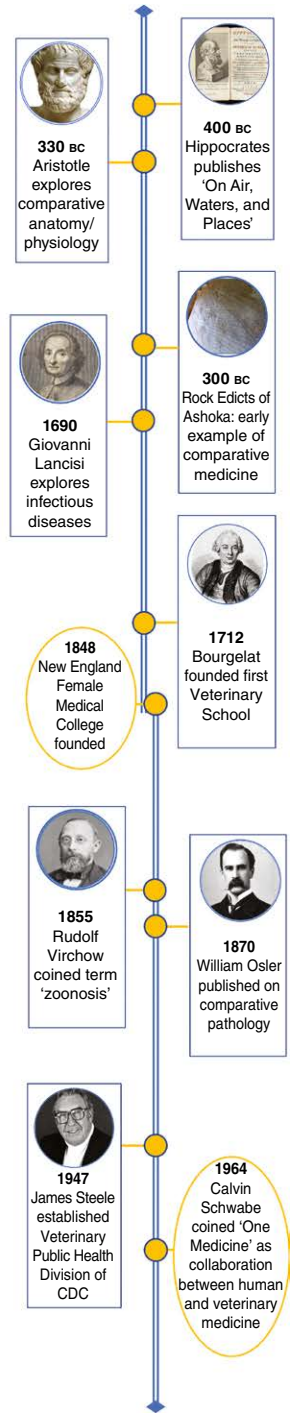
In the 1960s, Calvin Schwabe, a Doctor of Veterinary Medicine, founded the Department of Epidemiology and Preventive Medicine in the Veterinary School at UC Davis (1966), the first department like this ever in a veterinary school. In 1964, he promoted the collaboration of medical and veterinary workers against zoonotic diseases and used the term 'One Medicine' for the first time, emphasizing a need for collaboration between human and veterinary medicine (Schwabe, 1964).

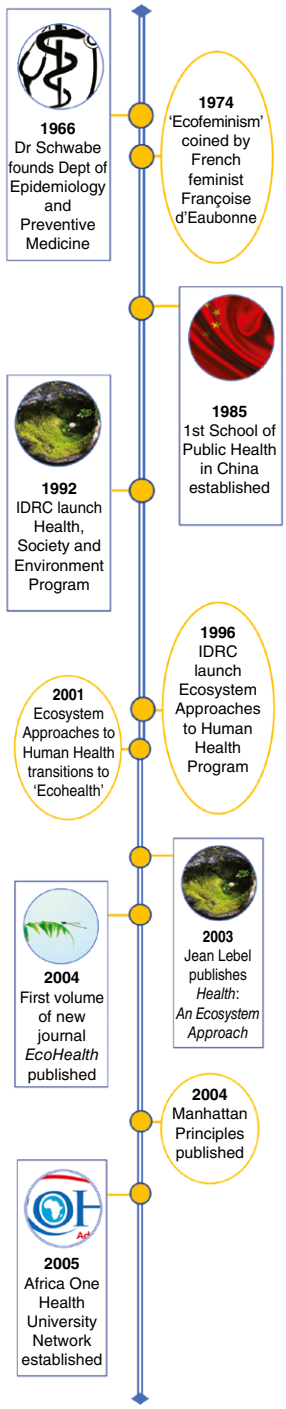
Ecofeminism developed as a branch of feminism and political ecology. From the concept of gender, the relationships between humans and the natural world were analysed. The term was coined in 1974 by the French writer Françoise d'Eaubonne in her book *Le Féminisme ou la Mort*. Ecofeminism presents a feminist perspective of Green politics calling for an egalitarian, collaborative society in which there is not one dominant group.

In 1992, the International Development Research Centre (IDRC) launched its Health, Society and Environment Program, which explored how environmental factors influence health and brought together specialists from different fields. The IDRC of Canada was very influential in the Ecohealth world at that time.

In 1996, the IDRC created the Ecosystem Approaches to Human Health Program that was eventually shortened and is now known as Ecohealth (2001) and supported Jean Lebel in publishing the first textbook on ecosystem approaches to health in 2003. In the same year, it hosted the International Forum on Ecosystem Approaches to Human Health in Montreal, Canada.

In 2004, the *EcoHealth* journal was launched. Also in 2004, the influential 12 'Manhattan Principles of One Health' were published by the Wildlife Conservation





Society. At a symposium entitled Building Interdisciplinary Bridges to Health in a 'Globalized World', several human and animal health experts came together and discussed human, domestic animal and wildlife diseases. As a result, 12 priorities were set on how to fight the threats to human and animal health, and they were named the 'Manhattan Principles'. This point in history is most frequently considered as a moment when the basis of the 'One Health, One World' concept was formed. The Manhattan Principles also formed the basis for the later Berlin Principles on One Health, bridging global health and conservation (Gruetzmacher *et al.*, 2021). The Berlin Principles were created in 2019 because much had changed on the planet during the previous 15 years.

The International Association for Ecology and Health (IAEH) was formed in 2006 and hosted a series of biennial conferences, such as in the USA in 2006, Mexico in 2008, the UK in 2010, China in 2012, Canada in 2014, Australia in 2016, Colombia in 2018 and South Africa in 2022.

In 2006, limited, non-sustained, person-to-person-to-person (3rd generation) spread of highly pathogenic avian influenza AI(H5N1) virus occurred. Some researchers think that this was the moment when a large part of the scientific community started to embrace One Health. In 2007, the International Ministerial Conference on Avian and Pandemic Influenza was held in New Delhi, India. A total of 111 countries participated and were encouraged to embrace One Health by way of establishing connections between human and veterinary health systems for pandemic preparedness in order to keep the public safe. In the same year the American Medical Association and the American Veterinary Medical Association called for collaboration between the human and veterinary medical communities.

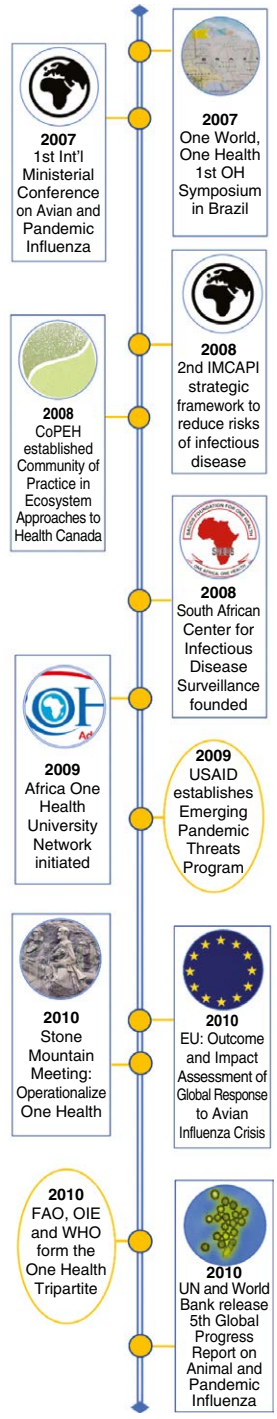
The year 2007 brought with it the official introduction of One Health to Brazil, where the first One Health Symposium was held. The 'One World, One Health' conference was held with the Wildlife Conservation Society (WCS) and EcoHealth Alliance. The main focus points revolved around the downstream effect of environmental destruction on human health through wildlife's ability to act as reservoirs and sentinels of disease.

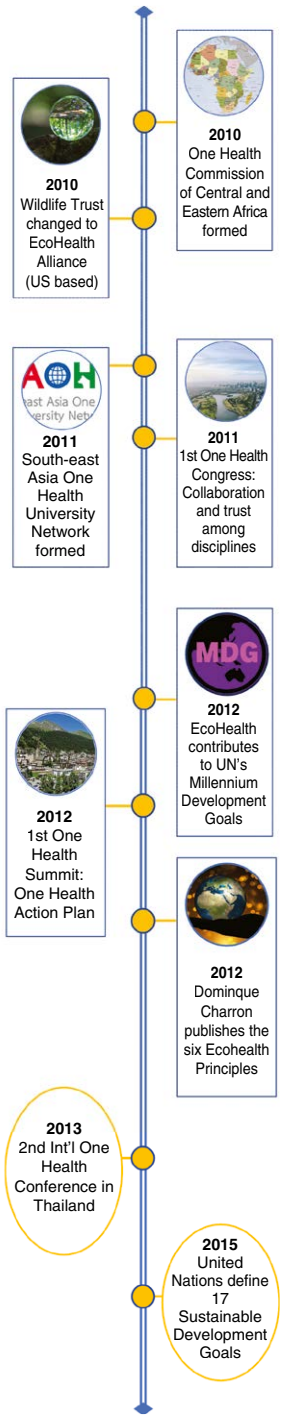
The 2008 International Ministerial Conference on Avian and Pandemic Influenza in Sharm el-Sheikh, Egypt hosted 120 countries that endorsed a new strategy for fighting avian influenza and other infectious

diseases in areas where animals, humans and ecosystems meet. The strategy was named Contributing to One World, One Health™: A Strategic Framework for Reducing Risks of Infectious Diseases at the Animal–Human–Ecosystems Interface. In 2008, the Canadian Community of Practice in Ecosystem Approaches to Health (CoPEH Canada) was created, including the formation of workshops and an Ecohealth field school. The IDRC later supported the development of an Ecohealth field-building Leadership Initiative in South-east Asia designed to strengthen the field through training, evidence-building and linking researchers. The Southern African Center for Infectious Disease Surveillance (SACIDS) was founded in January 2008 as a regional disease surveillance hub. It was then transformed in 2018 by the Council of Sokoine University of Agriculture (SUA) into the SACIDS Foundation for One Health, operating as a university research and training institute with the South African National Institute for Communicable Diseases and other member institutions across Africa (SACIDS: http://www.sacids.org/).

In 2009, the United States Agency for International Development (USAID) launched the Emerging Pandemic Threats Program for preventing the emergence of diseases of animal origin which could threaten human health. The Emerging Pandemic Threats Program aimed to improve US public health by addressing inadequacies through building national and local One Health capacities for early disease detection, laboratory-based disease diagnosis, rapid disease response and containment, and risk reduction.

In 2010, the 'Outcome and Impact Assessment of the Global Response to the Avian Influenza Crisis' was published by the Publications Office of the European Union (EU): 'The European Union has already taken new initiatives under the One Health umbrella and will continue to do so in the coming years', meaning that the One Health concept was to be applied into practical policies and strategies. In the same year, the United Nations and the World Bank released the 'Fifth Global Progress Report on Animal and Pandemic Influenza', where adopting the One Health approach was highlighted to keep developing pandemic preparedness and building on One Health response to emerging diseases and threats. Also in 2010, there was a meeting between the Center for Disease Control (CDC), World Organisation for Animal Health (OIE, now designated as WOAH), the Food and Agriculture Organization of the United Nations (FAO) and the World Health





Organization (WHO) called the 'Stone Mountain Meeting', where seven key activities to advance the One Health concept were identified in a document named 'Operationalizing "One Health": A Policy Perspective – Taking Stock and Shaping an Implementation Roadmap'. Finally, in 2010, a Tripartite Concept Note was published by OIE, FAO and WHO together, proposing international collaboration, sharing responsibilities and coordinating global activities to address health risks. In 2010, the International Ministerial Conference on Avian and Pandemic Influenza in Hanoi, Vietnam was held where 71 countries participated in adopting the Hanoi Declaration. The Hanoi Declaration recommended the broad implementation of One Health.

The Africa One Health University Network (AFROHUN) came from the Leadership Initiative of Public Health in East Africa (LIPHEA) and the Health Alliance, both spearheaded by Makere University School of Public Health (MakSPH) in Uganda, in collaboration with Muhimbili University of Health and Allied Sciences (MUHAS) School of Public Health in Tanzania, established in 2005 with support from USAID. The formation of One Health of Central and East Africa (OHCEA) was inaugurated in October of 2010 from LIPHEA and many schools of public health and faculties of veterinary medicine in Democratic Republic of Congo, Ethiopia, Kenya, Rwanda, Tanzania and Uganda. The focus was initially on disaster preparedness and response. Ultimately, the One Health Workforce was strengthened in Africa under the umbrella of USAID. The initial geographic focus was East and Central Africa; however, the network continues to expand, embracing West African universities in Senegal and beyond (AFROHUN: https://afrohun.org/).

Also in 2010, the organization Wildlife Trust changed its name to EcoHealth Alliance. In the following year, 2011, the South-east Asia One Health University Network (SEAOHUN) was established, working to expand the One Health workforce capacity across 92 universities in eight South-east Asian countries (usaid.gov). The first international One Health congress in Melbourne, Australia was held in 2011 with 650 attendees from 60 countries promoting the One Health approach. At this congress it was agreed that, in addition to human, animal and environmental health, for the One Health approach it is important to include disciplines such as economics, social behaviour and food safety.

The year 2012 marked the first One Health Summit in Davos, Switzerland where the One Health concept was presented through the Davos One Health Action Plan, considering ways to improve public health through multisectoral and multi-stakeholder cooperation. In the same year, Dominique Charron published the six overarching guiding principles for Ecohealth. Later that year, the Kunming Position Statement was released, identifying Ecohealth's contributions to the Millennium Development Goals.

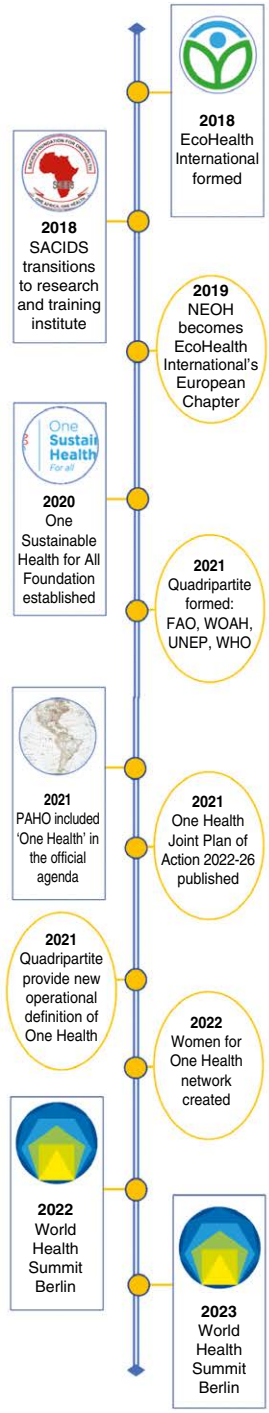
In 2013, the second One Health Congress was held with 1000 attendees from 70 countries, probably being the biggest One Health congress of all.

In September 2015, at the UN Sustainable Development Summit, the 2030 Agenda for Sustainable Development, with 17 Sustainable Development Goals (SDGs) at its core, was adopted. These 17 SDGs were the starting point for many 'equities'. The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future (https://sdgs.un.org/2030agenda).

As the first centre for One Health in China, the One Health Center of Excellence for Research and Training at Sun Yat-Sen University held international symposia in 2014 and 2019. These meetings laid the foundation for implementing the One Health concept and strategy in China. The Sino-Italian Food Safety Dialogue, held in Beijing in 2016, brought the One Health concept to bear on food safety issues. In February 2017, the Liaocheng City of Shandong Province held the academic conference 'One World, One Health', where experts expressed their positive response to promoting the One Health concept to address the challenges of infectious disease (Li *et al.*, 2022).

In 2016, a joint International One Health Congress and Biennial Conference of the International Association for Ecology and Health took place in Australia.

In 2018, the International Association for Ecology and Health transformed into Ecohealth International, then the following year, in 2019, the Network for Ecohealth and One Health (NEOH) became EcoHealth International's European Chapter. Within NEOH, several working groups started to grow, namely: Promoting Transdisciplinarity in Health Sciences, Communication and Collaboration, Learning Organization, Theoretical Dimension of One Health and Ecohealth, and Education in One Health and Ecohealth.



The One Sustainable Health forum was launched in July 2021 in Lyon, bringing together European and global professional and civil society organizations working on a holistic approach to health, taking into account human, animal and environmental health. The One Sustainable Health for All Foundation was created on 1 September 2020 in Lyon, France, as a response to the COVID-19 pandemic, with the objective to increase dialogue and innovative projects between public and private partners in favour of a holistic approach to health. It brings several new dimensions: (i) sustainability; (ii) for all (diversity / inclusiveness / gender); and (iii) by all (in a participatory way and without speaking in the name of others, deciding for others).

In 2021, the Quadripartite for One Health (FAO, UNEP, WHO, WOAH) promote the newly formed operational definition of One Health from their advisory panel, the One Health High-Level Expert Panel (OHHLEP). This is followed in 2022 by the publication of the Quadripartite's One Health Joint Plan of Action.

In 2022, a network, Women for One Health, was founded. The network represents parity across gender and other historically marginalized groups, to create a more equitable and inclusive scientific and One Health community. The Women for One Health network is promoting the importance of diversity and equity.

In 2022 and 2023, the World Health Summit (WHS) was held in Berlin bringing together leaders, health professionals, ministries and stakeholders for important public policy discussions and governance decisions for the future of One Health, Ecohealth and Planetary Health. A pre-workshop, 'Breaking Barriers: Advancing the One Health Agenda with a Focus on Environment', preceded the 2023 WHS organized by the German Federal Ministry for Economic Cooperation and Development (BMZ), the German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV), the Quadripartite Collaboration on One Health, the Wildlife Conservation Society (WCS), the Sector Initiative One Health of the German Society for International Cooperation (GIZ), and the International Alliance against Health Risks in Wildlife Trade. It brought together decision makers, scientists and implementers taking action related to the environmental pillar of the One Health approach to push the agenda towards action and important collaborative decisions for the future of One Health, Ecohealth and Planetary Health (https://oneworldonehealth.wcs.org/EVENTS/Breaking-Barriers.aspx).

There is still one part of One Health that is being underrepresented, namely plant health. The first and possibly most obvious link between human/animal health and plant health is the use of plants as food. Unhealthy plants as crops or vegetables directly influence dietary needs of humans and animals and can lead to food insecurity and different diseases as a consequence of malnutrition. Apart from serving as food, plants also serve as habitats and contribute to biodiversity, nutrient cycles and ecosystem services. Plants contribute to environmental sustainability by stabilizing soils, preventing erosion, sequestering carbon dioxide and improving air quality. For example, forests as 'lungs of the planet', once unhealthy or taken down, will not be able to clear the air adequately. Plants provide medicinal compounds and dietary nutrients, and contribute to traditional medicine practices. Overall, the wider recognition of plant health as an integral component of One Health is growing, but still modest; further attention needs to be attributed to plant health to realize fully the interconnectedness and holistic nature of the One Health approach.

Learning questions 5: Try to identify One Health / Ecohealth activities that were celebrated in your country or region, such as One Health Day, One Health/Ecohealth Conferences, Associations, or similar.
Example answer: If you were not able to think of something, or you do not know where to find information, you may want to look at websites from government, universities and non-government organizations. Or you might look at the One Health commission website (https://www.onehealthcommission.org) where many One Health activities are listed; it also includes a map of who is who in One Health. On this website, you can also search the events by country or by region.

1.4 Conclusions

1. Integrated health approaches have ancient origins in various cultures, but the naming of this formal recognition of interconnectedness between the health of people, animals and the environment is a relatively recent development. From early historical records to modern initiatives such as One Health and Ecohealth, the journey of recognizing and addressing the interdependence

of living beings and ecosystems has led to collaborative efforts and interdisciplinary approaches to tackle shared health challenges.

2. The One Health approach recognizes the interconnectedness of human, animal, plant and environment health. It emphasizes collaborative, holistic solutions to complex health challenges that transcend traditional boundaries, involving diverse disciplines and sectors to promote healthier populations, ecosystems and global sustainability. The evolution described in this chapter shows that it is highly adaptable to new global challenges and applicable across settings and complex issues.

3. The term originated in the mid-1900s and has gained substantial momentum during the past decade, rising to widespread international recognition as an approach for addressing complex global health challenges with specific expertise in the study of zoonotic diseases, many of which are driving the emergence of global pandemics. It aims to balance and optimize sustainably the health of people, animals and ecosystems through interdisciplinary collaboration, societal engagement and principles such as equity, stewardship and transdisciplinarity. One Health is evolving to include broader considerations such as climate change, sustainability and social justice.

4. One Health, Ecohealth and Planetary Health are integrated approaches to health that share a foundation but have different emphases. While they all promote holistic and transdisciplinary thinking to address health challenges, they differ in their perspectives on anthropocentrism, zoocentrism, biocentrism and ecocentrism. They are similar in that they highlight the interconnectedness of human, animal and environmental health, and emphasize collaboration across disciplines and sectors to find sustainable solutions to complex global challenges.

Notes

[1] 'The natural world or physical surroundings in general, either as a whole or within a particular geographical area' FAO *et al*., 2022).

[2] 'Human animals' is a term used to emphasize the biological and physiological aspects of human beings within the context of the broader animal kingdom. It highlights the fact that humans are a species of animals, sharing many biological characteristics and evolutionary history with other animals while also possessing unique cognitive, cultural and technological attributes. By using the terms 'human and non-human animals', the anthropocentric status of humans is questioned and a sense of humility and connection with the rest of the natural world promoted, recognizing that our existence and behaviours are deeply rooted in nature.

[3] In an anthropocentric viewpoint, human needs, desires and interests are often prioritized over the wellbeing and rights of other species or the natural world. This approach can lead to human-centred decision making, where the impact on humans is the central concern, sometimes at the expense of environmental sustainability or the rights of animals.

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