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# Legal Policy & Pandemics

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06 87646960
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# Table of Contents

*Legal Policy & Pandemics*
*The Journal of the Global Pandemic Network – LPPJ*
*2024, Vol. 3–4 pp. 5-6*
*ISSN 2785-2628*
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# Editorial

Volumes n. 3 (2023) and n. 4 (2024) of the Legal Policy & Pandemic Journal collect the research conducted by the members of the Global Pandemic Network (GPN) on One Health (OH) that was presented at a conference held in Rome (at Sapienza University and Museo Nazionale Romano – Palazzo Altemps), at the University of Macerata, and the University of Urbino Carlo Bo from May 10 to 15, 2024. These presentations were organized by the Institute for Global Health Emergencies Response (IGHER) of the European Public Law Organization (EPLO), UN-Habitat, the Human Rights Consortium of the University of London and the International Institute of Administrative Sciences (IIAS).

Developments at the international level by 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) (together named as the "Quadripartite organizations"), have led to the conceptualization of the "One Health strategy". This strategy has been defined by the One Health High Level Expert Panel (OHHLEP) as, "an integrated, unifying approach that aims to sustainably balance and optimize the health of people, animals and ecosystems". This approach is based on the recognition that the health of humans, domestic and wild animals, plants, and the wider environment (including ecosystems) are closely linked and interdependent [see the article of Coli].

## With the Covid-19 pandemic, the OH strategy is back in the spotlight

As a zoonosis, Covid-19 has shown that human health (as well as Human Rights) does not live in a vacuum and is not isolated, but is instead closely interconnected with the health of ecosystems and animals. Environmental degradation, climate change and biodiversity loss have devastating impacts on human health. These increase the risk of new pandemics, undermine all related human rights (such as the right to life, health, dignity and freedom), exacerbate inequalities and threaten the rule of law.

The acknowledgement that the severe ecological crisis we are experiencing acts as a vehicle for public health crises (specifically, pandemics) now places the One Health strategy at the centre of preventive health strategies.

## A key step is to move from strategy definition to implementation

This point is addressed by the proposed WHO pandemic treaty [Prieur], and recently flowed into the landmark decision taken by the 78th World Health Assembly that culminated in the formal adoption of the world's first Pandemic Agreement.

In this context, it is essential to understand the meaning and scope of the strategy and to define the tools for its implementation. The contributions in this volume converge in this direction: the One Health strategy now must be known and implemented through the integration of human, animal and environmental health safeguards for global sustainability.

The approach is complex: it "mobilizes multiple sectors, disciplines and communities at varying levels of society to work together to foster well-being 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" [WHO].

One Health represents a fundamental paradigm shift that must be understood and widespread throughout society in order to be made effective. It not only needs to be understood by people, but also to be formally included in the social and legal system, through appropriate (legal) tools.

The research exposed in vol. 3 and 4 of the Journal confirms the difficulty of introducing the strategy into the legal systems of different countries, and affirms the need to develop legal strategies to institutionalize One Health.

To this end, studies have shown the need for a real paradigm shift and the establishment of a robust legal framework [Bullon, Coli], as One Health is an essential element of resilience [Sulistiawati].

Institutions at all levels (international, regional, national, and local [Vito]) are called upon to act, although this causes problems of multilevel coordination [Dominici, Pecchioli, Di Giovanni]. Different types of regulation come to the fore, including the use of guiding principles and framework laws, and institutional mechanisms for administrative and scientific coordination [Bullon, Coli] that take into account the cross-cutting nature of the strategy. This affects many sectors, from industrialization and urban planning [Saygilar] to agricultural policies, biodiversity protection, and the protection of local communities [Gómez Jiménez] and their traditions and knowledge [see, for example, Barbieri *et al.*, who cites the case of the Mediterranean diet].

The One Health approach is also key to address current unmet public health issues. It examines, from a regulatory and organizational perspective, both the need to strengthen the network of services in the territory in line with a comprehensive public health care strategy, and the scope for public intervention to improve citizens' access to medicines and pharmaceutical innovation (also thanks to the increase of modern practices such as telemedicine) [Celati].

An interdisciplinary approach and collaboration are essential to enhance disease surveillance, reduce pollution, and promote sustainable practices [Shankar, Pandey].

To this end, it is necessary to gather credible data, implement programs, and promote evidence-based policy and practice. Technical agencies are needed, but this is not enough. Overcoming the challenge of coordination is essential, and can be achieved through interagency multidisciplinary groups such as the African Union's "One Health Coordinating Group on Zoonotic Diseases", which is tasked with strengthening coordinated surveillance, prevention, and control of zoonotic diseases on the continent [Kasimbazi].

The development of intersectoral regulations and commitment and participation in global forums and educational initiatives also go in this direction [Sulistiawati].

This requires strong political commitment, financial investments, and institutionalized national One Health programs to raise awareness. Thus, the role of communication is crucial [Kezaabu].

The paradigm shift is not easy and, in this perspective, the role of judges is essential. This transition can be observed both in the case law on climate change and in the case law in some countries that advocate for a transformative shift from an anthropocentric to an eco-centric worldview, in order to realize the full benefits of the One Health Approach [Shankar, Pandey].

The editors wish to thank Sapienza University of Rome, the European Public law Organization (EPLO), the University of Macerata, and the University of Urbino Carlo Bo for hosting the Conference where the results of the research published in these volumes were presented. The Conference was funded by the GPN and GLOVESS Projects of the University of Macerata, the Master's Programme in *"Scienze amministrative e innovazione nella pubblica amministrazione"* of the Universities of Macerata and Urbino Carlo Bo, the Law Department of the University of Urbino Carlo Bo, the European Public Law Organization (EPLO) Rome Office and the Associazione Nazionale fra le imprese assicuratrici (Ania).

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SECTION I
ESSAYS

# Regulatory Approaches to One Health: Integrating Human, Animal, Plant, and Ecosystems Health

*Carmen Bullon and Francesca Coli*

**Abstract.** Intergovernmental organizations have played a pivotal role in adopting and advancing the One Health approach, integrating it into their individual and collective work programs and strategies, with the Quadripartite assuming a pominent role in fostering One Health governance at the global level. However, although policies and legislation are identified as the primary pathways for One Health implementation in the One Health Joint Plan of Action (OHJPA), the operationalisation of One Health through legislation remains underexplored. This paper examines the evolution of One Health at the global level and the importance of understanding the approach from a regulatory perspective to support its effective implementation. After a brief introduction, Section II traces the historical evolution of One Health, from a sanitary focus to the integration of environmental concerns. Section III examines the role of international organizations in promoting and operationalizing the approach. Section IV highlights the importance of legislation in institutionalizing One Health and discusses different regulatory strategies: recognizing it as a general legal principle, embedding it into sector-specific legislation, or enacting a comprehensive framework law. Section V provides examples of how One Health has been integrated into national and international legal frameworks, particularly in relation to avian influenza and biodiversity conservation, as well as within the European Union's legal system. The conclusion argues that no single legal model can universally implement One Health; rather, the choice of strategy must align with each country's or forum's specific policy priorities.

***Keywords:*** One Health, Quadripartite, Global governance, legislation, implementation, regulatory frameworks.

## 1. Introduction

One Health is an integrated, unifying approach that aims to sustainably balance and optimize the health of people, animals, and ecosystems. It recognizes the health of humans, domestic and wild animals, plants, and the wider environment (including ecosystems) are closely linked and interdependent. The approach mobilizes multiple sectors, disciplines, and communities at varying levels of society to work together to foster well-being and tackle threats to health and ecosystems, while addressing the collective need for healthy food, water, energy, and air, taking action on climate change and contributing to sustainable development[1]. This definition was coined by OHHLEP, a technical panel of experts advising the Quadripartite composed by the Food and Agriculture Organization of the United Nations (FAO), the United Nations Environment Programme (UNEP) the World Health Organization (WHO) and the World Organization for Animal Health (WOAH).

While One Health has been extensively investigated from technical, governance and sociological perspectives, it has not yet received the same attention from the legal perspective. As a result, regulatory solutions for One Health governance and legislation remain inconsistent and scarce, and the approach has yet to fully benefit from extensive legal analysis.

In May 2024, the Global Pandemic Network (GPN) organized its Fifth Global Conference on the theme "One Health: International, Regional and National experiences". A significant number of participants focused their presentations on legal matters, informing and

[1] One Health High-Level Expert Panel (OHHLEP), Wiku B. Adisasmito, Salma Almuhairi, Casey Barton Behravesh, Pépé Bilivogui, Salome A Bukachi *et al.*, 'One Health: A New Definition for a Sustainable and Healthy Future' (2022) 18(6) *PLoS Pathogens* e1010537 <https://doi.org/10.1371/journal.ppat.1010537>.

being used as the basis for many of the discussions, making the Conference a landmark event in the progress in the legal understanding of One Health.

This paper builds on the presentation made by the authors at the Conference entitled "Introduction to the One Health Strategy". Following this introduction, Section 2 of this contribution provides an overview of the history and evolution of the One Health approach, from a primarily sanitary basis to the broader aspect of integration of environmental concerns. Section 3 discusses the role of international organizations in advancing and implementing the approach, while Section 4 focuses on the relevance of legislation in institutionalizing One Health and exploring different regulatory options in this regard. The latter includes recognizing One Health as a general legal guiding principle and incorporating a One Health approach into sector-specific legislation including options for drafting One Health framework laws. Section 5 provides examples of how One Health has been integrated into national and international legal frameworks (in areas such as avian influenza, biodiversity conservation and pollution control), as well as providing an outline of how One Health has been embedded into the European Union's legal system. Section 6 presents the conclusions.

## 2. Evolution of the concept of One Health in the context of sustainable development

Although the concept of One Health is relatively recent, the importance of addressing the health of all living species from a multisectoral perspective has deep historical roots.

This idea of One Health dates back to ancient Greece, where Hippocrates[2] (460-370 BC) proposed that unusual environmental and climatic conditions could influence health and the prevalence of infectious diseases. Similarly, ancient Rome recognized the interconnection between human and animal health with the Latin expression, Hygia pecoris, salus populi (the health of the flock is the salvation of the people) reflecting an early understanding of this interconnection[3]. Throughout history, scholars have explored the links between human health and the environment, including Claude Bourgelat (1712-1779) the founder of the first veterinary medicine schools, and Rudolf Virchow (1821-1902), who coined the term zoonosis and emphasized the importance of considering social, economic and political factors in public health for decision-making[4]. Calvin Schwabe (1927-2006) further advanced these ideas in the 1970s with the concept of "One Medicine"[5], highlighting the need to address disease, food security, environmental quality, and societal well-being together.

Building on these foundations, the concept of veterinary public health emerged, adopted by organizations such as FAO, WHO and WOAH (at the time OIE)[6]. In 1999, FAO, WHO, and WOAH defined Veterinary Public Health as "the sum of all contributions to the physical, mental, and social well-being of humans through the understanding and application of veterinary sciences".

As the links between human and animal health strengthened, the integration of public health and environmental concerns gained prominence as well. Rachel Carson's (1907-1964) influential book "Silent Spring" (1962) underscored the interconnectedness of humans, wildlife, and ecosystems, warning of the dangers posed by certain chemicals[7]. The 1972 Stockholm Declaration[8], a precursor to

[2] Hippocrates, *Dell'aere, dell'acqua e de' luoghi*, IV century. b.c.

[3] Prieto J., Lubroth J. and Bullon C., *El enfoque "Una sola salud" como contribución histórica de la medicina veterinaria a una sola salud en la Unión Europea y España*, XLVI International Congress of Veterinary History, Leon, 2024.

[4] *Ibidem*.

[5] This expression, with a profoundly clinical and epidemiological connotation, referred to the unity of the paradigms of medicine and veterinary science, one essential to the development of the other, both fundamental to the well-being and health of living beings. See Schwabe C., *Veterinary Medicine and Human Health*, Williams and Wilkins, Baltimore/London, 1984. "One Medicine" is also at the basis of the work of Jackob Zinsstag, who is often mentioned at the origins of One Health. See Zinsstag J., Schelling E., Waltner-Toews D. and Tanner M. (2011), *From "one medicine" to "one health" and systemic approaches to health and well-being*, *Preventive Veterinary Medicine*, 101, 148-156, Elsevier, doi: <https://doi.org/10.1016/j.prevetmed.2010.07.003>.

[6] FAO Veterinary Public Health e-bulletin. <https://www.fao.org/ag/aga/e-bulletin/e-bulletins-home/preview/en/c/139/>.

[7] Carlson R., *Silent Spring*, Houghton Mifflin, 1962.

[8] The 1972 United Nations Conference on the Human Environment in Stockholm was the first world conference to make the environment a major issue. The Stockholm Declaration, which contained

environmental law, and the 1992 Rio Declaration on Environment and Development[9], highlighted the importance of preserving human health and natural resources. The Convention on Biological Diversity (CBD) emphasized the connection between health and biodiversity, underscoring the value of a holistic approach to health and environmental threats[10]. Moreover, conservation agreements like the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)[11], the Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA)[12], and the Ramsar Convention on Wetlands[13] have integrated principles of health and environmental protection, further aligning with the concept of One Health.

Lastly, the framework of the Global Agenda for Development, the 2030 Agenda and the Sustainable Development Goals incorporate a series of interconnected and multisectoral objectives that include both human health (SDG 3) and environmental health (SDGs 13, 14 and 15) and propose an integrated approach arguably aligned with the One Health approach[14].

Although the underlying rationale of One Health has long been part of the medical and the veterinarian landscape, it was in the early years of the XXI century that the term "One Health" was coined. This first reference is attributed to then head of the field veterinary program of the Wildlife Conservation Society (WCS) William Karesh[15] and has the added value of expressly taking into account the environment as a necessary element of a holistic understanding of health. Organized by the World Conservation Society, the 2004 "One World, One Health" Symposium elaborated this concept and proposed the Manhattan Principles[16]. These 12 principles include recommendations that called for integrated approaches to managing human and animal diseases, including those affecting wildlife, and highlighted the risks of ecosystem disruption[17].

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26 principles, placed environmental issues at the forefront of international concerns and marked the beginning of a dialogue between developed and developing countries on the links between economic growth, pollution of the air, water and oceans, and the well-being of people around the world. It is available here <https://documents.un.org/doc/undoc/gen/nl7/300/05/pdf/nl730005.pdf>.

[9] The United Nations Conference on Environment and Development (UNCED), also known as the 'Earth Summit', was held in Rio de Janeiro, Brazil, from 3-14 June 1992. The Rio Declaration and its 27 universal principles is available here <https://documents.un.org/doc/undoc/gen/n92/836/55/pdf/n9283655.pdf>.

[10] The Convention on Biological Diversity was signed by 150 government leaders at the 1992 Rio Earth Summit. It recognizes that biological diversity is about more than plants, animals and micro-organisms and their ecosystems – it is about people and our need for food security, medicines, fresh air and water, shelter, and a clean and healthy environment in which to live. It is available here <https://www.cbd.int/doc/legal/cbd-en.pdf>.

[11] The Convention on International Trade in Endangered Species of Wild Fauna and Flora aims to ensure that international trade in specimens of wild animals and plants does not threaten the survival of the species. It is available here <https://cites.org/sites/default/files/eng/disc/CITES-Convention-EN.pdf>.

[12] The Agreement on the Conservation of African-Eurasian Migratory Waterbirds is dedicated to the conservation of migratory waterbirds and their habitats across Africa, Europe, the Middle East, Central Asia, Greenland, and the Canadian Archipelago. It is available here <https://www.unep-aewa.org/sites/default/files/uploads/aewa_agreement_text_2023-2025_corrected%20version%20as%20of%2010%20August%202023_EN.pdf>.

[13] The Convention on Wetlands is the intergovernmental treaty that provides the framework for the conservation and wise use of wetlands and their resources. It is available here <https://www.ramsar.org/sites/default/files/documents/library/current_convention_text_e.pdf>.

[14] See Dye C. (2022), *One Health as a catalyst for sustainable development*, *Nat Microbiol*, 7, 467-468, doi: <https://doi.org/10.1038/s41564-022-01076-1> and Queenan K., Garnier J., Nielsen L.R., Buttigieg S., de Meneghi D., Holmberg M., Zinsstag J., Rüegg S., Häsler B. and Kock R. (2017), *Roadmap to a One Health agenda 2030*, *CAB Reviews*, 12(014), doi: <https://doi.org/10.1079/PAVSNNR201712014>.

[15] <https://www.washingtonpost.com/archive/politics/2003/04/07/africas-apes-are-imperiled-researchers-warn/fc37f619-d7fe-407f-8f6e-b0d202eeb04a/>.

[16] The Manhattan Principles include 12 recommendations to introduce integrated approaches to the management of human and animal diseases, including domestic animals and wildlife . They arise from the Symposium "Establishing multidisciplinary links for health in a globalized world", organized by the Society for Wildlife Conservation in 2004.

[17] See, for example, Principles 2, 3 and 7. Available at <https://oneworldonehealth.wcs.org/About-Us/Mission/The-Manhattan-Principles.aspx> accessed 24.4.2025.

Between 2004 and 2019, numerous international organizations, NGOs and other entities embraced and developed the concept of One Health, leading to significant initiatives and conferences[18]. Notably, in 2006 then President of the American Veterinary Association established the One Health Initiative[19], which culminated in the creation of the One Health Commission[20] in 2009 and the One Health Conferences of Winnipeg (2009) and Atlanta (2010).

In 2019, the Berlin Principles[21] updated the Manhattan principles, emphasizing the role of ecosystem health and introducing new pressing issues such as antimicrobial resistance, pathogen spillover and climate change. These principles further identify solidarity among people and environmental justice as the ethical foundations of One Health, understood as the remediation of the disproportionate impact of the global environmental crises on certain countries, communities and vulnerable populations[22].

## 3. The crucial role of international organizations in advancing the One Health agenda

Intergovernmental organizations have played a pivotal role in adopting and advancing the One Health approach, integrating it into their individual and collective work programs and strategies[23]. Reference is made to the "Quadripartite", a partnership on One Health between FAO, UNEP, WHO and WOAH which was initiated by FAO, WHO and WOAH (the "Tripartite") in 2010[24]. Indeed, the 2010 "Tripartite Concept Note", highlighted the importance of collaborative efforts between the three intergovernmental organizations for pandemic preparedness and response at national, regional and community levels[25]. It also emphasized the development of normative standards and field programs to achieve One Health objectives[26]. One year later, the Tripartite identified three priority topics demanding a One Health approach: avian influenza, rabies and antimicrobial resistance (AMR)[27].

In 2018, the Directors of FAO, OIE and WHO formalized their collaboration through a Memorandum of Understanding on One Health[28] which was revised on March 2022 to include UNEP, forming the "Quadripartite"[29]. This revision underlined the need to better integrate the environmental sector into the One Health narrative, the importance of which had already been highlighted in the Berlin Principles (see above). Since then, the Quadripartite has provided global guidance on One Health implementation, including a One Health Joint Plan of Action (OHJPA)[30] and a Guide for implementing the OHJPA at the national level[31], among other joint documents[32]. Additionally, it established the One Health High Level Expert Panel (OHHLEP)[33], an advisory body composed of

[18] Such as the One Health Initiative. See <https://onehealthinitiative.com/history-of-the-one-health-initiative-team-and-website-april-2006-through-september-2015-and-the-one-health-initiative-website-since-october-1-2008-revised-to-june-2020-february-2021-and/> accessed 24.4.2025.

[19] See <https://onehealthinitiative.com>.

[20] See <https://www.onehealthcommission.org>.

[21] See the Preamble to the Berlin Principles <https://oneworldonehealth.wcs.org/About-Us/Mission/The-2019-Berlin-Principles-on-One-Health.aspx>.

[22] Gruetzmacher K. and Karesh W.B. *et al*. (2021), *The Berlin principles on One Health – Bridging global health and conservation*, *Science of The Total Environment*, 764, doi: <https://doi.org/10.1016/j.scitotenv.2020.142919>.

[23] Bullon C., *Legal Elements to Operationalise One Health: From Principles to Practice* (Research Orientations: One Health, Cambridge University Press).2025 <https://doi.org/10.1017/one.2025.2>.

[24] The FAO-OIE-WHO Collaboration – A Tripartite Concept Note – 28 September 2010. Available at <https://www.who.int/publications/m/item/the-fao-oie-who-collaboration>.

[25] *Ibidem*.

[26] *Ibidem*.

[27] FAO, OIE, WHO High Level Technical Meeting to Address Health Risks at the Human-Animal-Ecosystems interface. Mexico 2011. Available at <https://www.fao.org/4/i3119e/i3119e.pdf>.

[28] See <https://www.woah.org/app/uploads/2021/03/mou-tripartite-signature-may-30-2018.pdf>.

[29] See <https://www.fao.org/one-health/highlights/highlights-detail/quadripartite-partnership-strengthens-one-health-approach/en>.

[30] See <https://www.who.int/es/publications/i/item/9789240059139>.

[31] See <https://www.who.int/publications/i/item/9789240082069>.

[32] See <https://www.fao.org/one-health/resources/publications/en> and <https://www.who.int/teams/one-health-initiative/quadripartite-secretariat-for-one-health>.

[33] Mettenleiter T.C., Markotter W., Charron D.F. *et al.* (2023), *The One Health High-Level Expert Panel (OHHLEP)*, *One Health Outlook*, 5(18), doi: <https://doi.org/10.1186/s42522-023-00085-2>.

individual experts with broad multisectoral and geographic representation which has recently started its second term[34]. The OHHLEP has, since then, produced a widely accepted definition of One Health[35] that captures the complexity of the approach and its focus on holistic integration:

> One Health is an integrated, unifying approach that aims to sustainably balance and optimize the health of people, animals and ecosystems. It recognizes the health of humans, domestic and wild animals, plants, and the wider environment (including ecosystems) are closely linked and inter-dependent.
> The approach mobilizes multiple sectors, disciplines and communities at varying levels of society to work together to foster well-being 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[36].

This definition presents One Health as a complex concept that integrates various interconnected sectors, promoting a holistic perspective that recognizes their interdependence. Together with the definition, OHHLEP formulated five key underlying principles of One Health[37]:

> 1. equity between sectors and disciplines;
> 2. socio-political 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 well-being of current and future generations; and
> 5. transdisciplinary and multisectoral collaboration, which includes all relevant disciplines, both modern and traditional forms of knowledge and a broad representative array of perspectives.

Following the Covid-19 pandemic, the governing bodies of the four organizations have increased their attention to the One Health approach as a multidisciplinary approach prone to provide integrated solutions to global health, environmental and sustainability challenges.

Beyond the Quadripartite, the United Nations General Assembly has repeatedly emphasized the importance of the One Health approach in various contexts, including global health[38], antimicrobial resistance[39], pandemics[40], biodiversity[41] and disaster risk reduction[42], among others[43]. Other IOs and multilateral conventions have expressly introduced the One Health approach into their resolutions and documents. For example, the Conference of the Parties of the Convention on Biological Diversity (CBD) has been particularly active in highlighting the importance of One Health and its connection to biodiversity, with the

[34] See <https://www.who.int/groups/one-health-high-level-expert-panel> accessed 24.4.2025.

[35] One Health High-Level Expert Panel (OHHLEP), *One Health: A new definition for a sustainable and healthy future*, *Plos Pathogen*, 2022, doi: <https://doi.org/10.1371/journal.ppat.1010537>.

[36] *Ibidem*.

[37] *Ibidem*.

[38] Resolution 74/20 – Global health and foreign policy: an inclusive approach to strengthening health systems, 11 December 2019.

[39] Resolution 71/3. Political declaration of the high-level meeting of the General Assembly on antimicrobial resistance, 22 September 2016. See also Political Declaration of the High-level Meeting on Antimicrobial Resistance, 26 September 2024.

[40] Resolution 74/306 – Comprehensive and coordinated response to the coronavirus disease (COVID-19) pandemic, 11 September 2020 and Resolution 78/3 – Political Declaration of the General Assembly high-level meeting on pandemic prevention, preparedness and response, 5 October 2023.

[41] Resolution 77/167 – Implementation of the Convention on Biological Diversity and its contribution to sustainable development, 14 December 2022.

[42] Resolution 78/152 – Disaster risk reduction, 19 December 2023.

[43] For a list of FAO. WHO, UNEP and WOAH and UNGA Resolutions and documents addressing One Health see Prieur, Michel and Mekouar, Mohammed Ali in this number.

new landmark Global Biodiversity Framework approved in Kunming-Montreal[44] in 2022 referring explicitly to the importance of One Health to address the interlinkage between biodiversity and health.

One Health has also been influential in discussions leading to the approval of the WHO Treaty on Prevention, Preparedness and Response to Pandemics (PPPR) and its embodiment in the said text[45]. At the time of writing[46], the Intergovernmental Negotiating Body has released eight drafts for a WHO Agreement, all of which have included One Health in some form[47]. Notably, earlier versions of the draft Agreement (first version in INB 2) proposed One Health as a principle, with mentions in the Preamble and a dedicated article[48]. However, One Health as a principle was omitted in the draft presented to INB's seventh meeting in October 2023 and has not been reintroduced in subsequent drafts, where One Health has instead been consistently addressed as a separate article[49].

This evolution raises important questions about the legal nature of One Health. Understanding its normative content and operational mechanisms is critical to facilitating its effective and consistent implementation through legislation.

## 4. Regulatory approaches to addressing One Health

Legislation plays a critical role in fostering an enabling environment for the implementation of the One Health approach, at the national, regional and global levels[50]. Indeed, effective and fit-for-purpose legislation can secure long-term commitments (e.g., collaborative efforts across sectors and disciplines) and assign roles and responsibilities to both public and private stakeholders. This provides a foundation for accountability and successful operationalization of One Health. Conversely, legislation that does not facilitate institutional collaboration or does not ensure inclusive participation may hinder the advancement of the One Health agenda.

Several legal avenues can therefore be explored to address both the role of legislation in advancing One Health and the role that One Health could play within legislation[51]. This section discusses three possible approaches: (1) understanding One Health as a guiding legal principle; (2) mainstreaming One Health into sector-specific legal instruments; and (3) developing a broad One Health framework law or codification. As we will see, these approaches are not necessarily exclusive, and a combination of them is likely to be a good option.

### 4.1. One Health as a general guiding principle

One Health could be considered a general guiding legal principle to be applied across sectors and disciplines, promoting multisectoral and integrative approaches to global health and environmental challenges[52]. This option aligns with Ronald Dworkin's[53] concept of legal principles as prima facie flexible obligations that do not prescribe a specific outcome but guide decision-making in a way that balances justice and

[44] Convention on Biological Diversity, 2022, Conference of the Parties Fifteenth Meeting – Part II. Decision 15/4. Kunming-Montreal Global Biodiversity Framework CBD/COP/DEC/15/4. Available at <https://www.cbd.int/doc/decisions/cop-15/cop-15-dec-04-en.pdf>. See also Section 6 below for a more comprehensive overview of the activity of the CBD in relation to One Health.

[45] The discussions of the Intergovernmental Negotiating Agreement were concluded on 16 April 2025.See<https://www.who.int/news/item/16-04-2025-who-member-states-conclude-negotiations-and-make-significant-progress-on-draft-pandemic-agreement> accessed 24.4.2025.

[46] 18 September 2024.

[47] All versions of the draft Agreement and other relevant documents are available at <https://apps.who.int/gb/inb/index.html>.

[48] See Working draft, presented on the basis of progress achieved, for the consideration of the Intergovernmental Negotiating Body at its second meeting (A/INB/2/3). <https://apps.who.int/gb/inb/pdf_files/inb2/A_INB2_3-en.pdf> accessed 24.4.2025.

[49] Later versions of the draft Agreement are available in <https://apps.who.int/gb/inb/index.htm> accessed 24.4.2025.

[50] FAO. 2020. One Health legislation: contributing to pandemic prevention through law. Available at <https://www.fao.org/legal-services/resources/detail/en/c/1477431/#:~:text=The%20One%20Health%20approach%20recognizes,issues%20in%20a%20holistic%20manner>.

[51] See Bullon C., *One Health, Sustainable Development and the Principle of Integration: Legal Synergies for Effective Implementation* (2025) *Research Orientations: One Health* (Cambridge University Press, in press), doi: <https://doi.org/10.1017/one.2025.1>.

[52] *Ibidem*. See also Bullon C., *One Health as a legal principle: foundations, normative content and regulatory implications* (to be published) 2025.

[53] Dworkin R., *Taking Rights Seriously*, *New Impression with a Reply to Critics*, Duckworth, 1977.

fairness. Robert Alexy[54] similarly characterizes legal principles as "optimization commands", distinct from rules, which are more definitive in nature. Legal principles, therefore, serve as norms embodying social and moral values, forming the foundation for the creation, interpretation and implementation of legal rules[55]. As Dworkin emphasizes, principles must be followed not because they advance desirable policy outcomes, but because they fulfill the demands of justice and fairness. Emilio Betti adds that the normative content of legal principles is inherently open to legal and political interpretation and warns against imposing rigidly prescriptive content that could undermine their adaptability and expansiveness[56].

These characteristics are closely aligned with the goals of One Health, which requires flexible and adaptive implementation across various sectors, from pandemic response to biodiversity conservation and climate change[57]. As a legal principle, One Health could therefore be incorporated into legislation, fostering multistakeholder governance and cross-sectoral collaboration. Its normative value is even more compelling in the wake of the Covid-19 pandemic and the triple planetary crises – climate change, pollution and loss of biodiversity – underscoring the urgency of treating integrated health and environmental strategies not just as political choices but as moral imperatives[58]. In this context, decision-making on human and animal health must take account of environmental impacts, while economic and social policies must also consider their impact on human and animal health as well as the environment. Ultimately, this means that anthropocentric approaches (in general and to regulatory decisions in particular) to development need to be broadened to include the health and well-being of entire ecosystems[59]. Indeed, given humanity's pervasive influence on Earth's living and non-living systems[60], there is a clear responsibility to recognise that the environment shapes our habitat and directly affects the quality of life and health of present and future generations[61]. In this respect, One Health emerges as a guiding principle for advancing sustainable development[62].

### 4.2. Sector-specific rules under a One Health approach

Another way of operationalizing One Health is to develop specific rules for its implementation. This approach offers two possibilities. Sector-specific laws could be created to address global health challenges that benefit from a One Health perspective, such as pandemics, zoonoses, pollution control, or sustainable wildlife management. These laws could impose concrete obligations on both public and private actors and include mechanisms for institutional coordination, allowing for tailored solutions within specific areas of law. However, this approach risks perpetuating siloed governance, as institutions focused on individual sectors may struggle to ensure the equitable representation of interests across sectors within a multisectoral One Health mechanism.

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[54] Alexy R., *Law's ideal dimension*, *Oxford University Press*, 2021, 176.

[55] Etcheverry J., *An approach to legal principles based on their justifying function*, *Canadian Journal of Law & Jurisprudence*, 2019, doi: 10.1017/cjlj.2019.18.

[56] Betti E., *Teoria generale dell'interpretazione*, al cuidado de Giuliano Cifrò, Vol. II, Giuffrè, 1990, ISBN: 8814025924, 9788814025921.

[57] See Bullon, C. 'One Health, Sustainable Development and the Principle of Integration: Legal Synergies for Effective Implementation' (n 51).

[58] Lindenmayer J., Kaufman G.E., Baker L., Coghlan S., *et al.*, *One Health ethics: "What then must we do?"*, *CABI One Health*, 2022, doi: <https://doi.org/10.1079/cabionehealth.2022.0011>.

[59] Coghlan S. and Coghlan B.J. (2018), *One Health, Bioethics, and Nonhuman Ethics*, *The American Journal of Bioethics*, 18(11), 3-5, doi: <https://doi.org/10.1080/15265161.2018.1524224>. See also Lindenmayer J.M., Kaufman G.E., Baker L., Coghlan S., Koontz F.W., Nieuwland J., Stewart K.L. and Lynn W.S., *One Health ethics: "What then must we do?"*, *CABI One Health*, 2022, doi: <https://doi.org/10.1079/cabionehealth.2022.0011>.

[60] Lindenmayer J.M., Kaufman G.E., Baker L., Coghlan S., Koontz F.W., Nieuwland J., Stewart K.L. and Lynn W.S., *One Health ethics: "What then must we do?"*, *CABI One Health*, 2022, doi: <https://doi.org/10.1079/cabionehealth.2022.0011>.

[61] Advisory opinion of 8th July 1996, Legality of the Threat or Use of Nuclear Weapons, ICJ Reports 1996, 226, par. 29. See also ICJ Reports 1997, 3, para. 53.

[62] Lindenmayer J.M., Kaufman G.E., Baker L., Coghlan S., Koontz F.W., Nieuwland J., Stewart K.L. and Lynn W.S., *One Health ethics: "What then must we do?"*, *CABI One Health*, 2022, doi: <https://doi.org/10.1079/cabionehealth.2022.0011>. See also Advisory opinion of 8th July 1996, Legality of the Threat or Use of Nuclear Weapons, ICJ Reports 1996, 226, par. 29. See also ICJ Reports 1997, 3, para. 53.

Additionally, there is a risk that the concept of One Health could lose its integrity if each sector is regulated in isolation. Consistency across sectors could be achieved through international guidance, such as that provided by OHHLEP.

### 4.3. Framework One Health laws

Framework laws could be developed to establish a comprehensive institutional and regulatory framework for One Health, consolidating core principles that apply across sectors. Framework laws could be used to establish coordinating institutions or committees, to declare One Health a policy priority, to provide a legal basis for cross-sectoral One Health interventions, or to ensure the availability of appropriate funding.

This regulatory option echoes past debates on (1) the codification of environmental law in the 1970's[63], and (2) the development of regulatory frameworks for antimicrobial resistance (AMR). In the early 70s there were abundant laws tackling specific environmental sectors (air, water, biodiversity) without clear connections amongst them. Right before the landmark 1972 Stockholm Conference, Dante Caponera, then Chief of the FAO Development Law Service, recognized the issues of fragmented environmental regulation and advocated for a comprehensive, coherent approach to natural resource management[64]. Caponera proposed three options: (a) environmental coordinating committees, (b) a dedicated ministry or agency for environmental protection, and (c) comprehensive environmental protection laws. He argued that codifying environmental law was necessary to manage the interdependencies between environmental sectors[65]. Michel Prieur[66] later supported this codification, highlighting the need for political will, citizen engagement and the consolidation of environmental law as a collective value tied to sustainable development. The scope for environment law was not rigidly defined on purpose, to facilitate a dynamic and flexible evolution open to the arising needs[67].

Indeed, One Health shares similar characteristics, requiring cross-sectoral coordination and political commitment to establish its legitimacy as a key policy objective. However, environmental law has been shaped by numerous overarching international instruments, such as the Stockholm Declaration of 1972 and the Rio Declaration of 1992, alongside specific national laws and the establishment of dedicated environmental ministries. The same has not happened – so far– with One Health. Furthermore, One Health is not a distinct legal subject, but an interdisciplinary approach applied to various global health challenges. It encompasses a wide range of areas regulated by different ministries, each operating under its own legal principles, ranging from environmental law to health, agriculture, and land law, to name but a few[68]. While the various sectors regulated under environmental law share the common objective of protecting the environment, the regulatory objectives of One Health-related areas are far more diverse – ranging from the conservation of wildlife to human health – making it more difficult to codify them under a single legal instrument.

Regarding the regulatory framework for antimicrobial resistance, it is often referred to as the "quintessential" One Health challenge[69]

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[63] The authors are grateful to Ali Mekhouar and Michel Prieur, who provided the keynote speech at the Conference, for this idea and their guidance on this respect.

[64] Caponera D.A., *Towards a methodological approach in environmental law*, *Natural Resources Journal*, 12(2), The University of New Mexico Law School, 1972.

[65] Cano G.J., *Marco jurídico-institucional para el manejo de los recursos naturales*, *Legislative Study*, No. 9, FAO, Rome, 1975. Available at: (accessed on 25.8.2024). See also Gifford Pinchot. 1947. Breaking new grounds. Harcourt Brace, New York.

[66] Prieur M., *La codification au service du droit de l'environnement*, in M. Prieur, *Droit de l'environnement, droit durable*, Bruxelles, Bruylant, 2014, 233-245.

[67] Amirante D., *L'autonomie scientifique du droit de l'environnement*, in *Pour un droit commun de l'environnement – Mélanges en l'honneur de Michel Prieur*, Paris, Dalloz, 2007, 3-19.

[68] Bullon C., *One Health, Sustainable Development and the Principle of Integration: Legal Synergies for Effective Implementation'*, (2025) *Research Orientations: One Health* (Cambridge University Press, in press) <https://doi.org/10.1017/one.2025.1>.

[69] Robinson T.P. *et al.* (2016), *Antibiotic resistance is the quintessential One Health issue*, *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 110(7), 377-380, doi: 10.1093/trstmh/trw0. At UNGA's 71st in September 2016, the High-level meeting on AMR adopted a Political Declaration on antimicrobial resistance included in Resolution 73/1. This Resolution emphasized the relevance of the One Health approach, recognizing the interconnection between the animal, human, and environmental dimensions in combating AMR.

due to its multisectoral nature[70]. Antimicrobial resistance, driven by the overuse of antimicrobials in human, animal, and plant health, resulted in 1.27 million direct deaths in 2019 and contributed to 4.95 million more, ranking among the top 10 global health threats according to the WHO[71].

The Quadripartite recently developed a One Health Legislative Assessment Tool for AMR (OHLAT) to support countries in strengthening their national AMR-relevant legislation across sectors[72]. This Tool explores the content of the regulatory frameworks developed by countries to underpin governance and cross-sectoral legislative solutions, such as the establishment of a multisectoral governance mechanism[73], data sharing and reporting obligations or a joint framework for integrated surveillance. However, it cautions against cross-sectoral legislation that could lead to overlap or fragmentation with existing sector-specific laws. OHLAT suggests that AMR-framework laws focus on cross-sectoral elements, while leaving sector-specific provisions in dedicated laws. This approach highlights the need to identify legal elements that require cross-sectoral implementation while avoiding unnecessary duplication between sectors[74].

## 5. Examples of One Health implementation through legislation

Operationalizing the One Health approach at international, regional and national levels requires a paradigm shift in institutional structures and in the design and implementation of public policies at the human-animal-environment interface, with a strong focus on collaboration, participation and inclusiveness[75]. Beyond consultation and coordination, One Health also requires genuine collaboration between sectors, leading to the integration of shared values into all decision-making processes, facilitating systemic thinking and the development of a coherent and appropriate regulatory framework.

This section presents selected examples of how the One Health approach has been integrated into legislation at the national, regional and global levels. It illustrates the diversity of legal areas in which a One Health approach can be incorporated. Examples include the regulation of national responses to avian influenza and biodiversity. It concludes by providing a concrete overview of the integration of One Health within the regional legal framework of the EU.

### 5.1. Avian influenza

Highly pathogenic avian influenza (HPAI) is a highly contagious transboundary disease with zoonotic potential[76] that causes unprecedented

[70] AMR refers to the ability of microbes, such as bacteria and fungi, to develop resistance to antimicrobials like antibiotics or antifungals. While this process occurs naturally, it has been significantly accelerated by the overuse and misuse of antimicrobials in human health, animal and plant production. On 2019 AMR was directly responsible for 1.27 million deaths in 2019 and contributed to 4.95 million more, making it one of the top-10 public health threats according to the WHO.

[71] Antimicrobial Resistance Collaborators (2022), *Global burden of bacterial antimicrobial resistance in 2019: a systematic analysis*, Lancet, 399, 629-655, doi: 10.1016/S0140-6736(21)02724-0. See also: T*en threats to global health in 2019*, WHO, available at <https://www.who.int/news-room/spotlight/ten-threats-to-global-health-in-201>.

[72] Bullon C., Echeverria A., Matheu J., Loi C., *et al.*, *A regulatory response to antimicrobial resistance (AMR): The Quadripartite One Health Legislative Assessment Tool for AMR (OHLAT)*. Commentary. Journal of Global Health Law (to be published).

[73] The Global Action Plan for AMR, developed by WHO and endorsed by other members of the Quadripartite, recommends countries to set up a multisectoral governance mechanism to facilitate AMR coordination across sectors. Resolution WHA68.7, Global action plan on antimicrobial resistance, 26 May 2015. Available at <https://iris.who.int/bitstream/handle/10665/193736/9789241509763_eng.pdf?sequence=1>.

[74] Bullon, C. and Negri, S. *Drawing from AMR experience for better prevention, preparedness and response to complex health threats under a One Health Approach*. In Woolaston, K. One Health and the Law: One Health and the Law: Existing Frameworks, Intersections and Future Pathways. Cambridge University Press (to be published), 2025.

[75] Coli F., *The One Health approach and the 'just' transition to sustainable agri-food systems*, in *Direito Agràrio – Compreensao Juridica a COP 30*, G. De Miranda, T. Eloana (eds.), ABLJA, 2024. See also Bullon C., *One Health, Sustainable Development and the Principle of Integration: Legal Synergies for Effective Implementation*, (n 51).

[76] See <https://www.fao.org/animal-health/animal-diseases/highly-pathogenic-avian-influenza/en>.

mortality in wild birds and mammals worldwide[77], as well as significant social and economic costs. Transmission between different animal species, including mammals and domestic animals (cats and dogs) continues, with limited human infections contributing to the ongoing risk of a new epidemic[78]. Several factors, including anthropogenic pressures to biodiversity[79] and wildlife management, contribute to the spread of HPAI and the evolution of new viral strains.

A Resolution of the Convention on Migratory Species of 2008 requested FAO to apply the One Health approach to avian influenza management[80]. Two years later, in 2010, FAO, WHO and WOAH identified avian influenza as one of the three major health challenges necessitating a One Health approach[81]. This need has been reiterated in the context of various environmental conventions, including the Convention on Wetlands (RAMSAR)[82] and later resolutions of the Convention on Migratory Species (CMS)[83].

Many countries have enacted specific legislation to mitigate the risks associated with avian influenza and demanding a multisectoral One Health approach. Institutional coordination, particularly between the authorities responsible for animal and human health, wildlife and the environment, is crucial. Equally important is the involvement of local authorities and the private sector, including veterinary and health professionals, farmers, hunters and local communities, in ensuring rapid detection and control of the disease. Countries such as Albania[84], Andorra[85], Azerbaijan[86], Vietnam[87] and the USA[88] have implemented legislation establishing multisectoral government coordination structures for avian influenza surveillance and control. These structures often involve representatives from agriculture, health and environmental agencies, among other stakeholders. For example, the US Fish and Game Code establishes a multisectoral mechanism for avian influenza wildlife surveillance under the Natural Resources Agency, in consultation with the Department of Food and Agriculture[89]. It also creates an Avian Influenza Working Group comprising members from universities and research institutions[90]. Beyond multisectoral coordination, avian influenza legislation has also supported the implementation of other key One Health measures, such as biosecurity protocols to prevent the spillover of virus

[77] FAO, WHO, WOAH. 2024 Updated joint FAO/WHO/WOAH assessment of recent influenza A(H5N1) virus events in animals and people. Available at: <https://openknowledge.fao.org/items/e05bf73b-793e-43e2-b79b-15a26cd2488b>.

[78] EFSA. 2024. Drivers for a pandemic due to avian influenza and options for One Health mitigation measures, doi: 10.2903/j.efsa.2024.8735. Available at: <https://efsa.onlinelibrary.wiley.com/doi/epdf/10.2903/j.efsa.2024.8735>.

[79] CMS, FAO. 2023. Statement of the Scientific Task Force on Avian Influenza and Wild Birds. Available at: <https://www.cms.int/sites/default/files/publication/avian_influenza_2023_aug.pdf>.

[80] CMS. 2008. Resolution 9.8. Responding to the challenge of emerging and re-emerging diseases in migratory species, including highly pathogenic avian influenza H5N1. UNEP/CMS/Resolution 9.8. Available at: <https://www.cms.int/sites/default/files/document/Res_9_08_Wildlife_Disease_En.pdf>.

[81] FAO, OIE, WHO. 2010. The FAO-OIE-WHO Collaboration. A Tripartite Concept Note. Available at <https://www.who.int/publications/m/item/the-fao-oie-who-collaboration>.

[82] See, for example, 2012. Ramsar Resolution XI.12. Wetlands and Health: taking an ecosystem approach. Available at <https://www.ramsar.org/sites/default/files/documents/pdf/cop11/res/cop11-res12-e.pdf>.

[83] CMS Resolution 12.06 Wildlife disease and migratory species (available at <https://www.cms.int/sites/default/files/document/cms_cop12_res.12.6_wildlife-disease_e.pdf>).

[84] Albania. Order No. 168 establishing the working group for the prevention of avian influenza. 28 October 2005 <https://www.fao.org/faolex/results/details/en/c/LEX-FAOC067893>.

[85] Andorra. Decree on the institutional system for the protection against avian flu. 15 February 2006. Available at <https://www.fao.org/faolex/results/details/en/c/LEX-FAOC062368/>.

[86] Presidential Order No. 1320 on the establishment of the State Commission for the Prevention of Avian Influenza and the coordination of joint activities of all agencies in this field. <https://www.fao.org/faolex/results/details/en/c/LEX-FAOC197337/>.

[87] Vietnam. 2005. Resolution No. 15/2005/NQ-CP on urgent measures to prevent the avian influenza epidemic (H5N1) and type-A (H5N1) human influenza pandemic. Available at: <https://www.fao.org/faolex/results/details/en/c/LEX-FAOC061750/>.

[88] USA. 2015. Fish and Game Code – Chapter 5 of Part 2 of Division 4; Avian Influenza Wildlife Surveillance Act (secs. 3860-3863).Available at: <https://faolex.fao.org/docs/pdf/us156436.pdf>.

[89] *Ibidem*. Section 3862.

[90] *Ibidem*. Section 3863.

across species[91], data sharing initiatives[92], and community-based surveillance[93].

### 5.2. Biodiversity

Biodiversity and environmental health are essential for the health and well-being of humans, animals and ecosystems[94]. There is a strong link between biodiversity loss, pathogen spillover, and the rise of emerging infectious diseases[95], with anthropogenic factors – such as land use change – widely recognized as increasing the risk of zoonotic disease in humans[96].

In 2015, the WHO and the Secretariat of CBD published a joint report Connecting Global Priorities: Biodiversity and Human Health – A State of Knowledge Review, which identified biodiversity as a key environmental determinant of human health. The report emphasizes the need for integrative approaches, like One Health, to foster multidisciplinary research and policymaking on biodiversity and health[97].

The Conference of the Parties (COP) to CBD has adopted several instruments emphasizing the interconnection between biodiversity and One Health strategies. Decision 12/21[98] recognized the value of the One Health approach as consistent with the ecosystem approach (point 4), while decision 13/6[99] instructed the Executive Secretary to develop guidance on incorporating biodiversity and ecosystem management into One Health strategies. In response, the Subsidiary Body on Scientific, Technical and Technological Advice in 2017 developed Guidance on Integrating Biodiversity Considerations into One Health Approaches[100]. This Guidance identifies core principles for One Health implementation, including prevention, ecosystems approach, participation and inclusivity, transdisciplinary collaboration, and social justice and gender equality[101]. It further calls for legislative frameworks to incorporate a One Health approach to "minimize or mitigate impacts of ecosystem alteration, waste, pollution, unsustainable use of resources, pharmaceuticals and antibiotics on ecosystem, animal, plant and human health"[102].

As already mentioned in Section 3, in December 2022, CBD COP 15 approved the

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[91] See Poland. 2017. Regulation on measures related to highly pathogenic avian influenza. Available at <https://www.fao.org/faolex/results/details/en/c/LEX-FAOC182558/>. See also Bosnia i Herzegovina. 2014. Regulation on biosecurity measures to reduce the risk of transmission of highly pathogenic avian influenza from birds living in the wild to poultry and other captive birds. Available at <https://faolex.fao.org/docs/pdf/bih198126.pdf>.

[92] See Italy. 2005. ORDINANZA 19 ottobre 2005 Misure ulteriori di polizia veterinaria contro l'influenza aviaria. Gazzetta Ufficiale n. 254 del 31-10-2005. Available at <https://faolex.fao.org/docs/pdf/ita54838.pdf>.

[93] A 2022 Regulation in Indonesia on zoonosis control, including avian influenza, establishes a community-based surveillance road map. Indonesia. 2022. Regulation of the Coordinating Minister for Human Development and Culture of the Republic of Indonesia no. 7 of 2022 concerning Guidelines for the Prevention and Control of Zoonoses and New Infectious Diseases. Available at <https://faolex.fao.org/docs/pdf/ins214184.pdf>.

[94] Bernstein A. (2014), *Biological Diversity and Public Health*, *Annual Review of Public Health*, 35, 153-167, doi: 10.1146/annurev-publhealth-032013-182348.

[95] Schmeller D., Courchapm F. and Killeen G. (2020), *Biodiversity loss, emerging pathogens and human health risks*, *Biodiversity and Conservation*, 29, 3095-3102, doi: <https://doi.org/10.1007/s10531-020-02021-6>. See also Lawler O.K., Allan H.L., Baxter P.W.J., Castagnino R. *et al.* (2021), *The COVID-19 pandemic is intricately linked to biodiversity loss and ecosystem health*, *The Lancet Planetary Health*, 5, e840-e850, doi: 10.1016/S2542-5196(21)00258-8.

[96] Gibb R., Redding D.W., Chin K.Q., Donnelly C.A. *et al.* (2020), *Zoonotic host diversity increases in human-dominated ecosystems*, *Nature*, 584, 398-402, doi: <https://doi.org/10.1038/s41586-020-2562-8>.

[97] WHO, CBD. 2015. Connecting global priorities: biodiversity and human health: a state of knowledge review. Available at: <https://www.who.int/publications/i/item/9789241508537>.

[98] Convention on Biological Diversity, 2014, Conference of the Parties Twelfth Meeting – Decision XII/21. Biodiversity and Human Health CBD/COP/DEC/XII/21. Available at <https://www.cbd.int/doc/decisions/cop-12/cop-12-dec-21-en.pdf>.

[99] Convention on Biological Diversity, 2018, Conference of the Parties Thirteenth Meeting. Decision XIII/06. Biodiversity and Human Health CBD/COP/DEC/XIII/6. Available at <https://www.cbd.int/doc/decisions/cop-13/cop-13-dec-06-en.pdf>.

[100] Convention on Biological Diversity, 2017, Subsidiary Body on Scientific, Technical and Technological Advice. Twenty-first meeting. CBD/SBSTTA/21/9 Available at <https://www.cbd.int/doc/c/501c/4df1/369d06630c901cd02d4f99c7/sbstta-21-09-en.pdf>.

[101] *Ibidem*. Section 21.

[102] *Ibidem*. Section 23.

Kunming-Montreal Global Biodiversity Framework"[103] (GBF) acknowledging the interconnections between biodiversity and health and the importance of implementing the One Health approach (point 25). The GBF highlights the need to reduce pressures on biodiversity, and restore ecosystem services, green and blue spaces to support sustainable biodiversity and improved animal health[104]. Additionally, COP 15 Decision 15/29[105] on Biodiversity and Health acknowledges the OHHLEP definition of One Health and calls on parties to take into consideration the Quadripartite One Health Joint Plan of Action, and to "(1.(b)) "further integrate the One Health approach, among other holistic approaches, in their national biodiversity strategies and action plans, and national health plans, as appropriate, to support the implementation of the Kunming-Montreal Global Biodiversity Framework"[106].

### 5.3. One Health in EU legislation

In recent years, the One Health approach has been widely taken into account in various policies and laws adopted by the European Union[107]. To name but a few, are the Action Plan against Antimicrobial Resistance (AMR)[108], the European Green Deal[109], the "From Farm to fork" Strategy[110], the European Biodiversity Strategy 2030[111] and the recently adopted Common Agricultural Policy (CAP) 2023-2027[112].

It is noteworthy that One Health, which has traditionally been more prominent in the EU legal system as a policy instrument – mentioned more often in policies than in laws[113] – has become a legal instrument in recent years. Indeed, more and more Regulations, which are the most binding legal sources within the EU, explicitly refer to it: examples include Regulation 2022/2370 establishing the European Centre for Disease Prevention and Control[114], Regulation 2021/1756 dealing with official controls on animals and products of animal origin exported from third countries[115], and Regulation 2021/522 establishing a programme of Union action in the field of health[116]. This shift shows a clear trend towards strengthening the legal nature of One Health. Furthermore, COM/2022/404 emphasizes that "One Health should be emphasized as a horizontal and fundamental principle encompassing all

[103] Convention on Biological Diversity, 2022, Conference of the Parties Fifteenth Meeting – Part II. Decision 15/4. Kunming-Montreal Global Biodiversity Framework CBD/COP/DEC/15/4. Available at <https://www.cbd.int/doc/decisions/cop-15/cop-15-dec-04-en.pdf>.

[104] *Ibidem*. Targets 11 and 12.

[105] Convention on Biological Diversity, 2022, Conference of the Parties Fifteenth Meeting. Decision 15/29. Biodiversity and Health CBD/COP/DEC/15/29.

[106] *Ibidem*. Section 1.(b).

[107] See Coli F. and Schebesta H. (2023), *One Health in the EU: The Next Future?*, *European Papers*, 8(1), 301-316, <https://www.europeanpapers.eu/en/system/files/pdf_version/EP_eJ_2023_1_5_Articles_FColi_HSchebesta_00652.pdf>.

[108] COM (2011) 748 final – Action plan against the threats of Antimicrobial Resistance pages 4 and 14. AND COM (2017) 339 final – European Action Plan against Antimicrobial Resistance.

[109] COM (2019) 640 final – The European Green Deal.

[110] COM (2020) 381 final – Farm to fork strategy for a fair, healthy and environmentally friendly food system.

[111] COM (2020) 380 final – EU Biodiversity Strategy to 2030. Bringing nature back into our lives.

[112] Regulation (EU) 2021/2116 of the European Parliament and of the Council of 2 December 2021 on the financing, management and monitoring of the common agricultural policy and repealing Regulation (EU) No 1306/2013. OJ L 435 of 6.12.2021, 187-261.

[113] One Health is mentioned in 26 Communications of the European Commission and in 9 Regulations and 6 Decisions. Source: <https://eur-lex.europa.eu/homepage.html> (these results are up to date as of 25/09/2024).

[114] Regulation (EU) 2022/2370 of the European Parliament and of the Council of 23 November 2022 amending Regulation (EC) No 851/2004 establishing a European Centre for Disease Prevention and Control [2022] OJ L314/1.

[115] Regulation (EU) 2021/1756 of the European Parliament and of the Council of 6 October 2021 amending Regulation (EU) 2017/625 as regards official controls on animals and products of animal origin exported from third countries to the Union in order to ensure compliance with the prohibition of certain uses of antimicrobials and Regulation (EC) No 853/2004 as regards the direct supply of meat from poultry and lagomorphs. OJ L 357, 8.10.2021, 27/30.

[116] Regulation (EU) 2021/522 of the European Parliament and of the Council of 24 March 2021 establishing a Programme for the Union's action in the field of health ('EU4Health Programme') for the period 2021-2027, and repealing Regulation (EU) No 282/2014 (Text with EEA relevance) OJL 107 26.3.2021, 1-29.

EU policies" and Decision 2022/591 underlines the "importance of applying the multi-sectoral One Health approach in policymaking". These developments reflect a clear intention to fully integrate One Health into the EU regulatory framework across all legal areas.

## 6. Conclusions

One Health has gained prominence as a comprehensive approach for addressing complex health, ecological and sustainability challenges. However, its effective implementation requires robust legal mechanisms to embed One Health principles into national and international practice. This paper has examined the evolution of One Health, the role of international organizations, and the importance of legislative frameworks in advancing this approach. Several key conclusions emerge from this analysis:

One Health is an integrative approach, mirroring cross-sectoral integration processes, such as sustainable development and environmental law. While it originated within the veterinary domain and veterinary public health, One Health has expanded to address global health and ecological challenges at large. It provides a collaborative methodology across sectors and disciplines, promoting the recognition of the intrinsic value of all living species and our duty to respect and protect them.

International organizations have played a crucial role in shaping and promoting the One Health concept and agenda. Today, a consolidated global governance mechanism, led by the Quadripartite (FAO, UNEP, WHO and WOAH), is in place, with support from other international and regional entities. While One Health has been deeply embedded in areas such as antimicrobial resistance and zoonosis management, it has been inconsistently applied in other sectors, such as pollution control. This inconsistency presents significant opportunities to further advance the integration of health and environmental issues through a more cohesive One Health approach.

This paper has explored various legal pathways for integrating One Health into regulatory frameworks. There may be no single way to achieve this, and the optimal legal strategy will need to be tailored to the specific policy priorities and needs of the country or forum in which the legal discussion takes place. A combination of options, such as recognizing One Health as a guiding principle while operationalizing it through sector-specific legislation, may provide the most effective solution. To ensure widespread adoption of One Health across sectors, it is essential that the legal framework remains flexible and adaptable, providing overarching objectives and shared methodologies, advocating for integrated global health management and multisectoral collaboration. Given the broad and integrative nature of One Health and the diversity of sectors it encompasses, regulating it through one comprehensive legal instrument would be challenging. However, a country could decide to enact a framework One Health law recognizing One Health as a guiding principle, outlining a shared participatory methodology applicable across sectors, and declaring One Health as a national priority. At the supranational level, such a legal instrument could foster harmonization and integration of One Health principles.

The role of the legal profession is paramount in advancing the One Health agenda. Lawyers are uniquely positioned to translate the principles of One Health into concrete legal norms, fostering cross-sectoral collaboration and ensuring that regulatory frameworks reflect the interconnectedness of human, animal, and environmental health. By shaping laws that uphold equity and socioecological equilibrium, lawyers can help secure the sustainable future that One Health envisions for all species.

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SECTION I
ESSAYS

# Landscape for Implementing One Health Approaches in Africa

*Emmanuel Kasimbazi*

"Between animal and human medicine there are no dividing line nor should there be"
(Rudolf Virchow, 1856)

**Abstract.** The One Health approach in Africa is a collaborative effort to improve the health of people, animals and the environment. It involves multiple sectors and disciplines working together to address health threats that impact all three areas. Despite the progress in One Health approaches in some African countries to address zoonotic disease outbreaks, many do not have a formal approach and others have limited implementation. Some countries lack the diagnostic capacity for zoonotic diseases, coordinated surveillance mechanisms, multi-sectoral response strategies, and a skilled workforce. With the devastating impacts of zoonotic disease outbreaks, recent epidemics have caused a loss of lives and negatively impacted the economy. Thus, strengthening the One Health approach across African Union (AU) Member States will improve the continent's ability and capacity to efficiently prevent, detect, and respond to emerging and re-emerging zoonotic diseases. The policy and practice changes needed to address zoonotic diseases require strong political commitment, financial investments, and institutionalized national One Health programs.
The AU endorses a One Health approach in which multiple sectors work jointly to raise awareness, gather credible data, implement programs, and promote evidence-based policy and practice to improve human, animal, and environmental health. The AU, working through its technical agencies, set up an interagency multidisciplinary group, "the One Health Coordinating Group on Zoonotic Diseases", to strengthen coordinated surveillance, prevention, and control of zoonotic diseases on the continent. The AU needs to further leverage its unique political position on the continent to raise awareness, secure commitments, and influence policy at the head-of-state level. This article highlights the legal and institutional framework necessary for implementing one health approach in AU, Regional Economic Commission and national levels.

***Keywords:*** Legal, Institutional, One health, Africa.

## 1. Introduction

The One Health approach is a collaborative effort to improve the health of people, animals, and the environment by recognizing the close connection between the three. In other words, it is a unifying approach that seeks to balance and optimize the health of people, animals and the environment[1]. It was coined in 2003 to describe the interdependence of healthy ecosystems, animals and people, soon after the emergence of SARS broke out[2]. It is now widely accepted by the international community, due to the COVID-19 pandemic, which was first reported in China, but its origin is far from certain[3]. Thus it is particularly important to prevent, predict, detect, and respond to global health threats such as pandemics[4].

[1] World Health Organization, UNEP United Nations Environment Programme and World Organisation for Animal Health, 2022. *One health joint plan of action (2022–2026): working together for the health of humans, animals, plants and the environment*. World Health Organization. <https://www.who.int/publications/i/item/9789240059139> accessed on 4thApril, 2025.

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[4] WHO, 'What is One Health': 21 September 2017 <https://www.who.int/news-room/questions-

The One Health approach mobilizes multiple sectors, disciplines, and communities at varying levels of society to work together[5]. This way, new and better ideas are developed that address root causes and create long-term, sustainable solutions. It involves the public health, veterinary, public health, and environmental sectors[6]. It is particularly relevant for food and water safety, nutrition, the control of zoonoses (diseases that can spread between animals and humans, such as flu, rabies, and Rift Valley fever), pollution management, and combating antimicrobial resistance (the emergence of microbes that are resistant to antibiotic therapy)[7].

The African continent disproportionally experiences more outbreaks than the rest of the world, especially zoonotic outbreaks, diseases transmitted between animals and humans[8]. It has both competent vectors and environmental conditions that support the propagation of zoonotic diseases with pandemic potential[9]. The diseases range from endemic zoonoses such as brucellosis and leptospirosis to neglected zoonoses such as rabies and onchocerciasis to emerging zoonoses such as anthrax, yellow fever, Ebola, Lassa fever, Rift Valley fever (RVF), and Crimean Congo hemorrhagic fever (CCHF) and COVID-19[10]. This has demonstrated the importance of rapid joint action between governments, international health organizations such as the WHO, local health authorities, research institutions, and community-based organizations, alongside strong health systems, in preventing and adequately responding to infections.

The AU recognizes that preventing and controlling the outbreaks of zoonotic disease requires scientific knowledge and changes in policy and practice across multiple sectors[11]. It endorsed the One Health approach to address zoonotic diseases and human, animal, and environmental sectors jointly to raise awareness, gather credible data, implement programs, and promote evidence-based policy and practice[12]. It has a strategy that leverages the AU's convening power and advocates for political support for One Health at national, regional, and continental levels to improve countries' abilities to prevent, detect, and respond to emerging zoonotic disease threats[13]. It has established the African Union Interagency Group on One Health to coordinate, monitor, and evaluate the implementation of the AU One Health Strategy for Zoonotic Disease Prevention and Control[14]. The Interagency Group includes several AU offices,

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[7] *Ibidem*.

[8] BMC, One Health Outlook, 'Strengthening coordination and collaboration of one health approach for zoonotic diseases in Africa', 2023 <https://onehealthoutlook.biomedcentral.com/articles/10.1186/s42522-023-00082-5> accessed 8 December 2024.

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notably the Africa Centre for Disease Control and Prevention (Africa CDC), the African Union Inter-African Bureau for Animal Resources (AU-IBAR), and the Scientific, Technical and Research Commission (STRC)[15].

At the Regional Economic Commission level, the East African Community (EAC) ECOWAS, Economic Community of Central African States (ECCAS), Economic Community of West African States (ECOWAS), Intergovernmental Authority on Development (IGAD) and Southern African Development Community (SADC) are separately pursuing a One Health approach to address public health challenges by integrating human, animal and environmental health[16].

At the national level, several African countries have embraced a One Health approach to prevent and control shared health threats such as zoonotic diseases[17], and it can be argued that this approach should be widely adopted in practice and institutionalized through national frameworks and One Health programs[18].

This article analyses One Health Approaches in Africa. The article is divided into five sections. The first section provides an introduction. The second explains the importance of applying the One Health Approach in Africa. The third describes the approaches taken at the international, African Union, Regional Economic Commissions and national levels. The fourth section outlines the challenges of implementing One Health in Africa and the final section provides the conclusion.

## 2. Importance of One Health Approach to Africa

African countries have experienced significant economic losses due to successive epidemics, with an estimated annual productivity loss exceeding US$800 billion for the last two decades across the continent[19], This challenge is exacerbated by a predominantly reactive response to outbreaks of zoonotic infections, the persistence of socio-ecological enabling drivers, extensive environmental degradation, and the impacts of climate change[20]. Furthermore, the continent faces a profound loss of biodiversity, which diminishes the resilience of ecosystems and further threatens public health and livelihoods[21].

The last two decades have witnessed a global increase in the frequency of emerging and re-emerging infectious disease epidemics[22]. African countries have experienced the devastating impact of successive epidemics which are projected to have caused a loss of over 227 million years of healthy life and an annual productivity loss of over $800 billion across the continent[23]. Between 2016 and 2018, over 260 infectious disease epidemics, disasters, and other potential public health emergencies were identified in Africa with 41 (79%) of the 52 countries in the region recording at least one epidemic during that period[24]. The five top causes of disease epidemics were cholera, measles, viral hemorrhagic diseases, malaria, and meningitis[25] The outbreak of the

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[20] *Ibidem*.

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[24] Otu A *et al.* (n. 8).

[25] *Ibidem*.

Ebola virus disease and the COVID-19 pandemic have further exposed the vulnerability of health systems in Africa and have amplified the threat posed by the zoonotic spillover of infectious diseases to the health and economic security of the continent[26].

The One Health approach has been widely endorsed and promoted by organizations such as the World Health Organization (WHO), the Food and Agriculture Organization of the United Nations (FAO), and the World Organisation for Animal Health (OIE) and UNEP[27]. Therefore, at the global level, it helps to address shared health threats such as zoonotic diseases, antimicrobial resistance (AMR), food safety, food security, vector-borne diseases, and extreme weather or conflict events, which can all disrupt and displace populations[28]. Many global initiatives also embrace a One Health approach to attain relevant Sustainable Development Goals (SDGs), improve global health security, and comply with the International Health Regulations (IHRs)[29].

Zoonotic diseases are complex, and cannot be managed by the human health sector alone. Thus, WHO has taken multi-sectoral approaches to monitoring and evaluation of country capacities under IHRs[30]. Practically, taking a One Health approach involves the collaboration between human, animal, and environmental health sectors, as well as other relevant stakeholders, in the design and implementation of programmes, policies, legislation, and research intended to achieve better health outcomes for all[31]. In addition to the identification and control of shared health threats, strategies incorporating a One Health approach can also lead to more sustainable and cost-effective programme implementation where resources and responsibility are shared across all relevant stakeholders[32].

The One Health Approach is important in several ways. First, it helps to address shared health threats like zoonotic diseases, which can decrease food availability and create trade barriers[33]. Second, it is a collaborative, multi-sectoral and transdisciplinary approach to attaining optimal health outcomes for people, animals, plants, and their shared environment[34]. Third, it involves the collaboration between human, animal, and environmental health sectors and other relevant stakeholders in designing and

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[26] *Ibidem*.

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implementing programmes, policies, legislation, and research intended to achieve better health outcomes for all[35]. Fourth, it is critical for the accelerated implementation of the IHR, the OIE standards, to safeguard the socio-economic and political integration of the continent and to achieve the aspirations of AU Agenda 2063[36]. Fifth, it makes Africa safer and healthier for humans, animals, plants and their shared environment because there is a critical linkage between animal, human, agricultural, and environmental health, which underscores the interconnectedness of food systems and public health. However, emergencies and diseases of public health importance, including neglected and endemic zoonotic infections, are compounded by the growing threat of antimicrobial resistance. Yet, despite these efforts, the continent continues to face persistent challenges[37]. Emergencies and diseases of public health importance including neglected and endemic zoonotic infections are further exacerbated by the escalating threat of antimicrobial resistance (AMR), which undermines both health security and sustainable development[38]. Sixth, increases in globalization, urban density, ease of travel and animal movement, environmental changes, and habitat overlap between humans and animals provide new opportunities for the emergence and spread of diseases that adversely impact both human and animal health, prosperity, and food security[39]. Seventh, it promotes collaboration between researchers and practitioners from the fields of human, animal, and environmental health. Eighth, it advocates for a public health sector model that addresses diseases in all of these areas[40]. Ninth, it improves disease prevention and control by preventing, detecting and responding to emerging and re-emerging diseases[41]. Tenth, it reduces the economic cost of zoonotic diseases by providing the opportunity to use preventive medicine, such as vaccines, to reduce the economic cost of zoonotic diseases[42]. Eleventh, it limits the spread of infectious pathogens by using preventive medicine which can limit the spread of infectious pathogens overseas[43]. Twelfth, it protects against potential epidemics. Finally, it provides an opportunity to establish guidelines and strategies for effective solutions[44].

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## 3. One Health Approaches in Africa

### 3.1. One Health Approaches at the International Level

One Health has gained major traction in the past two decades. The rapid adoption of One Health concepts at the international level has resulted in different instruments and initiatives. The first was the IHRs, which are legally binding global instruments for WHO and Member States[45]. The One Health approach is critical for the accelerated implementation of the IHR 2005, the Office International des Epizooties (OIE) standards and to safeguard the socioeconomic and political integration of the continent and to achieve the aspirations of AU Agenda 2063[46].

The IHRs play a role in implementing One Health in several ways. The States Parties are obliged to comply with the rules to secure international health by ensuring maximum global public health security while minimizing interference with international transport and trade[47]. The purpose and scope of the Regulations are to prevent, protect against, control and provide a public health response to the international spread of disease in ways that are commensurate with and restricted to public health risks, and which avoid unnecessary interference with international traffic and trade[48]. Thus, they provide an overarching legal framework that defines countries' rights and obligations in handling public health events and emergencies that have the potential to cross borders.

The responsibility to implement IHR is imposed on both WHO and all States Parties. The WHO is responsible for coordinating the implementation and helps countries build capacity and also provides tools, guidance, and training to help countries strengthen their capacities[49].It is also required to collect information regarding events through its surveillance activities and assess their potential to cause international disease spread and possible interference with international traffic[50].

The States Parties are responsible for implementing the IHR at the national level. Under Article 4, each State Party is required to designate or establish a National IHR Focal Point and the authorities responsible within its respective jurisdiction for the implementation of health measures under the Regulations[51]. The National IHR Focal Points shall be accessible at all times for communications with the WHO IHR Contact Points[52]. States Parties are further required to ensure that surveillance systems can detect public health events in a timely manner[53].

The IHRs require State Parties to promptly notify WHO, by the most efficient means of communication available, through the National IHR Focal Point, and within 24 hours of assessment[54]. Using the IHR s decision instrument, the States are required to assess public health

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*372*(1725), 20160168. <https://pubmed.ncbi.nlm.nih.gov/28584176/> accessed 15 April, 2025.

[45] The IHR were first adopted by the World Health Assembly in 1969 and covered six diseases. The Regulations were amended in 1973, and then in 1981, to focus on three diseases: cholera, yellow fever and plague revised 2024. World Health Organization <20https://iris.who.int/handle/10665/246107> accessed 15 December, 2024. This is an instrument of international law, adopted pursuant to Article 21 of the WHO Constitution, and are legally-binding on 196 States Parties, including all the 194 Member States of WHO.

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[53] *Ibidem*, Art. 6.

[54] Article 6.

events and report to the WHO any that may constitute a public health emergency of international concern (PHEIC)[55]. To guide notifications, Annex 2 contains a decision instrument requiring States Parties to always notify the WHO of 4 specific diseases: smallpox, wild poliomyelitis, novel human influenza, and SARS[56]. The algorithm also lists pandemic-prone diseases that trigger further assessment, including cholera, pneumonic plague, yellow fever, and viral hemorrhagic fevers[57]. Beyond listed diseases, States Parties must utilize the instrument to assess any event of potential international public health concern, including from unknown causes, to determine if it is unusual or unexpected, may cross borders, or may require travel or trade restrictions (Annex 2)[58]. Departing from previous international norms, the IHRs authorize the WHO to consider reports from unofficial sources, such as scientists, nongovernmental organizations (NGOs), print and broadcasting outlets, and social media platforms[59]. When it receives an unofficial report, the WHO seeks verification from the States Parties in whose territory the event occurs[60].

States Parties are also required to ensure that the capacities national, points of entry and local community level and/or primary public health response levels are developed within the timeframe[61]. At the national level, required capacities include the following: (a) provide support through specialized staff, laboratory analysis of samples (domestically or through collaborating centres) and logistical assistance for example equipment, supplies and transport)[62], (b) to provide on-site assistance as required to supplement local investigations[63], (c) to provide a direct operational link with senior health and other officials to approve rapidly and implement containment and control measures, to provide direct liaison with other relevant government ministries[64], (d) to provide, by the most efficient means of communication available, links with hospitals, clinics, airports, ports, ground crossings, laboratories and other key operational areas for the dissemination of information and recommendations received from WHO regarding events in the State Party's territory and in the territories of other States Parties[65], (e) to establish, operate and maintain a national public health

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[55] *Ibidem*, Annex 1.

[56] World Health Organization, 2024. *Implementing the integrated sentinel surveillance of influenza and other respiratory viruses of epidemic and pandemic potential by the Global Influenza Surveillance and Response System: standards and operational guidance*. World Health Organization. <https://www.who.int/publications/i/item/9789240101432> accessed 15 April, 2025.

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[59] *Ibidem*, Art. 9.

[60] Gostin L.O., DeBartolo, M.C. and Friedman E.A., 2015. The International Health Regulations 10 years on: the governing framework for global health security. *The Lancet*, *386*(10009), 2222-2226. <https://pmc.ncbi.nlm.nih.gov/articles/PMC7138064/> accessed 15 April, 2025.

[61] *Ibidem*, Art. 19.

[62] Sisay, A.B.A.Y., 2019. Assessment of supply chain management of laboratory equipment, reagents, supplies and its potential impacts on the quality of laboratory diagnostic services of public hospitals in Addis Ababa. *Ethiopia: Addis Ababa University*. <https://www.academia.edu/72567250/Assessment_of_supply_chain_management_of_laboratory_equipment_reagents_supplies_and_its_potential_impacts_the_quality_of_laboratory_diagnostic_services_of_public_hospitals_in_Addis_Abeba_Ethiopia Accessed 15 April, 2025.

[63] Macefield R.C., Beswick A.D., Blazeby, J.M. and Lane J.A., 2013. A systematic review of on-site monitoring methods for health-care randomised controlled trials. *Clinical Trials*, *10*(1), 104-124. <https://pubmed.ncbi.nlm.nih.gov/23345308/> accessed 15 April, 2025.

[64] Landesman L.Y., 2005. *Public health management of disasters: The practice guide*. American public health association, <https://www.scirp.org/reference/referencespapers?referenceid=3828966 Accessed 15 April, 2025.

[65] Muhammad S.U., 2018. *Evaluation of Implementation of International Health Regulations (IHR 2005) Core Capacities of Nigerian Port of Entry in Combating Trans-border Spread of Diseases* (Doctoral dissertation, Kwara State University (Nigeria). <https://kwasuspace.kwasu.edu.ng/items/b9899ba1-7625-4735-85f5-599ebe7168a2/full> accessed 15 April, 2025.

emergency response plan, including the creation of multidisciplinary/multisectoral teams to respond to events that may constitute a public health emergency of international concern[66]; and (f) to provide the foregoing on a 24-hour basis[67].

The core capacity requirements for designated airports, ports and ground crossings within each State Party are as follows: (a) to provide access to an appropriate medical service including diagnostic facilities located so as to allow the prompt assessment and care of ill travelers, and adequate staff, equipment and premises[68], (b) to provide access to equipment and personnel for the transport of ill travelers to an appropriate medical facility[69], (c) to provide trained personnel for the inspection of conveyances[70], (d) to ensure a safe environment for travelers using point of entry facilities, including potable water supplies, eating establishments, flight catering facilities, public washrooms, appropriate solid and liquid waste disposal services and other potential risk areas, by conducting inspection programmes, as appropriate[71], and (e) to provide as far as practicable a programme and trained personnel for the control of vectors and reservoirs in and near points of entry[72].

The required capacities for responding to events that may constitute a public health emergency of international concern are: (a) to provide appropriate public health emergency response by establishing and maintaining a public health emergency contingency plan, including the nomination of a coordinator and contact points for relevant point of entry, public health and other agencies and services[73], (b) to provide assessment of and care for affected travellers or animals by establishing arrangements with local medical and veterinary facilities for their isolation, treatment and other support services that may be required[74], (c) to provide appropriate space, separate from other travellers, to interview suspect or affected persons[75], (d) to provide for the assessment and, if required, quarantine of suspect travellers, preferably in facilities away from the point of entry[76], (e) to apply recommended measures to disinsect, derat, disinfect, decontaminate or otherwise treat baggage, cargo, containers,

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[74] Wanyana M.W., King P., Mayinja H., Migisha R., Kadobera D., Kwesiga B., Bulage L., Ario, A.R. and Harris J.R., 2023. Assessment of Capacity and Performance of Points of Entry in Detection, Reporting and Responding to Public Health Events of International Concern, Uganda, July-September 2022. <https://link.springer.com/article/10.1007/s44250-024-00104-7> accessed 15 April, 2025.

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[76] Mouchtouri V.A., Christoforidou E.P., An der Heiden M., Menel Lemos C., Fanos M., Rexroth U., Grote U., Belfroid E., Swaan, C. and Hadjichristodoulou C., 2019. Exit and entry screening practices for infectious diseases among travelers at points of entry: Looking for evidence on public health impact. *International Journal of Environmental Research and Public Health*, *16*(23), 4638.

conveyances, goods or postal parcels including, when appropriate, at locations specially designated and equipped for this purpose[77], (f) to apply entry or exit controls for arriving and departing travellers[78], and (g) to provide access to specially designated equipment and trained personnel with appropriate personal protection, for the transfer of travellers who may carry infection or contamination[79].

The second instrument is the Berlin P rinciples on O ne H ealth – Bridging global health and conservation, 2019 that updated the Manhattan Principles[80]. In 2004, the Wildlife Conservation Society (WCS) was the initial proponent of the "Manhattan Principles", which proposed a new approach to health under the "One World – One Health framework", laying the ground for the now broadly adopted One Health approach[81]. The Principles contained a list of 12 recommendations for establishing a more holistic approach to preventing epidemic / epizootic disease and for maintaining ecosystem integrity for the benefit of humans, their domesticated animals, and the foundational biodiversity that supports all[82]. Since 2004 this approach has been adopted by numerous global entities and is generally portrayed as 'One Health'[83].

The Berlin Principles 2019 are an 'update' of the Manhattan Principles that aim to improve the health of humans, animals, and the environment. They address issues such as climate change, antimicrobial resistance, and emerging diseases[84]. This iteration contains ten principles to overcome the most important systemic policy and societal barriers, to transform and enable the world community to tackle increasing health threats at a global scale[85]. They urge world leaders, governments, civil society, the global health and conservation communities, academia and scientific institutions, business, finance leaders, and investment holders to take the following measures[86]:

a) Take action to retain the essential health links between humans, wildlife, domesticated animals and plants, and all nature and ensure the conservation and protection of biodiversity.
b) Take action to develop strong institutions that integrate understanding of human and animal health with the health of the environment, and invest in the translation of robust science-based knowledge into policy and practice.

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<https://pubmed.ncbi.nlm.nih.gov/31766548/> accessed 15 April, 2025.

[77] Chou, Y.H.A., 2017. *An air transportation risk assessment tool estimating the risk of global vector and vector-borne disease dissemination* (Doctoral dissertation, HEC MONTRÉAL). <https://www.researchgate.net/publication/268821898_Risk_assessment_of_vector-borne_diseases_for_public_health_governance> accessed 15 April, 2025.

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[83] University of Oxford, The Berlin Principles on One Health <https://oxfordinberlin.eu/the-berlin-principles-on-one-health> accessed 22 December 2024.

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c) Take action to combat the current climate crisis, which is creating new severe threats to human, animal, and environmental health, and exacerbating existing challenges.
d) Recognize that decisions regarding the use of land, air, sea, and freshwater directly impact health and well-being of humans, animals, and ecosystems and that alterations in ecosystems.
e) Devise adaptive, holistic, and forward-looking approaches to the detection, prevention, monitoring, control, and mitigation of emerging/ resurging diseases and exacerbating communicable and non-communicable diseases.
f) Take action to meaningfully integrate biodiversity conservation perspectives and human health and well-being when developing solutions for communicable and non-communicable disease threats.
g) Increase cross-sectoral investment in the global human, livestock, wildlife, plant, and ecosystem health infrastructure and international funding mechanisms.
h) Enhance capacity for cross-sectoral and trans-disciplinary health surveillance and clear, timely information-sharing to improve coordination of responses among governments and non-governmental organizations, health, academia and other institutions, the private sector and other stakeholders.
i) Form participatory, collaborative relationships among governments, NGOs, Indigenous Peoples, and local communities while strengthening the public sector to meet the challenges of global health and biodiversity conservation.
j) Invest in educating and raising awareness in human health for global citizenship and holistic planetary health approaches among children and adults in schools, communities, and universities.

Ensure the link between human, domestic animal and wildlife health and reduce the threat disease poses to people, their food supplies and economies, and the biodiversity essential to maintaining the healthy environments and functioning ecosystems.

### 3.2. One health Approaches at the African Union Level

#### 3.2.1. Policy Framework

Several instruments on one health have been developed at the African Union level to implement One Health Framework. The first instrument is the Libreville Declaration on Health and Environment in Africa, 2008, adopted at the first Inter-Ministerial Conference on Health and Environment (IMCHE)[87]. At the Conference, the Ministers in Africa resolved to build a strategic alliance to reduce environmental threats to human health and well-being[88]. The Declaration commits governments to establish a health-and-environment strategic alliance, as the basis for plans of joint action[89],update their national, sub-regional, and regional frameworks to address more effectively the interlinkages between health and environment through the integration of these links in policies, strategies, and national development plans[90], ensure integration of the agreed objectives in the areas of health and environment in national poverty reduction strategies and implement priority inter-sectoral programmes at all levels in health and environment[91], and build national and regional capacities to address the linkages between environment and health through the establishment and strengthening of health and environment institutions[92].

In addition, the Declaration requires M ember S tates to establish or strengthen systems for health and environment surveillance to allow measurement of interlinked health and environment impacts and to identify emerging risks[93],in order to manage them better and set up national monitoring and evaluation mechanisms to assess performance in implementing priority programmes and peer review mechanisms to learn from each other's experience[94].

The Declaration on Accelerating Implementation of International Health Regulations in Africa, 2017[95] saw the Heads of States commit themselves to accelerate the implementation of the IHRs at national, provincial and local levels

[87] The Libreville Declaration on Health and Environment in Africa, 2008 <https://www.afro.who.int/sites/default/files/2017-06/decLibrevilleDeclaration.pdf> accessed on 20 December 2024.

[88] *Ibidem*, Preamble.

[89] *Ibidem*, para. 1.

[90] *Ibidem*, para.2.

[91] *Ibidem*, para.3.

[92] *Ibidem*, para.4.

[93] *Ibidem*, Para. 5.

[94] *Ibidem*, Para.8.

[95] The Declaration on Accelerating Implementation of International Health Regulations in Africa <https://africacdc.org/download/declaration-on-accelerating-implementation-of-international-health-regulations-in-africa/> accessed on 20 December 2024. The Dec-

with a clear road map and monitoring mechanisms, put in place multi-sectorial mechanisms to accelerate the implementation of the IHRs and mobilize the necessary resources to implement the road maps for acceleration of implementation of the IHRs[96].

The 10-year Strategic Action Plan[97] to scale up health and environment interventions in Africa from 2019 to 2029 was endorsed at the third Inter-Ministerial Conference on Health and Environment in Gabon in 2018. Its objective are to reduce the burden of disease attributable to environmental determinants through safe, sustainable and health-enhancing human Environments, to harness the potential of the Libreville Declaration by operationalizing the Health and Environment Strategic Alliance at national and international levels and to mainstream the outcomes and impacts of the Libreville Declaration by integrating health and environment priority actions into national development policies to contribute to the attainment of the SDGs[98].

The Strategic Action Plan provides some health and environment priority interventions. First, is the strengthening of the legal and policy framework and institutional mechanisms for integrated environment and health interventions[99]. This requires improving inter-sectoral coordination by establishing formal alliances between health and environment, with the establishment of overarching national frameworks to develop integrated policies that are then implemented in a coordinated manner[100]. Second, is strengthening the legal and policy framework and institutional mechanisms for integrated environment and health interventions[101]. Third, is to establish integrated health and environment surveillance systems[102]. This integrated system is expected to track trends in indicators that focus on the environmental risk factors most relevant to health, health outcomes most influenced by the environment, and policy action deemed to reduce and prevent the risks[103]. Fourth, is strengthening the national monitoring capacities and data collection, including integrated surveillance capacities and early warning systems, as well as environmental health risk mapping[104]. This was expected to enable anticipation, preparation for and response to public health threats resulting from environmental degradation[105]. Fifth, is to develop joint health and environment national and local disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction[106].

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laration was adopted in Addis Ababa, Ethiopia at the 29th Ordinary Session of African Union Assembly from 3 to 4 July 2017.

[96] *Ibidem*.

[97] WHO, Strategic Action Plan to Scale up Health And Environment Interventions in Africa 2019-2029, <https://www.fondation-merieux.org/wp-content/uploads/2019/05/onehealth-meeting-2019-overview-of-the-strategic-action-plan.pdf> accessed 20 December 2024.

[98] *Ibidem*.

[99] *Ibidem*.

[100] Peters, D.T.J.M., Raab J., Grêaux K.M., Stronks, K. and Harting J., 2017. Structural integration and performance of inter-sectoral public health-related policy networks: An analysis across policy phases. *Health Policy*, *121*(12), 1296-1302. <https://pubmed.ncbi.nlm.nih.gov/29033059/> accessed 15 April, 2025.

[101] *Ibidem*.

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The Updated Regional Strategy for the Management of Environmental Determinants of Human Health in the African Region Regional strategy aimed to reduce the burden of diseases attributable to environmental determinants through safe, sustainable, and health-enhancing human environments across the Region with a general objective of guiding Member States on addressing health and environment linkages for achieving the SDGs[107]. Its specific objectives are to promote synergies and coordination between the health and environment sectors in support of implementing the Libreville Declaration, to develop and implement national joint action plans for the management of environmental risk factors of human health and ecosystem integrity and strengthening the national and regional capacity for integrated monitoring and surveillance of environmental determinants of health and ecosystem integrity through health and environment observatories[108].

The priority actions of the S trategy include strengthening the policy framework and institutional mechanisms for integrated environment and health interventions. In line with the Health and Environment Strategic Alliance in Africa (2010)[109], a multi-sectoral and multidisciplinary country task team should be established to include all interested parties, developing policies, laws, and tools to adequately address environmental protection and undertaking risk and capacity assessments for the development of national plans of joint action addressing the full array of environmental health determinants, the drivers that determine their associated risk levels, and the management of these risks[110].

Finally, the Framework for One is Health Practice in National Public Health Institutes Zoonotic Disease Prevention and Control Africa CDC – 2020 is aimed at providing a set of minimal objectives, proposed activities and focused guidance that national public health institute (NPHIs) and Ministries of Health that should adopt in order to address priority zoonotic diseases[111]. It further highlights how One Health approaches strengthen collaboration between relevant sectors to control these shared health threats[112].

### 3.2.2. Institutional Framework

The African Union has established several organs that support Member States with the implementation of a Framework for One Health Practice. The main institution is the Africa Centre for Disease Control and Prevention (Africa CDC), an autonomous health agency that works to strengthen public health in Africa[113]. Its functions are to[114]:

a) Establish early warning and response surveillance platforms to address all health threats and health emergencies and natural disasters in a timely and effective manner.
b) Assist Member States to address gaps in capabilities required for compliance with

[107] WHO: Regional Committee for Africa, 'Updated Regional Strategy for The Management Of Environmental Determinants Of Human Health in The African Region 2022-2032 <https://iris.who.int/handle/10665/366088> accessed 10th December 2024.

[108] *Ibidem*.

[109] WHO/UNEP. Arrangements of Health and Environment Strategic Alliance, Brazzaville, World Health Organization, 2010. AFR/RC72/10 at 5. <https://www.unep.org/topics/chemicals-and-pollution-action/chemicals-management/health-and-environment-strategic Accessed 16 April, 2025.

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[111] African Union, Framework for One Health Practice in National Public Health Institutes, 2020. <https://africacdc.org/download/framework-for-one-health-practice-in-national-public-health-institutes/> accessed 16 April, 2025.

[112] Sanga V.T., Karimuribo, E.D. and Hoza A.S., 2024. One Health in practice: Benefits and challenges of multisectoral coordination and collaboration in managing public health risks: A meta-analysis. *International Journal of One Health*, *10*(1), 26-36. <https://www.onehealthjournal.org/Vol.10/No.1/4.html> accessed 16 April, 2025.

[113] The Africa CDC was established during the 26th Ordinary Assembly of Heads of State and Government established the Africa CDC in January 2016 and it was officially launched in January 2017. Its headquarters are in Addis Ababa, Ethiopia.

[114] Kangume M.M., Atuhaire M.E., Ebonwu J., White J., Sorensen M.T., Wesonga, M.T. and Aragaw M., 2025. Continental Strategic Framework to Strengthen Cross-Border Surveillance, Coordination and Information Sharing in Africa. *International Journal of Infectious Diseases*, *152*, 107434. <https://africacdc.org/download/strategic-framework-strengthening-cross-border-surveillance-and-information-sharing-in-africa/> accessed 16 April, 2025.

the International Health Regulations (IHR 2005).

c) Support and/or conduct regional- and country-level hazard mapping and risk assessments for Member States.
d) Support Member States in health emergency responses, particularly those which have been declared a public health emergency of international concern (PHEIC).
e) Support health promotion and disease prevention through health systems strengthening, by addressing infectious and non-communicable diseases, environmental health and NTDs.
f) Promote partnership and collaboration among Member States to address emerging and endemic diseases and public health emergencies.
g) Harmonize disease control and prevention policies and the surveillance systems in Member States.
h) Support Member States in public health capacity-building through medium- and long-term field epidemiological and laboratory training programmes.

The Africa CDC has 5 divisions, which are as follows[115]: (a) Disease Control and Prevention, which focuses on disease control and prevention in Africa[116], (b) Emergency Preparedness and Response, which focuses on developing and implementing emergency preparedness and response plans[117], (c) Laboratory Systems and Networks, which focuses on establishing and strengthening laboratory systems and networks[118], (d) National Public Health Institutes and Research, which focuses on strengthening public health science and improving public health decision-making[119], (d) Public Health Information Systems, which focuses on developing and establishing public health information and technology systems[120], and (e) Surveillance and Disease Intelligence, which focuses on developing a surveillance workforce and assisting in national surveillance responsibilities[121].

The Africa CDC delivers its mandate through scientific evidence and data-driven interventions and programmes[122]. To fulfill its mandate, Africa CDC works through five Regional Collaborating Centres (RCCs), based in Egypt for the Northern Africa region, Gabon for the Central Africa region, Kenya for the Eastern Africa region, Nigeria for the Western Africa region, and Zambia for the Southern Africa region[123]. Africa CDC RCCs support Member States ensuring that there is improved infrastructure and enhanced capacity for integrated regional networks for disease surveillance, including laboratories and emergency preparedness and response[124]. The RCCs, in turn, work directly with NPHIs and MoHs in Member States[125]. NPHIs are national-level institutions that

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[115] Africa CDC <https://africacdc.org/> accessed 8December 2024.

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[122] *Ibidem*.

[123] Mubiala M., 2022. Africa and pandemics: towards a regional health security regime. *Yearbook of International Disaster Law Online*, *3*(1), 71-91. <https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(22)00583-9/fulltext> accessed 16 April, 2025.

[124] The Global Health Network, Africa CDC: 'Regional Collaborating Centers' <https://africacdc.tghn.org/regional-cc/https://africacdc.tghn.org/regional-cc/> accessed 8December 2024.

[125] Malouines, P. and Grandemange J.M., 2011, January. RCC-M: Content, working approach and future evolutions. In *Pressure Vessels and Piping Conference* (Vol. 44519, 769-783). <https://www.researchgate.net/publication/320636453_Pres-

lead and coordinate public health functions, including disease surveillance, laboratory systems and networks, emergency preparedness, response, and public health research[126]. NPHIs are science-based governmental organizations that serve as a focal point for a country's public health efforts and services to support MoH mandates[127].

Functional NPHIs currently exist in some African countries, with many more countries developing and strengthening their respective NPHIs[128]. Africa Centres for Disease Control and Prevention launched its strategic plan in 2023 for enhancing surveillance, emergency response, and infectious disease prevention[129]. The main goal was to strengthen Public Health Emergency Operation Centers (PHEOCs) in Africa and the Eastern Mediterranean region. The five-year strategic roadmap, spanning 2023 to 2027, outlined priorities to reinforce health surveillance systems and establish disease intelligence centers for more informed public health decisions[130].

The One Health Programme was established in 2018 to ensure that the One Health approach is incorporated broadly into the Africa's CDC's work[131]. The One Health Programme at Africa CDC is comprised of a cross-divisional One Health Technical Working Group (OH-TWG), whereby each of the five technical divisions is represented[132]: (a) Division Surveillance and Disease Intelligence, (b) Division of Emergency Preparedness and Response, (c) Division of Laboratory Systems, (d) Division of Public Health Institutes and Research, and (d) Division of Disease Control and Prevention[133]. The OH-TWG members work collaboratively across Africa CDC, the Regional Collaborating Centres, the AU, and with Member States to implement priority programme activities[134].

The CDC plays different roles in implementing the One Health Programme[135]. First, it has developed the Framework for One Health Practice in National Public Health Institutes (NPHIs) and is supporting Member States with the implementation focusing on zoonotic disease prevention and control[136]. Second, it co-chairs the African Union Task Force on Antimicrobial Resistance with the Inter-Africa Bureau for Animal Resources (AU-IBAR)[137]. This T ask F orce includes all AU agencies involved in animal, environmental and plant issues and works to strengthen coordination and collaboration on issues related to antimicrobial resistance[138]. Third, it co-chairs the Africa Coordinating Group for AMR control, with IBAR, RECs, WHO, FAO, and OIE, to coordinate AMR

entation_of_New_Edition_of_RCC-M_Code_in_2017> accessed 16 April, 2025.

[126] Zuber A., Pearson J., Sebeh Y., Jarvis, D. and Bratton S., 2023. Essential public health functions are not enough: fostering linkages between functions through national public health institutes improves public health impact. *BMJ Global Health*, 8(6), e011728. <https://pubmed.ncbi.nlm.nih.gov/37321660/> accessed 16 April, 2025.

[127] Myhre S.L., French, S.D. and Bergh A., 2022. National public health institutes: a scoping review. *Global Public Health*, *17*(6), 1055-1072. <https://pubmed.ncbi.nlm.nih.gov/33870871/> accessed 16 April, 2025.

[128] *Ibidem*.

[129] Africa CDC, Africa CDC Strategic Plan 2023-2027 available at <https://africacdc.org/download/africa-cdc-strategic-plan-2023-2027/>. accessed on 8December 2024.

[130] AllAfrica: 'Africa: Why the New Public Health Order is Essential for Africa's 2025-2027 Health Goals' available at <https://allafrica.com/stories/202408280386.html> accessed on 8December 2024.

[131] Africa CDC, One Health Programme <https://africacdc.org/programme/surveillance-disease-intelligence/one-health/> accessed on 8December 2024.

[132] *Ibidem*.

[133] Richards C.L., Iademarco M.F., Atkinson D., Pinner R.W., Yoon P., Mac Kenzie W.R., Lee B., Qualters, J.R. and Frieden T.R., 2017. Advances in public health surveillance and information dissemination at the Centers for Disease Control and Prevention. *Public Health Reports*, *132*(4), 403-410. <https://pubmed.ncbi.nlm.nih.gov/28609194/> accessed 16 April, 2025.

[134] De Araujo L., Chongo I., Magaia V., Gatambire A., Sacarlal J., Sumbana J., Tivane A., Maholela P., Inlamea O., Caron, A. and Knight-Jones T., 2024. Advancing one health capacities in Mozambique: A case study of COHESA. *One Health Cases*, (2024), ohcs20240023. <https://cgspace.cgiar.org/items/68eb76a4-33c4-44c2-a547-90ce1cbb6507> accessed 16 April, 2025.

[135] *Ibidem*.

[136] *Ibidem*.

[137] *Ibidem*.

[138] World Health Organization, 2021. *Antimicrobial resistance and the United Nations sustainable development cooperation framework: Guidance for United Nations Country teams*. World Health Organization. <https://openknowledge.fao.org/items/a26ba181-bb0f-41d5-a257-74f41a79ed73> accessed 16 April, 2025.

control efforts in Africa[139]. Fourth, it conducts event-based surveillance for public health events that involve both humans and animals and issues weekly reports to inform continental response efforts[140]. Fifth, it works with Member States to assess diagnostic capacity of both human and animal health laboratories in Africa for AMR and infectious disease threats[141]. Sixth, it offers fellowship and training opportunities to health professionals that address key One Health issues through the Kofi Annan fellowship, the Institute of Workforce Development online courses, various in-person regional training opportunities, and by supporting regional One Health networks that offer training opportunities like AFRO-HUN and SACIDS[142]. Seventh, it supports the AU regions and Member States with the implementation of One Health in National Public Health Institutes, and similar institutes, across Africa for zoonotic diseases in alignment with the Framework for One Health Practice in National Public Health Institutes[143].

The Inter-African Bureau for Animal Resources (AU-IBAR) operates as a technical office within the Department of Agriculture, Rural Development, Blue Economy, and Sustainable Environment (DARBE) of the African Union Commission[144]. Its core mission is to coordinate and support African Union M ember S tates in harnessing the potential of animals, including livestock, fisheries, aquaculture, and wildlife, as valuable resources for human well-being and economic development[145]. It has played a role in developing and implementing programs and projects with a One Health approach and spearheaded efforts for its institutionalization by both Member States and RECs[146]. Further, it has supported development and implementation of the integrated National Actions Plans against HPAI that supported multi-sectoral interventions bringing together human, animal and environment health actors[147]. Also, it has supported the development of the Regional Coordination Mechanisms for the Prevention and Control of transboundary animal diseases and zoonoses in Africa (IRCM)[148]. AU-IBAR supports coordination and harmonization of One Health interventions in the continent through supporting coordination and consultative meetings of One Health stakeholders[149]. Additionally, AU-IBAR is mandated to enhance the sustainable use of animals-livestock, fisheries, and wildlife – for human well-being and economic development, particularly in rural areas[150].

The Health Coordination Group on Zoonotic Diseases to oversee the implementation of the AU One Health Strategy for Zoonotic Disease Prevention and Control across Member

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[139] Panel M.M., 2020. *Meat, milk and more: Policy innovations to shepherd inclusive and sustainable livestock systems in Africa*. Intl Food Policy Res Inst. <https://ebrary.ifpri.org/digital/collection/p15738coll2/id/133855/> accessed 16 April, 2025.

[140] *Ibidem*.

[141] Varma J.K., Oppong-Otoo J., Ondoa P., Perovic O., Park B.J., Laxminarayan R., Peeling R.W., Schultsz C., Li H., Ihekweazu, C. and Sall A.A., 2018. Africa Centres for Disease Control and Prevention's framework for antimicrobial resistance control in Africa. *African Journal of Laboratory Medicine*, *7*(2), 1-4. <https://pmc.ncbi.nlm.nih.gov/articles/PMC6295971/> accessed 16 April, 2025.

[142] *Ibidem*.

[143] *Ibidem*.

[144] The African Union Inter-African Bureau for Animal Resources (AU-IBAR <https://www.au-ibar.org/about-us> accessed on 8December 2024.

[145] *Ibidem*.

[146] Alimi, Y. and Wabacha J., 2023. Strengthening coordination and collaboration of one health approach for zoonotic diseases in Africa. *One Health Outlook*, *5*(1), 10. <https://onehealthoutlook.biomedcentral.com/articles/10.1186/s42522-023-00082-5> accessed 16 April, 2025.

[147] Bhatia R., 2021. *National Framework for One Health*. Food & Agriculture Org, <https://openknowledge.fao.org/items/e456ed7c-8139-4ab9-8c2c-e72c84208b48> accessed 16 April, 2025.

[148] Rollet V., 2019. Health interregionalism in combating communicable diseases: EU cooperation with ASEAN and the African Union. *Regions and Cohesion*, *9*(1), 133-160. <https://www.jstor.org/stable/e26890720> accessed 16 April, 2025.

[149] Tangawamira Z., Seisay, M. and Nadiope E., 2023. Mechanisms for enhancing the effective role and participation of African Union Member States in Continental and Global aquatic biodiversity conservation and environmental management related Fora or Regimes. <https://www.au-ibar.org/resources/mechanisms-enhancing-effective-role-and-participation-african-union-member-states> accessed 16 April, 2025.

[150] Africa CDC: 'African Union establishes a One Health Coordination Group on Zoonotic Diseases 'available at <https://africacdc.org/news-item/african-union-establishes-one-health-coordination-group-on-zoonotic-diseases/https://africacdc.org/news-item/african-union-establishes-one-health-coordination-group-on-zoonotic-diseases/> accessed 9December 2024.

States[151]. This interagency group is tasked with developing and implementing the AU One Health Strategy for zoonotic diseases, creating a roadmap for its execution, coordinating and evaluating related activities, and documenting institutional roles in zoonotic disease prevention and control[152]. It specifically has the following objectives, namely: the development of the AU One Health Strategy for zoonotic diseases; the development of a consensual road map for the implementation of One Health Strategy for zoonotic diseases in Africa; undertaking an inventory of Zoonotic Disease Prevention and Control related activities; coordinate, monitor, and evaluate implementation activities of the AU One Health Strategy Zoonotic Diseases; compiling an inventory of Zoonotic Disease Prevention and Control associated activities being undertaken by the different AU institutions, document the roles of the institutions in the control and preventing zoonotic diseases, and to coordinate implementing, monitoring and evaluation of the AU One Health Strategy Zoonotic Diseases activities[153].

The Scientific, Technical and Research C ommission (STRC) deals with the science and technological components of One Health, from mobilizing research excellence, and capacity building, networking and coordination of the requisite capacity for surveillance of zoonotic diseases[154].

The DARBE, through the Directorate of Sustainable Environment and Blue Economy, is active in environmental protection, adaptation to climate change, protection of wildlife, resilience and Disaster Risk Reduction (DRR)[155]. A Multi-hazard Early Warning System for DRR was just established in AU Headq uarters to allow Regional Economic Communities and Member States for better preparedness and response to disasters of various nature, including zoonotic diseases[156].The Department of Health, Humanitarian Affairs, and Social Development (HHS) plays a role in advocacy, monitoring and evaluating AIDS, tuberculosis and other infectious diseases, using a One Health approach[157].

The AU-IAPSC is in charge of plant protection and phytosanitary issues. Through its Phytosanitary Strategy for Africa, the AU-IAPSC promotes the strengthening of common guidelines for the registration of pesticides and bio-pesticides in Member States and Regional Economic Communities[158]. This will ultimately lead to better coordination and consultation on sanitary and phytosanitary measures at the continental level.

The Pan-African Veterinary Vaccine Centre (AU-PANVAC) was established in 2004 as a Specialized Technical Office (STO)[159]. It was to

[151] The AU Interagency Group on One Health, formed during a meeting at AU-IBAR in Nairobi (June 13-14, 2022), comprises various AU entities, including Africa CDC, AU-IBAR, STRC, DARBE, HHS, AU-IAPSC, and CIDO.

[152] Vink W.D., McKenzie J.S., Cogger N., Borman, B. and Muellner P., 2012. Building a foundation for 'One Health': an education strategy for enhancing and sustaining national and regional capacity in endemic and emerging zoonotic disease management. *One Health: The Human-Animal-Environment Interfaces in Emerging Infectious Diseases: Food Safety and Security, and International and National Plans for Implementation of One Health Activities*, 185-205. <https://pubmed.ncbi.nlm.nih.gov/24264805/> accessed 16 April, 2025.

[153] *Ibidem*.

[154] The Scientific, Technical and Research commission (STRC) <http://www.austrc.org/> accessed 9December 2024.

[155] Basbug B.B., 2024. Disaster Risk Management and Climate Change Impact Actions in Türkiye. In *Disaster and Climate Risk Education: Insights from Knowledge to Action* (pp. 267-274). Singapore: Springer Nature Singapore. <https://figshare.le.ac.uk/articles/book/Disaster_and_Climate_Risk_Education_Insights_from_Knowledge_to_Action/27215823> accessed 16 April, 2025.

[156] Amaratunga D., Haigh, R. and Dias, N. eds., 2021. *Multi-Hazard early warning and disaster risks*. Springer. <https://research.manchester.ac.uk/en/publications/multi-hazard-early-warning-and-disaster-risks> accessed 16 April, 2025.

[157] Bakiika H., Obuku E.A., Bukirwa J., Nakiire L., Robert A., Nabatanzi M., Robert M., Moses M., Achan M.I., Kibanga, J.B. and Nakanwagi A., 2023. Contribution of the one health approach to strengthening health security in Uganda: a case study. *BMC Public Health*, *23*(1), 1498. <https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-023-15670-3> accessed 16 April, 2025.

[158] Dashiell K., Kumar P.L., Legg J.P., Adoyele M., Mahuku G., Ortega-Beltran A., Bandyopadhayay R., Goergen G., Coyne D., Wosula, E. and Stavolone L., 2019. Critical issues in plant health: 50 years of research in African agriculture. <https://www.researchgate.net/publication/331359897_Identifying_and_managing_plant_health_risks_for_key_African_crops_cassava> accessed 16 April, 2025.

[159] This was established after the Agreement signed on the 8th July 2003 between the Government of the Federal Democratic Republic of Ethiopia and the African Union, during the AU summit held in Maputo, Mozambique.

play a pivotal role in ensuring the quality of veterinary vaccines utilized across Africa. As part of its mission, it certifies a variety of vaccines employed in prophylactic programs on the continent, thereby safeguarding animal health and supporting agricultural development efforts[160]. Furthermore, it is a global reference laboratory for vaccine quality control, as recognized by both the World Organization for Animal Health (WOAH) and the Food and Agriculture Organization of the United Nations (FAO)[161]. It also plays some functions in promoting One Health Approach. First, it serves as a platform for collaboration, bringing together experts, researchers and policymakers from across the continent and addresses the unique veterinary challenges faced by different regions, promoting a Pan-African approach to disease prevention and control to achieve the Agenda 2063[162]. Second, it is at the forefront of the fight against animal diseases as well as zoonotic diseases with its mission to "Promote the use of good quality vaccines and reagents for the control and eradication of animal diseases in Africa[163]. Third, it plays a central role in the issues addressed were related to vaccine certification, support for producing laboratories and quality control support throughout the production and delivery chain[164]. These issues included many aspects, particularly with regard to the stakeholders involved on a continental (regional economic communities [RECs], African Union Inter-African Bureau for Animal Resources [AU-IBAR]), national (laboratories and Veterinary Services, private actors, etc.), and international (international organisations) level[165]. Vaccination registration issues and the need for harmonisation were also addressed[166]. Fourth, through its vaccine quality assurance systems, it plays a pivotal role in facilitating the adoption of improved methods for the production and quality control of priority vaccines in Africa[167]. It also provides free quality control for African Union (AU) member states[168]. Fifth, it is a member of the African Union Interagency Group on One Health which coordinates, supports, monitors and evaluates the implementation of the African Union One Health Strategy for Zoonotic Disease Prevention and Control across the Member States[169].

### 3.3. One Health Approaches at the Regional Economic Commissions Level

#### 3.3.1. EAC

The One Health approach is relevant to the East African Community (EAC) because the region faces many public health challenges, including zoonoses, antimicrobial resistance (AMR), food safety and security, climate change, biodiversity degradation and epidemic and pandemic prone disease[170].

The East African Community (EAC) adopted the One Health approach in 2014 to help prevent and control public health threats in the region[171]. It is implementing the One Health

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[160] Otte M.J., Nugent, R. and McLeod A., 2004. Transboundary animal diseases: Assessment of socio-economic impacts and institutional responses. *Rome, Italy: Food and Agriculture Organization (FAO)*, *2004*, 119-126. <https://academicjournals-org.webpkgcache.com/doc/-/s/academicjournals.org/journal/JVMAH/article-references/3F1732B67848> accessed 16 April, 2025.

[161] *Ibidem*.

[162] *Ibidem*.

[163] *Ibidem*.

[164] *Ibidem*.

[165] African Union Commission, 2015. The Livestock Development Strategy for Africa (LiDeSA) 2015-2035: the Roadmap to a Successful Livestock Sector. <https://www.au-ibar.org/fr/node/2243> accessed 16 April, 2025.

[166] Dellepiane N., Pagliusi, S. and Regulatory Experts Working Group, 2019. Opportunities for improving access to vaccines in emerging countries through efficient and aligned registration procedures: An industry perspective. *Vaccine*, 37(23), 2982-2989. <https://www.sciencedirect.com/science/article/pii/S0264410X19303470> accessed 16 April, 2025.

[167] Sinumvayo J.P., Munezero P.C., Tope A.T., Adeyemo R.O., Bale M.I., Nyandwi J.B., Haakuria V.M., Mutesa, L. and Adedeji A.A., 2024. Advancing vaccinology capacity: education and efforts in vaccine development and manufacturing across Africa. *Vaccines*, 12(7), 741, <https://pubmed.ncbi.nlm.nih.gov/39066380/> accessed 16 April, 2025.

[168] *Ibidem*.

[169] *Ibidem*.

[170] Hussein H.A., Abdi, S.M. and Ahad A.A., 2023. Factors and challenges contributing to antimicrobial resistance in East African pastoral settings and importance of One Health approach. *CABI One Health*, (2023), ohcs202300025. <https://www.cabidigitallibrary.org/doi/full/10.1079/cabionehealth.2023.0025> accessed 16 April, 2025.

[171] EAC, 'EAC Secretariat contributes to establishing a One Health workforce in the region', 15 December 2020 <https://www.eac.int/press-releases/147-health/1916-eac-secretariat-contributes-to-establishing-a-one-health-workforce-in-the-region> accessed 9December 2024.

approach in several ways. In 2021, the Regional One Health Strategy was adopted to emphasize the importance of transdisciplinary efforts to prevent and control disease[172]. The Strategy aims to consolidate gains so far made and streamline and guide the implementation and practice of One Health, complement national strategies and provide regional guidance and direction in the implementation of One Health in the EAC, harmonise, consolidate and synergise national effort and provide guidance for multi-disciplinary and multi-sectoral preparedness, prevention, detection and response to public health threats across EAC borders, encourage and promote the development of a community of practice in One Health approach in the region and mainstream One Health in the EAC Region[173].In addition, the EAC signed the MoU between the Republic of Uganda and the United Republic of Tanzania to improve the health of both animals and people[174].

At the institutional level, One Health Coordination Unit was established at the East African Community Secretariat that seeks to work with all eight EAC partner states' governments[175]. The unit's goal is to strengthen multi-sectoral collaboration, including between human health, animal health, agriculture, wildlife, and the environment. In parallel, capacities among the regional One Health workforce have been developed, such as in a rapid response team for epidemics and pandemics[176]. In addition, the East African Integrated Disease Surveillance Network (EAIDSNet), a regional initiative, has been established to strengthen the network a s a collaborative initiative between the national ministries of the EAC Partner States and national health research and academic between national ministries and academic institutions to prevent and control human and animal[177]. Its goals include strengthening collaboration, promoting information sharing, and harmonizing disease surveillance systems.

### 3.3.2. Intergovernmental Authority on Development (IGAD)

In 2024, the Health Emergency Preparedness, Response, and Resilience programme launched the IGAD[178]. This program aims to strengthen health system resilience and enhance multi-sectoral preparedness and response to health emergencies[179]. It has four components, namely (i) Strengthening the preparedness and resilience of regional and national health systems to manage Health Emergencies (HE) through strengthening multi-sectoral planning, financing and governance for HEs (ii) Improving the detection and response to HEs at the regional and national levels; (iii) Program management and supporting monitoring and evaluation; and (iv) Contingent Emergency Response Component (CERC)[180].

### 3.3.3. Southern African Development Community (SADC)

SADC made two initiatives on One Health initiatives. First, is the One Health in Eastern and Southern Africa (COHESA) project[181], which project aims to generate an inclusive research and innovation ecosystem that facilitates uptake, adaptation and adoption of solutions to issues that can be addressed by a One Health approach. It "sandpits " events where research institutions generate ideas and proposals for One Health projects[182]. The winning proposals receive funding, technical support, and mentoring[183]. Second is the FAO One Health flagship program which was launched in September 2022. T his program supports M ember S tates

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[172] *Ibidem*.

[173] *Ibidem*.

[174] EAC,'One-health-east-african-community-highlight' <https://www.giz.de/en/downloads/giz2024-en-one-health-east-african-community-highlight.pdf> accessed 9December 2024.

[175] *Ibidem*.

[176] *Ibidem*.

[177] EAC, 'East African Integrated Disease Surveillance Network' available at <https://www.eac.int/health/disease-prevention/east-african-integrated-disease-surveillance-network> accessed 9December 2024.

[178] IGAD, 'Launch of the Health Emergency Preparedness, Response and Resilience Programme for East and Southern Africa', <https://igad.int/launch-of-the-health-emergency-preparedness-response-and-resilience-programme-for-east-and-southern-africa/> accessed 9December 2024.

[179] *Ibidem*.

[180] *Ibidem*.

[181] International Livestock Research Institute, Capacitating One Health in Eastern and Southern Africa (COHESA) This project started in December 2021 and will end November 2025. <https://www.ilri.org/research/projects/capacitating-one-health-eastern-and-southern-africa-cohesa>.

[182] Mazet, J.A.K., Uhart, M.M. and Keyyu J.D., 2014. Stakeholders in one health. *Rev Sci Tech*, *33*(2), 443-52. <https://pubmed.ncbi.nlm.nih.gov/25707175/> accessed 16 April, 2025.

[183] *Ibidem*.

in building and implementing One Health strategies[184]. It includes an online learning course and a vision to establish a Regional One Health Support Centre in Southern Africa[185].

### 3.3.4 Economic Community of West African States (ECOWAS)

In the ECOWAS region, there are seven identified zoonotic diseases: Anthrax, Rabies, Ebola and other viral hemorrhagic fevers (for example, Marburg fever, Lassa fever, Rift Valley fever, and Crimean Congo Hemorrhagic fever), Zoonotic influenzas, Zoonotic tuberculosis, Trypanosomiasis and Yellow fever[186]. Therefore a multi-sectoral One Health approach to identify zoonotic diseases is of great regional concern for ECOWAS[187].

The One Health a pproach is important in the ECOWAS region and several initiatives have been taken to implement it. The first initiative has been through the use of workshops. In 2016, a workshop organized by a consortium of partners from multiple sectors including West African Health Organization (WAHO), ECOWAS Regional Animal Health Center (RAHC), ECOWAS Directorate of Education, Culture, Science and Technology, World Health Organization (WHO), World Organization for Animal Health (OIE), United States Agency for International Development (USAID) – Regional Office of West Africa, World Bank Group and United Nation Food and Agricultural Organization (FAO)[188]. This workshop was intended to foster multi-sectoral collaboration and coordination by operationalizing O ne hHealth practices in the ECOWAS member countries[189].

In 2017, WAHO convened a high level political and technical meeting in Abuja, Nigeria with the representatives from Ministries of Health, Agriculture and Environment from the 15 Member States as well as major technical and financial partners[190]. The meeting was to implement one of the recommendations of the Dakar consultative meeting on establishing a regional framework for the R-OHCM[191]. The Ministers reaffirmed the critical need for ECOWAS Member States and the region to engage in one health approach implementation and build capacities for better prevention, detection, and response to emerging and re-emerging disease threats[192]. Furthermore, the Abuja meeting also identified the need to develop strategies to support national O ne H ealth initiatives and a regional level coordination mechanism[193]. The call for technical and financial partners to support and work through the existing structures for institutionalizing the one health approach in the region was encouraged[194].

In 2018, a workshop to address zoonotic disease challenges within the ECOWAS region was held[195]. The facilitators included the U.S. Centers for Disease Control and Prevention (CDC) and regional Food and Agriculture Organization (FAO)[196]. It aimed at sensitizing participants on importance and need for a OH approach and at developing regional agenda for ECOWAS Member States to design robust regional and national One Health Coordination Mechanisms (OHCM) and sustain partnerships to achieve optimal health security in West Africa[197].

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[184] FAO, 'One Health', <https://www.fao.org/one-health/en> accessed 9December 2024.

[185] *Ibidem*.

[186] CDVC, One Health Zoonotic Disease Prioritization for Multisectoral Engagement in the Economic Community of West African States (ECOWAS) Region<https://www.cdc.gov/one-health/media/pdfs/ECOWAS-508.pdf> accessed 9December 2024.

[187] *Ibidem*.

[188] ECOWAS, 'One Health: ECOWAS and partners organize regional workshop to foster networking and trust-building' <https://www.raosupportcellecowas.com/post/one-health-ecowas-and-partners-organize-regional-workshop-to-foster-networking-and-trust-building>9December 2024.

[189] *Ibidem*.

[190] Virgil Kuassi Lokossou IK *et al.*, Operationalizing the ECOWAS regional one health coordination mechanism (2016-2019): Scoping review on progress, challenges and way forward. One Health, 2021, doi: 10.1016/j.onehlt.2021.100291.

[191] *Ibidem*.

[192] *Ibidem*.

[193] *Ibidem*.

[194] *Ibidem*.

[195] Goryoka G.W., Lokossou V.K., Varela K., Oussayef N., Kofi B., Iwar, V. and Behravesh C.B., 2021. Prioritizing Zoonotic diseases using a Multisectoral, one health approach for the economic community of West African States (ECOWAS). *One Health Outlook*, *3*, 1-11. <https://onehealthoutlook.biomedcentral.com/articles/10.1186/s42522-021-00055-6> accessed 16 April, 2025.

[196] Goryoka G.W., Lokossou V.K., Varela K., Oussayef N., Kofi B., Iwar, V. and Behravesh C.B., 2021. Prioritizing Zoonotic diseases using a Multisectoral, one health approach for the economic community of West African States (ECOWAS). *One Health Outlook*, *3*, 1-11. <https://onehealthoutlook.biomedcentral.com/articles/10.1186/s42522-021-00055-6> accessed 16 April, 2025.

[197] *Ibidem*.

In 2018, the region conducted a sub-regional One Health Zoonotic Disease Prioritization (OHZDP) workshop in Dakar, Senegal with the technical support of the US CDC and FAO, cumulating in a prioritization of seven important endemic and emerging zoonotic diseases including anthrax, rabies, Ebola and other haemorrhagic fevers, zoonotic influenza, trypanosomiasis, and yellow fever[198].

At the institutional level, the Regional Disease Surveillance and Control Center in Abuja is designated as the ECOWAS regional One Health coordinating institution to ensure sustainability of One Health coordination at the regional level[199]. Currently, the West African Health Organization (WAHO) is responsible for One Health coordination at the regional level as the Regional Disease Surveillance and Control Center is being operationalized[200]. There are also varying levels of One Health coordination within ECOWAS Member States. National level coordination should include both ministerial coordination as well as technical level coordination[201]. Within each M ember S tate, both levels should establish routine National One Health Platforms or coordinating mechanisms, while the rest are either in the process of establishing a formal coordination mechanism or have not yet begun the process[202]. Additionally, t he Regional Animal Health Center and the West African Health Organization have ongoing regional surveillance activities[203].

### 3.4. One Health Approaches at the National Levels in Africa

At the national level, several AU Member States have embraced One Health to prevent and control shared health threats like zoonotic diseases. Strengthening the One Health approach across AU Member States will improve the continent's ability and capacity to efficiently prevent, detect, and respond to emerging and re-emerging zoonotic diseases. The policy and practice changes needed to address zoonotic diseases require strong political commitment, financial investments, and institutionalized national One Health programs[204].

#### 3.4.1. Nigeria

Nigeria is the largest country in Africa with over 200 million people, hundreds of ethnic groups and languages[205]. Nigeria has a large and mixed economy, with herding and animal husbandry playing a significant role in the agriculture sector[206]. Anthrax, bovine tuberculosis, and rabies afflict livestock workers, and other zoonotic diseases such as Ebola virus disease (EVD) and Lassa fever have threatened Nigeria in recent years[207]. The government of Nigeria has adopted the One Health approach to bring together human and animal health workers, laboratory personnel, environmental scientists, and other experts and ministries related to human, animal, and environmental health[208].

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[198] *Ibidem*.

[199] *Ibidem*.

[200] *Ibidem*.

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Nigeria has had some experience in implementing One Health approaches. The National Inter-Ministerial Steering Committee on Avian Influenza and the National Technical Committee on Avian Influenza set up in Nigeria in 2005 involved multidisciplinary staff from multiple ministries (including agriculture and health), communicators, and industry players[209]. The One Health approach gave rise to a successful multi-sectoral emergency action plan that led to the elimination of the highly pathogenic avian influenza virus H5N1 in Nigeria in 2006[210].

### 3.4.2. Rwanda

The Rwanda One Health National Strategic Plan (ROHSP) is a result of the work done by the One Health Steering Committee (OHSC)[211]. The OHSC, established in 2011, has conducted a multi-actors, multi-sectoral, and multi-disciplinary participatory and consensus-building process for the government of Rwanda to tackle human, animal, and plant health-related complex problems using an integrative and comprehensive institutional, legislative, and technical framework[212].

Rwanda has the highest human density population in Africa and shares a border with countries where diseases such as Ebola, and Marburg have been declared[213]. Rwanda is at risk, furthermore, at the national level, from the pressure of human activities at the environmental and human interface that creates complex problems and favorable conditions for sparking off animal (domestic and wildlife), human, and plant emerging and re-emerging infectious diseases and other environmental or health-related challenges[214].

Recently, Rwanda has developed a One Health strategic plan to meet its human, animal, and environmental health challenges[215]. This approach drives innovations that are important to solve both acute and chronic health problems and offers synergy across systems, resulting in improved communication, evidence-based solutions, development of a new generation of systems-thinkers, improved surveillance, decreased lag time in response, and improved health and economic savings[216]. Several factors have enabled the One Health movement in Rwanda including an elaborate network of community health workers, existing rapid response teams, international academic partnerships willing to look more broadly than at a single disease or population, and relative equity between female and male health professionals[217]. Barriers to implementing this strategy include competition over budget, poor

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communication, and the need for improved technology[218]. Given the interconnectedness of our global community, it may be time for countries and their neighbours to follow Rwanda's lead and consider incorporating One Health principles into their national strategic health plans[219].

In 2015, the Government of Rwanda developed and approved a One Health strategic plan to streamline cross-sectoral and institutional interventions, minimize duplication of efforts, and maximise the use of public resources[220]. The goals are to promote integrated disease surveillance, prevention, and response across animal, human, and agricultural sectors; enhance education and communication among professionals in these fields; and introduce university students to One Health concepts[221]. They also aim to foster inter-professional collaboration in innovation, research, and discovery, develop educational tools for pre-university students on One Health, and create policies addressing upstream drivers of disease emergence, such as land use, water access, and deforestation[222].

### 3.4.3. Namibia

On 24 June 2024, the Namibian government, in partnership with Africa CDC, officially launched a Tripartite One Health National Strategy 2024-2028[223]. This signifies the country's commitment to addressing shared health threats between animals, humans, and the environment. The Ministries of Health and Social Services, Environment, Forestry and Tourism, Agriculture, Water, and Land Reform developed the strategy in close collaboration with the University of Namibia, the United Nations Foods and Agriculture Organization (FAO), and the World Health Organization (WHO)[224].

The Namibian One Health National Strategy is anchored on six thematic areas, which include enhancing One Health's capacities to strengthen health systems; reducing the risks from emerging and re-emerging zoonotic epidemics and pandemics; controlling and eliminating zoonotic, neglected tropical and vector-borne diseases; strengthening the assessment, management and communication of food safety risks; curbing the silent pandemic of Antimicrobial Resistance; and integrating the environment in One Health[225].

In Namibia, in close collaboration with the World Organisation for Animal Health and with the active support of the Friedrich Loeffler Institute, has rolled out a multi-sectoral rabies-control strategy consisting of post-exposure prophylaxis and parenteral vaccination against rabies, in addition to providing education to communities[226].This approach aligns with the global strategic plan to eliminate human deaths from dog-mediated rabies by 2030, a collaborative effort by the United Against Rabies Alliance, consisting of the WHO, the World Organisation for Animal Health, FAO, and the Global Alliance for Rabies Control[227].

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[225] *Ibidem*.

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[227] *Ibidem*.

### 3.4.4. Uganda

In Uganda, a strategic plan for One Health guides multi-sectoral response to epidemics implemented by a One Health Technical Working Group with cross-sectoral representation from the Ministry of Health, the Ministry of Agriculture, Animal Industry and Fisheries, and the Ministry of Tourism, Wildlife and Antiquities to oversee the One Health approach[228].The commitment to the One Health plan is aligned around strategic objectives among high-level government stakeholders: institutionalization and capacity building to ensure effective operation of the One Health Platform; strengthened preparedness and response to zoonotic diseases, AMR, and biosecurity threats; and communications and outreach to enhance awareness of the value of the One Health Approach[229]. These strategic objectives will lead to the goal of building resilient, sustainable systems to prevent and respond to zoonotic diseases and address AMR and biosecurity[230].

Uganda is supporting a One Health a pproach through the National One Health Platform and the Zoonotic Diseases Coordination Office[231]. Most of the legislation relevant to emerging zoonotic diseases and livestock-driven antimicrobial resistance date back decades ago, such as the National Drug Policy and Authority Act of 1993 and the Public Health Act of 1935[232]. In addition, while a number of Acts exist to regulate both emerging zoonotic diseases and livestock-driven antimicrobial resistance, their enforcement is challenged by the fact that there are few s tatutory i nstruments that provide details for their implementation. Consequently, the government faces serious challenges in implementing existing policies and such plans, such as the One Health Strategic Plan 2018-2022[233].

The existing legal framework largely targets control of infectious diseases, after an outbreak has occurred, and only marginally touches upon prevention and detection[234]. From a value chain perspective, most of the emphasis is given to production and marketing, while the consumption dimension is given relatively little attention[235]. As to prevention of livestock-driven antimicrobial resistance, it is indirectly legislated through the control of supply of antimicrobials under the National Drug Policy and Authority Act and the Veterinary Surgeons Act, which regulates Veterinary Practice[236]. However, AMR is not directly referenced in the existing legal framework and the relevant legislation does not regulate the use of antimicrobials at the farm level[237].

The Uganda Trypanosomiasis Control Council (UTCC) with its secretariat, the Coordinating Office for Coordinating Office for Control of Trypanosomiasis in Uganda (COCTU), is mandated to formulate policies and guidelines and to ensure that tsetse and trypanosomiasis

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[237] *Ibidem*.

control and research is carried out under statute 16 of 8th October 1992[238]. In particular, the Council aims to provide the Secretariat with a workforce that is h ighly skilled in the relevant professional and technical areas, h onest, committed, and dedicated to the task at hand, with high motivation and a strong sense of responsibility[239]. Capable of development beyond needs that the Secretariat can rise to the challenges of tsetse and trypanosomiasis[240].

The Coordinating Office for the Control of Trypanosomiasis in Uganda (COCTU) is a One Health initiative with documentary evidence in Africa. The COCTU has been implementing joint Human African Trypanosomiasis (HAT), animal trypanosomiasis, and Glossina species (tsetse fly) control in Uganda for almost three decades[241]. Despite the milestones and achievements, it continues to face financial challenges for its sustainability. Its name and associated perceptions also challenged its operation in other areas and fields, e.g. vector-borne diseases like Rift Valley fever (RVF)[242].

Northern Uganda has embarked on implementing a one-health approach to combat zoonotic diseases through The BIG FIX Uganda as the only organization offering animal welfare education, a veterinary hospital, and animal care in Northern Uganda through mass immunization of animals, radio talk shows, and outreach programs[243]. Since 2012, it has utilized a One Health approach to improve the lives of animals and the more than 7 million people in this region[244]. This approach includes tireless work to create and strengthen human-animal bonds, such as through our Comfort Dog Project[245].

### 3.4.5. Chad

The strategy of joint human and animal health campaigns applied in Chad for over 30 years has helped to improve coverage of childhood and livestock vaccination and increased access to disease prevention[246]. The campaigns are organized by the Chadian ministries for public health and livestock, supported by the Swiss Tropical and Public Health Institute (Swiss TPH) and its local partners[247]. The use of synergies across sectors intends to reduce costs compared to independent sectoral interventions[248].

Chad has made significant progress in terms of planning and policy development for epidemic response, immunization, and the fight

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[240] Ministry of Agriculture, Animal Industry and Fisheries: 'Co-ordinating Office for Trypanosomiasis in Uganda <https://coctu.go.ug/About_COCTU.html> accessed 7 December 2024.

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[242] *Ibidem*.

[243] Buregyeya E., Atusingwize E., Nsamba P., Musoke D., Naigaga I., Kabasa J.D., Amuguni, H. and Bazeyo W., 2020. Operationalizing the one health approach in Uganda: challenges and opportunities. *Journal of epidemiology and global health*, *10*(4), 250-257. <https://pmc.ncbi.nlm.nih.gov/articles/PMC7758849/> accessed 16 April, 2025.

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[248] Hamit Kessely *et al.*, 'Joint Human and Animal Health Campaigns in Chad' available at <https://www.cabidigitallibrary.org/doi/10.1079/onehealthcases.2024.0026> assessed 7th December 2024.

against zoonotic diseases[249]. There are positive experiences from past epidemics when coordination between state and non-state actors was enhanced, multiple stakeholders (e.g. alternative health providers, civil society, and religious authorities) and communities were engaged[250].

The outbreak of the Ebola virus disease and the COVID-19 pandemic have further exposed the vulnerability of health systems in Africa and have amplified the threat posed by the zoonotic spillover of infectious diseases to the health and economic security of the continent[251].

### 3.4.6. Kenya

Kenya stepped firmly towards implementing One Health in 2011 when the Zoonotic Disease Unit (ZDU) was established[252]. The ZDU is a collaborative platform shared between the human and animal health ministries. It serves as Kenya's One Health office and secretariat to the Zoonoses Technical Working Group (ZTWG)[253]. The first strategic plan for implementing One Health in Kenya (2012-2017) strengthened collaboration among multiple sectors to prevent and control zoonoses[254]. Specific outputs were produced, such as the prioritization of zoonotic diseases in Kenya and their inclusion in the Integrated Disease Surveillance and Response (IDSR) system[255]. This has led to better preparedness and response, and the rapid containment of the Rift Valley fever outbreak in 2018[256].

Kenya established a multi-sectoral committee to develop preparedness planning and efforts at mitigating the potential introduction and spread of HPAI H5N1[257]. This body also responded to an outbreak of RVF in the Eastern Africa Region during 2006-2007[258]. This coordinated efforts between the Ministry of Health (MoH) and Ministry of Agriculture, Livestock, and Fisheries (MALF), joint coordination and communication, built human capacity, especially through the Field Epidemiology and Laboratory Training program (FELTP) and other sustained collaboration with other US programmes led to the development of a fully functional BSL-3 laboratory at KEMRI and the formation of a national One Health coordinating office, the Zoonotic Disease Unit (ZDU) in 2012[259].

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[249] Remadji H., Neneck A.K., Colosio, V. and Ripoll S., TACKLING DEADLY DISEASES IN AFRICA: KEY CONSIDERATIONS FOR EPIDEMIC RESPONSE AND PREPAREDNESS IN CHAD. <https://www.researchgate.net/publication/354850054_Tackling_deadly_diseases_in_Africa_key_considerations_for_epidemic_response_and_preparedness_in_Chad> accessed 16 April, 2025.

[250] Hoinathy Remadji, *et al.*, 'Tackling Deadly Diseases in Africa: Key Considerations For Epidemic Response And Preparedness in Chad' <https://www.socialscienceinaction.org/wp-content/uploads/2021/09/TDDAP-Key-Considerations-Epidemic-Response-Preparedness-CHAD.pdf> accessed 7December 2024.

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[255] Omondi M., Ngere, I. and Ndeta C., 2016. Report on the Evaluation of Surveillance Systems Relevant to Zoonotic Diseases in Kenya, 2015: A Basis for Design of an Integrated Human-Livestock Surveillance System. *Nairobi: ILRI*. <https://cgspace.cgiar.org/items/47ea8b86-57aa-4b45-9b5e-47684b6dfa77> accessed 16 April, 2025.

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[258] OHRECA: 'The One Health landscape in sub-Saharan African countries' available at <https://cgspace.cgiar.org/bitstreams/0d5dd5d6-d33a-4e55-9553-7fd513bc3673/download> accessed 9December 2024.

[259] *Ibidem*.

## 4. Challenges of implementing One health in Africa

Though the One Health concept is an important that has evolving that is being integrated in international, regional and national frameworks, there are some challenges of implementing them[260]. First, there is weak governance and leadership are barriers to implementing One Health interventions in Africa[261]. As a result, local governments have not been able to effectively coordinate the various stakeholders' actions and mobilize sufficient resources to support the implementation of such interventions[262]. Second, there is inadequate planning to implement One Health interventions in Africa because there are no clear guidelines to stakeholders involved in implementation, making it difficult to set clear and measurable objectives and measure progress[263]. Third, there is ineffective collaboration between stakeholders[264]. The various stakeholders involved in implementing One Health interventions often work in isolation, without a comprehensive collaboration system, which can lead to unnecessary duplication of effort and resources and ineffective actions[265]. Fourth, there is limited involvement of local communities[266]. As a result, the local communities do not understand the purpose and relevance of One Health. Fifth, there is inadequate disease surveillance and monitoring which affects detecting diseases early and responding quickly. Sixth, there is limited training, practice and experience in One Health interventions in Africa. This leads to inadequate implementation[267]. Sixth, there are limited capacity financial and human resources that affect performance of public health workers and migration of health professionals to high-income countries[268]. In addition, this leads to delays and interruptions in implementation of One Health interventions[269]. Seventh, there is limited access to healthcare. Some countries have limited access to healthcare services, which makes it difficult to educate the public about One Health[270]. Eight, some countries are vulnerable to climate change and environmental degradation, which can lead to disease outbreaks[271]. Ninth, some countries have inadequate infection control and improper waste disposal, which can lead to the spread of resistant microorganisms[272]. Lastly, there is limited communication and this leads to difficulties in developing joint action plans, coordinating disease surveillance and control activities, and raising community awareness of the importance of human, animal, and environmental health[273]. The studies also highlight the need to

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[263] *Ibidem*.

[264] *Ibidem*.

[265] *Ibidem*.

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[268] *Ibidem*.

[269] *Ibidem*.

[270] Barrett M.A., Bouley T.A., Stoertz, A.H. and Stoertz R.W., 2011. Integrating a One Health approach in education to address global health and sustainability challenges. *Frontiers in Ecology and the Environment*, *9*(4), 239-245. <https://www.researchgate.net/publication/250077591_Integrating_a_One_Health_approach_in_education_to_address_global_health_and_sustainability_challenges> accessed 16 April, 2025.

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[273] Uchtmann N., Herrmann J.A., Hahn, E.C. and Beasley V.R., 2015. Barriers to, efforts in, and optimization of integrated One Health surveillance: a review and synthesis. *EcoHealth*, *12*, 368-384. <https://pubmed.ncbi.nlm.nih.gov/25894955/> accessed 16 April, 2025.

strengthen communication and collaboration among different stakeholders to support the successful implementation of One Health interventions in Africa[274].

## 5. Conclusion

The One Health approach is an important approach because it cuts across boundaries of animal, human, plant, and environmental health systems and sectors, for effective prevention, preparedness, control, and mitigation of disease threats and to promote health, sustainability, and equity. Thus, it allows a more in-depth analysis of the drivers of disease emergence and reemergence. This analysis can enable more effective risk management strategies and evidence-based policies to strengthen and develop sustainable health systems. Moreover, One Health considers the health and sustainability of the natural resource base all living beings depend on and provides theories, tools, and methods that help us to understand health interconnections and trade-offs and make decisions in the face of complexity and uncertainty[275]. However, there are still challenges that affect effective implementation of One Health Approach in Africa.

It is important that further steps are taken to implement One Health Approach at regional and national levels. At the regional level, there is a need to strengthen regional health systems and enhance the continent's preparedness and resilience against pandemics and other global health emergencies, African states should consider developing an African Convention on Epidemics and Pandemics. This C onvention would foster political commitment at the highest levels, ensuring that health security becomes a priority across the continent. It would promote a cooperative and interconnected African system that leverages shared resources, expertise, and data to prevent, predict, respond to, and recover from pandemic emergencies effectively. Such a framework would support the Africa Centres for Disease Control and Prevention (Africa CDC) in coordinating regional responses, harmonizing public health policies, and building the capacity of national health systems. By adopting a unified approach, the convention would strengthen the continent's ability to address health crises, reduce vulnerabilities, and ensure sustainable development through a regional coordinated mechanism.

At the national level, the African States need to adopt a multi-faceted strategy that includes developing Standard Operating Procedures (SOPs) to establish robust mechanisms for early disease surveillance, prevention, control, investigation, response, mitigation, and management at local and national levels. There is a need to adopt practical One Health guidelines to guide countries in implementing coordinated actions across sectors. Strategic plans are essential to build resilient and sustainable systems capable of preventing, detecting, and responding to zoonotic diseases while addressing critical issues such as antimicrobial resistance and biosecurity. Countries should also consider legislative reforms and institutionalize the One Health approach by enacting laws that promote cross-sectoral integration. Additionally, inter-ministerial, multi-sectoral, and interdisciplinary collaborations should be strengthened through the establishment of effective coordinating mechanisms to improve data sharing and minimize territoriality. Investments in research and laboratory capacity building, particularly in whole-genome sequencing, are crucial to providing real-time insights into the biology and evolution of infectious organisms as institutions commit to harmonized and coordinated data-sharing practices to ensure a unified and effective approach to health threats. Together, these actions will create a robust framework for achieving One Health goals and improving public health outcomes.

Finally, there is need to develop a multi-sectoral health information system that captures critical actionable elements from all major sectors and undertake, within the national research agenda, multi-institutional research activities with the participation of leading institutes from human health, animal health, and environment sectors for cross-fertilization of ideas and generation of appropriate solutions for efficient implementation of One Health.

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SECTION I
ESSAYS

# Towards an Eco-centric Future: Judicial and Governmental Roles in Promoting the One Health Approach in India

*Uday Shankar and Shubham Pandey*

> Natural resources are assets belonging to the entire nation. Article 48-A of the Indian Constitution (1950) mandates that the State must protect and improve the environment while safeguarding the country's forests and wildlife. Additionally, under Article 51-A, every citizen must protect and preserve the natural environment, which includes forests, lakes, rivers, and wildlife, and to show compassion towards all living creatures.
>
> Supreme Court of India
> in T.N. Godavarman Thirumulpad vs Union of India (2006)*

**Abstract.** The aftermath of the pandemic presented an opportunity to look at the issue of the promotion and the protection of health in a holistic way. The integration and interdependency of the health of humans, animals, and the wider environment get the nomenclature of One Health. The One Health Approach underscores the vital interconnectedness of human, animal, and environmental health, advocating for a comprehensive perspective in addressing global health challenges. Historically, One Health is rooted in recognizing the symbiosis between humans and their environment. However, modern industrialization and urbanization have intensified environmental changes, prompting global health organizations to formalize the One Health framework. Human activities, such as pollution and deforestation, exacerbate climate change, posing significant health risks and necessitating a re-conceptualization of health management that integrates ecological conservation. The One Health approach calls for interdisciplinary collaboration to enhance disease surveillance, reduce pollution, and promote sustainable practices. The goal of One Health can effectively be shaped through institutional interventions. Thus, the paper examines the adoption of litigation strategies to advance the goal. Further, it also identifies the initiatives undertaken by the government connected with the holistic approach towards health. It critically looks into the support the judiciary and the government for a transformative shift from anthropocentric to eco-centric worldview to realize the full benefits of the One Health Approach.

***Keywords:*** One Health Approach, Zoonotic Diseases, Gaia, Climate Change, Global Warming, Sustainable Development Goals, Rule of Law, COVID-19, Paris Agreement.

## 1. Introduction: The Interconnected-ness of Humans, Animals and the Environment

In his seminal work "Origin of Species", Charles Darwin posited, "All the organic beings that have ever lived on this earth may be descended from one primordial form"[1]. This statement implies that all life on Earth may be interconnected, akin to siblings and cousins, much like all humans trace their lineage to a single maternal ancestor. Among Earth's earliest recognizable life forms were algae, a family of simple organisms[2]. In 1678 Dutch tradesman and scientist Anton van Leeuwenhoek first observed algae, describing them as akin to a 'little animal'[3]. He asserted: "All life functions take place inside of

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**Figure 1.** Cynobacteria's Transformation of Earth.

cells, making them the smallest unit of life"[4]. Two centuries later, German botanist Matthias Schleiden and zoologist Theodore Schwann proclaimed: "All living things are made up of cells"[5]. Subsequently, German physician Rudolf Virchow concluded that cells could only arise from pre-existing cells[6].

Algae were among the first organisms and pivotal in establishing conditions for more advanced life forms on Earth. The early Earth's atmosphere likely resembled that of Venus and Mars, over 95% carbon dioxide and approximately 3% nitrogen, with traces of other gases but devoid of free oxygen[7]. Under such conditions, only anaerobic bacteria, which do not require oxygen, could survive[8]. The emergence of cyanobacteria, or blue-green algae, drastically altered the Earth's

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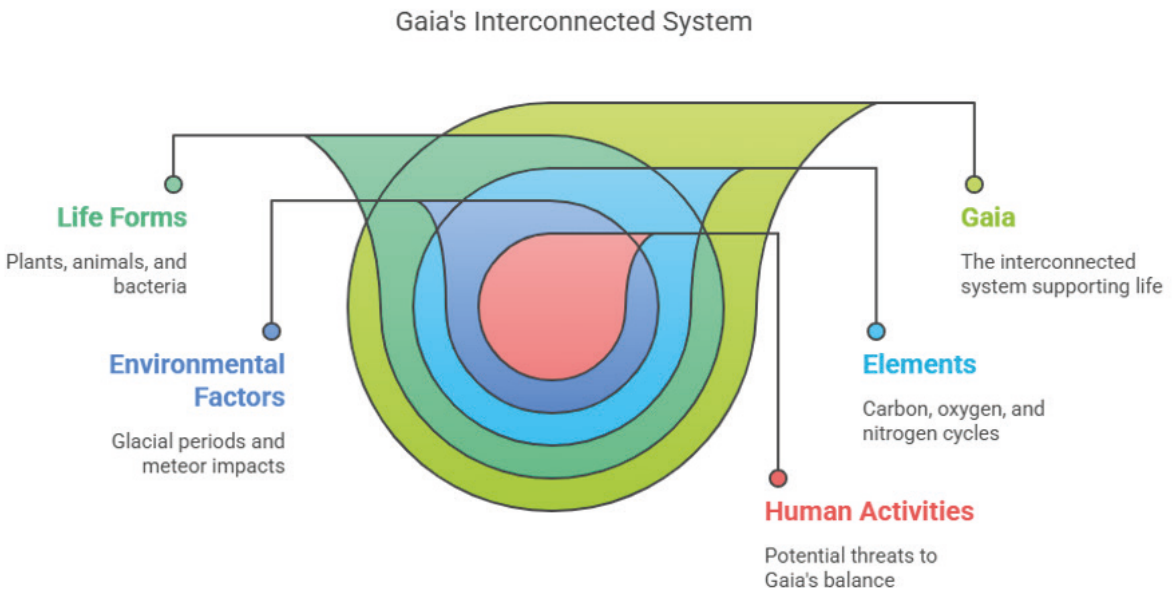


**Figure 2.** Gaia's Interconnected System.

atmosphere[9]. Through their respiration process and photosynthesis, which utilized solar energy, these algae consumed carbon dioxide and released oxygen[10]. This caused the buildup of free oxygen in the atmosphere and the creation of the ozone layer, which protects life from harmful ultraviolet radiation[11]. Blue-green algae had a greater impact on transforming the planet than humans, leading to an atmosphere of roughly 77% nitrogen, 21% oxygen, 1% water vapour, and 1% argon, with carbon dioxide levels around 550 parts per million (ppm)[12].

In addition to producing oxygen, blue-green algae contributed to regulating planetary temperatures[13]. Initially, the Earth was hot from the energy of its formation[14]. As it cooled, carbon dioxide and methane released by the earliest bacteria acted as greenhouse gases, maintaining temperatures conducive to life[15].

With the sun's gradual increase in output, blue-green algae mitigated its effects by consuming carbon dioxide and emitting oxygen, reducing the greenhouse effect and stabilizing Earth's temperature[16]. Life also retained water on Earth, as hydrogen, a light gas and primary water component, would have otherwise evaporated into space without living processes to bind it, leaving the planet arid like Mars[17]. Life even influenced geography. Free oxygen combined with iron in the oceans and on land to form iron oxides and other mineral deposits[18]. The skeletal remains of marine organisms settled as sediments on the ocean floor, eventually forming chalk and limestone, while other organic matter was converted into coal and oil[19]. Life and

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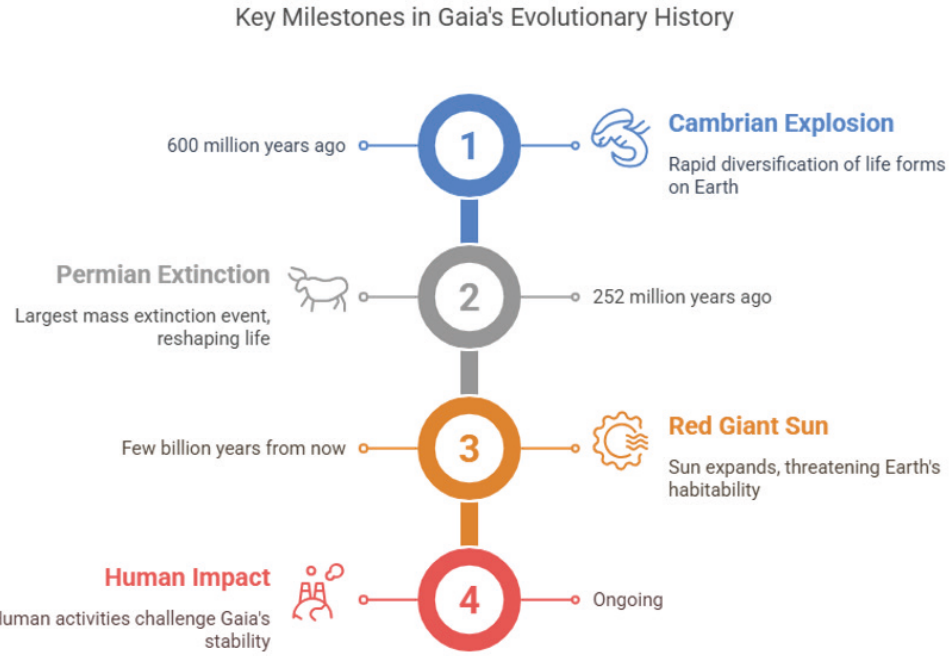


**Figure 3.** Gaia's Ongoing Evolution.

non-life on Earth together formed what British environmental scientist James Lovelock named Gaia, after the Greek goddess of the Earth[20].

Gaia, the great mother of all, was believed to be the creator and originator of Earth and all the celestial gods, including the Titans and giants[21]. Lovelock envisioned Gaia as an interconnected system, uniting plants, animals, bacteria, rocks, oceans, and the atmosphere into a single entity that shapes the planet and supports life[22]. The essential elements of life – carbon, oxygen, and nitrogen – cycle through the air, plants, animals, soil, water, and Earth's crust over hundreds of millions of years[23]. Lovelock's Gaia Hypothesis posits that we are one with the planet and all life[24]. Gaia, viewed as a system, is not a single organism but a network of living communities evolving in harmony with their non-living environment[25]. She functions through a blend of creativity and discipline, like evolution, where creativity stems from genetic mutations and sexual reproduction. In contrast, discipline comes from natural selection, guiding organisms to adapt to their environment[26].

However, Gaia's powers have limits. She cannot stop the cycles of glacial and interglacial periods, manage the sun's eventual expansion into a red giant in a few billion years, survive a massive meteor impact, or endure the effects of a nearby supernova explosion[27]. Additionally, Gaia may not endure the damage inflicted by human activities[28]. Gaia nurtures life in general, not any specific form. Over the past 600 million years, she has overseen five major mass extinctions[29], including the Permian extinction, which eliminated 75 to 90 per cent of all species[30]. Nonetheless, life

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persisted, with new families of creatures occupying the niches left by extinct species. Gaia functioned optimally as long as she operated autonomously and automatically, without a planetary brain, weaving webs of interdependence through the creativity of matter and life[31].

Problems arose when Gaia acquired a brain shaped by human intelligence and technology[32]. Humans lack the science or wisdom to control Gaia and possess powerful enough technology to harm her seriously[33]. We are already disturbing most ecosystems in three of Gaia's four major zones: the biosphere, hydrosphere, and atmosphere[34]. Over time, our actions will also impact the lithosphere, altering Earth's geology[35]. We are not Gaia's guiding mind, leading her to new heights; instead, we are a dysfunctional mind, akin to a heavy-drinking, drug-abusing, chain-smoking glutton, harming ourselves and Gaia through overconsumption and pollution.

Since the advent of agriculture, humans have been destroying local ecosystems and biodiversity[36], however, we have only begun interfering with essential Gaia process elements in the twentieth century. Approximately half a century ago, we started using chlorofluorocarbons (CFCs), considered harmless chemicals[37]. In 1985, we discovered that CFCs were depleting the protective ozone layer, increasing human skin cancer rates, potentially reducing crop yields, and adversely affecting plankton growth, a crucial food source for many large aquatic organisms, disrupting oceanic ecosystems[38].

More detrimentally, we are disrupting Gaia's temperature control mechanisms by increasing atmospheric carbon dioxide and methane levels. Coal and oil, formed from plant remains millions of years ago, are now mined and burned as primary energy sources[39], raising atmospheric carbon dioxide from a pre-industrial level of 280 parts per million (ppm) to 360 ppm in 1995 and 550 ppm in 2015[40]. Our 1,300 million cattle, 250 million hectares of irrigated fields, and numerous rubbish heaps have more than doubled atmospheric methane from a natural level of 700 parts per billion (ppb) to 1,600 ppb in 1995 and 1,800 ppb in 2015[41].

According to the Intergovernmental Panel on Climate Change (IPCC), based on current trends, global temperatures may rise between one degree Celsius and four degrees Celsius by the end of the next century[42]. This increase will raise sea levels, shift ecological zones, alter rainfall patterns, and cause massive agricultural disruptions. Gaia will strive to cope, but many plant and animal species, unable to adapt swiftly enough, will perish[43].

## 2. Emergence of the Idea of One Health

In 2004, the Wildlife Conservation Society organized a Conference bringing together international experts from various fields to discuss the observed and potential spread of zoonotic diseases and their transmission between humans, domestic animals, and wildlife populations. The conference's outcome resulted in the publication of "Manhattan Principles of One World – One Health", which coined the definition of One Health in the current context[44].

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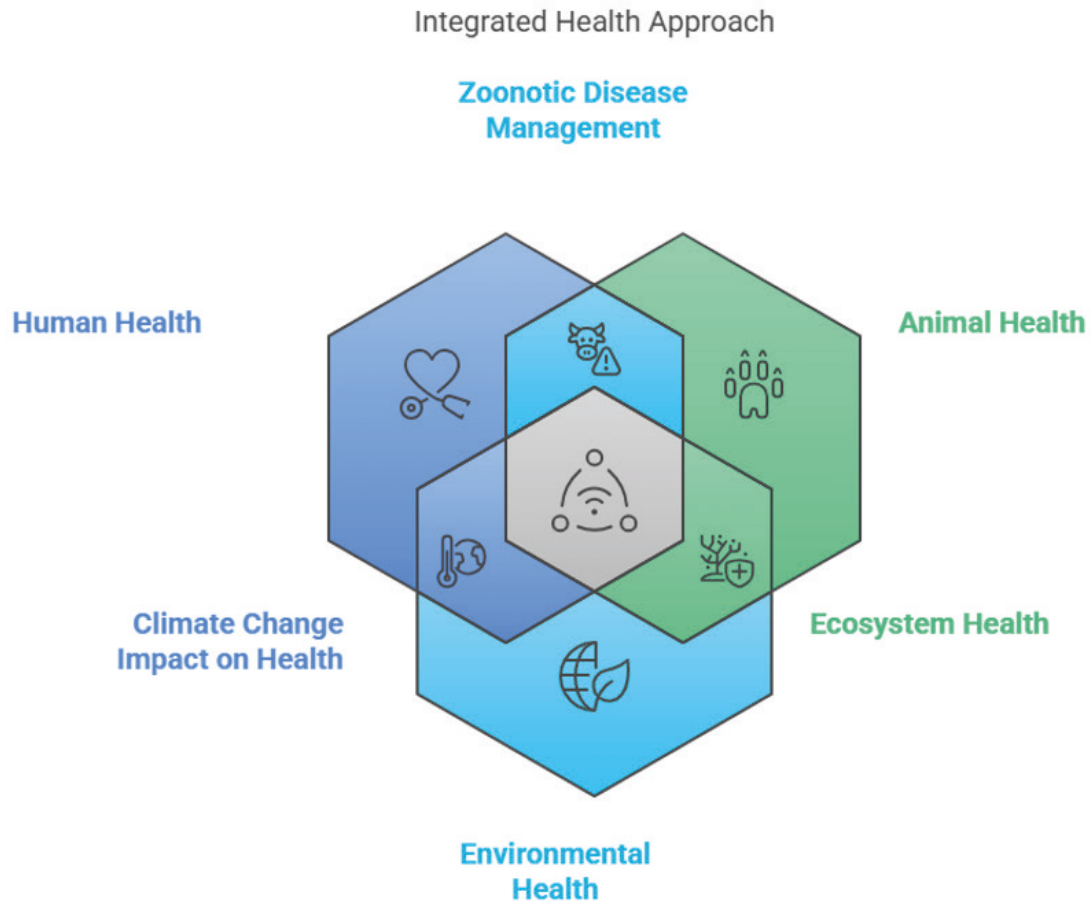


**Figure 4.** Integrated One Health Approach.

World leaders, civil society, the global health community, and science institutions recognized, for the first time in 2004, the link between human health and domestic and wildlife, animal health, and environmental health, including land and water, biodiversity health and resilience of ecosystems[45]. The participants of this conference propounded that human health programs must incorporate conservation efforts towards preserving biodiversity, including flora and fauna, and environmental resources like land, water and air[46]. At the conference, the emphasis was also on reducing the demand for international wildlife and bushmeat trade, which protects wildlife populations and lessens the risk of disease movement, cross-species transmission (zoonotic diseases that can be transmitted from animals to humans), and development of novel pathogen-host relationships[47].

In 2008, the World Health Organization for Animal Health (OIE) and the Food and Agriculture Organization of the United Nations (FAO), with support from UNICEF and the UN System Influenza Coordination, established a tripartite agreement to collaborate more closely on issues concerning the interconnectedness of animals, humans, and ecosystems[48]. OIE and FAO emphasized the need for a One Health approach, which integrates human, animal, and environmental health to prevent and manage diseases effectively[49]. The importance of

[45] Supra note 45.

[46] *Ibidem* 45.

[47] *Ibidem* 45.

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strengthening global disease surveillance systems to detect and respond to zoonotic diseases early was also highlighted.

However, the notion of One Health is not new and has been "re-discovered and explored throughout human history"[50]. From time immemorial, the interdependence of humans and animals and respect for land and water has been an intrinsic part of various cultures and spiritual beliefs of many ancient civilizations. However, today's One Health ideas differ from ancient systems due to the changing nature of societies and economic systems[51]. The exponential acceleration in environmental changes due to the industrial revolution and growth in the global human population have raised significant challenges[52]. With the rapid industrialization in the past century, we have witnessed an increase in the emission of harmful greenhouse gases, which is causing the depletion of the ozone layer, global warming and climatic changes leading to unseasonal rains, floods and droughts in many parts of the world[53]. The most disturbing of these effects is the worldwide rise of temperatures, which disturbs marine and terrestrial ecology and leads to threatening impacts on humans, animals, and plant species – concerning environmental pollution, including water, air and soil, greenhouse gas emissions leading to global warming and climatic changes, mass-scale deforestation and changing land use patterns[54]. The number of people on Earth and the intensity of their actions, which have led to massive environmental changes, have never been as significant as they are today[55]. There is a need to re-conceptualize health management in today's changing world.

## 3. Severe Implications of Pollution for Human, Animal and Environmental Health

Access to clean water is vital for a healthy life, yet its absence leads to millions of deaths yearly. Water-borne diseases, such as diarrhea and gastrointestinal illnesses caused by bacteria, viruses, and protozoa, have triggered numerous outbreaks[56]. In developing countries, especially in Africa, millions suffer from these diseases. According to the World Health Organization (WHO), 3.4 million people, mostly children, die annually from water-related illnesses[57]. The United Nations Children's Fund (UNICEF) estimates that 4,000 children die each day due to contaminated water[58]. WHO also reports that over 2.6 billion people lack access to clean water, resulting in around 2.2 million deaths annually, with 1.4 million of these being children[59]. Enhancing water quality could reduce the global disease burden by approximately 4%[60].

Air pollution is a silent killer, responsible for millions of deaths each year. According to the World Health Organization (WHO), around 4.2 million deaths annually are linked to ambient air pollution[61]. The majority of these fatalities result from cardiac diseases, strokes, lung cancer, and chronic respiratory diseases[62]. WHO estimates that ambient air pollution contributes to

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25% of the global burden of ischemic heart disease (IHD) and 40% of chronic obstructive pulmonary disease (COPD)[63]. During the COVID-19 pandemic, higher pollution levels were associated with more severe outcomes of infections[64]. For instance, even a small increase in long-term exposure to PM 2.5 significantly raised the COVID-19 death rate[65]. A recent global burden of disease report ranks PM 2.5 as one of the leading causes of death and disability[66]. Additionally, growing evidence shows that other pollutants like nitrogen dioxide (NO2) and ozone (O3) also contribute to cardiovascular disease (CVD) and are considered independent environmental risk factors for cardiovascular health[67].

Soil is a natural resource that serves as a buffer, providing support, anchorage, and nutrition to crop plants. However, the entry of contaminants from agricultural soils into the human food chain has become a serious issue[68]. Trace elements can infiltrate the food web through soil, water, plants, and animals[69]. Once soil is contaminated with heavy metals (HM) or pesticide residues, it poses significant health and environmental risks. Human activities contribute to the accumulation of trace metals in soil, which remain for long periods due to their non-degradable nature and long biological half-lives[70]. Excessive use of fertilizers and pesticides also pollutes groundwater through runoff and leaching[71]. The improper application of agrochemicals endangers human health and impacts non-target plants and other organisms in the agroecosystem[72]. Major soil pollutants include persistent organic compounds like polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), polychlorinated naphthalene (PCNs), and phenolic compounds (PHEs), along with heavy metals such as lead (Pb), cadmium (Cd), arsenic (As), mercury (Hg), zinc (Zn), and copper (Cu)[73]. When these pollutants exceed critical levels, they become toxic to plants, animals, and humans[74].

Environmental pollution significantly impacts human and animal health through various pathways, underscoring the need for a holistic approach to preservation[75]. Rapid industrialization and agricultural activities release numerous pollutants, including heavy metals like lead, arsenic, mercury, and hazardous gases such as carbon dioxide, methane, and ammonia[76]. These pollutants contaminate air, water, and soil, leading to respiratory and cardiopulmonary diseases, allergies, and other health issues in humans and animals[77]. Industrial activities introduce heavy metals and persistent organic compounds into the environment, which accumulate and cause toxic effects, impairing immune systems and leading

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[71] Lerner D.N., & Harris B. (2009), The relationship between land use and groundwater resources and quality. Land use policy, 26, S265-S273.

[72] Quandahor P., Kim L., Kim M., Lee K., Kusi F., & Jeong I.H. (2024), Effects of Agricultural Pesticides on Decline in Insect Species and Individual Numbers. Environments, 11(8), 182.

[73] Satpati G.G., Kundu D., Rajak R.C., Gupta S., Kim J.W., & Davoodbasha M. (2024), Algal-based membrane reactor for the remediation of emerging contaminants from wastewater: Mechanism, synthesis and technological advancement. Algal Research, 79, 103465.

[74] *Ibidem* 74.

[75] Chen F., Jiang F., Ma J., Alghamdi M.A., Zhu Y., & Yong, J.W. H. (2024), Intersecting planetary health: Exploring the impacts of environmental stressors on wildlife and human health. Ecotoxicology and Environmental Safety, 283, 116848.

[76] Supra note 74.

[77] Shetty S.S., Deepthi D., Harshitha S., Sonkusare S., Naik P.B., & Madhyastha H. (2023), Environmental pollutants and their effects on human health. Heliyon, 9(9).

to chronic illnesses[78]. Agricultural pollution from pesticides and fertilizers further degrades soil and water quality, impacting ecosystems and food safety[79]. In concentrated animal feeding operations, livestock production emits harmful gases and particulates that exacerbate air pollution and contribute to climate change[80].

The consciousness that human health is linked with the health of the environment, plant and animal health and planetary health has assumed much significance in the post-pandemic world. In the last few years, there has been a significant rise in human health emergencies due to these zoonotic spillovers all around the world. We have seen zoonotic diseases like Zika, Ebola, H1NI, H1N5, SARS, MERS, Dengue and COV-19 transmuting from animals to humans[81]. Experts predict that, with the deterioration of the environment and planetary health, there will be a significant increase in zoonotic spillover diseases in humans in the coming decade[82].

## 4. Reconceptualization of Health Paradigm

The concept of "health" can be seen as a holistic acronym[83], emphasizing the interconnectedness of various elements essential to well-being:

Humans: At the core of health are humans whose physical, mental, and emotional well-being is influenced by numerous external and internal factors. Achieving and maintaining good health is vital for individuals and communities to thrive. Ecosystems: Health extends beyond individual humans, encompassing the environments in which we live. Healthy ecosystems provide clean air, water, food, and resources for human survival. The balance of natural ecosystems is crucial for sustaining life and overall well-being. Animals: Animals are critical in maintaining environmental health, biodiversity, and human livelihoods. Whether as companions, wildlife, or livestock, the well-being of animals is deeply tied to human health and ecosystems. The health of animals is often a direct reflection of the state of the environment. Living: Living refers to the dynamic nature of health, requiring constant care, adaptation, and growth. Health is not static but a continuous process of maintaining balance within the body, mind, and surroundings. Together: Health is collective and relational. It involves individual well-being and the shared health of communities, nations, and the planet. Collaboration and cooperation between humans, animals, and nature are essential for achieving sustained health. Harmoniously: True health exists when all these elements – humans, ecosystems, animals, and life itself – coexist in harmony. A balanced relationship ensures the preservation of resources, the reduction of environmental degradation, and the promotion of mutual well-being.

Thus, the acronym for "health" represents a broad, interconnected approach that reflects the balance needed between all living organisms and their environments for holistic, sustainable well-being. The traces of One Health ideology were prevalent in ancient Indian discourse, where the sages and saints envisioned that good Health is not restricted to humans but extends to the whole ecosystem[84]. "From plants to animals, from soil to rivers, when everything around us is healthy, we can be truly healthy"[85]. The United Nations provides for 'One Health' as an integrated, unifying approach that balances the health of people, animals and the environment[86].

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[78] Mitra S., Chakraborty A.J., Tareq A.M., Emran T.B., Nainu F., Khusro, A. & Simal-Gandara J. (2022), Impact of heavy metals on the environment and human health: Novel therapeutic insights to counter the toxicity. Journal of King Saud University-Science, 34(3), 101865.

[79] Supra note 73.

[80] Place S.E., & Mitloehner F.M. (2010), Invited review: Contemporary environmental issues: A review of the dairy industry's role in climate change and air quality and the potential of mitigation through improved production efficiency. Journal of Dairy Science, 93(8), 3407-3416.

[81] Han B.A., Kramer A.M., & Drake J.M. (2016), Global patterns of zoonotic disease in mammals. Trends in parasitology, 32(7), 565-577.

[82] Mishra J., Mishra P., & Arora N.K., Linkages between environmental issues and zoonotic diseases: with reference to COVID-19 pandemic. Environmental Sustainability, 4(3), 455-467.

[83] B.R. Evans & F.A. Leighton, (2014), A history of One Health, 33(2) Revue Scientifique et Technique de l OIE 413-420.

[84] Shaw J. (2016), Religion,'nature'and environmental ethics in ancient India: archaeologies of human: non-human suffering and well-being in early Buddhist and Hindu contexts. World Archaeology, 48(4), 517-543.

[85] PM inaugurates 6th Edition of One Earth One Health – Advantage healthcare India 2023 (PM India, 26th Apr, 2023), <https://www.pmindia.gov.in/en/news_updates/pm-inaugurates-6th-edition-of-one-earth-one-health-advantage-healthcare-india-2023/> accessed 27th May 2024.

[86] One Health (World Health Organization, 21 Sept., 2020) <https://www.who.int/news-room/

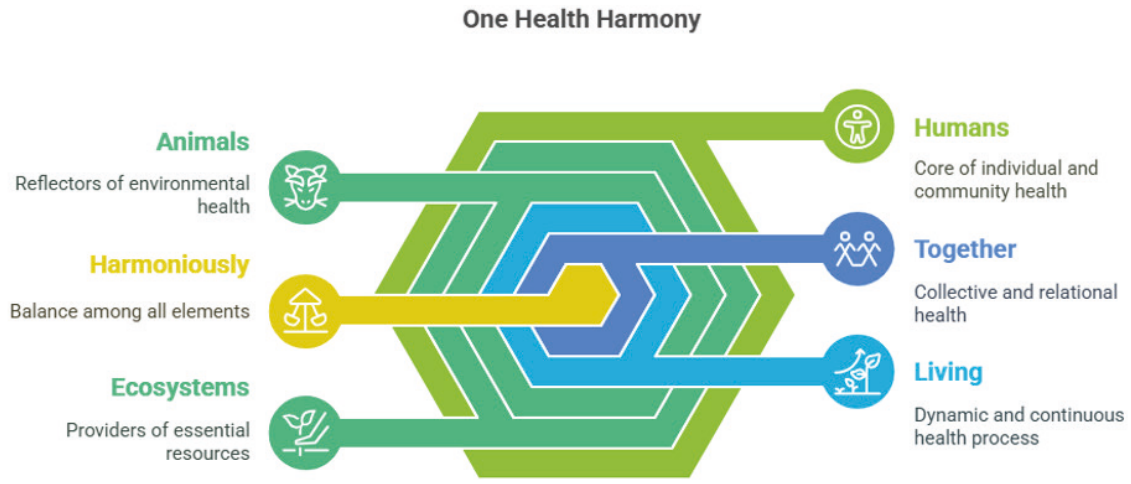


**Figure 5.** One Health Harmony.

The relationships between human and animal health in their shared environment have long been documented, and it is not new[87]. With the advancements in molecular knowledge and robust techniques of archaeology and anthropology, it has been found that environmental changes have triggered infectious diseases emerging in human populations from animal sources[88]. For example, the measles virus, which significantly impacted human populations before the advent of modern vaccines, originated from the cattle virus known as rinderpest[89]. This virus crossed the 'species barrier' and evolved into an independent human virus between the 10th and 12th centuries CE[90]. Rinderpest virus was a common cattle virus at that time, with which humans had been in contact for almost 9000 years earlier. The key factor that contributed to the emergence of measles was large-scale urbanization[91]. The measles virus requires a densely populated environment with at least 500,000 individuals in close contact to thrive and sustain transmission[92]. Clustered settlements and urban populations living closely together created a congeal environment for rinderpest to become measles[93]. A similar scenario happened in the case of acquired immunodeficiency syndrome (HIV 1 and HIV 2), the AIDS pandemic of the 20th century[94]. The pathologists first detected these viruses in chimpanzee and Sooty Mangabey monkeys, but in the early 1900s, they started emerging in urbanizing Africa[95].

## 5. Role of Courts in Promoting One Health

As an independent and critical pillar of the State, the judiciary can significantly contribute to addressing the problems related to planetary health, environmental health, animal health, wildlife, and human health. Justice Brian Preston, Chief Judge of the Land and Environmental Court of New South Wales, Australia, argues that there are nine ways, at least, where a court can help address environmental and climatic issues[96].

questions-and-answers/item/one-health> accessed 27th May 2024.

[87] Nading A.M. (2013), Humans, animals, and health: From ecology to entanglement, Environment and society, 4(1), 60-78.

[88] Spyrou M.A., Bos K.I., Herbig A., & Krause J. (2019), Ancient pathogen genomics as an emerging tool for infectious disease research, Nature Reviews Genetics, 20(6), 323-340.

[89] Furuse Y., Suzuki A., & Oshitani H. (2010), Origin of measles virus: divergence from rinderpest virus between the 11 th and 12 th centuries, Virology journal, 7, 1-4.

[90] Supra note B.R. Evans & F.A. Leighton, (2014).

[91] Supra note 90.

[92] F.L. Black (1966), Measles endemicity in insular populations: Critical community size and its evolutionary implication, J. Theor. Biol., 11, 207-211.

[93] Y. Furuse & H. Shitani (2010), Origin of Measles virus: Divergence from rinderpest virus between 11th and 12th centuries, J.Virol, 7, 52.

[94] B.H. Hahn *et al.*, AIDS as a Zoonosis: Scientific and Health Implications, Science, 287, 607-614.

[95] M.D. Grmek (1990), History of AIDS: emergence and origin of a modern pandemic. Princeton University Press, Princeton, New Jersey.

[96] B.J. Preston, The contribution of the courts in tackling climate change 28 Journal of Environmental Law 11-17 (2016).


**Figure 6.** Judiciary's Role in Climate Justice.

The legal aspects of addressing climate change through the judiciary include several key responsibilities[97]:

1. Equal access to justice: Ensuring all individuals, especially vulnerable communities, can seek legal recourse for climate-related harm.
2. Prompt adjudication of claims: Courts must prioritize climate cases and avoid delays to prevent further environmental damage.
3. Upholding the rule of law: Ensuring compliance with climate laws by governments, corporations, and individuals and holding violators accountable.
4. Forcing action on climate change: Courts can compel the executive, legislature, and private sector to take climate responsibilities seriously through legal rulings.
5. Upholding legal values: Courts must interpret and enforce fundamental legal principles like justice, equity, and sustainability in climate cases.
6. Promoting environmental values: Courts can assign economic value to ecological

[97] Setzer J., & Vanhala L.C. (2019), Climate change litigation: A review of research on courts and litigants in climate governance. Wiley Interdisciplinary Reviews: Climate Change, 10(3), e580.

harm, incentivizing sustainable practices through tools like carbon pricing.
7. Developing climate law: The judiciary shapes climate change law by setting legal precedents and guiding policy development in line with evolving scientific knowledge.
8. Evidence-based decisions: Courts rely on scientific evidence to make informed rulings, ensuring their choices reflect the true impact of climate change.

These legal aspects ensure that the judiciary plays a central role in advancing climate action and promoting environmental justice[98]. At the global level, there has been a marked increase in environmental and climate-related litigation, with key areas of focus including the following:

1. Rights-based litigation: This encompasses legal claims relating to the standing of plaintiffs, the right to a healthy environment and life, intra- and inter-generational equity, the public trust doctrine, and the legal recognition of the rights of nature[99].
2. Enforcement of statutory and executive commitments: Litigants seek judicial enforcement of legislative provisions, regulatory frameworks, and executive actions about climate change obligations and targets[100].
3. Adaptation and its impacts: Claims involve the legal review of adaptation measures implemented by governments or entities and their broader social, economic, and environmental consequences[101].
4. Corporate liability and responsibility: Litigations increasingly address corporate accountability, emphasising the liability of fossil fuel producers and other industries contributing to greenhouse gas emissions[102].
5. Climate vulnerability: Legal claims highlight the disproportionate impacts of climate change on vulnerable populations, including Indigenous communities, women, and children, demanding specific legal protections and remedies for these groups[103].

### 5.1. Human Rights Linked to Environment & Climate

#### I. Supreme Court of Netherlands: Urgenda Foundation vs State of Netherlands[104]

The Dutch Supreme Court upheld lower court rulings requiring the Dutch government to reduce greenhouse gas emissions by at least 25% by the end of 2020 compared to 1990 levels[105]. This decision affirmed the 2015 District Court ruling and the 2018 Court of Appeal judgment that supported Urgenda's claim[106].

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[98] *Ibidem* at 98.

[99] Juliana vs. United States No. 18-36082 (9th Cir. Jan. 17, 2020); Advocate Padam Bahadur Shrestha vs. Prime Minister and Office of Council of Ministers Case No. 074-WO-0283, Supreme Court of Nepal (December 2018).

[100] Friends of Irish Environment CLG vs. Government of Ireland IESC 49 (2020); Letter of Formal Notice to Officials, Notre A aire a Tous and others vs. France (filed December 17, 2018); Sheikh Asim Farooq vs. Federation of Pakistan WP No. 192069/2018 (2018).

[101] Petition of Torres Strait Islanders to the United Nations Human Rights Committee Alleging Violations Stemming from Australia's Inaction on Climate Change (accessed 29 March 2021); Philippi Horticultural Area Food & Farming Campaign v. MEC for Local Government Environmental Affairs and Development Planning: Western Cape, No. 16779/17 (High Ct. Cape Town Div. February 17, 2020); Conservation Law Found. v. ExxonMobil Corporation No. CV 16-11950-MLW, 2019 WL 7598579, Complaint (May 6, 2019).

[102] City & County of Honolulu v. Sunoco LP No. 1CCV-20-0000380 (Haw. 1st Cir. Ct. March 9, 2020); Mayor & City Council of Baltimore v. BP P.L.C. No. 24-C-18-004219 (Md. Cir. Ct. July 20, 2018); Rhode Island v. Shell Oil Products Co. No. PC-2018-4716 (R.I. Super. Ct. July 2, 2018).

[103] Ali Steel Industry v. Government of Khyber Pakhtunkhwa 2016 CLD 569; Petition to the Inter-American Commission on Human Rights Seeking Relief from Violations Resulting from Global Warming Caused by Acts and Omissions of the United States (Inter-Am. Comm'n H.R. filed 2005); BELA v. Bangladesh WP No. 57 of 2010, D-/01-02-2012.

[104] Urgenda Foundation cs. The State of Netherlands, Supreme Court of Netherlands, Case No. 19/00135 (20 December 2019).

[105] Besselink L.F. (2022), The national and EU targets for reduction of greenhouse gas emissions infringe the ECHR: The judicial review of general policy objectives: Hoge Raad (Netherlands Supreme Court) 20 December 2019, Urgenda v the state of the Netherlands. European Constitutional Law Review, 18(1), 155-182.

[106] Verschuuren J. (2019), The State of the Netherlands v Urgenda Foundation: The Hague Court of Appeal upholds judgment requiring the Netherlands to further reduce its greenhouse gas emissions. Review of European, Comparative & International Environmental Law, 28(1), 94-98.

The State's appeal, which raised numerous objections, was rejected[107]. The Supreme Court based its decision on the consensus in climate science that urgent action is needed to prevent dangerous climate change[108]. The Court emphasized the State's obligations under Article 2[109] and Article 8[110] of the European Convention on Human Rights (ECHR), which mandates protecting the right to life and the right to private and family life. The Court found that the Dutch State must take appropriate measures to mitigate the imminent risk posed by climate change[111]. Despite global emissions being a collective issue, the Court asserted that each country, including the Netherlands, must act according to its share of responsibility[112]. The decision underscores the necessity of adhering to internationally recognized standards, such as those outlined by the Intergovernmental Panel on Climate Change (IPCC), which recommend a 25-40% reduction by 2020[113]. The Supreme Court concluded that the Dutch government's planned reduction was insufficient and that more immediate action was required to meet the ECHR obligations and protect the Dutch population from the severe impacts of climate change[114].

### II. European Court of Human Rights (ECtHR): Verein KlimaSeniorinnen Schweiz and Others v. Switzerland[115]

Verein KlimaSeniorinnen Schweiz, an association representing over 2,500 senior women and four individual applicants, filed a lawsuit against Switzerland before the European Court of Human Rights (ECtHR[116]). They claimed that the Swiss government's inadequate climate policies violate their human rights under the European Convention on Human Rights (ECHR), particularly the right to life (Article 2)[117] and private and family life (Article 8)[118].

The plaintiffs argued that older women are particularly vulnerable to the impacts of climate change, such as the increasing frequency and severity of heat waves. They contended

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[107] Supra note 105.

[108] The emission of greenhouse gases, including carbon dioxide, is leading to higher concentrations of these gases in the atmosphere. These greenhouse gases trap the heat radiated by the earth, leading to an overall increase in Earth's surface temperatures. In the last century and a half, due to massive industrialisation, there have been increased levels of greenhouse gases in the atmosphere, leading to the earth's warming by approximately 1.1 degrees Celsius. Climate Science and the international community assert that if the Earth's temperatures increase beyond 2 degrees Celsius, and according to more recent estimates, even by 1.5 degrees Celsius, then it would lead to unfavourable consequences, including extreme and prolonged heat (like the one India has witnessed in 2024), extreme drought, extreme precipitation, disruption of ecosystems, which in turn could endanger the food supply, rise in sea levels due to melting of glaciers and polar ice caps. This would jeopardise the lives and welfare of the people and environment all over the globe. See Global Climate Dashboard: Tracking climate change and natural variability over time <https://www.climate.gov/>; Also see United Nations Climate Change, UN Climate Meetings (60th Subsidiary Bodies) Enhanced Transparency Framework <https://unfccc.int/news/simon-stiell-biennial-transparency-reports-shine-a-light-on-progress-of-climate-action-i-encourage> accessed 11th June 2024.

[109] Rights and Freedoms: Everyone's right to life shall be protected by law. No one shall be deprived of his life intentionally saved in executing a sentence in court following his conviction of a crime for which the penalty is provided in law. Article 2 of the European Convention on Human Rights 1950.

[110] Right to respect for private and family life: Everyone has the right to respect his private and family life, home and correspondence. Article 8 of the European Convention on Human Rights 1950.

[111] Supra note 105.

[112] The idea of common but differentiated responsibility (CBDR) is a principle of international environmental law that states all Nations' responsibility for global environmental destruction. Yet, owing to the wide differences in levels of economic development, they are not equal. CBDR was formalised in International law at the United Nations Conference on Environment and Development (UNCED) in 1992 in Rio de Janeiro, Brazil. See Common But Differentiated Responsibilities (CBDR): International Environmental Law (Britannica) <https://www.britannica.com/topic/common-but-differentiated-responsibilities> accessed 11th June 2024.

[113] Intergovernmental Panel on Climate Change (IPCC), Global Warming of 1.5 degree Celsius <https://www.ipcc.ch/sr15/> accessed 11th June 2024.

[114] Supra note 105.

[115] No. 53600/20, judgment (Grand Chamber) of 9 April 2024.

[116] Bähr C.C., Brunner U., Casper K., & Lustig S.H. (2018), KlimaSeniorinnen: lessons from the Swiss senior women's case for future climate litigation. Journal of Human Rights and the Environment, 9(2), 194-221.

[117] Supra note 110.

[118] Supra note 111.

that Switzerland's climate policies cannot mitigate these impacts, thereby failing to protect their rights to life and health[119]. The plaintiffs claimed that by not taking adequate action to combat climate change, Switzerland is violating Articles 2 and 8 of the ECHR, which obligate the State to protect the right to life and to respect private and family life[120]. Climate change, through phenomena like extreme heatwaves, poses a direct threat to life, particularly for vulnerable groups such as older people[121]. The health impacts of climate change, including increased mortality and morbidity due to heatwaves and other extreme weather events, affect individual's ability to enjoy their private and family life[122]. The ECtHR in April 2024, decided that the Swiss government had violated the right to life of older women by failing to take adequate action to combat climate change[123]. The Court agreed with their argument and directed the Swiss government to update its policies and take more significant action against the climate crisis[124].

However, the ECtHR decision that the Swiss government violated the right to life of older women by not adequately addressing climate change was significantly impacted when the Swiss Parliament voted to overrule it in June 2024[125]. This landmark ruling, issued after an eight-year legal battle by the KlimaSeniorinnen group, mandated Switzerland to enhance its climate policies. However, the Swiss Parliament, led by the far-right Swiss People's Party (SVP), accused the ECtHR of judicial overreach and maintained that the country had already taken sufficient measures against global warming[126].

This parliamentary rejection has several critical implications. Firstly, it sets a concerning precedent for non-compliance with ECtHR judgments, potentially encouraging other countries to adhere to international human rights obligations selectively[127]. The over-ruling of the decision undermines the authority of the Court and poses a risk to the rule of law and international human rights oversight[128]. Secondly, the overruling weakens the precedent set by the ECtHR that linked the human right to health with climate change, diminishing the potential for future climate litigation based on human rights grounds[129].

Moreover, this decision reflects broader political trends in Europe, where the rise of far-right parties has often been accompanied by opposition to stringent climate policies[130]. The move may influence public support for ambitious climate action in Switzerland and other European nations. Lastly, despite the parliamentary vote, the Swiss Federal Council still holds the authority to comply with the ECtHR's ruling. However, given the environment minister's reluctance, Switzerland might face international pressure to fulfil its legal obligations under the European Convention on Human Rights if it remains non-compliant.

### 5.2. Indian Courts and Environmental Discourse

The Courts in India, with the Supreme Court at the apex and the National Green Tribunal (NGT), have played a transformative role in envisioning and shaping a more ambitious mitigation and adaptation effort to meet the goals laid out

[119] The Swiss Climate Policy does not specify a domestic share. The Federal Council aims to reduce domestic emissions by 34% from 1990 to 2030. Switzerland's targets are lower compared to the EU (55%), Denmark (70%), Finland (60% by 2030 and carbon neutral by 2035), and Germany (65%). Green Peace, KlimaSeniorinnen Schweiz <https://en.klimaseniorinnen.ch/wp-content/uploads/2024/04/2024-FAQ-EN-KlimaSeniorinnen-v.-Switzerland.pdf> accessed 11th June 2024.

[120] Supra note 117.

[121] Saucy *et al.*, The role of extreme temperatures in cause-specific acute cardiovascular mortality in Switzerland: A case-crossover study, Science of The Total Environment, 790, Swiss Tropical and Public Health Institute, Project A.06, Heat and health, Synthesis (2022).

[122] Hösli A., & Rehmann M. (2024), Verein KlimaSeniorinnen Schweiz and Others v. Switzerland: the European Court of Human Rights' Answer to Climate Change. Climate Law, 1(aop), 1-22.

[123] *Ibidem* at 123.

[124] Supra note 117.

[125] Swiss Parliament defies ECtHR on climate women's case (12th June 2024, BBC News) <https://www.bbc.com/news/articles/cl55ggjqvx7o> accessed on 23rd April 2025.

[126] *Ibidem* at 126.

[127] KlimaSeniorinnen vs Switzerland (ECtHR) Application no. 53600/20 (Climate Case Chart) <https://climatecasechart.com/non-us-case/union-of-swiss-senior-women-for-climate-protection-v-swiss-federal-council-and-others/> accessed 23rd April 2024.

[128] *Ibidem* at 128.

[129] *Ibidem* at 128.

[130] Kulin J. (2024), Climate Whataboutism and Rightwing Populism: How Emissions Blame-Shifting Translates Nationalist Attitudes into Climate Policy Opposition. Environmental Politics, 1-21. <https://doi.org/10.1080/09644016.2024.2431393>.

under the Sustainable Developmental Goals and the Paris Agreement 1.5C reduction targets[131]. India's commitments by 2030 include voluntary reduction of emissions, approximately 40% cumulative electric power installed capacity from non-fossil fuel energy resources, and the creation of an additional carbon sink of 2.5-3 billion tons of CO2 equivalent through forest cover[132].

## I. Supreme Court of India: Environmental Rule of Law

The Supreme Court of India is the apex adjudicatory body, which exercises original and appellate jurisdiction over civil and criminal matters. The Apex Court has been instrumental in establishing India's environmental rule of law. The Supreme Court in Hinch Lal Tiwari vs Kamala Devi[133] emphasized the need to maintain the ecological balance by preserving community resources like forests, tanks, ponds, hillocks, and mountains[134]. The Court held that protecting these resources is necessary for a healthy environment that enables people to enjoy a quality life[135]. This is the essence of the fundamental right to life guaranteed under Article 21[136] of the Constitution of India. The Apex Court, in this case, reprimanded the local government authorities, who were held responsible for converting lakes and ponds into residential plots.

Natural resources, including soil, water, and air, are not the private property of any citizen; these resources are for everyone's common utilization. In M.C. Mehta vs Kamal Nath[137], the Supreme Court laid down the jurisprudence in the name of the Public Trust Doctrine, where it was propounded that the State is the trustee of all natural resources, and the public is the beneficiary of these resources. As a trustee, the State has a legal duty to protect specific natural resources like air, sea, waters, and forests from converting them to private ownership and degradation[138].

Every person must utilize these natural resources judiciously and, more importantly, not be polluted or degraded. It is incumbent upon the States to prevent their degradation by enacting laws and penalizing those who pollute or degrade them. In Vellore Citizen's Welfare Forum vs Union of India[139], the Supreme Court interpreted the Sustainable Development Goals to craft two essential principles: the Precautionary Principle and the Polluter Pays Principle. The Court contextualized the precautionary principle in the municipal laws of the country to mean that the State Government and authorities must anticipate and prevent environmental degradation activities that pose a severe threat or irreversible damage to the environment[140]. As per the polluter pays principle, persons who engage in activities that degrade or pollute the environment would be held absolutely liable and made to compensate for the harm done or damage caused to the environment[141]. In this case, the industries responsible for polluting the soil and groundwater by dumping the untreated waste were liable to compensate for the harm caused to the villagers in the affected area and provide the cost for restoring the environmental degradation[142].

Notably, the Supreme Court of India highlighted that environmental justice could be achieved by shifting our perspectives from an Anthropocentric to an eco-centric worldview[143]. The Apex Court in T.N. Godavarman Thirumulpad vs Union of India[144] made incisive observations. It held that sustainable development, precautionary and polluter pay principles are rooted in anthropocentrism, where human interest reigns supreme and non-human aspects hold only instrumental value to humans[145]. The Court held that the time has

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[131] Gill G.N., & Ramachandran G. (2021), Sustainability Transformations, Environmental Rule of Law and The Indian Judiciary: Connecting the Dots through Climate Change Litigation. Environmental Law Review, 23(3), 228-247.

[132] India's Intended Nationally Determined Contribution: Working towards Climate Justice (2015). <https://www.fao.org/faolex/results/details/en/c/LEX-FAOC188478/#:~:text=Through%20the%20submission%20of%20the,40%20per%20cent%20by%202030(2021)>; Climate Action Tracker 2020 India Pledges and Targets <https://climateactiontracker.org/countries/india/> accessed on 30th May 2024.

[133] (2001) 6 SCC 496.

[134] *Ibidem* at 134.

[135] *Ibidem* at 134.

[136] Article 21: No person shall be deprived of their life or personal liberty expect according to procedure established by law. Constitution of Inda, 1950.

[137] (1997) 1 SCC 388.

[138] *Ibidem* at 138.

[139] (1996) 5 SCC 647.

[140] *Ibidem* at 140.

[141] Boyle A.E. (2005), Globalising Environmental Liability: The Interplay of National and International Law. Journal of Environmental Law, 17(1), 3-26.

[142] Supra note 140.

[143] AIR 2006 SC 1774.

[144] *Ibidem* at 144.

[145] *Ibidem* at 144.

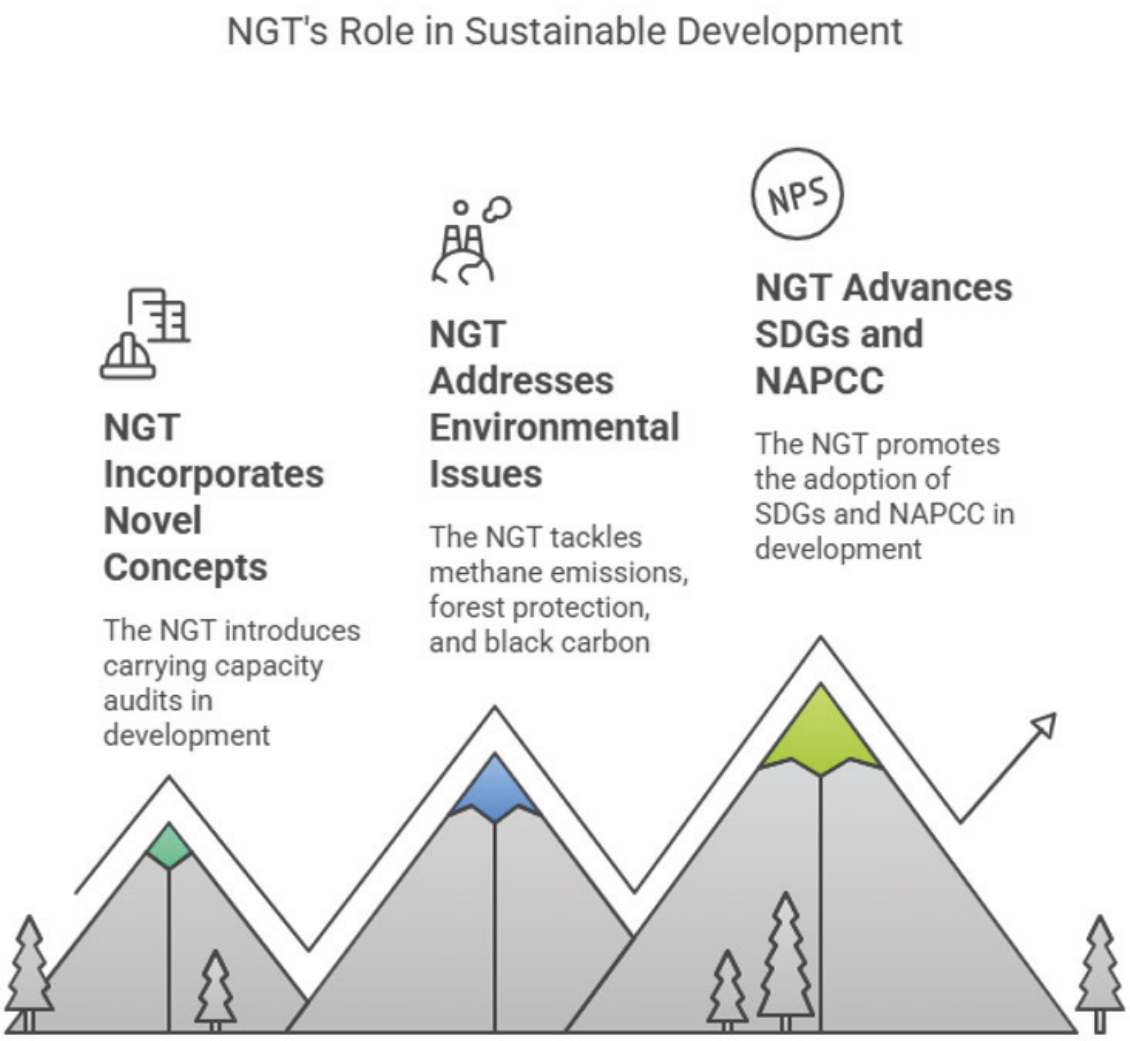


**Figure 7.** NGT's Role in Sustainable Development.

come to shift to Ecocentrism, where human beings are part of nature and non-humans have intrinsic value in themselves. In other words, humans do not take precedence over other non-human entities and are obliged to humans and non-humans.

## II. National Green Tribunal

The National Green Tribunal (NGT) was established on October 18, 2010, under the National Green Tribunal Act 2010[146]. Its primary purpose is to facilitate the effective and expedited resolution of causes related to environmental protection, forest conservation, and the management of natural resources[147]. The NGT upholds legal rights regarding the environment and offers relief and compensation for damages suffered by individuals and property[148]. As a specialized adjudicatory body, it has the expertise to address intricate environmental disputes across various disciplines[149]. The Tribunal operates according to the principles of natural justice rather than strictly following the procedures outlined in the Code of Civil Procedure, 1908[150]. Its focused jurisdiction in environmental issues aims to deliver swift ecological justice and reduce the litigation burden on higher courts.

[146] Nain Gill G. (2010), A Green Tribunal for India. Journal of Environmental Law, 22(3), 461-474.

[147] Gill G.N. (2016), Environmental justice in India: The National Green Tribunal and Expert Members. Transnational Environmental Law, 5(1), 175-205.

[148] Rengarajan S., Palaniyappan D., Ramachandran P., & Ramachandran R. (2018), National Green Tribunal of India – An Observation from Environmental Judgements, Environmental Science and Pollution Research, 25, 11313-11318.

[149] Chaturvedi E. (2021), Climate change litigation: Indian perspective. German Law Journal, 22(8), 1459-1470.

[150] Supra note 147.

Recently, the NGT has played a commendable role in laying down sustainable development jurisprudence by incorporating novel concepts like carrying capacity audits in developmental activities[151]. The NGT has addressed multiple climatic and environmental issues, including higher methane emissions due to livestock farming[152], the importance of forests and their protection in maintaining ecological sustainability in the biosphere[153], and increasing concentrations of greenhouse gases through deposits of black carbon from wide-scale forest fires[154]. Further, the NGT has advanced the adoption of Sustainable Development Goals (SDGs) and the National Action Plan on Climate Change (NAPCC) in development objectives, effectively addressing climate change[155].

### i. Carrying Capacity as Environmental Rule of Law

In Ajay Khera vs. Container Corporation of India[156], the National Green Tribunal emphasized carrying capacity as a yardstick measure for sustainability. Ecologists define carrying capacity as "a threshold level of anthropopressure, which the environment can balance and withstand without irreversible changes and serious degradation"[157]. The concept of carrying capacity provides a "tool for sustainable development of human settlements", which measures the maximum number or density of individual populations that a specific area of land can sustainably support, especially in the face of severe environmental degradation of air, water and land[158]. In this case, the National Green Tribunal directed the regulatory authorities to do a carrying capacity assessment relating to air pollution for 102 'non-attainment cities'[159]. The assessment included within its fold several metrics, like the number of vehicles, population, and extent of various activities, including institutional, industrial and commercial[160]. The NGT, in another landmark decision, the University of Delhi vs Ministry of Environment Forest and Climate Change[161], highlighted the importance of carrying capacity assessment in urban planning and construction activities and suspended environmental clearance certificates for constructing high-rise building projects near the reserve forest area. According to the Tribunal, 'carrying capacity is an integral part of sustainability, without which working towards SDGs to tackle climate change only remains on paper.'[162] The NGT said that the regulatory authorities failed to consider the vital physical and environmental requirements of the carrying capacity assessment project, and the regulatory body granted the certificate without meaningful appraisal in terms of estimations of total existing particulate matter load, assimilative and supportive capacity[163].

### ii. Livestock Emissions

The United Nations Environment Programme (UNEP) and Climate and Clean Air Coalition have termed livestock a significant source of methane emissions worldwide[164]. Methane has a higher warming potential than

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[151] Ajay Khera vs. Container Corporation of India 2019 SCC OnLine NGT 1346.

[152] Nuggehalli Jayasimha vs the Government of Delhi 2020 SCC OnLine NGT 513.

[153] Courts on its Own Motion vs State of Himachal Pradesh NGT order dated August 1, 2017.

[154] Rajiv Dutta vs Union of India 2017 SCC OnLine NGT 30.

[155] Society for Protection of Environment and Biodiversity vs Union of India NGT order dated December 8, 2017.

[156] 2019 SCC OnLine NGT 1346 and 2018 SCC OnLine NGT 2188.

[157] M. Świąder, S. Szewrań ski and J.K. Kazak, (2018). 'Foodshed as an Example of Preliminary Research for Conducting Environmental Carrying Capacity Analysis' 10(3) Sustainability 1-22.

[158] Gitanjali Gill & G. Ramachandran, (2021), Sustainability Transformations, Environmental Rule of Law and The Indian Judiciary: Connecting the Dots through Climate Change Litigation 23(3) Environmental Law Review 228-247.

[159] Non-Attainment Cities are those that have, over 5 years, consistently not met the National Ambient Air Quality Standards (NAAQS) for PM 10 (Particulate matter that is 10 microns or less in diameter) or NO2 (Nitrogen Dioxide). See Parliament Library and Reference, Research, Documentation and Information Service (LARRDIS) <https://loksabhadocs.nic.in/Refinput/New_Reference_Notes/English/15072022_173626_102120463.pdf> accessed on 30th May 2024.

[160] Supra note 157.

[161] 2020 SCC OnLine NGT 557.

[162] Supra note 162 para 17 and 27.

[163] Supra note 162.

[164] United Nations Environment Programme and Climate and Clean Air Coalition, Global Methane Assessment: Benefits and Costs of Mitigating Methane Emissions (UNEP 2021) 25.

carbon dioxide, which is 20 times higher[165]. The National Green Tribunal in Nuggehalli Jayasimha vs the Government of Delhi[166] highlighted the direct link between dairy livestock and high methane emissions leading to severe impact on climate. The NGT, based on a study, found that in 2012, the total Indian livestock emitted close to 15.3 million tons of methane, which could raise the surface temperatures to 0.69 mk over 20 years[167]. Thus, the NGT ordered the Central Pollution Control Board (CPCB) to develop evidence-based livestock monitoring mechanisms and lay down sustainability guidelines for livestock management[168].

### iii. Forest Fires Emissions

Further, NGT in Courts on its Own Motion vs State of Himachal Pradesh[169] has highlighted the intricate interconnection of sustainability domains in the context of the illegal felling of trees. The NGT propounded the adverse contribution of deforestation, which includes the destruction of carbon sinks, animal habitats and medicinal plants, global warming and soil erosion[170]. In the last decade, the hilly states of Uttarakhand and Himachal Pradesh in India have witnessed large-scale uncontrolled forest fires ravaging and affecting ecological sustainability[171]. The NGT in Rajiv Dutta vs Union of India[172] highlighted the adverse effects of forest fire emissions, which are two-fold. First, forest fires contribute to climate change by increasing the concentration of greenhouse gases[173]. Second, forest fires changed the Earth's albedo (the measure of reflectivity of the Earth's surface)[174] by depositing more light-absorbing particles such as black carbon.

### iv. Green and Clean Fuel

The NGT holds the power as a transformative lever to direct persons or bodies to stop doing wrong things while simultaneously enabling persons or bodies to move towards a sustainable development vision. NGT has, in several landmark judgements, promoted the use of non-coal fuel sources like piped natural gas (PNG), compressed natural gas (CNG), biogas, propane, butane and others to help reduce carbon dioxide emissions[175]. Since India is a signatory to the Kyoto Protocol and, subsequently, the Paris Agreement, promoting efficient, environment-friendly measures to generate and consume clean and green energy is imperative. In Babubhai Saini vs Gujarat, PCB[176], the NGT ordered the closing of the coal gasifier unless the body does not change to PNG or other clean fuel technology. Also, in several of their judgements, the apex court in the county, the Supreme Court of India, have laid impetus on generating clean energy through wind[177] and solar power[178].

### v. Upholding SDGs and Climate Accord

The NGT has made significant strides in upholding India's international commitments to the Rio Declaration 1992 and the Paris Agreement 2015, especially in tackling carbon emissions related

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[165] Boucher O., Friedlingstein P., Collins B., & Shine K.P. (2009), The Indirect Global Warming Potential and Global Temperature Change Potential Due To Methane Oxidation. Environmental Research Letters, 4(4), 044007.

[166] 2020 SCC OnLine NGT 513.

[167] Gill G.N., & Ramachandran G. (2021), Sustainability Transformations, Environmental Rule of Law and The Indian Judiciary: Connecting the Dots through Climate Change Litigation. Environmental Law Review, 23(3), 228-247.

[168] Supra note 167.

[169] NGT order dated August 1, 2017.

[170] *Ibidem* at 170.

[171] Forest Survey of India, India State of Forest Report (ISFR) 2023 <https://fsi.nic.in/forest-report-2023> accessed 23rd April 2025.

[172] 2017 SCC OnLine NGT 30.

[173] Singh S. (2022), Forest Fire Emissions: A Contribution to Global Climate Change. Frontiers in Forests and Global Change, 5, 925480.

[174] Earth's Albedo is the fraction of solar energy (sunlight) reflected back into by the Earth's surface and atmosphere. A higher albedo means more sunlight is reflected and less is absorbed, which tends to have a cooling effect on the planet. Earth's average albedo is about 0.3, meaning approximately 30% of incoming solar radiation is reflected back into space, while the surface, oceans and atmosphere absorb the remaining 70%. National Aeronautics and Space Administration (NASA), Measuring Earth's Albedo (Earth Observatory) <https://earthobservatory.nasa.gov/images/84499/measuring-earths-albedo> accessed 10th June 2024.

[175] Babubhai Saini vs Gujarat, PCB NGT Order Mach 6 2019.

[176] *Ibidem* note 176.

[177] T.N. Godavarman v Union of India (2016) AIR 2006 SC 1774.

[178] Sheela Bahuguna v Union of India (2018) SCC OnLine Utt 1268.

to construction projects. The construction industry alone accounts for 40% of greenhouse gases globally[179] and 22% of annual carbon dioxide emissions domestically[180]. In Society for Protection of Environment and Biodiversity vs Union of India[181], the NGT struck down a government notification which exempted specific building and construction projects from conducting environmental impact assessments. The NGT reasoned that in the name of 'ease of doing responsible business', the government notification ignored the ecological impact and violated the precautionary principle, which forms part of the international commitments[182]. The Environment Impact Assessment report evaluates the carbon emission associated with any construction project, its adverse impact on the ecology and the best practices/ strategies to mitigate the consequences[183]. Thus, the EIA helps achieve the targets laid down in the Paris Agreement and fulfil the Sustainable Development Goals (SDGs).

## 6. Role of Indian Government in Promoting One Health: One Health Mission

### 6.1. One Health Mission

The need to launch the One Health Mission arose from the significant health, productivity, and conservation challenges posed by India's unique environment[184]. India is home to diverse wildlife, one of the largest livestock populations, and a high human population density, all contributing to heightened risks of disease spread across different sectors. The COVID-19 pandemic, outbreaks of Lumpy Skin Disease in cattle, and the constant threat of Avian Influenza highlighted the necessity of addressing diseases from a human health perspective and the perspectives of livestock and wildlife[185]. This comprehensive approach leverages the strengths and complementarities of each sector, aiming to create integrated, robust, and agile response systems to manage and mitigate disease threats effectively.

### 6.2. What is India's National One Health Mission?

The National One Health Mission of India is a cross-ministerial effort initiated by the Prime Minister's Science, Technology, and Innovation Advisory Council (PM-STIAC[186]). It is designed to coordinate, support, and integrate existing One Health activities nationwide. This mission seeks to review the focus areas of various One Health efforts, identify opportunities for collaboration, and address any remaining gaps in the current framework[187]. The overarching goal is to create a cohesive strategy for managing health threats that impact humans, animals, and the environment.

### 6.3. Goals of the One Health Mission

The goals of the One Health Mission include[188]:

1. Pandemic Preparedness and Integrated Disease Control: Achieving preparedness and control against priority diseases affecting humans and animals through an integrated surveillance system and response readiness.
2. Research and Development (R&D): Targeted R&D to develop essential tools such as vaccines, diagnostics, and therapeutics.
3. Data and Information Integration: Streamlining data sharing and access across sectors.
4. Community Participation: Ensuring community involvement in preparedness and response activities.

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[179] P. Graham, R. Rawal, (2019). 'Achieving the 2 °C goal: the potential of India's building sector' 47(1) Building Research and Information 108-122, 109.

[180] Society for Protection of Environment & Biodiversity v Union of India NGT order dated December 8, 2017.

[181] *Ibidem* at 181.

[182] *Ibidem* at 181.

[183] Chaudhary A., & Akhtar A. (2024), A Novel Approach for Environmental Impact Assessment of Road Construction Projects in India. Environmental Impact Assessment Review, 106, 107477.

[184] Yasobant S., Bruchhausen W., Saxena D., & Falkenberg T. (2019), One Health Collaboration for A Resilient Health System in India: Learnings from Global Initiatives. One Health, 8, 100096.

[185] De Sadeleer N., & Godfroid J. (2020), The Story Behind COVID-19: Animal Diseases at The Crossroads of Wildlife, Livestock and Human Health. European Journal of Risk Regulation, 11(2), 210-227.

[186] *Ibidem* at 187.

[187] Bawa K.S., Sengupta A., Chavan V., Chellam R., Ganesan R., Krishnaswamy J., & Vanak A.T. (2021), Securing Biodiversity, Securing Our Future: A National Mission On Biodiversity and Human Well-Being for India. Biological Conservation, 253, 108867.

[188] Choudhury M.C., & Chaube P. (2022), Integrating Rare Disease Management in Public Health Programs in India: Exploring The Potential Of National Health Mission. Orphanet Journal of Rare Diseases, 17(1), 43.

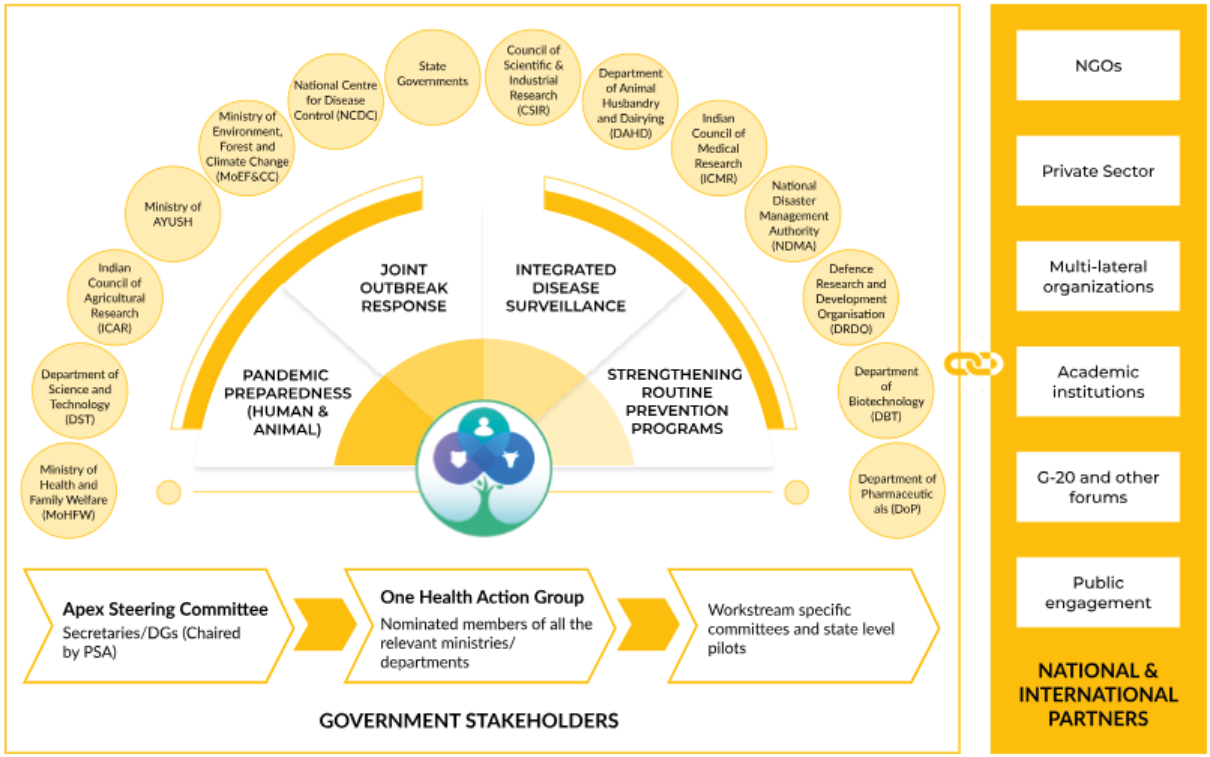


**Figure 8.** Source: National One Health Mission[189].


**Figure 9.** Integrated One Health Strategies.

[189] Office of the Principal Scientific Adviser to the Government of India, National One Health Mission, <https://www.psa.gov.in/innerPage/psa-initiatives-covid/national-one-health-mission/4053/4053> accessed 25th June 2024.


**Figure 10.** Integrated Strategies and Governance for Global Health.

Specific efforts to be undertaken include[190]:

- Implementing integrated disease surveillance across human, animal, and environmental sectors.
- Developing a robust environmental surveillance system.
- Establishing effective outbreak investigation mechanisms.
- Strengthening existing programs through state pilots and detailed mapping exercises.

### 6.4. How Those Goals Would Be Achieved

The goals of the One Health Mission would be achieved through several critical enabling activities:

1. Targeted R&D: Developing vaccines, diagnostics, and therapeutics.
2. Data and Database Integration: Enhancing information sharing and investment in disease modelling analytics.
3. Streamlining Regulatory Processes: Simplifying study approval processes and integrating efforts to prevent operational silos.
4. Governance Model: Building a sustainable governance structure that integrates existing programs and strengthens them further.

These efforts will be supported by comprehensive mapping exercises of disease priorities, surveillance programs, and laboratory capabilities to ensure adequate resource utilization and capacity building.

### 6.5. Focus of the Government of India

The government of India focuses on integrated disease control and pandemic preparedness within the broader landscape of One Health[191]. This includes addressing infectious, zoonotic, and transboundary animal diseases and diseases with epidemic or pandemic potential. The government aims to implement early warning systems, enhance surveillance, and develop response readiness to handle endemic and emerging health threats effectively[192].

[190] Gaitonde R., San Sebastian M., Muraleedharan V.R., & Hurtig A.K. (2017), Community Action for Health in India's National Rural Health Mission: One Policy, Many Paths. Social Science & Medicine, 188, 82-90.

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[192] Golechha M., Bohra T., Rana R., & Panchamia J. (2025), Impact of India's Flagship National Health Mission on Governance, Human Resources for Health, and The Health System: A Scoping Review. World Medical & Health Policy, 17(1), 6-30.


**Figure 11.** Beneficiaries of One Health Mission.

### 6.6. Beneficiaries of the Mission

The One Health Mission is designed to benefit a wide range of stakeholders:

1. Human Population: By reducing the risk of zoonotic diseases and improving overall health.
2. Livestock and Wildlife: Through better disease control and management.
3. Environment: Addressing environmental health issues such as antimicrobial resistance and water quality.
4. Healthcare System: By improving preparedness and response capabilities for pandemics and epidemics.
5. Research and Development Sector: Through targeted R&D initiatives and streamlined regulatory processes.

## 7. Conclusion

The One Health Approach emphasizes the interconnectedness between human, animal, and environmental health, advocating for a comprehensive perspective in tackling global health challenges. By recognizing the pivotal roles played by biodiversity and ecosystem resilience, this approach highlights the detrimental impact of human activities such as pollution and deforestation on overall health and underscores the need for integrated solutions.

Over time, courts and governments have increasingly acknowledged the benefits of such interconnections for holistic protection and promotion of heath. The judicial and institutional interventions are serving as a significant reminder of the relevance of such approach for better planet. Landmark judicial decisions, such as the Dutch Supreme Court's ruling in the Urgenda Foundation case, have set precedents linking environmental protection directly to human rights. Similarly, governments worldwide are progressively incorporating the One Health framework into their policies, promoting interdisciplinary collaboration to enhance disease surveillance, reduce pollution, and foster sustainable practices.

However, for the One Health Approach to reach its full potential, stakeholders must shift from an anthropocentric worldview to an ecocentric one. The Supreme Court of India notably emphasized this paradigm shift in the TN Godavarman case, highlighting the necessity of

considering the rights and health of all living beings, not just humans. Adopting an eco-centric perspective ensures that environmental conservation and biodiversity protection are integral to health policies and practices.

The beneficial implications of embracing the One Health Approach are profound. By fostering greater collaboration across disciplines and sectors, this approach can lead to more effective disease prevention and control, enhanced environmental sustainability, and improved public health outcomes. It can also mitigate the impact of zoonotic diseases, climate change, and ecological degradation, ultimately contributing to a healthier planet for all its inhabitants. Adopting the One Health Approach signifies a commitment to holistic and sustainable health management, ensuring the well-being of humans, animals, and the environment.

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SECTION I
ESSAYS

# One Health: Building a Resilient Indonesia*

*Linda Yanti Sulistiawati*

**Abstract.** The Coronavirus Disease 2019 (COVID-19) pandemic has highlighted the interconnectedness of human, animal, and environmental health, emphasizing the importance of a One Health approach to address emerging infectious diseases, zoonoses, and environmental degradation. Indonesia faces significant health threats from zoonotic diseases, deforestation, and climate change. The country has actively promoted One Health through multilateral engagement (e.g., G20, ASEAN), cross-sectoral regulations, higher education networks (Indohun), and surveillance systems like SIZE. However, the implementation of One Health in Indonesia is not without challenges. Some of the challenges are limited coordination, weak enforcement of environmental policies, and low awareness among professionals and the public. In order to successfully implement One Health, Indonesia needs to improve cross-sectoral collaboration, increase education and capacity-building, and addressing the importance of the One Health approach, including environmental and ecosystem health.

***Keywords:*** One Health, environmental health, Indonesia, zoonotic diseases, infectious diseases, climate change, public health policy.

People throughout the world have been experiencing infectious diseases long before the World Health Organization (WHO) declared the Coronavirus Disease 2019 (COVID-19) outbreak a global pandemic. Infectious diseases are caused by pathogenic microorganisms, such as bacteria, viruses, parasites, or fungi[1]. Many of the key determinants of health and the causes of infectious diseases relate to sanitation and water supply, environment and climate change[2], education, agriculture[3], trade, industrial development, and housing[4]. These health threats emerge from the imbalances of the human, animal, and environmental interfaces.

Rapid economic development has caused improvements in the well-being of humans globally, but it has also led to a faster diminishing of natural resources[5]. The consequences of environmental degradation extend far beyond ecological concerns, ultimately damaging the relationships between health, food production, and natural systems[6]. One of the many effects of the worsening relationship is the animal-origin diseases that could threaten human health and may result in a global health crisis[7]. Most emerging infectious diseases in humans

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1 <https://academic.oup.com/jambio/article-abstract/131/5/2095/6716018?redirectedFrom=PDF>.

2 Nichols G., Lake I., Heaviside C., Climate Change and Water-Related Infectious Diseases. Atmosphere (Basel). 2018 Oct 2, 9(10), 385, doi: 10.3390/atmos9100385. 3.

3 Grace D., McDermott J., Infectious Diseases and Agriculture. Encyclopedia of Food Security and Sustainability. 2019, 3, doi: 10.1016/B978-0-08-100596-5.21570-9. 440.

4 World Health Organization Eastern Mediterranean Region. Infectious Diseases. Available on <https://www.emro.who.int/health-topics/infectious-diseases/index.html> accessed on 19 February 2024.

5 Huo J, *et al.*, Depletion of Natural Resources and Environmental Quality: Prospects of Energy Use and Energy Imports in China. Resource Policy. 2023, 86, 104049, doi: 10.1016/j.resourpol.2023.104049. 3.

6 Ali, Insan, Rahman Anisur. Environmental Degradation: Causes, Effects, and Solutions, International Journal for Multidisciplinary Research (IJFMR), May-June 2024, <https://www.ijfmr.com/papers/2024/3/20366.pdf> accessed on 10 June 2024.

7 Ney Steven. Making Sense of The Global Health Crisis: Policy Narratives, Conflict, and Global Health Governance. Journal of Health Politics, Policy, and Law. 2012 Apr, 37(2), 254, doi: 10.1215/03616878-1538620. 254.

(>60%) are of zoonotic or animal-origin, with the majority of these (around 70%) originating in wildlife[8]. The COVID-19 pandemic is the latest example of a major disease of probable animal origin[9].

Environmental degradation also comes in the form of climate crises, like extreme weather, floods, and wildfires, which cause hazards to human and animal health and well-being[10]. The effects of climate change on pathogens and the health status of humans, domestic animals, including livestock and pets, and wildlife may have several possible outcomes. Evidence suggests that the natural environment is changing as a result of climate change, compromising feed and food security and accelerating the spread of infectious diseases, including drug-resistant infections and vector-borne diseases[11].

In order to decelerate the declining environmental condition, it is crucial to focus not only on human and animal health, but also on environmental health. Environmental health is the theory and practice of assessing and controlling factors in the environment that can potentially affect adversely the health of present and future generation[12].

One main aspect of controlling infectious diseases from the declining environmental condition is implementing the One Health approach. The One Health approach is an integrated, unifying approach that aims to sustainably balance and optimize the health of humans, animals, plants, and ecosystems[13]. It recognizes that the health of humans, domestic and wild animals, plants, and the wider environment (including ecosystems) are closely linked and interdependent[14].

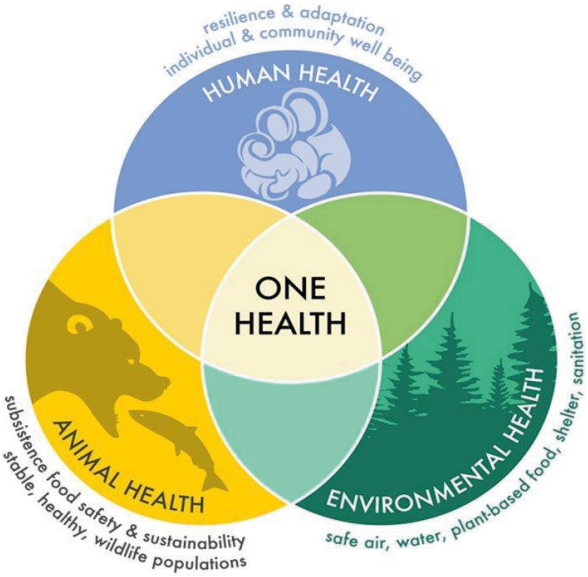


**Figure 1.** Source: <https://storage.size.go.id/wiki/uploads/images/gallery/2023-08/rlvCeWN9F-2PV7bWH-dr-qadeer-one-health-ppm111.jpg>.

One Health approach addressed health threats, recognizing the interconnectedness between the health of humans, animals, plants, and the environment; biodiversity; and food

[8] Salyer S.J., Silver R., Simone K., Barton Behravesh C., Prioritizing Zoonoses for Global Health Capacity Building-Themes from One Health Zoonotic Disease Workshops in 7 Countries, 2014-2016. Emerg Infect Dis. 2017 Dec, 23(13), S55-64, doi: 10.3201/eid2313.170418. PMID: 29155664; PMCID: PMC5711306. Accessed on 19 February 2024.

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systems. It also highlighted the existing vulnerabilities and inequalities worldwide, with wide-ranging consequences for populations who have been historically marginalized and excluded[15].

Indonesia has been promoting the One Health approach locally, regionally, and internationally. This article will highlight the involvement, implementation of such approaches, challenges, and the steps suggested on implementing the One Health and the importance of Environmental Health approach in Indonesia.

## 1. One Health in Indonesia

Indonesia is a nation with 274 million people spread over around 6,000 populated islands[16]. With its large population, vast territory, and extensive biodiversity, ranging from wild animals to livestock, Indonesia is susceptible to zoonotic and infectious diseases[17]. This is shown by the SARS-CoV-2 (COVID-19) infection that hit Indonesia in 2020. SARS-CoV-2, or Severe Acute Respiratory Syndrome Coronavirus 2 is a highly transmissible and pathogenic coronavirus that emerged in late 2019 and has caused a pandemic of acute respiratory disease, named COVID-19, which threatens human and public safety[18]. As of 23 March 2024, based on data from the Ministry of Health, since the pandemic started there were 6, 829, 162 confirmed cases and 162, 063 deaths due to COVID-19 in Indonesia[19].

Indonesia also faced several zoonotic diseases, like rabies, leptospirosis, and anthrax, years prior to experiencing the COVID-19 pandemic[20]. Up to today, the Government of Indonesia (GoI) is still battling the diseases. In another example, a s of April 2023, there have been 31,113 cases of bites from animals that transmit rabies, and currently, there are 26 provinces in Indonesia where rabies is endemic, but only 11 provinces are rabies-free[21].

In order to minimize and eradicate the effects of the diseases, Indonesia has been actively involved with One Health initiation. The country has been implementing and adopting the One Health approach in many aspects since decades ago[22]. The implementation has been conducted through enacting cross-sector regulations and policies that focus on the importance of human, animal, and environmental interconnectedness[23]; participating in promoting the approach at a multilateral level[24];

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[15] Chair's Summary: Health Ministers' Meeting of the G20 2022, the Lombok G20 One Health Policy Brief, Available at <https://g7g20-documents.org/fileadmin/G7G20_documents/2022/G20/Indonesia/Sherpa-Track/Health%20Ministers/2%20Ministers%27%20Annex/The%20Lombok%20G20%20One%20Health%20Policy%20Brief_28102022.pdf> accessed on 20 February 2024.

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[24] Sekretariat Kabinet Republik Indonesia. Dari G20 hingga KTT ke-42 ASEAN: Advokasi One Health dalam Ketahanan Kesehatan [Internet]. Jakarta: Sekretariat Kabinet Republik Indonesia; [cited 2025 Apr 26]. Available at: <https://setkab.go.id/dari-g20-hingga-ktt-ke-42-asean-advokasi-one-health-dalam-ketahanan-kesehatan/>.

participating in a higher education institution network to promote One Health[25]; and developing Surveillance Systems to Identify Zoonoses and Emerging Infectious Diseases (SIZE)[26]. Indonesia's involvement in promoting and implementing the One Health includes a number of measures as outlined below.

A. Actively participated in promoting One Health in multilateral level
   Indonesia is committed to promoting the One Health approach on international stages. This is reflected in Indonesia's support and involvement at the multilateral level, where Indonesia is actively proposed the approach to be discussed and included in the agenda of the meetings[27]. The following are some of Indonesia's contributions in initiating the implementation of One Health.
   1) During the 1st G20 Summit of 2022, Indonesia proposed and supported the commitments of G20 countries, as set out in the "Lombok G20 One Health Policy Brief", to achieve significant outcomes from the One Health implementation, particularly in low- and middle-income countries[28]. The adoption of the One Health approach can enable greater resilience for the health of individuals and communities, thereby helping to ensure that the overall health of humans, animals, plants, and the environment are considered simultaneously, for the benefit of present and future generations[29].
   2) On 23 May 2023, Indonesia actively participated in encouraging other Association of Southeast Asian Nations (ASEAN) countries to adopt and integrate the One Health approach to strengthen health systems to be resilient and responsive by establishing ASEAN One Health Network through ASEAN Leaders' Declaration on One Health Initiative and developing ASEAN One Health Joint Plan of Action to improve regional and national capacity and capabilities[30].
   3) On November 2023, Indonesia supported the Asia Pacific Regional Forum on Health and Environment (APRFHE) to place health and environment at the center of national development and to pledge cooperation with other countries in the region[31].

B. Set cross-sector regulations to implement One Health in the country
   Aside from Indonesia's participation in international forums, since 2010 it has established cross-sector regulations that assimilate the concept to implement One Health initiatives. Several ministries are involved and responsible for the implementation of the policies and regulations, particularly the Ministry of Health, the Ministry of Agriculture, the Ministry of Environment and Forestry, and the Coordinating Ministry of Human Development and Cultural Affairs[32]. Below are some regulations related to the implementation of the One Health approach.

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[25] Institut Pertanian Bogor. Partisipasi PSSP dalam Webinar "Role of One Health in Zoonotic Disease Control from Wildlife Animals" [Internet]. Bogor: Institut Pertanian Bogor; [cited 2025 Apr 26]. Available at <https://primata.ipb.ac.id/partisipasi-pssp-dalam-webinar-role-of-one-health-in-zoonotic-disease-control-from-wildlife-animals-2/>.

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[27] World Health Organization. Building resilience: The Indonesia One Health Joint Plan of Action [Internet]. Geneva: WHO, 2024 Jan 25 [cited 2025 Apr 26]. Available at <https://www.who.int/indonesia/news/detail/25-01-2024-building-resilience--the-indonesia-one-health-joint-plan-of-action>.

[28] World Bank. Safeguarding animal, human, and ecosystem health: One Health at the World Bank [Internet]. Washington (DC): World Bank; [cited 2025 Apr 26]. Available at <https://www.worldbank.org/en/topic/agriculture/brief/safeguarding-animal-human-and-ecosystem-health-one-health-at-the-world-bank>.

[29] G20 Health Ministers. The Lombok G20 One Health Policy Brief. 2022 Oct 28.

[30] ASEAN Leaders' Declaration on One Health Initiative, 23 May 2023, Available at <https://asean.org/wp-content/uploads/2023/05/11-ASEAN-One-Health-Initiative-Declaration_adopted.pdf> accessed on 20 February 2024.

[31] Kerjasama antara Kementerian Kesehatan dan Kementerian Lingkungan Hidup pada Pelaksanaan APRFHE ke-11, BKPK Public Relations, 23 November 2023, Available at <https://www.badankebijakan.kemkes.go.id/kolaborasi-kemenkes-dan-klhk-dalam-penyelenggaraan-aprfhe-ke-11/> accessed on 20 February 2024.

[32] Badan Kebijakan Kesehatan Kementerian Kesehatan Republik Indonesia. One Health Demi Atasi Pandemi di Masa Depan [Internet]. Jakarta: Badan Kebijakan Kesehatan; [cited 2025 Apr 26]. Available at <https://www.badankebijakan.kemkes.go.id/one-health-demi-atasi-pandemi-di-masa-depan/>.

- Minister of Health Regulation No. 1501/Menkes/Per/X/2010 on Types of Infectious Diseases and Countermeasures[33]. This regulation sets a list of infectious diseases based on epidemiological, social-cultural, security, economic, scientific and technological considerations and the impact on society.
- Minister of Home Affairs Regulation No. 101 of 2018 on Minimum Service Standard on Disaster Management (SPM-PB)[34]. This regulation sets technical standards for basic services in disaster management that include disaster victim rescue and evacuation activities, including rapid response to extraordinary events involving priority infectious or zoonosis diseases, such as rabies, anthrax, leptospirosis, and avian flu.
- Presidential Instruction No. 4 of 2019 on Capacity Enhancement in Preventing, Detecting, and Responding to Outbreaks of Disease, Global Pandemics, and Nuclear, Biological, and Chemical Emergencies[35]. This Presidential Instruction requires Ministries, Governors, and related agencies to assess, review, and/or refine regulations and take coordinated and integrated actions in accordance with their respective powers and authorities to prevent, detect, and respond on infectious diseases, global pandemics, nuclear, biological, and chemical emergencies that have impact on the national and/or global level.
- Minister of Agriculture Regulation No. 237/KPTS/PK.400/M/2019 on Priority Zoonotic Diseases (MoA Regulation No. 237 of 2019)[36]. This regulation sets a list of zoonotic diseases that require prevention and priority control, which include avian flu, rabies, anthrax, brucellosis, leptospirosis, Japanese B. encephalitis, salmonellosis, toxoplasmosis, etc.
- Coordinating Minister on Human Development and Cultural Affairs Regulation No. 7 of 2022 on the Guidelines for Prevention and Control of Zoonosis and Emerging Infectious Diseases (Permenko PMK No. 7 of 2022)[37]. This regulation provides guidelines for the prevention and control of zoonoses and emerging infectious diseases (EID) that must be used by ministries/agencies, local governments, village governments, academics/experts, the private sector, and the community to plan, develop, implement, and evaluate policies on the prevention and control of zoonoses and EIDs.
- National Action Plan for Health Security (NAHPS) 2020-2024. This NAHPS addressed the importance of zoonotic prevention and control which must be carried out by means of communication, collaboration, and cross-sectoral coordination within the framework of "One Health".

C. Participated in a higher education institution network to promote One Health

In January 2012, Indonesia participated in the Southeast Asia One Health University Network (SEAOHUN) of higher education institutions by establishing the Indonesia One Health University Network (<https://www.Indohun.org>). Members of Indohun are from higher education institutions, including academics, scientists, physicians, veterinarians, public health specialists, nurses, communities, ecologists, and professionals[38]. Indohun's mission is to

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[33] Simpson S., Kaufmann M.C., Glozman V., Chakrabarti A., Disease X: Accelerating the Development of Medical Countermeasures for the Next Pandemic. Lancet Infect Dis. 2020 May, 20(5), e108-15, doi: 10.1016/S1473-3099(20)30123-7. 108.

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[35] Beik Mohammadi S., Danesh T., Habibzadeh H., Nekouei Moghadam M., Hassani E., Heidari B.A., Identification and Analysis of Parameters and Global Experiences of Hospital Preparedness Against Chemical, Biological, Radiological and Nuclear Disasters: A Scoping Review. J Clin Res Paramed Sci. 2022, 11(1), e123626, doi: 10.5812/jcrps-123626. 2.

[36] Standley C.J., Carlin E.P., Sorrell E.M., Barry A.M., Bile E., Diakite A.S., Keita M., Koivogui L., Mane S., Martel L.D., Katz R., Assessing Health Systems in Guinea for Prevention and Control of Priority Zoonotic Diseases: A One Health Approach. One Health. 2019, 7, 100093, doi: 10.1016/j.onehlt.2019.100093. 2.

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[38] Indonesia One Health University Network (IndoHUN) [Internet]. Jakarta: IndoHUN; [cited 2025 Apr 26]. Available at <https://indohun.org/#about>.

foster multidisciplinary collaboration in the human, animal, and environmental health sectors[39]. Indohun is also establishing a One Health Collaborating Center to enhance university research, academic, and community initiatives related to One Health and to encourage One Health collaboration at the local level[40]. Currently, Indohun has 34 faculties from 20 university members, and 12 laboratory network members, to engage and work together in addressing regional and global health issues[41].

On 26 January 2023, Indohun established the world's first Global Health Agromaritime One Health Collaborating Center (GHA-OHCC IPB) with Bogor Agriculture University (IPB University), in Indonesia[42]. The GHA-OHCC IPB aims to address complex and dynamic One Health-related challenges in Indonesia by promoting awareness of One Health through multi-sectoral and interdisciplinary collaborations[43].

Although Indohun has actively promoted One Health, more work is still required to reach a wider audience. Indohun could involve more ecologists and environmentalists to raise awareness that the environment has a significant contribution to maintaining balance and optimal health of humans, animals, plants, and ecosystems.

D. Developed Surveillance Systems to Identify Zoonoses and Emerging Infectious Diseases

Indonesia developed surveillance systems in the form of an information system and a system which enables the public to actively participate in reporting new cases of Zoonoses and EIDs.

Based on Permenko PMK No. 7 of 2022, surveillance system is performed with:

a) Integrated surveillance

The s urveillance system through integrated surveillance is developed in the form of Information System for Zoonoses and EIDs (SIZE) application that integrates different sectoral data on diseases, early warnings for disease events, and records of responses to and analysis of Zoonoses and EIDs for healthcare service providers, agencies, local governments, and other stakeholders[44]. The objective of this application is to improve disaster risk map with the interoperability principles[45]. The integrated surveillance is carried out cross-sectorally between ministries, local governments, and any other stakeholders in a coordinated, laboratory-based, and real-time manner through an integrated system[46]. The detection of zoonotic diseases and EIDs by the ministries/agencies must be reported through the reporting system and forwarded to SIZE[47].

SIZE can be used through application and website (<https://onehealth-size.id/>). Those who use SIZE through application are

[39] Indonesia One Health University Network (IndoHUN). Together We Achieve More: Celebrating 5 Years of IndoHUN [Internet]. Jakarta: IndoHUN; [cited 2025 Apr 26]. Available at <https://indohun.org/news/together-we-achieve-more-celebrating-5-years-of-indohun/>.

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[42] Institut Pertanian Bogor (IPB University). Perkuat Sistem One Health, IPB University Siapkan Fasilitator [Internet]. Bogor: IPB University, 2023 Sep [cited 2025 Apr 26]. Available at <https://www.ipb.ac.id/news/index/2023/09/perkuat-sistem-one-health-ipb-university-siapkan-fasilitator/>.

[43] Medcom.id. GHA-OHCC, Pusat Penelitian Baru IPB University Usung Konsep One Health [Internet]. Jakarta: Medcom.id, 2023 Sep 18 [cited 2025 Apr 26]. Available at <https://www.medcom.id/pendidikan/news-pendidikan/4KZPyM6b-gha-ohcc-pusat-penelitian-baru-ipb-university-usung-konsep-one-health>.

[44] Article 1 Coordinating Minister for Human Development and Culture Regulation Number 7 of 2022.

[45] Article 11 Coordinating Minister for Human Development and Culture Regulation Number 7 of 2022.

[46] Article 16 Coordinating Minister for Human Development and Culture Regulation Number 7 of 2022.

[47] Article 21 Coordinating Minister for Human Development and Culture Regulation Number 7 of 2022.

healthcare service providers for humans and animals that record their responses to every warning/alert for disease events that emerge in each district/city, and those who use the website are ministries/agencies and local governments[48].

b) Community Based Surveillance (CBM)
CBM is conducted through:
   1) data and information submission;
   2) assistance in the form of facilities, experts, and funding;
   3) information technology development; and
   4) ideas and considerations regarding the formulation of Health Surveillance policies and/or implementations[49].

GoI has set up a list of notifiable diseases that require reporting through the surveillance system to relevant ministries as stated on MoA Regulation No. 237 of 2019. The list includes diseases like avian flu, rabies, anthrax, brucellosis, leptospirosis, salmonellosis, and toxoplasmosis[50].

Several ministries are involved in carrying out their surveillance and disseminating the protocols on handling zoonotic and EIDs, like the Ministry of Agriculture with its Global Strategic Plan for Rabies Elimination[51] and the participation of the Ministry of Environment and Forestry in the Practical Guidebook for Prevention and Control of Zoonoses and New Infectious Diseases which assigned its field officer to support the implementation[52].

Although guidelines and surveillance systems are already available, Indonesia still needs to introduce the One Health approach and its related tools to the field officers as implementation is not optimal. For example, there are a number of rabies cases in some endemic provinces, one of them is in Bali, has not even gotten adequate treatment[53]. The community has not received proper information about control and prevention. If there are reports of handling cases in the field, they prefer to wait for confirmation from an authorized agents and not take any precautions. As a result, if there is a bite in humans, early prevention is not carried out, which results in handling delays that cause mortality and morbidity[54].

## 2. One Health and Environmental Health in Indonesia

Indonesia has the third-largest tropical forest in the world covering an area of over 90 million hectares[55]. The main issue that Indonesia faces with its forest is deforestation, which is brought on by urbanization, conversion of the forest functions into human life-supporting activities, such as agriculture, oil palm plantation, logging, and mining activities.

Deforestation plays a significant role in climate change, biodiversity loss, and environmental ecosystem imbalances[56]. These factors have resulted in an increase in the number of cases of wild animals invading human settlements and the emergence of zoonotic diseases[57]. Deforestation due to human activities is a significant factor for climate change that could lead to health problems[58]. Climate change

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[48] Article 22(3) Coordinating Minister for Human Development and Culture Regulation Number 7 of 2022.

[49] Article 30 Coordinating Minister for Human Development and Culture Regulation Number 7 of 2022.

[50] Saadatnia G., Golkar M., A Review on Human Toxoplasmosis. Scandinavian Journal of Infectious Diseases. 2012, 44(11), 805-814, doi: 10.3109/00365548.2012.693197. 805.

[51] Dinkes Luwu Timur Sosialisasi Pengendalian Rabies dengan Pendekatan One Health, Warga Lutim, 27 June 2019. Available at <https://warta.luwutimurkab.go.id/2019/06/27/dinkes-luwutimur-sosialisasi-pengendalian-rabies-dengan-pendekatan-one-health/> accessed on 20 February 2024.

[52] KLHK Terbitkan Tiga Buku Panduan Hadapi Penyakit Infeksi Baru dan Zoonosis, 4 February 2019. Available at <https://klikhijau.com/klhk-terbitkan-tiga-buku-panduan-hadapi-penyakit-infeksi-baru-dan-zoonosis/> accessed on 19 February 2024.

[53] ABC Indonesian. Penyebab Kasus Rabies di Bali Indonesia Masih Tinggi [Internet]. Sydney: Australian Broadcasting Corporation, 2024 Sep 26 [cited 2025 Apr 26]. Available at <https://www.abc.net.au/indonesian/2024-09-26/penyebab-kasus-rabies-di-bali-indonesia-masih-tinggi/104400930>.

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[55] Butler R.A., Rainforest Information, 14 August 2020. Available at <https://rainforests.mongabay.com/> accessed on 20 February 2024.

[56] Okia C.A., Global Perspectives on Sustainable Forest Management. Rijeka: InTech, 2012, 15-17.

[57] Tajudeen Y.A., Oladunjoye I.O., Bajinka O., Oladipo H.J., Zoonotic Spillover in an Era of Rapid Deforestation of Tropical Areas and Unprecedented Wildlife Trafficking: Into the Wild. Challenges. 2022, 13(2), 41, doi: 10.3390/challe13020041. 3.

significantly affects people's lives because it may put agricultural productivity under strain, which could result in undernourishment and stunted growth in children and increased vulnerability to infectious diseases[59].

Since 2011, Indonesia has made an effort on slowing deforestation by issuing a moratorium on forest-clearing permits for plantations and logging through Presidential Instruction No. 10 of 2011 regarding Suspension of License Issuance on Primary Forest and Peatlands. This moratorium has been made permanent by Presidential Instruction No. 5 of 2019 concerning the Termination of Granting of New Permits and Improvement of Primary Natural Forest Governance and Peatlands.

However, burning practices still occur. During 2021, fires had burned 353,222 hectares of land which primarily happened in West Nusa Tenggara and East Nusa Tenggara[60]. These practices brought serious local and regional health consequences[61].

In September 2023, the forest fires were worsened by the climate change that resulted in the scorching weather from El Nino system[62]. Haze from the forest fires and burning practices in Sumatera, reached neighboring countries, such Malaysia and Singapore in where Singapore have taken measures to minimize the health impact on their people, such as closing schools, requesting their people to reduce doing outdoor activities and physical exertion[63].

The health of human communities is also impacted by the use of natural resources. Non-renewable fossil fuels for electricity generator, transport, and industry can cause air pollution that is responsible for significant mortality every year due to heart and lung diseases[64]. In the first months of 2023, it was recorded 638,000 patients are suffering from upper respiratory tract infection (ARI), a 13-fold increase compared to during the COVID-19 pandemic[65].

To address these issues, the GoI and Ministry of Environment and Forestry has enacted a number of laws and regulations, such as Government Regulation No. 22 of 2021 on Environmental Protection, Organization, and Management that regulates air quality protection and management. However, there are major obstacles to implement the regulations, like the loopholes in the regulations itself and social-economic factors, like population and poverty[66]. Population becomes a source of environmental problems when natural resources are no longer able to provide sufficient support for human needs[67].

Indonesia could incorporate the One Health approach into the regulations to make it more comprehensive and could provide people and stakeholders a better understanding of the risks associated with forest fires and the use of non-renewable fossil fuels to the health of human, animals, and environmental.

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[63] Singapore Government Agencies Implement Measures to Mitigate Impact of Haze, National Environment Agency, 7 October 2023. Available at <https://www.nea.gov.sg/media/news/news/index/singapore-government-agencies-implement-measures-to-mitigate-impact-of-haze-(7-october-2023)> accessed on 21 February 2024.

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[65] *Tempo*. 'Transisi Energi Mengusir Polusi', 27 August 2023. Available at <https://majalah.tempo.co/read/opini/169577/polusi-udara-transisi-energi> accessed on 21 February 2024.

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[67] Wijoyo S and Prihatiningtyas W., Forest-Fire-Related Environmental Issues in Indonesia, Environmental Policy and Law, 2019, Available at <https://repository.unair.ac.id/97827/1/1.%20A.pdf> accessed on 20 February 2024.

## 3. Challenges

Indonesia consists of more than 17,000 islands, with 274 million people living in the archipelago[68]. To implement the One Health approach for that scale the GoI faces many challenges including:

- The vast territory and large population causes inadequate communication and difficulties in conducting better coordination, monitoring, and reporting systems, which resulted in differences in how the One Health concept is understood between key sectors, institutions, and field personnel, both locally and nationally, resulting in inefficiency and ineffectiveness in its implementation.
- Indonesia has enacted cross-sectoral policies and regulations, but the focus of the regulations is mainly on human and animal health. Although there are regulations pertaining to the environment, they have not been fully enforced. The policies and regulations on environment related to One Health are mainly focused on wildlife management and conservation, while natural resource management, biodiversity conservation, management and sustainable use, pollution, and waste management are not getting much attention[69]. There is a lack of awareness about the connection between the One Health approach and environmental sectors, so the public and stakeholders have little understanding of the risks that may arise from the environmental issues, like forest fires and the use of non-renewable fossil fuels, to the health of human, animals, and the environmental itself.
- There is a lack of awareness and capacity to address the importance of the One Health approach among professionals and academics. Moreover, there are not many professionals and academics who are well aware of and fully understand the existence of One Health approach and how it is implemented.

## 4. Conclusions

Based on the above discussions, to successfully implement the One Health approach the GoI could increase the effectiveness and efficacy of the implementation of One Health policies and regulations, the pertinent institutions, agencies, stakeholders, and parties involved, including field officers, both locally and nationally, must determine and improve their communication, coordination, monitoring, and reporting systems. The government also needs to actively approach in engaging and collaborating with cross-sectoral agencies and stakeholders on the importance of the environmental sector in order to achieve optimal health outcomes between people, animals, plants, and the environment. There is also a need to enhance professionals and academics' awareness and capacity, as well as addressing the importance of the One Health approach, including environmental and ecosystem health.

[68] Indonesia Archipelago Disaster Information System (INADIS). The Indonesian Archipelago [Internet]. [cited 2025 Apr 26]. Available at <https://www.inadis.org/the-indonesian-archipelago>.

[69] Kementerian Koperasi dan UKM Republik Indonesia. 7,2 Juta Ton Sampah di Indonesia Belum Terkelola dengan Baik [Internet]. Jakarta: Kemenkop UKM; [cited 2025 Apr 26]. Available at <https://www.kemenkopmk.go.id/72-juta-ton-sampah-di-indonesia-belum-terkelola-dengan-baik>.

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SECTION I
ESSAYS

# The One Health Approach in Turkiye: Current Applications and Future Prospects

*Yasemin Saygilar*

**Abstract.** The One Health approach is based on the interconnectedness of human, animal, and environmental health, advocating for a comprehensive and integrated approach to health governance. This perspective is important in addressing health complexities of the 21st century characterized by zoonotic diseases, antimicrobial resistance, and environmental changes.
Turkiye's strategic location at the crossroads of Europe and Asia signifies a merger of diverse ecosystems and biological diversities. Factors such as its geographic location and extensive livestock production naturally place Turkiye at the forefront of facing zoonotic diseases carried by migratory birds and animals, emerging infectious diseases, and environmental health issues arising from industrialization and urban sprawl, making the One Health concept not just relevant but essential for Turkiye.

***Keywords:*** One Health, environment, disease, biodiversity, zoonotic.

## 1. Introduction

According to UNEP, the One Health concept is predicated on the interconnectedness of human, animal, and environmental health, advocating for a comprehensive and integrated approach to health governance[1]. The approach is based on the recognition that human health is intricately linked to the conditions of animal health and environmental health. This integrative perspective is crucial in addressing health complexities of the 21st century characterized by emerging zoonotic diseases, antimicrobial resistance, and environmental changes[2].

Globally, this concept has gained traction due to the increase in zoonotic diseases, concerns over food safety, and the impacts of climate change on public health[3]. In Turkiye, a country characterized by considerable biodiversity, intense agricultural activities, and rapid urbanization, the One Health approach, which provides a unique matrix of challenges and opportunities, reflecting its geographical, socio-economic, and ecological diversity, is both relevant and necessary. In this context, it is essential to explore how the One Health concept is currently manifested in Turkiye, the challenges faced, and potential strategies for its future implementation.

## 2. Current Implementation of One Health in Turkiye

Turkiye's strategic location at the crossroads of Europe and Asia not only epitomizes a blend of cultures and histories but also signifies a merger of diverse ecosystems and biological diversities. In Turkiye, the relevance of the One Health approach can be traced to the country's geographic location, which places it between two continents along major migration routes for numerous bird species, making it a significant point of surveillance for avian diseases[4]. Additionally, Turkiye's extensive livestock production necessitates continuous monitoring and control of animal diseases that could

[1] <https://www.unep.org/topics/chemicals-and-pollution-action/pollution-and-health/unep-one-health#:~:text=One%20Health%20is%20an%20integrated,are%20closely%20linked%20and%20interdependent>.

[2] Francesca Coli, Hanna Schebesta (2023), 'One Health In The EU: The Next Future?', 302. [Accessed on 20 sep 2024]. Available from: doi: 10.15166/2499-8249/652.

[3] Kim Gruetzmacher, William B. Karesh, John H. Amuasi, Adnan Arshad, Andrew Farlow, Sabine Gabrysch, Jens Jetzkowitz, Susan Lieberman, Clare Palmer, Andrea S. Winkler, Chris Walzer (2021), 'The Berlin Principles On One Health-Bridging Global Health and Conservaiton'. *Science of the Total Environment*, 764, 142919 [Online].

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potentially transfer to humans[5]. These factors naturally place Turkiye at the forefront of facing zoonotic diseases carried by migratory birds and animals, emerging infectious diseases, and environmental health issues arising from industrialization and urban sprawl[6]. The proximity of human populations to diverse livestock and wildlife further enhances the risks of zoonotic spillover, making the One Health concept not just relevant but essential for Turkiye[7].

In Turkiye, "One Health" was first brought to the agenda in an article written in 2007, in parallel with the developments in the world[8]. Following this, the Turkish Medical Association and the Turkish Veterinary Association published a joint declaration in Ankara on 25.04.2009 titled "One World, One Health", which was created to address the negative effects of new zoonotic diseases that have emerged in recent years on human, animal and environmental health[9].In the declaration; to achieve the success targeted in the "One World, One Health" concept, human and veterinary physicians at national and international levels should work in cooperation with each other on education, legislation and practice, and in parallel with international initiatives, some suggestions decided by both professional organizations in our country should be implemented by national organizations[10].

The Turkish government, non-governmental organizations (NGOs), and various stakeholders have intermittently applied the One Health approach, particularly in response to specific health crises.

Some of the activities of the Ministry of Health related to One Health are prevention of zoonotic, vectorial and parasitic diseases; conducting surveillance and epidemiological studies of these diseases; in case of disease, the situation is investigated and the necessary diagnosis and treatment services are provided; it aims to prevent the emergence of new cases and epidemics by ensuring cooperation with relevant institutions and organizations[11].

According to the Article 772 in the aims and objectives section of the Agriculture and Food Section of the 10th Development Plan of Turkiye covering the years 2014-2018, the One Health policy will be implemented, including animal welfare, with the Business-Oriented Preventive Veterinary Medicine System[12]. In addition, the "One Health Joint Action Plan" was published by the Veterinary Public Health and Social Studies Association for 2022-2026, based on the agreement made with the United Nations Food and Agriculture Organization.

Turkiye's management of Avian Influenza in the past demonstrated a form of the One Health approach through coordinated efforts between the Ministries of Health, Agriculture, and Forestry[13]. Similarly, the coordinated response to the Crimean-Congo Hemorrhagic Fever (CCHF) involving human, vector, and animal surveillance illustrates a move towards a One Health strategy. The government, in coordination with various NGOs and international bodies like WHO and FAO, undertook comprehensive surveillance programs, public awareness campaigns, and vaccination drives to monitor and control these diseases[14]. Examples of the One Health approach include the Foundation of the Zoonosis National Committee in 1991; the Preparation And Fight Against Bird Flu and The Epidemic Affecting Humans Project (AIHP) in 2006; Multi-Stakeholder Health Responsibility

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[5] Inci A., Doğanay M., Özdarendeli A. (2018), Overview of Zoonotic Diseases in Turkey: The One Health Concept and Future Threats. Turkish Journal of Parasitology, 42(1), 39-80, doi: 10.5152/tpd.2018.5701. 40.

[6] Inci A., Yildirim A., Duzlu O., Doganay M., Aksoy S (2016) Tick-Borne Diseases in Turkey: A Review Based on One Health Perspective. PLoS Negl Trop Dis 10(12), e0005021, doi: 10.1371/journal.pntd.000502.2.

[7] Inci A., Doğanay M., Özdarendeli A. (2018), Overview of Zoonotic Diseases in Turkey: The One Health Concept and Future Threats. Turkish Journal of Parasitology, 42(1), 39-80, doi: 10.5152/tpd.2018.5701.67.

[8] <https://evrimagaci.org/tek-saglik-konsepti-saglik-politikalarina-butuncul-bakis-acisi-neden-onemlidir-19064?srsltid=AfmBOoomCzTHt-cOcmtydB7JI604PvG2c-O2TDmBKDDv58wSfLQm1QfF>.

[9] Adnan Serpen, 'Covid 19 Pandemisi Altıncı Ay Değerlendirme Raporu'. 691 [Accessed on 20 sep 2024]. Available from: doi: covid19-rapor_6_Part78.pdf (ttb.org.tr). 691.

[10] <https://www.ttb.org.tr/haberarsiv_goster.php?Guid=6691bf7c-9232-11e7-b66d-1540034f819c>.

[11] Türkiye'de Tek Sağlık – VETERİNER HALK SAĞLIĞI ve TOPLUMSAL ÇALIŞMALAR DERNEĞİ (vhsd.org.tr).

[12] Ministry of Development, 2013.

[13] Pandemi Döneminde Yeniden "Tek Sağlık" Kavramı During the Pandemic Period Again "One Health" Concept Betül AKKAYA 1, Birgül PİYAL. 26.

[14] <https://www.vethekimder.org.tr/TR,153/tek-saglik.html>.

Development Program (2013-2023); Rational Drug Use National Action Plan and many studies carried out by the Ministry of Food, Agriculture and Livestock[15].

## 3. Legislation Regarding Protection of Environment Reflecting One Health Approach

Article 3 of the Environmental Code states general principles regarding the protection, improvement, and prevention of pollution of the environment. Everyone, especially the administration, professional chambers, unions, and non-governmental organizations, is responsible for protecting the environment and preventing pollution and is obliged to comply with the measures to be taken and the principles determined in this regard. In all kinds of activities in the fields of protecting the environment, preventing environmental degradation, and eliminating pollution; The Ministry and local governments cooperate with professional chambers, unions, and non-governmental organizations when necessary[16].

According to Article 9 on the protection of the environment, it is essential to protect the biological diversity that constitutes the natural environment and the ecosystem that contains this diversity. The principles of biodiversity conservation and use are determined by taking the opinions of local governments, universities, non-governmental organizations, and other relevant organizations.

According to Turkish Criminal Code art. 181, any person who deliberately discharges waste or residues into the soil, water or air, contrary to the technical procedures determined by the relevant laws and in a way that will harm the environment, is punished with imprisonment from six months to two years.

## 4. Challenges to Effective Implementation

Despite these applications, several challenges obstruct the seamless integration of the One Health approach within Turkiye's health and environmental policies. Primarily, there is an institutional fragmentation where human, animal, and environmental health sectors operate with minimal collaboration[17]. This lack of integration inhibits effective information sharing and resource allocation, essential components of the One Health approach. Furthermore, public awareness and education regarding the importance of linking human health with animal health and ecosystem health remain limited[18]. This gap in understanding reduces community engagement and support, which are critical to the successful implementation of One Health initiatives.

## 5. Strategies for Enhanced One Health Implementation to encourage the One Health initiative

Turkiye can adopt several strategic measures, such as an integrated policy framework. Developing a strong policy framework that explicitly integrates human, animal, and environmental health is crucial. This framework should also include a strong legislative framework to facilitate collaboration across different government sectors and define clear roles and responsibilities for the prevention, detection, and response to health emergencies. Legislative framework in this context also includes the constitution. One Health approach should be included under art. 56 of the Turkish Constitution[19].

Secondly, enhancing the capabilities of health professionals, veterinarians, and environmental scientists through inter-disciplinary training programs can foster a more collaborative approach to health challenges. Special emphasis should be placed on rural areas where the human-animal-environment interface is most pronounced.

Elevating public awareness about the One Health concept through education campaigns can enhance community-based surveillance and compliance with health measures. Schools,

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[15] Türkiye'de Tek Sağlık – VETERİNER HALK SAĞLIĞI ve TOPLUMSAL ÇALIŞMALAR DERNEĞİ (vhsd.org.tr).

[16] <https://www.tarimorman.gov.tr/Belgeler/Mevzuat/Kanunlar/%E2%82%ACEVRE%20KANUNU.pdf>.

[17] Sahinturk P. (2022), Tek sağlık uygulamalarının değerlendirilmesi: standardize edilmiş güncel yöntemler. BAUN Sağ Bil Derg, 2022, 11(Supplement 1), 51-58, <https://doi.org/10.53424/balikesirsbd.1145053>.

[18] <https://vethekimder.org.tr/Eklenti/25,teksaglikpdf.pdf?0&_tag1=AAFA7CAC50E616381B23872B98BE6E15544A9A6F#:~:text=T%C3%BCrkiye%27de%20%C3%B6nemli%20bir%20di%C4%9Fer,duyurulan%20ortak%20deklarasyonun%20yay%C4%B1nlanmas%C4%B1%20olmu%C5%9Ftur.100>.

[19] Art. 56 of the Turkish Constitution: "Everyone has the right to live in a healthy and balanced environment. It is the duty of the State and citizens to improve the environment, protect environmental health and prevent environmental pollution".

local media, and community leaders can play significant roles in these educational efforts.

Lastly, investing in research to better understand the interactions between human, animal, and environmental health within the Turkish context is vital. Furthermore, establishing a more integrated surveillance system could facilitate early detection and control of potential outbreaks.

## 6. Conclusion

The One Health approach has a significant assurance for Turkiye, given its unique epidemiological and ecological challenges. By addressing current barriers and strategically investing in policies and programs that enhance integration across health sectors, Turkiye can better manage public health risks that pass over human, animal, and environmental boundaries. Such an integrative approach not only prepares Turkiye to effectively manage current health challenges but also fortifies it against future threats in an increasingly interconnected world[20].

In Turkiye, within the framework of One Health, there are various action plans created by both the Ministry of Health and the Ministry of Food, Agriculture and Livestock, various symposiums that have been held and continue to be held in this field, informative trainings and a committee formed by relevant Ministries such as the National Zoonosis Committee. In addition, the Ministry of Food, Agriculture and Livestock, with the principle of "Prevention is Better than Treatment", is fighting against animal diseases in line with the EU. These are positive steps in the field of One Health.

Regarding the protection of the environment, issues such as establishing an effective administrative structure, eliminating any legislative inadequacies, ensuring that sanctions are measurable and specific, and encouraging the public's participation in environmental awareness and protection are factors that affect deterrence. At this point, the diversification of environmental problems and the fact that their damage is more noticeable make a deterrence policy based on preventive measures necessary. When looking at examples from some countries, it can be seen that the legal tools used in environmental protection, especially administrative sanctions, have been developed and made more effective with new preventive strategies. Innovative administrative law measures are needed to improve compliance with environmental law and increase the degree of protection. Issues such as collaborative administrative sanction mechanisms, reaching an adequate level of administrative sanctions, restructuring the administrative organization (technological infrastructure), power sharing, and the role of the administration in efforts to increase environmental awareness are prominent issues in more effective protection of the environment through administrative law tools. The breadth of the content of the concept of the environment and the insufficiency of environmental protection tools in the face of technological developments require legal regulations to be changed (kept up to date) and to include different areas.

As a result, although Turkiye has legal regulations on human, animal and environmental health, it is of course extremely important to emphasize one health in legal regulations for these to be put into practice and for the concept of one health to be fully established in the country's policy.

[20] Betül Akkaya, Birgül Piya (2022), Sağlık ve Toplum, 32 (3) 23-33 Review "During the Pandemic Period Again "One Health" Concept" 31 [Accessed on 20 sep 2024]. Available from: doi: 3-Pandemi-Doneminde-Yeniden-Tek-Saglik-Kavrami.pdf (ssyv.org.tr).

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SECTION I
ESSAYS

# From the One Health Approach to the Search of Dignity by the Means of Climate Change and Housing Policy*

*María Luisa Gómez Jiménez*

**Abstract.** The idea of One Health has emerged as a relevant approach which allows us to understand how to deal with all the issues that impact our own quality of life and dignity in our daily activities. The study presented focuses on specific effects of climate change and how they are changing the way we should think about cities and urban settings. Thus, the one health approach permits an integrated response to issues which overlap different regulations and topics, and helps to provide a SDG-oriented policy addressing dignity concerns.

***Keywords:*** climate change, One Health, dignity, housing.

## 1. Towards a definition of one health

The idea of thinking globally in a one Health and ecosystemic approach is not new in an international scenario. The concept of One Health is defined by the World Health Organization as, "an approach to designing and implementing programs, policies, legislation and research in which multiple sectors communicate and work together to achieve better public health outcomes", and involves a connection between soft-law administrative law and hard-law administrative law.

The legal basis for the One Health approach is firmly rooted in international agreements and national legislations that address public health, biodiversity, and environmental sustainability. This paper addresses the idea of one health as a holistic concept which integrates different knowledge that is interconnected and rooted within the scope of a common impact on public health. This knowledge adopts the form of regulations and intersects in a wider context to propose rules for promoting health on the planet as it's improved for humans.

This idea is considered a key topic within the Spanish legal framework. Spain has taken significant steps towards integrating One Health principles into its regulatory system, as was showcased in the latest public health reforms. The 33/2011 Act on Public Health explicitly recognizes the need for intersectoral cooperation to address health risks which crosses traditional sectorial boundaries. This law mandates coordination between health, veterinary, and environmental authorities, forming the basis for a holistic approach to health governance. Moreover, Spain has aligned its efforts with European Union directives, such as the One Health Action Plan against Antimicrobial Resistance (2017), which promotes prudent antibiotic use and multisectoral cooperation to combat AMR (European Commission, 2017)[1].

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[1] Gómez Jiménez M.L. (2020), Ciudades saludables en la era post-COVID. Lecciones aprendidas: Un apunte sobre los efectos de la pandemia en las políticas de urbanismo y vivienda, en: *Pandemia y derecho. Una visión multidisciplinar*, Laborum, 125–141, and also Gómez Jiménez M.L. (2023), *S*alud pública, emergencias sanitarias y co-gobernanza: Estudio del régimen jurídico de las prestaciones desde el Derecho comparado autonómico español antes de la próxima pandemia, Thomson-Reuters Aranzadi.

| Impact of Climate Change | Effect on Acoustic Insulation | Possible Solution |
|---|---|---|
| More frequent extreme weather events | Increased external noise | Strengthen insulation on facades and roofs |
| Changes in construction materials | Changes in acoustic properties | Develop new materials with good thermal and acoustic performance |
| Increased need for ventilation | Possible compromise of insulation | Ventilation systems with acoustic attenuation |
| Increased use of outdoor spaces | Increased exposure to noise | Improve insulation in areas close to outdoor spaces |
| Updated regulations | Stricter noise requirements | Proactive adaptation to new standards |
| Increased thermal stress | Increased sensitivity to noise | Integrated solutions for thermal and acoustic comfort |
| Changes in urban soundscape | New noise patterns | Adaptive design of acoustic insulation |
| Increased population density | Higher noise levels | Urban planning that considers acoustic insulation |

**Figure 1.** Table of possible impacts of climate change on the acoustic insulation of homes and proposal of possible technical solution. Own elaboration.

## 2. The need for an integrated response from a dignity approach: some examples from the climate change perspective in housing aspects

The Study of Dignity, as we know it, refers to an intrinsic quality of human beings which deserves protection and care[2], as we approach it from different scenarios and aspects in which human beings are developing its day-by-day activities. In this regard, the specific attention to housing dignity and its connection with the paradigm of a one health approach is better understood from the umbrella of the intersection among not only housing law or urban parameters, but also under the scope of climate change and its health impact. Therefore, the know-how derived from the implementation of public policies addressing climate change[3] is also utilized to improve human health. In this way, housing policy serves as a sector-specific case study that allows for a new perspective on the One Health approach.

This is why we will analyze some relevant aspects that affect the definition of healthy housing and how it is impacted by climate change[4]. The question We aim to answer is: how can the one health approach be projected within the topic of the right to dignity in housing while taking into consideration the impact of climate change? To answer this question, we will explore the different dimensions of healthy housing, from the possible effects of climate change to the concept of climate change resilience.

### a. Acoustic Insulation

The relationship between the effects of climate change and the impact on noise is indirect, but is present in the changes caused by the new climate emergency. The effect is partly caused by changes in the behavior patterns of citizens, who with different climatic situations must modify their schedules and adapt to more extreme heat or greater cooling, without prejudice to the consequences that this may have on the design of cities.

The existing regulations regarding noise protection are described within the Technical Building Code, and the Basic Document on Noise Protection (DB-HR). The document specifies the technical requirements, but fails in setting a fixed picture of building conditioning factors in use which have been applied throughout the length and breadth of the Spanish geography.

The regulation of the basic documents for protection against noise and acoustic insulation, linked to the Technical Building Code, was the subject of attention by Order VIV/984/2009, of 15 April, which modifies certain basic documents of the Technical Building Code approved by Royal Decree 314/2006, of 17 March. and Royal Decree 1371/2007, of 19 October[5].

The need to guarantee an adequate standard of living for citizens through the reduction of noise pollution emphasizes the importance of implementing measures to improve acoustic quality. Scientific studies have shown that noise not only generates greater physical and emotional stress, but can also disturb the coexistence of both residents and families. It

[2] Puyol Montero J.M. (Coord.) (2020), New challenges for law: Studies on the dignity of human life, Real Colegio Complutense, Tirant lo Blanch.

[3] Alenza García F., & Mellado Ruiz L. (2022), *Estudios sobre cambio climático y transición energética: Estudios conmemorativos del XXV aniversario del acceso a la cátedra del Prof. Iñigo del Guayo*, Marcial Pons; Alonso Ibáñez R. (2018), La eficiencia energética de los edificios y el marco jurídico de la rehabilitación urban, en: Galera R., & Gómez Z. (eds.), *Políticas locales de clima y energía*, INAP.

[4] Gómez Jiménez M.L. (Dir.) (2025), Política de vivienda y cambio climático, Tirant lo Blanch; López Ramón F. (2021), Notas a la Ley de Cambio Climático, *Actualidad Jurídica Ambiental*, 114; Moreno Molina A. (2023), El Derecho del Cambio climático: retos, instrumentos y litigios, Tirant lo Blanch.

[5] BOE 24 April 2009.

can also impact the professional environment, especially when professional activities (remote work) are carried out at home[6].

Activities that generate noise pollution are framed within the right to housing[7] insofar as it ensures the dignity and adequacy of the dwelling for those who must reside in it. Therefore, actions that improve acoustic quality not only generate comfort, but can also improve the economic value of the home as they represent a selling point in the real estate market[8].

Therefore, apart from the provision contained in the technical regulations of the Technical Building Code, attention must be given to the Noise Law, which was approved by Law 37/2003, of 17 November. This is a regulation that requires, in our view, precise regulatory adjustments to integrate the conditioning factors, among others, of climate change. Prof. Aguirre Font[9], would have stated the need for these adjustments in the field of urban planning[10]. We believe that a further step must be taken in the regulation of noise to mitigate the effects of new housing uses, patterns of behavior, and activities caused by, for example, the "touristification" of the historic centers of our cities, through the conditions they impose regarding the acoustics of buildings. On the other hand, as we pointed out, these areas are made up of old building stock that needs not only energy rehabilitation but also acoustic improvement.

An example of what we mean can be found in Article 7 of Law 37/2003, which deals with the examination of different types of acoustic areas[11]. However, it does not include the challenges presented by climate change throughout these sectors. Additionally, Article 15 makes no reference to the potential use of noise maps in informing climate change adaptation measures or in addressing acoustic impacts[12]. This omission remains despite the provisions contained in Royal Decree 1367/2007 of 19 October, which expands Law 37/2003 of 17 November on Noise specifically regarding acoustic zoning, quality objectives, and acoustic emissions[13].

### b. Light pollution and the use of electricity

Although not expressed in this way, in the Law on the Right to Housing, lighting is considered key to the well-being of living beings. Attention to light pollution is intrinsically connected to air pollution, as has been shown by Law 34/2007 on air quality and air pollution[14]. Thus, the standard defines it as: "The nocturnal luminous glow or brightness produced by the diffusion and reflection of light in gases, aerosols and particles suspended in the atmosphere, which alters the natural conditions of the night hours and hinders astronomical observations of celestial objects, the natural brightness must be distinguished, attributable to the radiation of celestial sources or objects and to the luminescence of the upper layers of the atmosphere, of the luminous glare due to the light sources installed in the outdoor lighting"[15].

The increase in gases affects the quality of the night sky and affects the quality of life of residents in housing. t is worth noting that housing

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[6] In this regard, the impact of Law 10/2021, of 9 July, on remote work should not be forgotten.

[7] STC 52/2024, of 8 April (BOE of 15 May 2024).

[8] Merida Rodriguez M. (2025), Apuntes sobre el tratamiento del paisaje en la política de vivienda en España, en: Gomez Jimenez M.L., *Vivienda y Cambio Climático. Desafíos Regulatorios*, Tirant lo Blanch.

[9] Font A. (2022), Noise: state of the art and pending challenges in Administrative Law, *Observatory of Environmental Policies*, n. 2022, January, 789-805.

[10] Thus, it points out: "For this reason, mechanisms and economic resources should be articulated to guarantee a progressive and global adaptation of municipal planning to the provisions of the legislation on noise, even if it is through compensation to individuals affected by singular limitations on their uses – not susceptible to equitable distribution in accordance with the legislation on land. This would avoid many of the problems generated by the incompatibility of residential and leisure uses in the current planning, as Joan M. Trayter pointed out".

[11] Thus, the regulation distinguishes between: "Sectors of the territory with a predominance of land for residential use. Sectors of the territory with a predominance of land for industrial use. Sectors of the territory with a predominance of land for recreational and entertainment use. Sectors of the territory with a predominance of land for tertiary use other than that contemplated in the previous paragraph. Sectors of the territory with a predominance of land for health, educational and cultural use that requires special protection against noise pollution. Sectors of the territory affected by general transport infrastructure systems, or other public facilities that require them. Natural areas that require special protection against noise pollution".

[12] The connetion among climate change and noise control is more relevant than imagined.

[13] BOE of 24 October 2007.

[14] BOE 16 November 2007.

[15] Article 3(f) of the Law.

adaptation to climate change can lead to the reduction of light pollution. This reduction increases the visual access of residents to the surrounding landscape from within the home, resulting in their increased comfort[16]. We cannot disconnect the impact on the environment since it impacts on single health. However, we have not yet verified the existence of regulatory attempts that connect the above-mentioned variables, even though the improvement of the quality of our night sky and to the reduction of air pollution allow for improvements in the management and energy efficiency of homes. This also contributes to reducing greenhouse gas emissions and improving the climate resilience of housing.

### c. Thermal Comfort Management (Heating and Air Conditioning)

According to a report published by *The Lancet*, heat deaths in Europe could triple within 75 years. Thus, heat can lead to an increase in mortality. The rise in temperature could be up to 4 degrees if no measures are taken. The most affected countries will be those in southern Europe, including Spain, so it is a public health priority to adapt the building stock to ensure thermal comfort in homes, particularly for the elderly population. This thermal adaptation involves the modification of the technical regulation as we have seen and requires the necessary awareness to carry out a substantial modification of the building premises to adapt them to the climatological conditions.

Law 7/2021 on climate change and energy transition implements adaptation to climate change through the National Adaptation Plan, a basic instrument that will be responsible for compiling information on violations and adaptations to climate change in socioeconomic sectors, ecological systems and territories. The residential sector is part of the diffuse sectors[17], and because it involves less energy use, the planned energy transition must be carried out under the specificities of Spanish building regulations.

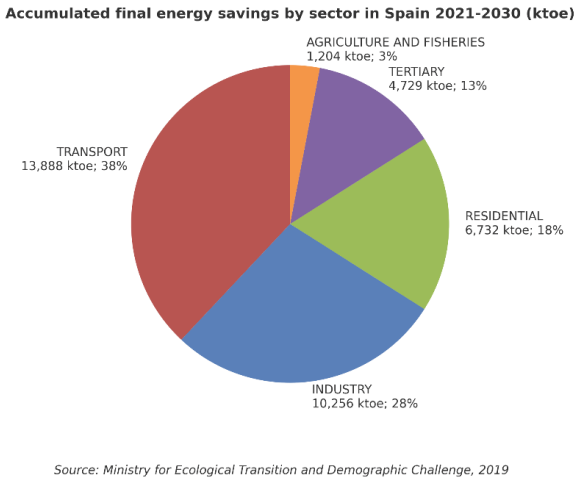


**Figure 2.**

The PNIEC (National Integrated Energy and Climate Plan), whose temporal projection was foreseen for the period from 2021 to 2030, also pointed out that the residential sector was a diffuse energy sector because it both generates and consumes energy[18]. Notwithstanding the references that we will make to the principles derived from the European statements, in its first draft the PNIEC integrated objectives linked to the execution of measures with effective translation into energy savings, with 18 percent of these savings expected to come from the residential sector.

The specific content of the measures provided for in the PNIEC, which was approved prior to the Spanish Law on Climate Change, points to the need: "… to achieve 4,755.9 ktoe of cumulative final energy savings during the period 2021 – 2030. These savings will be the result, on one hand of the intervention on the thermal envelope of 1,200,000 homes in the whole period, starting with 30,000 homes/year in 2021 and ending with 300,000 homes/year in 2030".

The forecasts of the first PNIEC were soon addressed in the formulation of a new draft of the PNIEC 2023-2030[19] which aligned with the objective of reducing energy dependence by

[16] Sobre contaminación lumínica puede ser interesante la lectura de: Chepesiuk R. (2009), Missing the Dark: Health Effects of Light Pollution, *Environmental Health Perspectives*, 117(1), A20-A27; Falchi F., Cinzano P., Duriscoe D., Kyba C.C., Elvidge C.D., Baugh K., … & Furgoni R. (2016), The new world atlas of artificial night sky brightness, *Science Advances*, 2(6), e1600377; Stone T. (2017), The Value of Darkness: A Moral Framework for Urban Nighttime Lighting, *Science and Engineering Ethics*, 23(2), 461-485.

[17] Diffuse sectors are understood to be those that are not subject to emissions trading, as the ministry itself reminds us: <https://www.miteco.gob.es/es/cambio-climatico/temas/mitigacion-politicas-y-medidas/definicion-difusos.html>.

[18] Page 117, PNIEC, approved in January 2020.

[19] The new document is the result of Article 14 of Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the governance of the Energy Union and Climate Action

51%. These issues arise from the effects of the wars that Europe is witnessing in the first half of the 21st century.

Due to these regulatory adjustments, the implementation of these provisions must be reflected not only in regional regulations but also in the local regulations. The explanatory draft memorandum of the new PNEIC refers to actions included in the More Energy Security plan, including the Iberian mechanism which aimed to decouple the price of natural gas from the electricity market and helped reduce the price of electricity in Spain[20]. In addition, according to the draft of the new PNIEC 2023-2030, Spain should reduce its GHG emissions in diffuse sectors by at least 37.7% (compared to 2005) by 2030[21].

In this context, in synergy with the provisions of article 8.2 of the Law on Climate Change and Energy Transition, a significant reduction in the carbon footprint is expected due to foreseen modifications of carbon footprint regulations. This regulation is established by Royal Decree 163/2014 of 14 March on the creation of the carbon footprint register, compensation and carbon footprint absorption projects. However, the regulatory approach to energy efficiency certification of residential buildings was impacted, as the obligation contained in the Royal Decree of 2014 to register the carbon footprint of buildings was repealed. Furthermore, RD 390/21, of 1 June[22] integrates air conditioning as an element used to evaluate the energy efficiency of homes[23].

Air conditioning continues to be a key element in home adaptation to climate change. The provision contained in technical standards approved by the Basic Documents, recalls its importance. However, these documents are still shaped by the time of their approval, which was prior to the declaration of the climate emergency in Spain.

Additionally, verification measures to promote the integration of renewable energies in buildings, are crucial. Gifreu Font emphasized this, stating that almost 50 percent of the final energy consumption of the EU is concentrated in heating and cooling functions of which 80 percent is consumed by buildings[24]. However, the forecasts contained in the HE standards for energy saving are not updated to current needs.

The technical standards derived from the Building Technology Code are of a basic nature. Having said this, it is mandatory to connect them under the scope of DB-HE[25]. Therefore, although the initial modification that took place in 2019 was based on climate change adaptation, aligned with European regulatory premises, a technological adaptation is needed. This technological innovation can improve not only energy efficiency measurements, but also energy efficiency. Although the guides do not mention it, technological innovation can also foster home automation[26].

The guide for the application of the DB-HE advances and the 2019 modifications also entail an improvement in the adoption of a new method for calculating primary energy consumption according to UNE-EN ISO 52000-1:2017. In this context, amendments are envisaged regarding the 5 HE standards[27]. It would perhaps be desirable to formulate a 6th HE standard, linked exclusively to the variable of climate change, although in the existing standards there are requirements connected to it.

It may be interesting to explore measures which adjust the current provisions aimed at improving the housing climate change adaptation by promoting the idea of resilient housing.

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(Governance Regulation). provides that by 30 June 2023, each Member State must submit to the Commission a draft update of the most recent PNIEC.

[20] This theme has been accompanied by a battery of measures, some of which we will briefly comment on later.

[21] Thus, page 185, of the draft document.

[22] We will return to the examination of this regulation later.

[23] The provision of the energy savings certificate system was the subject of attention by Royal Decree 36/2023, of 24 January.

[24] Gifreu Font J. (2019), The Integration of Energy Efficiency Measures in Building in View of the EU Objectives for the Horizons 2020-2030. Las Redes District Heating And Cooling, *Revista Catalana de Derecho Ambiental*, 1, 1-55.

[25] These are classified according to the purpose they serve. A guide on the application of these can be seen in: DB-HE Application Guides (2019), Ministry of Transport, Mobility and Urban Agenda.

[26] The 2019 DB-HE implementation guide stated: "In addition, regulations should reflect technical and technological advances and the benefits they bring. In this framework of evolution, regulations must, in turn, incorporate the improvements in regulatory quality that are deemed necessary after the experience acquired".

[27] HE0: Limitation of energy consumption: HE1: Conditions for the control of energy demand: HE2: Conditions of thermal installations: HE3: Conditions of lighting installations: HE4: Minimum contribution of renewable energy to cover DHW demand: HE5: Minimum generation of electrical energy.

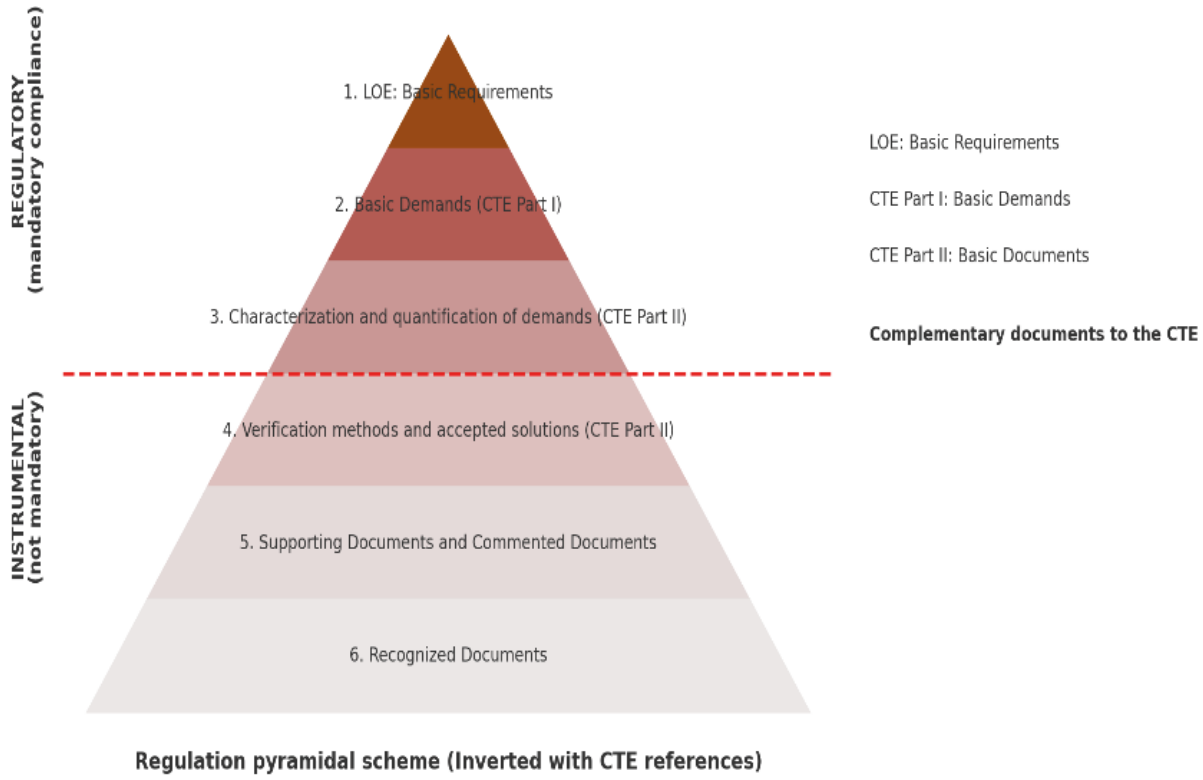


**Figure 3.** Source: diagram contained on the website developed by the Eduardo Torroja Institute of Construction Sciences. CSIC for the General Directorate of Urban Agenda and Architecture of the Ministry of Housing and Urban Agenda.

**Table 1.** Some Energy Improvement Proposals under DB-HE. Source: Authors, in synergy with the data provided by the current documents and technical updates.

**1. Strengthen energy efficiency requirements (HE0 and HE1)**
- Further reduce limits on non-renewable primary energy consumption.
- Increase the requirements in thermal insulation and airtightness of the envelope.
- Introduce stricter requirements for the solar factor of windows and the thermal transmittance of enclosures.

**2. Expand the reach of renewable energy (HE4 and HE5)**
- Increase the minimum percentage of renewable energy contribution for DHW and electricity.
- Include energy storage systems as a requirement to optimize the use of renewables.
- Promote the integration of photovoltaic and thermal systems in facades, not only on roofs.

**3. Adaptation to climate change (New section HE6)**
- Introduce a new section focused on climate change adaptation measures.
- Include requirements for passive cooling systems and dynamic sun shading.
- Establish criteria for resilient design in the face of extreme weather events.

**4. Circular economy and carbon footprint (Cross-cutting modification)**
- Introduce the concept of Life Cycle Assessment (LCA) in the selection of materials and systems.
- Establish embodied carbon footprint limits for new construction and renovations.
- Encourage the use of recycled materials[28] with low environmental impact.

**5. Improve the regulation on energy rehabilitation (HE0 to HE5)**
- Create a specific section with adapted criteria for the rehabilitation of existing buildings.
- Establish staggered energy improvement objectives in renovations.

[28] Taking into account the energy cost that allowed its origin.

- Introduce the concept of the "building energy passport" to plan long-term improvements.

**6. Energy monitoring and management systems (New section HE7)**
- Require the installation of real-time energy monitoring systems.
- Establish standards for the integration of smart energy management systems.
- Promote the implementation of IoT technologies for energy optimization.

**7. Adaptive thermal comfort (HE1 and HE2 modification)**
- Incorporate adaptive thermal comfort models that take into account climate variability.
- Establish design requirements based on hours of discomfort, not just energy demand.

**8. Sustainable Cooling (HE2 Modification)**
- Promote low-impact cooling systems (geothermal, free-cooling, etc.).
- Set stricter limits for the use of refrigerants with high global warming potential.

**9. Integration with electric mobility (New HE8 section)**
- Require the pre-installation of charging points for electric vehicles in residential buildings.
- Promote the integration of V2G (Vehicle-to-Grid) systems in the building's energy management.

**10. Dynamic Certification (Cross-Sectional Modification)**
- Implement a dynamic energy certification system based on the real performance of the building.
- Require regular certification updates based on actual consumption data.

These regulatory proposals could be framed in a more "liquid" action against climate change, insofar as immediate actions are required to alleviate the effects of climate emergency situations, whose point of no return has already been exceeded. This does not mean that there have been no regulatory advances, which have been more intense in recent years, as we refer to state regulation and the regional development and local application of these issues is abundant. However, greater agility is needed in the administrative response[29].

As an example of this, Rulemaking TED/845/2023, of 18 July, approves the catalogue of standardized energy efficiency measures[30], as a sort of static group of measures. Recently, regulatory bodies have begun to see the need for this agility in the catalogue of standardized solutions that it allows, according to Article 3 of Order 18 July 2023[31].

### d. Water Use and Management

One of the pending issues in climate change adaptation and mitigation has to do with water use and management. It is not only a question of a possible guarantee by means of renewable energies[32], but of ensuring that it does not impede the exercise of citizens' rights to decent and adequate housing. In other words, water supply network, and the risks of floods or prolonged droughts that affect the water management systems, can define whether the unit is suitable, healthy and safe for its residents. It is not in vain that the Law on Climate Change and Energy Transition devoted special attention to water resources[33]. From the perspective of public health, the technical building code devoted attention through the basic DB-HS standards[34].

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[29] Alonso Ibáñez R. (2018), La eficiencia energética de los edificios y el marco jurídico de la rehabilitación urbana, en: Galera R., & Gómez Z. (eds.), *Políticas locales de clima y energía*, INAP.

[30] With the modifications it has had through the Resolution of July 3, 2024, of the General Directorate of Energy Planning and Coordination, which updates Annex I.

[31] Thus, the regulation states: "it allows the catalogue to be reviewed, expanded and updated by resolution of the head of the Directorate-General for Energy Policy and Mines (now, Directorate-General for Energy Planning and Coordination, by virtue of Royal Decree 503/2024, of 21 May, which develops the basic organic structure of the Ministry for the Ecological Transition and the Demographic Challenge, and Royal Decree 1009/2023, of 5 December, which establishes the basic organic structure of the ministerial departments, is amended), which may modify Annex I of the aforementioned order, including new files in the catalogue, withdrawing or modifying the files contained therein".

[32] Delgago Piqueras F. (2013), Water Security and Climate Change, Aranzadi.

[33] On the examination of these and the conditioning factors linked to climate change, see also the report by Prof. Mellado Ruiz L. (2024), Current legal challenges of the water-energy binomial, *Revista Catalana de Dret Públic*, 68, 96-114, <https://doi.org/10.58992/rcdp.i68.2024.4193>.

[34] In particular, HS4, relating to water supply, and HS5, relating to water evacuation.

As the issue of water management and use is a key factor, it should also be subdivided into three different sections. The first should be focused on the analysis of the existing technical regulation and whether it is adequate to address the threat of climate change. The second section should be to consider extreme weather events and their consequences, (i.e. floods, prolonged drought…) and how they affect housing. The third should be to improve water management in the built and urbanized environment. Consider, for example, that the supply of drinking water is one of the key elements for the classification of land as urban.

As we pointed out, and as we have been able to examine in the previous technical conditions, the regulation by the technical building code referred to basic health standards[35].

It should be noted, however, that not all regulations relating to sanitation address home water management resources. Of the 6 HS, only 3 are directly or indirectly related to water. For example, the DB-HS is used to protect the home against moisture. It is well known that humidity causes health problems and poses problems for the building itself, making it unhealthy[36].

Climate change is also not mentioned in the regulations, even after their latest reform in 2022, except for the provisions contained in the Climate Change and Energy Transition Law which incorporates provisions on the risks arising from floods[37].

The State Law is especially relevant in the connection between water management and its impact on climate change. The law provides certain rules to not only assure water security, which in southern Spain and in the face of the effects of climate change is key, but also to protect of biodiversity, to reduce exposure and vulnerability to climate change, and to increase climate resilience.

The development contained in article 19.4 of the regulation is relevant as it details the actions that must be carried out to adapt homes to climate change from the perspective of water security. Due to its relevance, we find it necessary to transcribe part of its content, even if it is only schematic, because it represents the flexibility that urban planning demands in order to respond to the home adaptation needs caused by new climatic variables and their impact on the most precious resources (such as water).

The regulation states:

> In order to address the risks identified in the previous paragraph, hydrological planning and management should:
> - Anticipate the foreseeable impacts of climate change, identifying and analyzing the level of exposure and vulnerability of socio-economic activities and ecosystems, and developing measures to reduce such exposure and vulnerability. The analysis provided in this section will take special account of extreme weather events, from the probability of their occurrence, their intensity and impact.
> - Identify and manage the risks arising from climate change in relation to its impact on crops and the agronomic needs for irrigation water, the water needs for cooling thermal and nuclear power plants and other uses of water.
> - Consider and include in planning the impacts derived from climate change on the typologies of surface and groundwater bodies and their reference conditions.
> - Determine the necessary adaptation of water uses compatible with the available resources, once the impacts of climate change have been considered, and with the maintenance of the conditions of good condition of the water bodies.
> - Consider the principles of the Water Strategy for the Ecological Transition for the adaptation and improvement of the resilience of the resource and uses to climate change in the identification, evaluation and selection of actions in the hydrological plans and in water management.
> - Include those actions whose express purpose is to improve water security by

[35] Note that the expression salubridad and unhealthy, or linked to health, is used. However, as the Royal Academic of Language reminds us, health is understood as the quality of health, and health is what "is good for health". Therefore, these basic rules attend to housing that meets conditions that make it healthy.

[36] The Basic Document defines it as the need to limit the risk: "foreseeable risk of inadequate presence of water or humidity inside buildings and in their enclosures as a result of water from atmospheric precipitation, runoff, soil or condensation, providing means that prevent its penetration or, where appropriate, allow its evacuation without causing damage".

[37] Thus, in Article 19 of the Law.

reducing exposure and vulnerability and improving the resilience of water bodies, including nature-based measures.
- Include in the planning the impacts derived from the retention of sediments in the reservoirs and the solutions for their mobilization, with the dual objective of maintaining the regulatory capacity of the reservoirs themselves and restoring the transport of sediments to the coastal systems to stop the regression of the beaches and the subsidence of the deltas.
- Draw up the financing plan for the actions ensuring financing to address the risks of the first section.
- Monitor the impacts associated with climate change in order to adjust actions according to the progress of these impacts and improvements in knowledge".

The measures included in the regulation represent relevant regulatory improvements that will also be projected in the sectoral regulation on the public hydraulic domain. These measures must be oriented not only to water efficiency but also to what we would call "water resilience" in the face of possible scenarios of water scarcity[38]. Imaginative technological resources that allow us not only to ensure supply in cities but also to ensure that homes have the conditions of habitability that meet the technical health standards to which we referred to earlier are also necessary.

Finally, although this relevant issue warrants a dedicated and in-depth analysis, urban sustainability must also be assessed through the lens of risk management. This includes early detection of vulnerabilities related to urban planning and involves preparation in order to mitigate or prevent the impacts caused by extreme weather phenomena.[39]

### e. Protection Against Adverse Events – Extreme Weather Events

Adverse weather events are becoming more frequent, according to the World Meteorological Organization[40]. Although these phenomena are not new, they increase in intensity and extend to areas where they were not previously occurring. The need to address this new scenario poses a necessary coordinated effort that integrates not only civil protection, but also urban planning[41], land use law planning, construction foresight and social education.

The climate emergency, declared at the beginning of 2020, highlighted the value of prevention and containment measures that anticipate the occurrence of natural disasters, as part of the process of adaptation to new climatic situations. However, the climate emergency has had episodes that have demanded specific attention, such as the effects of drought or, at the other extreme, floods caused by torrential rains[42].

The climate stress involved in facing extreme situations both in urban planning and housing allows us to qualify what we have come to call a legal test of climate stress, which involves evaluating all the risk and danger scenarios and examining to what extent the legal system is prepared to respond to them. We expect to prevent or anticipate the event and therefore improve the regulatory response to situations of vulnerability. This generates, in short, a kind of land resilience that allows cities and homes to be classified as resilient.

In the case of civil protection, adverse weather phenomena have an impact on the way action protocols must be provided in the event of emergency situations. Civil protection is addressed by Law 17/2015, of 9 July[43], which deals with the provision of administrative measures linked to situations that were subsequently the subject of attention in the Judgment of the Constitutional Court 58/2017,

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[38] Van der Berg A. (2023), Climate adaptation planning for resilient and sustainable cities: Perspectives from the City of Rotterdam (Netherlands) and the City of Antwerp (Belgium), *European Journal of Risk Regulation*, 14, 564–582, <https://doi.org/10.1017/err.2022.17>.

[39] Such as meteosunamis, floods due to torrential rains, or typhoons, overflowing rivers, and other climatic episodes that put the health and safety of the occupants of the homes at risk and demand that they be resilient and prepared, as they are in accordance with the approved regulations on housing adaptation. An example of this would be buildings in countries such as Japan that are accustomed to typhoons and other phenomena such as landslides.

[40] <https://wmo.int/es/news/media-centre/el-cambio-climatico-y-los-fenomenos-meteorologicos-extremos-golpean-asia-con-fuerza>.

[41] Socias Camacho J. (2022), Trayter, Environmental Urbanism and Climate Change: The Sustainable Tourist City, Atelier.

[42] Valencia DANA is one of a kind example of this catastrophic situation.

[43] BOE of 10 January 2016.

of 11 May. Within the framework of this regulation, the National Civil Protection Strategy was approved, as part of the National Security Strategy[44]. This gives the necessary attention to inter-administrative coordination mechanisms at the national level (for example, article 149.1.29) which also attributes to the state the exclusive basic competence in the field of public security. It has also led to the approval of successive regulatory texts aimed at foreseeing and responding to emergency situations caused by adverse phenomena[45].

The Spanish regulatory framework involves the verification of possible risks arising from adverse phenomena such as forest fires, seismic risks, volcanic activity, floods, a nuclear emergency, tidal waves, as well as other air accidents or other related circumstances. In all instances, the connection with climate change remains essential. The National Civil Protection Strategy covers the period 2019-2023. However, a new strategy is currently in the formulation phase and has not yet been approved[46]. Additionally, the development of the Basic Civil Protection Standards is underway. This deals with the risks that must be the subject of civil protection planning and serves as the basis for improving the coordination and efficiency of the actions of the intervention and assistance services in emergencies[47]. It is true that, without entering the examination of both present and future regulatory development, attention to civil protection and emergencies has given rise to abundant regional regulatory provisions[48].

Notwithstanding the novelties that the new national strategy will incorporate by integrating pioneering technologies for the registration of catastrophes, emergencies and the damage and losses they cause[49], European attention has also been focused on the adoption of the European disaster resilience targets[50]. These objectives emphasize the need to anticipate, prepare, alert, respond, and ensure, especially in relation to critical infrastructures and essential supply services for the population.

All these measures have an impact on an adapted home, since resilient housing must integrate the measures resulting from the principles described in order to prevent it from being subjected to, or affected by natural disasters, potentially caused by climate change. "If we were to examine the existing regulations on emergency and civil protection responses to the conditioning factors of climate change, we would possibly conclude that their value is especially relevant, not only for situations of extreme phenomena but also in the integration of preventative measures and action protocols for the population. These are essential in responding to scenarios that, although not previously common, have become more frequent and more likely to occur due to climate change"[51].

In this context, the review of the existing regulations on seismic risks, the effect connected with seismic-resistant materials, and the measures planned to minimize the impact of an earthquake on homes, is particularly

[44] The first national security strategy was approved in 2019. Order PCI/488/2019, of 26 April, which publishes the National Civil Protection Strategy, approved by the National Security Council.

[45] This is the case, for example, with Law 17/2015, of 9 July, on the National Civil Protection System; Resolution of 16 December 2020, of the Undersecretary's Office, which publishes the Agreement of the Council of Ministers of 15 December 2020, which approves the General State Civil Protection Emergency Plan; Royal Decree 524/2023, of 20 June, approving the Basic Civil Protection Standard; and specifically in forestry matters: Royal Decree 893/2013, of 15 November, approving the Basic Guideline for emergency civil protection planning for forest fires; Resolution of 31 October 2014, of the Undersecretary's Office, which publishes the Agreement of the Council of Ministers of 24 October 2014, which approves the State Civil Protection Plan for Forest Fire Emergencies.

[46] The new civil protection strategy that is being drafted when these lines are drafted will be in synergy with the National Plan for Disaster Risk Reduction 'Horizon 2035', approved at the Conference of Presidents held in La Palma in 2022.

[47] On this point, <https://www.proteccioncivil.es/-/gobierno-comunidades-y-municipios-acuerdan-impulsar-la-ii-estrategia-nacional-de-protecci%C3%B3n-civil>.

[48] Its complete consultation can be made in the code of regulations of the Official State Gazette <https://www.boe.es/biblioteca_juridica/codigos/codigo.php?id=174_Codigo_de_Proteccion_Civil&tipo=C&modo=2>.

[49] As evidenced by the European IMPACTO project, which seeks with technology to coordinate actions and know them to prevent damage and anticipate an early response to disasters. and adverse phenomena.

[50] This has been highlighted in: Commission Recommendation of 8 February 2023 on the Union's disaster resilience objectives (2023/c 56/01).

[51] In this context, it is especially interesting to read the report: <https://www.ipcc.ch/srocc/>.

interesting. Consider that, if an earthquake occurs, in addition to the specific regulations of the building area, this catastrophe also entails the activation of Civil Protection protocols. The resolution of 5 May 1995, by the Secretary of State for the Interior, provides for the publication of the Agreement of the Council of Ministers approving the Basic Guideline for Civil Protection Planning in the Face of Seismic Risk[52]. However, an assessment of the impact of seismicity on buildings must also be carried out, as in the cases examined above, which includes the examination of building constraints and the approval of regulations that provide not only seismic resistant materials but also housing rehabilitation strategies.

The intersection between climate change and building parameters affects the quality of life of residents in the dwellings. This is also linked with aspects such as seismicity, in such a way that it allows the integration of seismic resistant structures and their adaptation to the specific conditions of seismicity and earthquake risk. This is not a new issue. As the president of the Spanish Association of Seismic Engineering highlighted in 2016, 75 percent of homes do not strictly comply with seismic resistant construction regulations[53]. It is therefore necessary to carry out a building rehabilitation that allows measures to be integrated in this area as well.

The current regulations are obsolete in terms of attention to seismic risks, and do not propose strategies which allow for the updating of the measures to be adopted according to the current danger. Royal Decree 997/2002, of 27 September which introduces the standard for seismic resistant construction: general part and building (NCSR-02)[54], was approved in 2002. Considering that risks associated with earthquakes also arise from the quality of the building materials, in 2008, the regulation on the structural concrete[55], mentions earthquake protection and prevention.

Finally, within the framework of standardized technical regulations from the European Committee for Standardization, seismic resistant construction is necessary according to the 2004 Euro-code 8: Seismic resistant structures project[56]. This sets technical standards that, have been updated subsequently, are rooted in outdated *seismic hazard maps,* which give rise to the adoption of seismic protection measures. Attention to seismicity and the risks associated with it in buildings require that appropriate training and education measures be carried out for the population in the event of possible environmental catastrophes caused by climate change. It is necessary to train the population to be able to face situations that involve the existence of earthquakes.

## 3. Some takeaways

The One Health approach represents a paradigm shift in addressing health challenges by recognizing the interconnectedness of human, animal, and environmental health. Administrative law plays a central role in embedding One Health principles into governance structures, enabling coherent and effective responses to global health risks. Future legal reforms should prioritize adaptability, resilience, and cross-sectoral collaboration to ensure sustainable health systems.

Regardless of the adjustments marked by the conditioning factors of European regulation, the studies that come to adjust the Spanish regulations to the new parameters that climate change will, or should mark in the coming years regulatory changes to adjust the entire regulatory mechanism to the new premises. These require flexibility, since it is the technical reports of specialists, with the support of AI, that can illustrate to what extent a regulatory modification is necessary, whether in the energy efficiency certification procedure, the regulation of the Basic Documents of the Technical Building Code or in other related issues related to the use of renewable energies, or specific innovations to improve efficiency in water consumption in the face of drought episodes, or improvements in building and human resilience with respect to disasters caused by extreme weather events.

Finally, and this is one of the issues that is also linked to urban projections, we must learn to adjust, in a more flexible way, the wickers of 21st century urbanism. This is due to the fact that the demands arising from, the climate emergency on the one hand and the digital transition on the other, show us the

[52] BOE of 25 May 1995, No. 124.

[53] <https://www.rtve.es/noticias/20160128/expertos-alertan-75-edificios-espanoles-necesitaria-rehabilitacion-frente-a-terremotos/1292201.shtml>.

[54] BOE No. 144 of 11 October 2002.

[55] Royal Decree 1247/2008, of 18 July, approving the structural concrete instruction (EHE-08).

[56] Their consultation can be viewed at: <https://www.une.org/encuentra-tu-norma/busca-tu-norma/norma?c=N0060451>.

urgent need to make structural changes. These changes must go beyond the administrative soft-law documents that populate the already complex regulatory meshes and must result in a regulation that involves all parties, not only the Public Administration, at its different levels of competence, but also companies and entities of the third sector. These changes cannot be addressed if there is not a one health approach implemented in the whole decision-making process, and without it dignity cannot be assured.

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SECTION I
ESSAYS

# Practical Legal Issues of the One Health Approach in Italy*

*Allegra Dominici, Luca Di Giovanni and Niccolò Pecchioli*

**Abstract.** The contribution aims to investigate some of the concrete problems related to the application of the global One health approach. In particular it will be focused on the difficulties related to the different notions of the environment and health, the impact of the adoption of the One Health approach in the division of competences between the different levels of governance in States such as Italy, and, focusing on the climate litigation, the contribution will analyze the profile of the subjective legal situations.

***Keywords:*** environment and health, different notions, division of competences, State and regions, climate litigation, subjective legal situations.

## 1. Introduction

This contribution aims to study and investigate some of the concrete problems that the application of the global One Health approach[1] may pose, with particular regard to the Italian State.

Firstly, the contribution will attempt to examine the difficulties in implementing the integration principle, given that this principle, in order to be correctly applied, requires subject-objects (environment and health) with common definitions and public actors with a similar organisational structure. In this respect, on the other hand, it is evident how some of the S tates adopting the One Health approach have profoundly different notions of environment and health and, at the same time, how in some States there are no administrative authorities with clear and certain competences.

Secondly, with specific regard to the division of competences, the contribution intends to focus attention on the impact of the adoption of the One Health approach – meaning the vision of health in its global dimension and therefore also including in it the protection of the environment and ecosystems – may reflect in the delicate division of competences between State and regions as outlined by Title V of the Italian Constitution.

Following the pandemic emergency and the numerous critical issues that have emerged, the so-called PNRR decree (legislative decree no. 111/2021) identifies the modalities to set up 'a new institutional set-up for prevention in the health, environmental and climatic fields' in Italy[2]. This new institutional arrangement will therefore necessarily have to adapt to a distribution of competences that, in the field of health protection, envisions the co-participation of a plurality of institutional actors.

Finally, also worthy of attention is the profile of the subjective legal situations claimed by individuals in the context of the application of the One Health approach, within which divergent and heterogeneous approaches can be found. One option is certainly that of the so-called 'climate change litigation', well represented by the Italian case called 'Giudizio Universale'. From this point of view, it is worth noting how the issue of global health has become the fulcrum of climate change litigation after the adoption of the Paris Agreement on climate

* (Par. Nn. 1,3,5 A. Dominici; n. 2 L. Di Giovanni; n. 4 N. Pecchioli).

[1] Cf. W.B. Adisasmito *et al.*, *One Health: A New Definition for A Sustainable and Healthy Future,* in *PLoS Pathog,* 2022.

[2] Reference is made here in particular to Bill S. 1891 laying down provisions for the valorization and strengthening of the veterinary public health prevention and control system, which proposed adopting the One Health approach as a 'fundamental precondition to any political discussion on the subject'; followed by the National Prevention Plan (PNP) 2020-2025 drawn up in agreement with the State-Regions Conference, in which Line of Action 12 is dedicated to the 'Development of the One Health approach'; and lastly, under Mission 6 of the PNRR approved by Italy, the health reform to be carried out is required to be in line with the One Health approach.

change, which refers to many human rights that are considered fundamental under Articles 2 and 8 of the ECHR. These include the right to health protection, a right that is clearly threatened by the consequences of global warming and that necessarily and promptly requires States to take incisive action to reduce the level of pollution due to carbon emissions.

## 2. The One Health approach and the principle of integration: lights and shadows

As already specified, the One Health holistic vision constitutes a healthcare model based on the integration of different disciplines and, in particular, on the recognition of the fact that human health, animal health and ecosystem health are strongly connected, to the point of being mutually influenced by external factors, positive or negative[3]. This model has been implemented at both national and European level, as demonstrated by a series of official documents signed by the Minister of Health, the Istituto Superiore di Sanità and the European Commission, which clearly highlight the positive effects that could derive from its adoption in view of achieving the goal of global health[4].

These positive effects can be seen, within the Italian system, in the adoption of measures aimed at creating a new institutional structure aimed at collective prevention in the State in the health, environmental and climate fields, through the establishment of new organizational structures whose operators have received interdisciplinary training and are able to carry out multidisciplinary and integrated interventions[5]. The methods of action of these structures are based on the activation of cooperation and coordination mechanisms, among which the Control Room stands out for its functions. T his body is responsible for the creation of an effective interaction, on the one hand, between the health prevention system and the environmental prevention system and, on the other hand, between the Higher Institute of Health and the Higher Institute for Environmental Protection and Research[6].

The relevance of the principle of integration is therefore evident both in the relationship between protected objects and with reference to public entities that must guarantee the protection of the health, animal and environmental components. Integration must take place with specific measures suitable to ensure that the three public interests are taken care of in a contextual and coordinated way. Moreover, the increased importance of this principle in the context of the promotion not only of health and welfare policies, but also of all public policies, is well known to operators in the sector.

In this regard, consider the activities carried out to defend the soil, understood as a complex resource that embodies multiple specialties (environmental, cultural, productive and historical) and which requires a holistic approach to coherently govern all its functions[7]. But the discussion can also be extended to forms of protection of marine areas, in favor of which

[3] Within scholars, for a general overview of the One Health approach, please refer to L. Ferrari Violini (edited by), *One Health. Dal paradigma alle implicazioni giuridiche*, Turin, Giappichelli, 2023 e a F. Aperio Bella (edited by), *One Health: la tutela della salute oltre i confini nazionali e disciplinari*, Naple, Editoriale Scientifica, 2022.

[4] To consult the relevant documents, please refer to the following websites: www.salute.gov.it, www.iss.it/one-health and www.health.ec.europa.eu. The importance of the One Health approach, moreover, is also underlined at a national level by the fact that the Ministry of Health has, within its internal organisation, a Department of Human Health, Animal Health and the Ecosystem, thereby demonstrating the desire to conform to this approach not only from a functional point of view, but also from a structural point of view. For a general overview of the European regulatory documents on the subject, see A. den Exter, *European Health Law*, Maklu, 2017 e T.K. Hervey, C. Young e L.E. Bishop, *Eu Health Law and Policy*, Elgar, 2017".

[5] For further information, please refer to the art. 27 of the legislative decree of 30 April 2022, n. 36, which establishes the National Health Prevention System from environmental and climate risks (SNPS), to the ministerial decree. of the Ministry of Health 9 June 2022 for the definition of the tasks carried out by the subjects of the art. 27 and the Prime Ministerial Decree. 29 March 2023, with which the methods of interaction of the National Health Prevention System from environmental and climate risks (SNPS) with the National Environmental Protection System (SNPA) were defined.

[6] Articles 1-2, Prime Ministerial Decree March 29, 2023.

[7] In this regard, we note the opinion of the Italian Constitutional Court, expressed in sentence 23 May 2019, n. 179, according to which the soil requires an integrated protection approach, because this asset must be seen "no longer just as a topographical space susceptible to building occupation, but re-evaluated as a complex resource that embodies multiple vocations (environmental, cultural, productive, historical)".

the integration of public policies increasingly appears to be the only direction to take, also due to the numerous recommendations coming from supranational regulatory texts[8].

Furthermore, the extreme significance of the principle of integration is also recalled by the art. 11 of the Treaty on the Functioning of the European Union (TFEU), which uses it to meet the needs of environmental protection by requiring the competent national authorities to integrate environmental considerations into all policies and activities implemented within the European territory in order to achieve the set climate objectives, reduce pollution and promote sustainable economic development[9]. Objectives have been overcome by the awareness of the usefulness of this principle for the achievement of a broader aim, which is that of the creation of a "fully sustainable future"[10].

This type of future can only be achieved by making use of a systemic conception of the territory, which enhances every constituent element of this asset in an integrated perspective, abandoning the previous vision composed exclusively of sectoral interventions. It is necessary to get rid of all those national measures carried out in a fragmented way to share a strategy with a broader scope of operation, with organic and coordinated management and in compliance with a unitary result perspective[11].

If these appear to be the positive characteristics of the application of the integration principle, we cannot ignore, however, some critical issues that the implementation of this principle could pose for the competent administrative authorities. In essence, not only lights, but also shadows characterize the use of the integrative principle. In particular, the difficulties in the concrete application of the principle are found, on the one hand, in relation to the lack, of common definitions concerning the notion of health and the concept of territory in the States that adopt the One Health approach. On the other hand, with regard to the non-existence of administrative structures with homogeneous functional characteristics, this makes it difficult to coordinate the activities implemented to achieve a high level of public health.

From the first point of view, it is worth noting that, in order to integrate two or more objects, it is necessary for them to have common content bases. If these minimum contents do not exist, it is difficult, if not impossible, to carry out a correct integration of the essential elements that distinguish them. In other words, if the One Health approach is inspired by the definition of health offered by the World Health Organization, understood as a state of complete physical, mental and social well-being, while the Italian State, is forced to refer to the so-called essential levels of services, which have inevitably transformed health protection into a financially conditioned right, it is clear that it will be very complicated to be able to implement the objectives desired by the International Health Organization in Italian territory. T his is because the supranational concept of health is profoundly distant from concept in force in the internal legal system.

At the same time, the misalignment between concepts is also found in the identification of the notion of State sovereignty. It has already been said that the One Health holistic vision rests its foundations on the desire to establish a healthcare model based on the integration of different disciplines and, specifically, on the desire to simultaneously protect human, animal and environmental health. To achieve this objective, however, it is necessary to first identify the concepts of man, animal and environment-territory and to verify the existence or non-existence of a core of minimum meanings common to the States that intend to adopt the One Health approach.

In the case of the concept of environment-territory it seems clear that this essential semantic unity is not present. For example, in Italy the State has a bivalent nature and is made up of two components identified by art. 9 of the Constitution. F irstly, the environmental

[8] Among the numerous texts that can be mentioned, the following are worth mentioning: the European Landscape Convention, the Convention for the protection of the marine environment and the Mediterranean coast, the Protocol on the integrated management of the coastal zones of the Mediterranean, EU Directive no. 89/2014 on maritime gunfire planning.

[9] See the Communication from the European Commission Com/2001/0264, containing the European Union's sustainable development strategy.

[10] On the topic, for example, see E. Frediani, *Aree industriali dismesse e "aperture laterali": la vicenda del permesso di costruire in deroga*, in *Dir. amm*., 2019, n. 2, 309 ss.

[11] On the awareness of the profound interrelationships that can be established between the components of the territory, please refer to the ruling of the EU Court of Justice, section. II, 25 May 2023, n. 575/21, which highlights how the execution of a project in the area can produce effects in various areas (landscape, environment, health and climate).

factor, which refers to the ecological-naturalistic aspects of the territorial areas of the Nation, and secondly, the landscape factor, which, however, is relevant for the historical-cultural aspects that distinguish these areas. Other countries, however, such as Austria, Finland, Norway, Sweden and Ireland, do not recognize the environment-landscape distinction in their constitutional charters and take the territory into consideration only and exclusively for environmental aspects[12].

It is evident, therefore, that the hypothesis of an integration between legal systems that possess different territorial notions is impracticable due to a lack of understanding of the cognitive references used by the operators of these systems, which do not allow a mutual and effective communication of objectives set and the actions performed. The absence of common elements from which to start can produce inertia in the promotion of public policies or, at least, the activation of measures for non-coinciding purposes.

The same thing occurs in the second case, i.e. that relating to the non-existence of administrative structures with homogeneous functional characteristics. Even in this situation one can easily see how the use of the principle of integration implies the promotion of collaborative agreements between States, aimed at the execution of shared actions and the construction of a cooperation network. These are noble aspirations, which, however, are too abstract and difficult to implement in practice. What seems to be missing, in fact, is a set of public administrations equipped with flexible structures and certain skills. In the example of Italy where, due to the content of the articles 117 and 118 of the Constitution, there is a chaotic and obscure division of legislative and administrative functions, which favors overlapping of responsibilities and indefinite operational roles.

This aspect will be explored in depth in the following paragraph, with specific reflections on the problems that arise when implementing the One Health approach. What needs to be highlighted here is the fact that excessive hope is placed in an instrument which, from the beginning, due to external causes, has presented a series of critical issues in its implementation and which, unfortunately, has continued to maintain them up to the present day.

## 3. One Health approach and the allocation of responsibilities

The reception of guidance from international organizations, such as the World Health Organization, on the need to emphasize the inseparable link between the protection of human health and the protection of the environment has led, first at the European level and then within individual national legal systems, to the preparation of plans for reforming health systems in line with the One Health approach.

This represents an important step in the evolution of the protection of the right to health in that by adopting the One Health approach, a protective apparatus is inferred that turns its gaze both to the welfare of human beings and to the protection of ecosystems and the animal world, aiming at the pursuit of health protection that is effective and better even and especially from a preventive perspective.

An approach that requires intersectoral coordination, involving different technicians in the field, but also intergovernmental, fitting, within it, into the division of competencies between the European Union, the central state and local authorities. An objective that requires, on the one hand, capillary actions on the population through the intervention of territorial structures and, on the other hand, actions at the national and supranational level[13].

The adoption of the integrated approach in which One Health translates entails pitfalls concerning the Italian national legal system, this for two reasons. The first, of a substantive nature, concerns the intertwining of competency titles pertaining to health, environmental and animal protection, which, in the light of the division of competencies as outlined by the constitutional text, cannot be attributed to a single subject matter[14].

Health protection and environmental protection are included within the distribution of state-region competencies outlined by the Italian Constitution, Article 117 as distinct competency titles pertaining to health protection, a

[12] For further information on the topic, please refer to L. Di Giovanni, *El concepto de paisaje jurìdico en el convenio europeo y en las constituciones contemporàneas*, in *Revista Aranzadi de Derecho ambiental*, 2020, n. 45, 255 ss.

[13] See S. Iaria, *The potential of the NRP and the "One Health" project in the perspective of the revitalization of territorial health care,* in *Administration on the Way Forum,* 2024.

[14] Cfr. A. Saporito, *The National Recovery and Resilience Plan and the right to health, a new evolution?*, in *Amministrativ@mente*, 1/2024.

competency of concurrent type (in which only the S tate is responsible for determining LEAs), while environmental protection is defined as an exclusive S tate competence. Animal protection is not included among the competences under Article 117 but, following the 2022 amendment, the new Article 9 Const. refers to S tate law for what concerns the determination of the ways and forms necessary for the implementation of such protection, implicitly recognizing the competence of the S tate to regulate the matter.

However, the intertwining of human, environmental and animal health is not a novelty followed exclusively by the transposition of international indications. O n the contrary, the Constitutional Court has often pointed out the polysemic nature of health protection as understood in the constitutional text, thus bringing it back into the protective framework of Article 32 Const. the triple declination that is suggested: human, environmental and animal health. This suggests that the rigid division of subjects should be overcome since the One Health approach came within our legal system.

The second critical issue follows the first and lies in the concrete manner through which this intertwining of competencies is actually exercised to ensure compliance with constitutional dictates and the introduction of innovations aimed at reforming the healthcare organization in such a way as to make the adoption of the new approach effective[15].

The term One Health is first included at the level of European legislation in Regulation 2021/522, precisely defined in Articles 3 and 4 as a "multisectoral approach that recognizes that human health is linked to animal health and the environment and that actions to address threats to health must take these three dimensions into account". Furthermore, the One Health approach is defined as a guiding legal principle in the pursuit of general and specific protection.

Following this, domestically, the need to prepare a health apparatus suitable for the provision of such a mechanism is included in Decree Law No. 111 of 2021 in which, within Mission No. 6 of the National Resilience Plan[16], the need to "designate a new institutional arrangement for prevention in the areas of health, environment and climate" is specified.

This new institutional arrangement, as mentioned above, traces the distribution of competencies that, in the field of health protection, sees the co-participation of various institutional actors. First, it should be emphasized that institutional reform is being prepared by following two actions, establishing uniform structural, organizational and technological standards for territorial care and defining a new institutional arrangement for health, environmental and climate prevention in line with the one-health approach.

This second action is embodied in the NRP2 decree law (Law No. 79/2022)[17] which approves the following system. On the one hand, at the central level, the establishment of the National System of Prevention of Environmental and Climate Risks (SNPS)[18] which identifies and evaluates health issues associated with environmental and climate risks to contribute to the implementation of prevention policies, contributes to the definition of the Essential Levels of Care, and identifies an integrated monitoring system[19] with the National System of Environmental Protection (SNPA)[20].

At the regional level, the Regional System for Prevention of Environmental and Climate

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[15] Cfr. on this point M. Gnes, *The resilience of the Italian Healthcare System and the COVID-19 emergency,* in *Global Pandemic Network,* December 2023, vol. 2; G. Ragone, *One Health and the Italian Constitution, between eco-centric drives and new perspectives on the protection of human, environmental and animal health,* in Corti Supreme e Salute 3/2022.

[16] The health care system reform outlined in the Sixth Plan's mission is in turn divided into two groups of objectives; Component 1: Neighborhood networks, facilities and telemedicine for territorial health care; Component 2: Innovation, research and digitization of the National Health System; with regard to Component 1, in turn, this is embodied in four avenues of action: establishment of Community Homes; Home as the first place of care and telemedicine; Community Hospitals; and Health, Environment, Biodiversity and Climate.

[17] Art. 27 paragraph 2 of Decree-Law 79/2022, so-called PNRR Decree2.

[18] Ex art. 27 co 4 l.n. 79/2022, The prevention departments of the ASLs and autonomous provinces, the Experimental Zooprophylactic Institutes, the Higher Institute of Health and the Ministry of Health are part of the SNPS.

[19] To this end, a Steering Committee was established at the Prime Minister's Office consisting of a representative of the Prime Minister's Office, two representatives of the SNPS, two representatives designated by the Minister of Ecological Transition, and one representative of the regions and autonomous provinces designated by the State-Regions Conference.

[20] Established by l.n. June 28, 2016, no. 132.

Risks (SRPS) was established[21] and contributes to the pursuit of centrally established objectives by adapting them to the specific instances of the territory in which it operates.

As a means of linking the two systems, the National Environmental Protection System is envisioned as a centralized control room that aims to better integrate the actions of the local system with the central system.

The choice of the Italian legislature was therefore to replicate the scheme adopted at the central-state level, also at the local-regional level. Aiming to achieve the objectives set through the One Health approach, ensuring, however, the incorporation of territorial instances and therefore to the inevitable involvement of local authorities in the implementation of the decree, while maintaining firm respect for the constitutional principle of loyal cooperation on which the structure of relations between the different levels of government is based.

## 4. The One Health Approach and its practical legal implications on climate change litigation: the Giudizio Universale case

One of the areas in which practical legal implications of the One Health approach have arisen is certainly that of so-called climate change litigation. The aim of these lines is therefore to investigate if and how the One Health approach has influenced climate change litigation. The investigation will be carried out with particular reference to the case of Italy.

The One Health paradigm in its holistic dimension has become the fulcrum of climate change litigation after the adoption of the Paris Agreement on Climate Change, where a catalogue of human rights including the right to health is found, as well as the 2018 Global Warming of 1.5°C report dedicated to the consequences of global warming on all the determinants of global health in the difference between a 1.5° and 2° increase by the end of the century.

In this context, in the vein of the Urgenda case, where the Netherlands was required to take incisive action to reduce domestic coal emissions in the name of the rights under Articles 2 and 8 of the ECHR[22], the Italian case called Giudizio Universale (Last Judgement) must be remembered[23].

It is important both because it represents the first Italian case on climate litigation, and because in claiming the protection of the right to a stable and safe climate, numerous documents confirmatory of the One Health paradigm were evoked in court, such as the Parma Declaration on Environment and Health of 2010, the Doha Declaration on Climate, Health and Wellbeing of 2012, the Lancet Commission's Planetary Health initiative, and the 'Global Coalition on Health, Environment and Climate Change' launched by UN bodies in 2018. With these documents, the Giudizio Universale case was intended to corroborate the fact that there is a causal chain between planetary emergency and human health.

The key facts of the case are as follows. On 5 June 2021, an environmental justice NGO, A Sud, and over 200 plaintiffs filed a lawsuit alleging that the Italian government was violating fundamental rights, including the right to a stable and safe climate, by failing to take the necessary actions to meet the Paris Agreement's temperature targets. The lawsuit, part of a campaign called Giudizio Universale (The Last Judgment), seeks a declaration that the government's inaction is contributing to the climate emergency and a court order to reduce emissions by 92% by 2030 compared to 1990 levels[24].

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[21] Choice made by the Decree of the Minister of Health of June 9, 2022, implementing Decree Law PNRR2.

[22] *State of the Netherlands v. Urgenda Foundation* (2019) is climate change litigation heard by the Supreme Court of the Netherlands related to government efforts to curtail carbon dioxide emissions. The case was brought against the Dutch government in 2013, arguing the government, by not meeting a minimum carbon dioxide emission-reduction goal established by scientists to avert harmful climate change, was endangering the human rights of Dutch citizens as set by national and European Union laws. The initial ruling in 2015, requiring the government to meet an emissions goal of 25% reduction from 1990 levels by 2020, was upheld through the Supreme Court on appeals, affirming that reduction in emissions was necessary for the Dutch government to protect human rights. It is the first such tort case taken against a government challenging climate change aspects based on a human rights foundation, and the first such successful climate justice case.

[23] Documents and additional information about the legal action can be found in <www.giudiziouniversale.eu>.

[24] According to a summary of the claim released by the plaintiffs, the government's climate obligations stem from the Paris Agreement, EU regulations and IPCC reports. The human right to a stable and safe climate is based, *inter alia*, on guarantees in Arti-

At the beginning of 2024, the Court of Rome issued its judgment, finding the plaintiff's claim inadmissible for lack of jurisdiction.

The plaintiff's request for measures to ensure a 92% reduction in CO2 emissions compared to 1990 levels was held to be inadmissible, as the Court found that it exceeded the self-imposed targets that States had set for themselves in international agreements and then transposed into European and national law, whereby they set the achievement of climate neutrality by 2050 with a cut in CO2 emissions by 2030 equal to 55% of those produced in 1990.

On this point, the Judge noted that the action was aimed at identifying unlawful conduct in the face of a breach of the obligation that the Italian State had assumed directly towards individual citizens to guarantee them a right to a stable and safe climate, which would also presuppose more rigorous choices than those imposed by the EU, relying on the precautionary principle. The Court, therefore, declined jurisdiction by noting that, through an extra-contractual action for damages, the plaintiffs intended to judicially impose political choices reserved to the legislature and the executive in order to achieve the objectives assumed at an international and European level.

As regards this case, at least three critical issues have to be stressed:

1) The case assumes the existence of a right to a stable and safe climate, which would have an individual dimension. However, this assumption is problematic because such a subjective situation, even if it exists, is more reasonably to be considered undifferentiated than that of any other subject[25];
2) The request to the court to order the State to take every initiative to restore and preserve the quality of the climate determines an encroachment of jurisdiction into the legislative and/or governmental function such that it results in the violation of the cardinal principle of the separation of powers[26].
3) The claim for damages was not examined due to the failure to demonstrate the causal link between the State's commissive/omissive conduct and its impact on the climatic condition that would have caused the damage to persons or property[27].

Leaving aside these aspects that demonstrate the applicative, perhaps even structural, limits of judicial action to protect and implement the One Health approach, it is, however, also true that Giudizio Universale case played an advancing role, in the sense that litigation can be ascribed a strategic value, where it is consciously designed to further the clarification, respect, protection and fulfilment of rights. The idea is to change laws, policies and practice, and to secure remedies or relief following violations. In this sense, the Giudizio Universale case, despite its negative outcome, may also have served its purpose.

## 5. Conclusive Remarks

The One Health approach embodies a comprehensive evaluation of human health while also considering its interconnection with environmental health and animal welfare. Despite the evident advantages associated with the One Health approach, its implementation has brought to light several noteworthy challenges. As previously noted, the efficacy of the One Health approach hinges on the application of the integration principle. While this principle is underpinned by European Union law, specifically Article 11 of the TFEU, its practical realization in the context of implementing the One Health approach is impeded

cle 6 of the Treaty on European Union (guaranteeing fundamental rights) and Articles 2 (right to life) and 8 (right to privacy) of the European Convention on Human Rights. These violations give rise to non-contractual liability on the part of the Italian Government under Article 2043 of the Italian Civil Code.

[25] See EU General Court, *Carvalho v. EU Parliament* – Order of 8 May 2019 Case T-330/2018, concerning an application for the annulment of a legislative intervention on greenhouse gases, with a related claim for damages, due to the negative impact of that legislation on the personal and professional lives of the plaintiffs; application rejected due to the undisputed harmfulness of the legislative measures but also due to the undifferentiated nature of the subjective situation brought before the Court.

[26] About the implications of this principle see I. Bruno, *The "Giudizio Universale" Case. Four constitutional tests on the powers of the court hearing the case,* published in *www.federalismi.it.* See also F. Gallarati, *Constitution-Based Climate Litigation: Comparative Study on the Invocation of National Constitutions in Climate Litigation*, BioLaw [Internet]. 24 novembre 2022;(2), 157-81. Available at <https://teseo.unitn.it/biolaw/article/view/2333>.

[27] G. Campeggio, Giudizio Universale *case and the problem of truth*, published in <www.dirittocomparati.it>.

by the inherent ontological and semantic disparities in key terms, such as health, territory, and environment, as stipulated in national legislations. Conversely, within the domestic legal framework, additional complexities stem from the fragmented allocation of responsibilities among State-Regions, the governing bodies responsible for health protection. The current health protection approach is hindered by the separation of responsibilities among the traditional domains of health protection, environmental protection (addressed in Article 117 of the Constitution), and animal welfare (included in Article 9 following the 2022 law). This division of responsibilities is based on the principle of loyal cooperation which necessitates involvement from various levels of government. With the new legislation, it appears that this division is being upheld. Finally, there is the challenge of asking for compensation and specific protection for individual citizens' claims resulting from the recognition of these rights at a global level. This challenge arises from Italian courts' inability to identify a suitable basis for a compensation claim, as illustrated in the famous Universal Judgment. Despite the issues analyzed in this discussion, integrating the One Health approach into the national legal system could certainly be a significant advancement in health protection, and more broadly, in safeguarding fundamental rights. This could involve adopting a common institutional language, establishing mechanisms for health protection that respect its global nature, and enhancing the role of different levels of government. Lastly, it's important to highlight the significant role this approach could play in protecting individual fundamental rights, particularly in terms of their justiciability, as demonstrated in the aforementioned case of the so-called Last Judgment.

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SECTION I
ESSAYS

# Public Health Regulatory and Organizational Challenges in the Prism of the One Health Approach in Italy

*Benedetta Celati*

**Abstract.** The COVID-19 pandemic has shown clearly the urgency of adopting a unifying and holistic "One Health" approach to improve global preparedness for health and climate emergencies. The paper investigates the contribution of this approach to address current unmet public health issues, examining, from a regulatory and organizational perspective, both the need to strengthen the territorial network of services, in line with a comprehensive public health care strategy, and the scope for public intervention to improve citizens' access to medicines and pharmaceutical innovation. Attention will be paid to the relationship between proximity and new technologies, in terms of prevention and treatment, focusing on telemedicine as a service activity to support widespread healthcare delivery and the integration of multiple sectors, disciplines and communities.

***Keywords:*** One Health, territorial health care, comprehensive public health care strategy, innovation, telemedicine.

## 1. Lessons learnt from the Covid-19 pandemic: the relevance of the integrated One Health approach

The Covid-19 pandemic has brought to the fore the intrinsic relationship between human, animal and environmental health, or more specifically, ecosystems[1].This interconnectedness is exemplified by several factors, including the overuse of antibiotics in farm animals, which increases the risk of infection by antibiotic-resistant bacteria, the adverse effects of climate change, and the growing awareness of the necessity to preserve balanced and functional ecosystems to safeguard human health[2].

In a scenario of this kind, an interdisciplinary vision is indispensable to producing fundamental and comprehensive scientific and epidemiological knowledge. In the same way, it is essential an overall reassessment of the institutional and regulatory framework, with the aim of integrating these issues into organizational and regulatory choices.

However, the recognition of such interdependence has long been taken into consideration, particularly in the European Union law, with the «protection of human health» as one of the objectives of EU environmental policy[3].

A comparable perspective can be observed in the recent reform of Articles 9 and 41 of the Italian Constitution, as set forth in Constitutional Law No. 1 of 11 February 2022[4]. In addition to enshrining the protection of the environment, biodiversity and the ecosystem within the Constitution, this reform stipulates that economic activity may be subject to limitations to safeguard human and environmental

[1] E. Chiti, 'Oltre la disciplina dei mercati: la sostenibilità degli ecosistemi e la sua rilevanza nel Green Deal europeo' (2022) Rivista della Regolazione dei Mercati, 2.

[2] See World Health Organization 2022 'A health perspective on the role of the environment in One Health', <https://www.who.int/europe/publications/i/item/WHO-EURO-2022-5290-45054-64214>.

[3] See Article 191 (ex-Article 174 TEC). 1. «Union policy on the environment shall contribute to pursuit of the following objectives:

- preserving, protecting and improving the quality of the environment;
- protecting human health;
- prudent and rational utilization of natural resources;
- promoting measures at international level to deal with regional or worldwide environmental problems, and in particular combating climate change».

[4] Constitutional Law No. 1 of 11 February 2022 'Amendments to Articles 9 and 41 of the Constitution on environmental protection'.

health[5]. As Guido Alpa has observed[6], the same results were achieved with the doctrinal elaboration of the right to the environment by Massimo Severo Giannini[7] and Alberto Predieri (who employed a broad notion of "landscape")[8], as well as with the Constitutional Court's jurisprudential guidelines, as demonstrated in the famous Ilva case[9].

This renewed integrated approach to the protection and promotion of health serves to further confirm the multidimensional structure of this relevant legal field. At the same time, it represents an evolution driven by the assertion of the "One Health" concept[10].

As defined by the One Health High Level Expert Panel[11], this concept refers to:

> (an) integrated, unifying approach that aims to sustainably balance and optimize the health of people, animals and ecosystems. It recognizes the health of humans, domestic and wild animals, plants, and the wider environment (including ecosystems) are closely linked and inter-dependent. The approach mobilizes multiple sectors, disciplines and communities at varying levels of society to work together to foster well-being 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[12].

The dissemination of this concept brings a substantial progression in our comprehension of the intricate interrelationship between climate change, infectious diseases and the social determinants of health[13].

Certainly, the transition from theory to practice presents an obvious complexity and the risk that the development of a coherent One Health policy is only cosmetic. To operationalize the principles of One Health in practice (beyond their promotion within political conferences) and respond to people's health needs, it is indeed necessary to address not only the clinical problem but also the multiple environmental, social and economic variables that impact on wellbeing. This assumption is supported by the increasing number of documented ecological disasters and the impact of pandemics, which show how human health is dependent on a complex multiplicity of factors.

The development of interdisciplinary and intersectoral strategies aimed at the prevention, surveillance, monitoring and mitigation of diseases is therefore vital. This implies a shift in focus from the mere treatment of pathology to the promotion of health in a broad sense[14]. To achieve this goal, the system of prevention in the health, environmental and climatic spheres must be strengthened, along with strengthening research activity. The perspective is founded on the principle of equity, which entails reducing disparities in access to health services and fostering intergenerational solidarity. Furthermore, this latter concept is explicitly referenced in the Italian Constitution (art. 9, as reformed in 2022).

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[5] M. Delsignore, A. Marra, M. Ramajoli, 'La riforma costituzionale e il nuovo volto del legislatore nella tutela dell'ambiente' (2022) Rivista Giuridica dell'Ambiente, 1.

[6] G. Alpa, 'Note sulla riforma della Costituzione per la tutela dell'ambiente e degli animali' (2022) Contratto e impresa, 2.

[7] M.S. Giannini, 'Aspetti giuridici dell'ambiente' (1973) Rivista trimestrale di diritto pubblico, 1.

[8] A. Predieri, 'Paesaggio' in Enc. dir. (Milano Giuffrè 1981), vol XXXI.

[9] In this case, the Court carried out a balancing act between opposing interests, noting that the legislator had privileged the continuity of production over the protection of health and the environment (Constitutional Court, 2018, no. 58).

[10] See L. Violini (ed.), *One Health. Dal paradigma alle implicazioni giuridiche* (Torino Giappichelli 2023); F. Aperio Bella (ed.), *One health: la tutela della salute oltre i confini nazionali e disciplinari. Per un approccio olistico alla salute umana, animale e ambientale.* (Napoli Editoriale Scientifica 2022).

[11] In 2021, the World Health Organization (WHO), the World Organization for Animal Health (WOAH), the Food and Agriculture Organization of the United Nations (FAO) and the United Nations Environment Programme (UNEP) established the One Health High-Level Expert Panel (OHHLEP), a group of 26 independent experts on One Health, which has produced an official definition of the concept, published in December 2021. "One Health" represents an evolution of the One Medicine approach, which is primarily focused on disease treatment rather than disease prevention and encompasses only two dimensions of human and animal health.

[12] Joint Tripartite (FAO, OIE, WHO) and UNEP Statement – Tripartite and UNEP support OHHLEP's definition of "One Health", available at <https://www.fao.org/3/cb7869en/cb7869en.pdf>.

[13] The term "social determinants of health" is used to describe the various factors that influence an individual's health status, as well as the broader health of communities and populations.

### 1.1. The Alma Ata comprehensive primary healthcare model

A closer examination reveals that the grounds for this approach can be traced back to the primary health care model that was outlined at the Alma Ata Conference in 1978[15]. Nevertheless, despite its conceptualization, the model was never fully implemented, due to factors beyond only economic and financial constraints[16]. Even more relevant is the fact that the model in question was notably "innovative", representing a transition from a more traditional biomedical approach to a distinct bio-psycho-social one[17]. It was established on the creation of intersectoral strategies, which were not focused solely on the clinical aspects of diseases, as exemplified by the concept of "Selective Primary Health Care". Rather, they were focused on the "horizontal" openness to individuals and communities, in accordance with the model of the Comprehensive Primary Health Care, and on the centrality of the territory[18].

Although a selective approach has become the dominant paradigm[19], the emergence of One Health in the political and legal discourse of the European Union[20] suggests a potential shift towards a more comprehensive model. This approach, which considers the preparedness and resilience of health systems, the demand for services and the actual health needs of the population, could mark a transformation towards the implementation of the primary health care principles just as identified at the Alma Ata Conference.

The aforementioned change in the Italian system shows with particular evidence in the restructuring of organizational models of territorial care and in the necessity to coordinate the holistic perspective of One Health with technological innovations and telemedicine tools. This is also intended to ensure the full implementation of the principle of substantial equality in access to (socio-)health services.

The objective of this paper is to examine the role of the One Health approach in addressing current unmet public health issues. In doing so, it will consider both the necessity to reinforce the network of services within a given territory in accordance with a comprehensive public healthcare strategy and the scope for public intervention to enhance citizens' access to medicines and pharmaceutical innovation. Furthermore, the relationship between proximity and new technologies is examined, with a particular focus on their role in prevention and treatment. From this angle, telemedicine is discussed as a service activity that has the potential to support the delivery of healthcare on a wider scale and facilitate integration across multiple sectors, disciplines, and communities.

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[14] In this regard, it should be noted that as early as 1946, when the WHO was founded, health was defined as a state of complete physical, mental and social well-being, which does not merely consist of the absence of disease or infirmity.

[15] According to the Alma-Ata declaration: «Primary health care is essential health care based on practical, scientifically sound and socially acceptable methods and technology made universally accessible to individuals and families in the community through their full participation and at a cost that the community and country can afford to maintain at every stage of their development in the spirit of self-reliance and self-determination. It forms an integral part both of the country's health system, of which it is the central function and main focus, and of the overall social and economic development of the community. It is the first level of contact of individuals, the family and community with the national health system bringing health care as close as possible to where people live and work and constitutes the first element of a continuing health care process».

[16] The Primary Health Care approach promoted in the Alma Ata Declaration was judged to be inefficient and unsustainable from an economic point of view, and the so-called Selective Primary Health Care approach, based on cost-effectiveness as the main tool for evaluating and validating health care choices, was preferred.

[17] G. Maciocco, 'A trent'anni da Alma Ata. Cure primarie: evoluzione storica e prospettive' (2008) Ann Ig., 4.

[18] In addition to the Alma Ata Declaration of 1978 on primary health care, it is also important to consider the Ottawa Charter of 1986 on health promotion. Both documents articulated the necessity of integrating health and social justice to ensure the universal accessibility of essential health services, to acknowledge the influence of socio-economic determinants on health outcomes, and to engage communities at the local level.

[19] J.A. Walsh, K.S. Warren K.S., 'Selective primary health care: an interim strategy for disease control in developing countries' (1979) The New England Journal of Medicine, 18.

[20] The One Health approach is mentioned in 8 regulations, 1 directive, 7 decisions and 22 communications. See F. Coli, H. Schebesta, 'One Health in the EU: The Next Future?' (2023) European Papers, 1.

## 2. Territorial health care reform in Italy

The Italian National Health Service (INHS or SSN in Italian) is currently structured in a way that attempts to balance two competing objectives: on one hand, the need to ensure a uniformity in guaranteeing the right to health; on the other, the need to achieve complete territorial differentiation[21]. In this context, two distinct approaches have emerged. The first one places considerable emphasis on the role of accredited private entities, as evidenced by the model adopted in Lombardy[22]. The second one is characterized by a restriction in recourse to external private facilities, as exemplified by the model adopted in Emilia-Romagna[23]. Nevertheless, both models maintain the centrality of the hospital as a site of care, at least until the outbreak of the pandemic[24], which has underlined the necessity of transitioning away from hospital-centric systems towards integrated care[25].

The complex dialectic that emerges from this process contributes to the formation of a healthcare governance structure that is primarily focused on the autonomous decision-making of the regions with regard to the organization of their respective healthcare systems. Nevertheless, this autonomy is constrained by the involvement of the State in establishing the fundamental standards of health care and social rights to be provided across the country[26]. Furthermore, the recent crisis has served to highlight the necessity to ensure equality in the enjoyment of fundamental rights[27].

In that respect, a centralizing influence can be observed in the predictions of the "Mission 6 – Health" of the National Recovery and Resilience Plan (NRRP)[28] and of the Ministerial Decree no. 77 of 23 May 2022 ("Regulation establishing models and standards for the development of territorial care in the National Health System"). The aforementioned acts are intended to delineate new directions in the field of healthcare that are consistent with the cross-cutting and holistic approach to health established by the international and European recognition of the integrated One Health methodology[29]. Indeed, for the first time, total funding for primary healthcare exceeds that for hospital healthcare[30].

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[21] See R. Bin, D. Donati, G. Pitruzzella, *Lineamenti di diritto pubblico per i servizi sociali e sanitari* (Torino Giappichelli 2021); A. Pioggia, 'Il diritto alla salute alla prova della differenziazione: autonomie, organizzazione e diseguaglianza' (2020) Istituzioni del Federalismo, 1. Furthermore, the issue is delicate in light of the prospects of implementing a system of differentiated regionalism, as outlined in the third paragraph of Article 116 of the Constitution and addressed in Law No. 86 of 26 June 2024.

[22] See C. Buzzacchi, 'La sanità nella Regione Lombardia' (2023) Le Regioni, 2-3.

[23] Some Regions, like Emilia-Romagna and Tuscany, have invested in community care in the past and are already close to the standards set by the central government while others start from little more than zero. C. Tubertini, *Pubblica amministrazione e garanzia dei livelli essenziali delle prestazioni. Il caso della tutela della salute* (Bologna BUP 2008).

[24] Article 8 of Decree-Law No. 14 of 9 March 2020 and Article 4 bis, Decree-Law No. 18 of 17 March 2020, converted with amendments by Law No. 27 of 24 April 2020, provided for the establishment of the so-called Special Continuity of Care Units, aimed at strengthening the home management of Covid-19 patients for whom hospitalisation is not necessary.

[25] In this context, regional systems that were more focused on hospital care have presented obvious difficulties in adapting See C. Tubertini, 'L'assistenza territoriale in trasformazione. Il ruolo delle comunità e delle istituzioni' (2024) Lavoro e diritto, 3.

[26] See art. 117 of the Italian Constitution «The State has exclusive legislative powers in the following matters: […] m) determination of the basic level of benefits relating to civil and social entitlements to be guaranteed throughout the national territory».

[27] See A. Pioggia, 'Diseguaglianze nell'eguaglianza. Il ruolo dell'amministrazione pubblica' (2023) EtnoAntropologia, 1.

[28] The Sixth Mission of the National Recovery and Resilience Plan is dedicated to the reform of the health system – Reform 1.1: Proximity health services, structures and standards for care in the territory: «The implementation of the reform intends to pursue a new health strategy, supported by the definition of an adequate institutional and organisational set-up, which allows the country to achieve adequate quality standards of care, in line with the best European countries and which increasingly considers the NHS as part of a broader community welfare system».

[29] S. Gabriele, 'L'assistenza sanitaria territoriale: una sfida per il Servizio sanitario nazionale' (2023) Ufficio Parlamentare di Bilancio, Focus tematico, 2.

[30] However, C. Tubertini (2024) draws attention to the fact that the resources made available by the NRRP only relate to investments in infrastructure. The costs associated with the personnel who will be responsible for managing and operating the new healthcare facilities must be considered as part of current expenditure and, as a result, must be charged outside the scope of NRRP resources.

The objective of this legislation is to establish the reference framework for the new territorial healthcare system, with the ultimate goal of standardizing regional systems through the construction of unified models[31]. This will inevitably entail the regulation of organizational aspects. The objective is not only to achieve a level of homogeneity that facilitates providing essential services respectful of qualitative and quantitative criteria throughout the national territory, but also to attain greater homogeneity in the organizational models that are used to provide assistance[32].

If the fundamental objective of the NRRP is the elimination of the disparities that have emerged in the social structure because of the 2020 pandemic, the tools to achieve this result in the health sector are identified in precise strategies. These are centered on the need to bridge the gaps between the various regional healthcare systems through the reinforcement of local structures, such as Community Homes[33] and Hospitals[34], and the advancement of technological innovation through telemedicine as a distinctive service offering that is accessible across the entire territory, with the home as the primary point of care[35]. The reform also redefines the role of districts[36] as organizational units of Local Health Authorities. In accordance with the Decree, Districts are responsible for the coordination of all community healthcare services within their designated territories[37]. This encompasses primary health services and social care programs that incorporate relevant healthcare components, such as integrated domiciliary care. They are responsible for the delivery and purchase of services within a defined budgetary framework. Finally, they serve as the principal forum for needs assessment and service planning, in accordance with population health management and chronic care models[38].

Furthermore, it is planned to strengthen integration mechanisms, initially in the socio-health sector, with the deployment of personnel from the areas responsible for the management of basic social services within the community houses[39]. Subsequently, and more broadly, in accordance with the One Health approach[40], the establishment of the National System for Health Prevention of environmental and climate risks, as indicated in Legislative Decree 36/2022[41]. This system is integrated with the National Environmental Protection System.

To fulfil Italy's commitment to the One Health approach, a shared Steering Committee was established in March 2023[42]. The purpose

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[31] See M. D'Arienzo, 'Verso un sistema di unità sanitaria? Luci e ombre del DM 77/2022' (2023) Corti Supreme e Salute, 2.

[32] See C. Tubertini (2024), 399, and A. Pioggia, 'La sanità nel Piano Nazionale di Ripresa e Resilienza'. (2022) GDA, 2.

[33] The first experiences of community care date back to the 'Case della Salute' (Health Homes), the experimentation of which was provided for in Annex A to the Ministerial Decree of 10 July 2007, implementing Law 296 of 27 December 2006 (2007 Budget Law).

[34] Community Hospitals were already envisaged in Ministerial Decree No. 70 of 2 April 2015 (annex 1. paragraph 10).

[35] See A. Pioggia, 'La casa come primo luogo di cura: un passo avanti o un pericoloso balzo all'indietro?' (2024) Diario di Diritto Pubblico, <https://www.diariodidirittopubblico.it/la-casa-come-primo-luogo-di-cura-un-passo-avanti-o-un-pericoloso-balzo-allindietro/>.

[36] A socio-health district is a territorial unit that brings together different structures and socio-health services with the objective of guaranteeing integrated and personalized care for people in need. The primary objective is to facilitate continuity of care and coherence between the various services, thereby promoting a holistic approach to health and well-being.

[37] F. Dalponte, L. Ferrara, V.D. Tozzi, 'La trasformazione del Distretto Socio Sanitario' (2022) Rapporto Oasi, Università Bocconi.

[38] See the Ministerial Decree no. 77 of 23 May 2022.

[39] Ministerial Decree no. 77 of 23 May 2022, in the list of professions indicated in the table 'Functional cooperation of the figures constituting the multiprofessional team' in Annex 1, provides for the social worker. Moreover, among the services of the Community Homes, integration with the Social Services is envisaged as mandatory.

[40] Moreover, in September 2023, the Department of Human Health, Animal Health and Ecosystem (One Health) and International Relations was established at the Ministry of Health.

[41] Containing "Further Urgent Measures for the Implementation of the National Recovery and Resilience Plan", converted with amendments into Law no. 79 of 29 June 2022. By decree of the Minister of Health of 9 June 2022, adopted after agreement with the State-Regions Permanent Conference, the tasks of the National System for Preventing Health from Environmental and Climatic Risks were defined.

[42] Prime Minister's Decree of 29 March 2023, published in the "Gazzetta Ufficiale Serie Generale" no. 113 of 16/05/2023. "Definition of the modalities of interaction of the National System for Prevention of Health from Environmental and Climate Risks

of this Committee is to facilitate strategic and operational coordination between the National Health Prevention System for environmental and climatic risks and the consolidated National System of Environmental Protection. The Steering Committee is responsible for the promotion of initiatives that facilitate interaction and integration between regional environmental and climate risk prevention systems and regional environmental protection agencies. Additionally, the Committee adopts directives that foster and harmonize the policies and strategies implemented by the aforementioned two bodies.

## 3. From cure to care

The importance of proximity is therefore clear to see. Indeed, daily life environments and territory become pivotal in ensuring the well-being of humans, animals and ecosystems.

This approach entails a reorientation of the organizational structure of services, accompanied by a reduction in the centrality of the hospital and the enhancement of non-institutionalized services, whether provided at home or near the home.

The realization of such a model is dependent upon the capacity to consider the multifaceted needs of the people within a conceptual framework of care that extends beyond the scope of mere health interventions, providing assistance in accordance with the specific requirements of each individual[43]. This strategy represents an action of "initiative medicine"[44], based on prevention and early diagnosis, as well as education[45], capable of proactively addressing potential risk factors.

In order to facilitate progress in this direction, it is critical to create an increasingly coordinated system that enables the interoperability of environmental and health information, even before the comparison and balancing of interests phase, as is the case, for example, of issuing of certain authorization-type measures linked to specific industrial activities. Similarly, it is essential to guarantee the effective implementation of socio-health integration, which represents a comprehensive conceptualization of health that encompasses the social dimension[46]. This is one of the areas where the greatest variation between territories occurs. Some regions have demonstrated an effective coordination of health and social services, while others have struggled to do so. In fact, many regions still draw up the health plan, the social plan, and various other plans, but in a "separate" manner. It should no longer be possible to think and act in this way.

It's worthy to note that the National Prevention Plan 2020-2025[47] – a central planning tool for the implementation of prevention and health promotion interventions within a defined geographical area – adopts an innovative approach, namely the implementation of the principle of "Health in all policies"[48]. This strategy involves the formation of interdisciplinary collaborations with the objective of not only preventing the emergence of diseases but also of fostering the capacity of individuals to engage in self-care and collective health promotion. Furthermore, it aims to promote interactions between individuals and the health system through the establishment of trust-based relationships. Consistent with such an approach is the Guideline document for urban planning from a public health perspective – Urban Health, approved by the Unified Conference with the State-Regions Agreement of

with the National Environmental Protection System and establishment of the Steering Committee".

[43] A. Pioggia, *Cura e pubblica amministrazione. Come il pensiero femminista può cambiare in meglio le nostre amministrazioni* (Bologna il Mulino 2024).

[44] As opposed to wait-and-see healthcare, which is based on the ability to provide answers to a need expressed by the patient.

[45] Initiative medicine represents a care model that seeks to address the pressing concerns associated with an ageing population and the prevalence of chronic diseases. It aspires to transcend the limitations of the conventional 'waiting medicine' paradigm.

[46] V. Molaschi, 'Integrazione socio-sanitaria e COVID-19: alcuni spunti di riflessione' (2020) Il Piemonte delle Autonomie, 2.

[47] The "National Prevention Plan 2020-2025" was adopted by the State-Regions Agreement of 6 August 2020.

[48] Consistent with Article 168(1) TFEU, which states: «A high level of human health protection shall be ensured in the definition and implementation of all Union policies and activities». In this sense, and still with a view to the One Health approach, it is recalled that Art. 11 TFEU states that «environmental protection requirements must be integrated into the definition and implementation of other Community policies», while Art. 13 TFEU provides that «(i)n formulating and implementing the Union's agriculture, fisheries, transport, internal market, research and technological development and space policies, the Union and the Member States shall, since animals are sentient beings, pay full regard to the welfare requirements of animals».

22 September 2021, which represents a significant development in the field of urban planning with a public health perspective. The document is designed to facilitate the integration of actions to protect and promote public health into urban planning, recognizing the intrinsic link between urban planning and public health, ensuring, also in this way, the implementation of the principle of substantive equality enshrined in the Constitution.

Furthermore, the document emphasizes that the pandemic has underlined the necessity for a novel conceptualization of community wellbeing in relation to the built environment and public health. This entails a shift from a medical model that focuses on the individual to a social model in which health is seen as the outcome of the interaction between various socio-economic, cultural and environmental factors. It thus becomes evident that it is necessary to reinforce the multidisciplinary collaboration between designers (urbanists, architects, transport specialists, etc.), public health experts (epidemiologists and healthcare professionals) and policy makers, developing systemic operational capabilities capable of addressing the complexity of urban management.

## 4. Public intervention to improve citizens' access to medicines and pharmaceutical innovation

What has been said so far, in emphasizing the importance of prevention, including working on social factors, also highlights the central role of companies operating in specific sectors, such as biomedical innovation and the pharmaceutical industry, which today are almost exclusively left to the market. However, the new European industrial strategy – presented in March 2020 and updated in May 2021 – considers industrial biotechnology, biomedicine and pharmaceuticals to be key enabling technologies.

For this, the One Health approach appears to offer a promising perspective for fostering the implementation of a novel paradigm of action and knowledge production. By leveraging the insights gained from the pandemic scenario, this approach has indeed the potential to drive transformative changes in the existing structure of innovation policies.

One Health, therefore, may be conceived of as a strategic model which valorizes the role played by scientific progress in anticipating pandemic events and thus protecting public health interests, in contrast to the trend of the emergency logic that usually accompanies the management of such critical situations.

The emergency approach is what characterized most of the measures taken in the context of the Covid-19 pandemic. Instead, the challenges represented by innovation as an essential factor for improving the prevention and management of health crises should be taken into consideration.

To demonstrate this assumption, one might consider the question of supplying products necessary to contain the spread of the virus. The legislative framework governing intellectual property and patents has proved to be a significant driver of innovation. However, it also presents a substantial obstacle to the efficient dissemination of research outcomes, data and innovative technologies. As evidenced by the doctrine, the rate of innovation in the pharmaceutical market has reached a notable plateau. Some commentators have postulated that this phenomenon may be attributed to a malfunction of the patent system. Such an approach would, to some extent, turn into an obstacle to the ultimate purpose it was established for[49], no longer being able to stimulate sufficient sequential innovation and thus unable to guarantee adequate collective benefits.

The solution proposed to reconcile the demands protected by the TRIPs Agreement's rules on intellectual property with the need to protect the fundamental right to health is the well-known instrument of compulsory licences for the production of medicines or medical devices in the event of a health crisis[50]. In the Italian legal system, this flexibility was introduced by the "Simplification Decree" (D.L. n. 77/2021), which added Article 70-bis of the Industrial Property Code (as set forth in Legislative Decree No. 30 of February 10, 2005), introducing a mandatory licensing regime for the use of essential medicinal and medical

[49] C. Desogus, 'Nuove frontiere tra regolazione, proprietà intellettuale e tutela della concorrenza nel settore farmaceutico: le pratiche di brevettazione strategica' (2015) Rivista della Regolazione dei mercati, 1.

[50] Compulsory licensing is when a government allows someone else to produce a patented product or process without the consent of the patent owner or plans to use the patent-protected invention itself. It is one of the flexibilities in the field of patent protection included in the WTO's agreement on intellectual property – the TRIPS (Trade-Related Aspects of Intellectual Property Rights) Agreement.

devices patents in the event of a national health emergency[51].

The One Health approach allows us to move beyond the limitations of a narrow focus on flexibility and exceptions. It permits us to consider the insights of the doctrine on global public knowledge and the necessity of reforming institutions such as the WHO[52], so that it can effectively facilitate the coordination of health systems and provide them with technical assistance.

Furthermore, it is pertinent to recall the role played by the antitrust authorities during the pandemic, which safeguarded innovation through their vigilance against both competition-distorting practices and abuses of patent law[53].

In this sense, it is relevant to consider the European Commission's Temporary Framework of 8 April 2020 on commercial cooperation in response to the Coronavirus pandemic[54]. This framework provides a useful point of reference in terms of emergency law. In highlighting the necessity of taking decisive action against businesses that exploit the health emergency to engage in anticompetitive conduct, the Commission also encourages the conclusion of collaborative agreements between the pharmaceutical industry and other stakeholders with the objective of ensuring citizens' access to essential goods[55]. Consequently, the instrument of the Comfort letter is reintroduced, offering guidance on the competitive admissibility of the agreements adopted by enterprises to address the public health emergency.

From a different perspective, it would be beneficial to consider what could stimulate innovation and improve the protection of citizens' health beyond the scope of monitoring anti-competitive activities. This is particularly true in a sector where European industrial policy appears to be able to exert its greatest influence, as is the case with the biomedical and pharmaceutical industry[56].

The hypothesis of this paper is that the One Health approach could represent a "recovery and resilience strategy" capable of generating a change in public intervention in this field in the name of the so-called "common European interest". In this regard, the role played by state aid is important, with the establishment, for example, of "Important Projects of Common European Interest", which allows Member States to support highly innovative transnational projects aimed at the development and implementation of products and processes, under the conditions set out by the European Commission in specific guidelines provided in 2014[57].

A further tool, this time of vertical nature and more closely aligned with a strategic industrial approach, is the "joint undertaking", which is established, in accordance with Article 187 TFEU, for the enactment of European research and development programmes in specific sectors, that explicitly adopts the One Health approach[58].

This instrument enables the establishment of institutionalized partnerships between private and public enterprises, as evidenced by the Innovative Medicines Initiative (IMI) and

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[51] Art. 70-bis *of the Italian Industrial Property Code «*In the event of the declaration of a national state of emergency motivated by health reasons, in order to cope with proven difficulties in the supply of specific medicines or medical devices deemed essential, compulsory licences may be granted, in compliance with international and European obligations, for the non-exclusive, non-saleable use, primarily aimed at supplying the domestic market, of patents relevant for production purposes, with a validity bound to the continuation of the emergency period or up to a maximum of twelve months from the end of the emergency period».

[52] See in this sense, Professor Luigi Ferrajoli's proposal which aim to transform them into genuine global institutions of guarantee, capable of engaging in equal dialogue with other universal institutions such as the World Trade Organization (WTO). See in particular, L. Ferrajoli, *Per una Costituzione della Terra. L'umanità al bivio* (Milano Feltrinelli 2022). Article 21 of the WHO Constitutions states that: «The Health Assembly shall have authority to adopt regulations concerning: (a) sanitary and quarantine requirements and other procedures designed to prevent the international spread of disease».

[53] See M. Passalacqua, B. Celati, Stato che innova e stato che ristruttura prospettive dell'impresa pubblica dopo la pandemia (2019/2020) Concorrenza e mercato.

[54] (Communication) 2020 C/116/02.

[55] M. Hosseini, 'The evolution of EU competition law and policy in the pharmaceutical sector: long-lasting impacts of a pandemic' (2025) Journal of Antitrust Enforcement, 13.

[56] See M. Passalacqua, B. Celati, cit.

[57] Communication from the Commission – Criteria for the analysis of the compatibility with the internal market of State aid to promote the execution of important projects of common European interest (2014/C 188/02).

[58] Such as Horizon Europe or the EU4Health Programme (2021-2027).

the public-private "Initiative for Innovation in the Health Sector" partnership[59].

The issue has recently gained traction in a study commissioned by the European Parliament[60], which focused on a proposed public research infrastructure designed to address the entire drug development cycle. This infrastructure, known as the "European Medicines Infrastructure", is to be established through a treaty among participating States.

Such an "enterprise" should act in a complementary manner to the functions ascribed to the recently established Health emergency and preparedness response authority (HERA)[61], charged with preventing, detecting and responding rapidly to health emergencies. Indeed, the European authority, precisely because of its preparedness and response function, seems to be in line with the emergency logic referred to above, even if, in order to fully understand future health threats, it will necessarily have to adopt a One-Health approach, that is considered central to the construction of the European Health Union, of which the HERA is a fundamental pillar[62].

In any case, in April 2024 the plenary session of the European Parliament failed to approve the amendment to the report on the revision of pharmaceutical legislation, which would have led to the establishment of a European public infrastructure for pharmaceuticals, vaccines and biomedical research (so called "European Medicines Facility")[63].

However, the proposed legislation on pharmaceuticals would establish the HERA as an autonomous and independent entity from the Commission, reporting to the European Centre for Disease Prevention and Control[64]. This new structure may be regarded as a prototype for the development of a public infrastructure.

It is important to recall that the ninth principle of the "Manhattan Principles on One World, One Health" of 2004[65] has already emphasized the necessity of increasing global health infrastructure investments, «improving the coordination between governmental and non-governmental agencies, vaccine and pharmaceutical companies, and all relevant partners».

In the light of the above, the concept of One Health may be regarded as a potential catalyst for the emergence of new paradigms of action, capable of delineating structures for the protection and promotion of innovation that extend beyond the scope of incentives determined by patent rights or antitrust supervision, but are founded on the recognition of knowledge as a strategic asset that should be invested in.

## 5. Telemedicine as a tool to facilitate community care and cross-sectoral integration

The provision of healthcare services using ICTs has been one of the core pillars of the strategy adopted to ensure resilient post-pandemic recovery. As early as 2008, in a Communication on "Telemedicine for the benefit of patients, health systems and society"[66], the European Commission highlighted the substantial contribution that telemedicine could make to the quality of life of its citizens, e.g. by improving access to healthcare in areas that are difficult to reach or where there is a shortage of qualified personnel; reducing hospitalization for people with chronic diseases through telemonitoring; and reducing waiting lists for some diagnostic services.

After the Covid 19 crisis, as mentioned above, Territorial Healthcare Infrastructures gained a stronger and more central role. In this sense,

[59] <https://research-and-innovation.ec.europa.eu/researcharea/health/innovative-health-initiative_en>.

[60] https://www.europarl.europa.eu/stoa/en/document/EPRS_STU(2021)697197.

[61] HERA is s a new Directorate-General within the European Commission. See the Commission Decision of 16 September 2021 establishing the Health Emergency Preparedness and Response Authority (2021/C 393 I/02).

[62] See M. McKee, A. de Ruijter 'The path to a European Health Union' (2024) The Lancet Regional Health – Europe.

[63] The proposal, after having been set aside by the compromise reached in the ENVI committee, was resubmitted with an amendment by 50 MEPs from different groups.

[64] <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52025DC0147>.

[65] In 2004, the Wildlife Conservation Society (WCS) brought together stakeholders to discuss global health challenges at the nexus of human, animal, and ecosystem health. The symposium "Building Interdisciplinary Bridges to Health in a Globalized World" at The Rockefeller University gave birth to the "Manhattan Principles" (http://www.oneworldonehealth.org/sept2004/owoh_sept04.html, n.d.). These detailed a collaborative, trans-disciplinary approach, coined "One World – One Health", or simply "One Health".

[66] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on telemedicine for the benefit of patients, healthcare systems and society, COM/2008/0689 final.

telemedicine has acquired a specific function for the implementation of a health system based on the centrality of the home as the first place of care[67].

In terms of the transition from cure to care, telemedicine is in fact the best means of gathering, decoding and classifying needs[68]. Therefore, it is very important that its use is equitable and homogeneous, and that regional solutions are interoperable with each other, in order to help reduce territorial disparities[69].

All of this is made even more complex by the fact that the regions remain the main institutional actor, but it is necessary to ensure territorial proximity responses that enhance the differences between territories (e.g. by adapting organization and interventions according to their urban or suburban specificity and the needs of users).

Nevertheless, the use of these tools has been promoted for years as a solution to the problems of providing health care in remote areas, where distance or the uneven distribution of resources makes quality health care difficult or precludes high quality medical service[70].

However, the use of telemedicine does not automatically mean the democratization of care. In this sense, it is important to focus more on the most disadvantaged to avoid the paradox that those who could benefit from digital health tools are actually those who use them least.

During the pandemic, it became also increasingly clear that reliable and timely information on the health status of the population is key for the formulation of public health policies and the dissemination of accurate information to the public knowledge[71].

In the context of the One Health approach, prevention is, indeed, essential. Therefore, telemedicine appears to be a powerful tool to enhance the ability to prevent and mitigate health risks in all areas of human, animal and environmental health, helping in the early detection of potential health threats.

In that regard, the concept of One Digital Health has been developed as a framework to focus on the digitalization of One Health and to provide data-driven solutions to challenges at the human-animal-ecosystem interface[72]. Ensuring real-time surveillance of human, animal and environmental diseases is in fact of paramount importance, and data are crucial for assessing the risks associated with the (re-) emergence of infections.

Data are also critical for the effective implementation of a multidisciplinary approach, as demonstrated by the tripartite cooperation between the World Health Organization (WHO), the World Organization for Animal Health (OIE) and the Food and Agriculture Organization of the United Nations (FAO), which is based on interoperability of information[73].

## 6. Final remarks

One Health approach shows that individual well-being is also, and above all, common well-being[74]. In this respect, the Italian Constitution, which, in Article 2, calls for «the fulfilment of the inalienable duties of political, economic and social solidarity», expresses a principle of cohesion[75] that seems very much in line with the approach analyzed in the paper.

Indeed, One Health appears to be an instrument for a fuller realization of the social rights of the individual[76], enabling the implementation of cohesion policies between institutions and citizens, realized through the prescription of «public

[67] See Ministerial Decree of 29 April 2022 approving the organisational guidelines containing the "digital model for the implementation of home care".

[68] F. Aperio Bella (2023), 'The Role of Law in Preventing "Remote" Defensive Medicine: Challenges and Perspectives in the Use of Telemedicine', Federalismi, 1.

[69] See the Guidelines for submitting regional telemedicine projects – Regional/provincial operational plan of AGENAS.

[70] See J. Preston, F.W. Brown, B. Hartley (1992), 'Using telemedicine to improve health care in distant areas', Hosp Community Psychiatry, 1.

[71] See N. Peek, M. Sujan, P. Scott 'Digital health and care in pandemic times: impact of COVID-19' (2020) BMJ Health Care Inform., 1.

[72] See A. Benis A, O. Tamburis, C. Chronaki, A. Moen (2021), 'One Digital Health: A Unified Framework for Future Health Ecosystems', J Med Internet Res., 2.

[73] See David T.S. Hayman *et al.*, 'Developing One Health surveillance systems' (2023), One Health, 17.

[74] See S. Valaguzza, *One Health: Scenari di policy*, in L. Violini (ed) *op. cit.*, 46.

[75] See D. Donati, 'Coesione e collettività: elementi inscindibili o elementi occasionali?', *Materiali del Panel "Coesione economica, sociale e territoriale nella società civile in trasformazione" nell'ambito della IV Conferenza annuale Icon-S Italian Chapter. "Politica e istituzioni tra trasformazioni e riforme" Università Bocconi, Milano 13 e 14 ottobre 2023*.

[76] G. Ragone, M. Ramajoli, *One Health e ordinamento italiano: il livello costituzionale, la normazione primaria e la fase dell'implementazione amministrativa*, in L. Violini (ed) *op. cit.*, 15.

services aimed at eliminating the causes of social inequality, in accordance with the program of substantive equality announced in Article 3.2»[77].

However, many challenges still remain to be met in order to translate this approach into concrete organizational and regulatory measures capable of ensuring the protection of the three components of the ecosystem (environment, humans and animals).

With this in mind, the regions must be provided with adequate infrastructural and financial resources. Otherwise, there is a risk that organizational and functional differentiation will not be a correct translation of the principle of substantive equality, but a counterproductive fragmentation, caused by disparities between better-equipped geographical areas and those that are struggling to cope.

[77] R. Bin, D. Donati, G. Pitruzzella, *op. cit.*, 175.

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SECTION I
ESSAYS

# Bridging Silos: The Role of Communication in Advancing the One Health Approach in Africa

*Annette Kezaabu*

**Abstract.** The One Health approach recognizes that the changing interactions between people, animals, plants, and our shared environment influence public health, and aims to achieve optimal health outcomes through a collaborative, multisectoral approach to designing and implementing programs, policies, legislation, and research. The control of emerging and existing zoonotic diseases, which spread between animals and people, is one area where a One Health approach is relevant for Africa irrespective of challenges in implementation. Effective communication can be as a tool is needed to prepare and respond to diseases and threats of diseases as well as overcoming the barriers to implementing this approach across sectors. This article explores the critical role of communication in bridging these silos to advance the One Health approach across the continent. It highlights how strategic communication fosters collaboration among key stakeholders, government agencies, non-governmental organizations, academia, and local communities while promoting knowledge sharing, transparency, and trust. Concerted efforts are essential to harmonize fragmented efforts and catalyze a unified response to attaining the objectives of One Health and SDG's.

***Keywords:*** communication, misinformation, disinformation, Silos, One Health.

## 1. Introduction

The One Health concept is built on the understanding that the health of humans, animals, and the environment are deeply interconnected. African countries have experienced the devastating impact of successive epidemics and zoonotic diseases, ranging from endemic zoonoses such as brucellosis and leptospirosis to neglected zoonoses such as rabies and onchocerciasis to emerging zoonoses such as anthrax, yellow fever, Ebola, Lassa fever, COVID-19 and most recently the Mpox in 2024[1], are projected to have caused a loss of over 227 million years of healthy life and an annual productivity loss of over US$800 billion across the continent[2].

With the signing of the Libreville Declaration at the first Inter-Ministerial Conference on Health and Environment in 2008 and the subsequently endorsed a 10-year Strategic Action Plan to scale up health and environment interventions in Africa from 2019 to 2029 at the third Inter-Ministerial Conference on Health and Environment in Gabon in 2018, the One Health approach was adopted in African countries[3] However, implementation thereof has met several strides which on one hand hamper development and on the other encourage the surge of zoonotic diseases. These health challenges, compounded by factors such as environmental degradation and the growing threat of climate change, demand a collaborative and multi-disciplinary approach. Communication as a tool aims to break down silos across sectors to create a unified strategy for disease control, prevention, response, and health promotion. The WHO's Joint External Evaluation[4] tool evaluates a country's risk communication capacity in five main areas: (1) risk communication systems; (2) internal and partner communication

[1] WHO, Mpox Outbreak 2024, <https://www.who.int/emergencies/situations/mpox-outbreak> accessed 23 April 2025.

[2] WHO Regional Office for Africa, <https://www.afro.who.int/sites/default/files/2019-03/Productivity%20cost%20of%20illness%202019-03-21.pdf (2019)> accessed 20 November 2024.

[3] International Institute for Sustainable Development, 'Health and Environment in Africa Bulletin, Vol 14 No 1, Monday, 1 September 2008; A report of the first Inter-ministerial Conference on Health and Environment in Africa' (September 2008) <http://www.iisd.ca/africa/hae/hae1/> accessed 23 April 2025.

[4] Joint external evaluation tool: International Health Regulations (2005), second edition ISBN 978-92-4-155022-2.

and coordination; (3) public communication; (4) communication engagement with affected communities; and (5) addressing perceptions, risky behaviors, and misinformation[5]. Building risk communication capacity facilitates public confidence and trust in public systems when information can change rapidly and there are many unknowns. Risk communication using a One Health approach may leverage mass and social media campaigns to raise awareness of zoonotic diseases and prevention methods; engage in rumor tracking and misinformation management; and train service providers as well as cadres of community workers and volunteers from the human, animal, and environmental health sectors, civil society groups, and media professionals on how to effectively communicate and engage the public on One Health issues[6].

## A. Bridging Silos in the One Health Approach

The concept of bridging silos refers to strategies and practices aimed at enhancing collaboration and communication across different departments or teams within an organization[7]. Silos typically arise when teams operate in isolation, focusing on their specific goals without sufficient interaction with other groups. This can lead to inefficiencies, redundancy, and a lack of innovation. One of the primary issues in OH is the existence of "silo mentality" among professionals in different health sectors who often operate independently, which restricts their ability to share critical information and collaborate effectively[8]. One Health seeks to transition from traditional management of individual sectors towards an interdisciplinary approach that addresses zoonotic diseases at the human-animal-environmental interface[9] which demands that there must be intersectoral coordination for there to be success.

A study conducted in Australia in 2017 indicated that, "the absence of a clear definition and subsequent vision for the future of One Health are barriers to interdisciplinary collaboration, and that siloed approaches by different sectors restrict the ability for professionals to work collaboratively across disciplines"[10]. This hampers the success of the One Health initiative in Africa. This lack of communication is considered to be counterproductive and derails any efforts to form an integrated system for prevention, control and treatment of zoonotic diseases.

## B. The importance of Communication

Communication is at the core of the One Health approach, as it facilitates collaboration between human health, veterinary, and environmental sectors. Collaboration and communication between actors from different sectors, disciplines and countries is the foundation for OH surveillance and other OH activities. Communication and cooperation between human health care providers, public health professionals, and veterinarians is important to better address issues of emerging diseases and environmental change. Communication is central to our everyday ideas about what makes life worth living and is necessary in all aspects of human endeavor. To improve the effectiveness of the One Health approach, there is a need to create a balanced and greater relationship among existing groups and networks, especially between veterinarians and physicians, and to amplify the role that environmental and wildlife health practitioners, as well as social scientists and other disciplines, play to reduce public health threats. It ensures that all stakeholders, governments, international agencies, communities, and health professionals work together toward shared health outcomes. Without effective communication, the fragmented nature of these sectors can lead to inefficiencies and missed opportunities for disease control and prevention.

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[5] *Ibidem.*

[6] Fostering One Health Risk Communication Systems and Coordination <https://thecompassforsbc.org/trending-topics/fostering-one-health-risk-communication-systems-coordination> accessed 25 November 2024.

[7] Jean Egmon, Bridging Silos: A Proven Method for Effective Business Collaboration (Kellogg School of Management, Northwestern University 2001).

[8] Moatlhodi Kgosimore *et al.* (2024), 'Status of One Health Implementation in Botswana', One Health Cases, ohcs20240016, <https://doi.org/10.1079/onehealthcases.2024.0016> accessed 23 April 2025.

[9] Burke R.L., Kronmann K.C., Daniels C.C., Meyers M., Byarugaba D.K., Dueger E., & Vest K.G. (2012), A review of zoonotic disease surveillance supported by the armed forces health surveillance center. Zoonoses and Public Health, 59(3), 164-175. 10.1111/j.1863-2378.2011.01440.x.

[10] Johnson I., Hansen A., Bi P. (2018), The challenges of implementing an integrated One Health surveillance system in Australia, Zoonoses Public Health, 65(1), e229-e236, doi: 10.1111/zph.12433. Epub 2017 Dec 10. PMID: 29226606; PMCID: PMC7165821.

## 2. Understanding the importance of One Health Approach in Africa

### A. The One Health Framework

One Health is an approach that recognizes that the health of people is closely connected to the health of animals and our shared environment. This concept has gained prominence in recent years, especially in light of global health challenges such as zoonotic diseases and antimicrobial resistance[11]. It is an interdisciplinary approach that recognizes the linkages between human and animal health, and environmental health focusing on; zoonoses, food security, environmental health and Antimicrobial Resistance[12].

The One Health Framework was developed by the Quadripartite, which includes the: Food and Agriculture Organization (FAO), United Nations Environment Programme (UNEP), World Health Organization (WHO), and World Organisation for Animal Health (WOAH)[13]. One Health provides a holistic framework for addressing diseases and health risks that affect multiple domains. One Health has been implemented in human and animal health for decades; its significance grew during the COVID-19 pandemic[14].

The One Health Programme at Africa Centres for Disease Control and Prevention (Africa CDC) is comprised of a cross-divisional One Health Technical Working Group (OH-TWG), whereby each of the five technical divisions is represented: 1) Division Surveillance and Disease Intelligence, 2) Division of Emergency Preparedness and Response, 3) Division of Laboratory Systems, 4) Division of Public Health Institutes and Research, and 5) Division of Disease Control and Prevention[15]. The OH-TWG members work collaboratively across Africa CDC, the Regional Collaborating Centres, the AU, and with Member States to implement priority programme activities[16].

### B. Public Health Challenges in Africa

Public health can be defined as the process of mobilizing local, state, national, and international resources to solve major health problems affecting communities[17]. It can also be understood as the health status of a population, the extent to which they are free from disease and premature death[18]. Alternatively, it can be seen as a philosophy of interventions aimed at protecting and promoting the health of the population[19]. Africa faces unique challenges, including high rates of zoonotic diseases, emerging pandemics, and the effects of climate change. Diseases like Ebola, Rift Valley fever, and the impacts of climate-related changes on agriculture and water sources require integrated responses[20]. The One Health approach is essential for effectively tackling these challenges, as it encourages early detection, surveillance, and intervention strategies that span across sectors.

Africa experiences more than the fair share of the burden health threats that impact our wellbeing at the human-animal-environment interface including zoonotic diseases, emerging infectious and vector-borne diseases, antimicrobial resistance, food-borne disease, climate change, and death with appalling disparities within and between countries, complicated by the attenuation of the human resource capital

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[11] What is 'One Health'?, <https://www.who.int/news-room/questions-and-answers/item/one-health> accessed 22 November 2024.

[12] World Health Organization, 'One Health' (26 October 2023) <https://www.who.int/health-topics/one-health> accessed 23April 2025.

[13] FAO, UNEP, WHO and WOAH (2022), Global Plan of Action on One Health. Towards a more comprehensive One Health, approach to global health threats at the human-animal-environment interface, Rome, <https://doi.org/10.4060/cc2289en> accessed 20 November 2024.

[14] Nina Jamal, Wendla Antonia Beyer, Teresa Pegger, Nathalie Danner, Breaking Institutional Silos and Achieving Health for All (FOUR PAWS International, Austria) nina.jamal@four-paws.org.

[15] Africa Centres for Disease Control and Prevention, 'One Health Programme' (Africa CDC, n.d.) <https://africacdc.org/programme/surveillance-disease-intelligence/one-health/> accessed 23 April 2025.

[16] One Health Programme, <https://africacdc.org/programme/surveillance-disease-intelligence/one-health/> accessed 22 November 2024.

[17] Dean Rickles (2011), 'Public Health' in Fred Gifford, *Handbook of the Philosophy of Science, Philosophy of Medicine*, 16, North-Holland, 523.

[18] Kaseje D.C.O., Juma P. and Oindo M. (2005), 'Public health in Africa: What is new – the context, the gains, the losses, the renewed public health, and the way forward', Kidney International, 68, S49, doi: 10.1111/j.1523-1755.2005.09810.x.

[19] Baggot R. (2000), Public Health Policies and Politics, Hampshire, United Kingdom, Palgrave.

[20] Arctic Council 2017, *Arctic Council. Operationalizing One Health in the Arctic* [Google Scholar].

through death, disease, civil wars, brain drain, as well as inappropriate training programs[21].

Public health challenges are further exacerbated by poor preparation of health systems for major epidemics, absence of functional global surveillance systems, weak health systems, unprepared and unskilled HCWs, and poor access to and knowledge of the use of personal protective equipment[22]. In addition, the devastating effects of culture, hand-washing habits, social media and religious practices have all been clearly demonstrated in the recent outbreaks[23]. Public health often takes a similar focus, aiming to create healthy circumstances and conditions for people by focusing on the determinants of health. In this respect, OH uses health as an inclusive determinant, such that it includes actions that are broad in orientation and scope, so that health activism ought not to be limited to human agents[24].

### C. Current Status of the One Health Approach in Africa

The current status of One Health in Africa is marked by growing recognition and adoption of the approach at the continental level, with the African Union actively endorsing it to address zoonotic diseases, but still faces challenges in fully operationalizing it at national levels due to issues like siloed working practices and limited capacity within health sectors, requiring further efforts to build strong multisectoral collaborations and implement effective One Health strategies across the continent[25].

The African Union endorses the One Health approach to address zoonotic diseases, human, animal, and environmental sectors work jointly to raise awareness, gather credible data, implement programs, and promote evidence-based policy and practice[26]. Operationalizing One Health remains a challenge and has struggled to gain a firm institutional foothold as One Health activities continue to exist in silos. To help eliminate the preceding siloed approach of addressing zoonotic diseases at national level, the AU organisations are leading the development of an African Union One Health strategy to support AU Member States to develop/establish, coordinate, monitor, and evaluate implementation of holistic zoonotic disease prevention and control programmes and help get ahead and prevent future pandemics[27].

While some African countries have made progress in implementing One Health frameworks, there remain significant gaps in policy, coordination, and practical application[28]. Regional disparities, inconsistent policies, and lack of integration between human, animal, and environmental health sectors continue to limit the approach's full potential. Additionally, resource constraints and political instability further exacerbate these challenges[29].

## 3. Communication Barriers to the One Health Approach in Africa

### A. Siloed Health Systems

One of the major barriers to the successful implementation of One Health in Africa is the siloed nature of health systems. This refers to fragmented healthcare delivery models where various health programs operate independently without integration[30]. In many African countries,

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[21] Omuse E.R., Machekano H., Sokame B.M., Mutyambai D.M., Dubois T., Subramanian S., and Chidawanyika F. (2025), 'One Health interventions and challenges under rural African smallholder farmer settings: A scoping review', One Health, 20, 100959, doi: 10.1016/j.onehlt.2024.100959.

[22] Easterly W. (2009), How the millennium development goals are unfair to Africa, World Dev, 37, 26-35, doi: 10.1016/j.worlddev.2008.02.009.

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[25] Africa CDC, One Health Program, accessed from <https://africacdc.org/programme/surveillance-disease-intelligence/one-health/> accessed 25 November 2024.

[26] Alimi Y., Wabacha J. (2023), Strengthening coordination and collaboration of one health approach for zoonotic diseases in Africa. *One Health Outlook*, 5, 10. <https://doi.org/10.1186/s42522-023-00082-5> accessed on 25 November 2024.

[27] *Ibidem*.

[28] Yopa D.S., Massom D.M., Kiki G.M., Sophie R.W., Fasine S., Thiam O., Zinaba L., Ngangue P. (2023), Barriers and enablers to the implementation of one health strategies in developing countries: a systematic review, Front Public Health, 11, 1252428, doi: 10.3389/fpubh.2023.1252428. PMID: 38074697; PMCID: PMC10701386.

[29] *Ibidem*.

[30] Supra note 21.

human health, animal health, and environmental health sectors often operate independently, without effective coordination or communication. Many countries face challenges in health facility data systems such as poor data quality, siloed data systems, reporting burden on frontline workers, limited capacity for analysis and use at national and sub-national levels[31]. These challenges are, despite the heavy investments made by countries, still faced in facility data systems[32]. Fragmented data management systems used by disease programmes are often disconnected from a comprehensive national facility data system and may operate in isolation[33].

Most investments are vertical, partner-driven and program-specific with limited system-wide impacts[34]. Poor linkages exist amongst different actors and solutions as they are not designed to capture robust data across multiple programmatic areas. This lack of cross-sector collaboration leads to fragmented responses to health crises, delaying effective intervention and response[35]. In Burkina Faso, for example, intersectoral health governance appears fragmented and still unable to lead actors towards a shared vision or a definition of strategic priorities that are feasible and collectively validated for integrated zoonotic disease surveillance[36].

### B. Cultural and Linguistic Barriers

Africa is a continent with rich cultural and linguistic diversity. This diversity can complicate efforts to communicate health risks and preventive measures effectively, particularly in rural areas where healthcare providers and patients do not share a native language[37]. Such barriers often result from a lack of language diversity training in medical education[38] which poses challenges in terms of achieving high levels of satisfaction among medical professionals and patients, providing high-quality healthcare and maintaining patient safety[39]. Language or communication barriers have the potential to negatively impact medical care as well as any ongoing relationship between patients, providers, and facilities. Ongoing relationships include but are not limited to ethical and legal implications that may occur over time[40]. Health messages must be culturally sensitive and linguistically appropriate to resonate with local populations and encourage behavior change. Cultural and linguistic barriers can be especially true for minority groups belonging to specific ethnicities, races, or communities[41]

### C. Information Gaps and Misinformation

WHO defines this information disorder, or infodemic – as an overabundance of information, including false or misleading information, in digital and physical environments during an emergency[42]. The flow of accurate health information is often disrupted by gaps in data collection and dissemination, especially in remote or conflict-prone

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[31] <https://www.afro.who.int/news/countries-strengthen-health-data-collection-analysis-and-use-support-resilient-health-systems> accessed 24 April 2025.

[32] *Ibidem*.

[33] WHO; Countries to Strengthen Health Data collection, analysis and use in support of resilient health systems accessed from <https://www.afro.who.int/news/countries-strengthen-health-data-collection-analysis-and-use-support-resilient-health-systems> on 25 November 2024.

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[35] *Ibidem*.

[36] Spencer J., McRobie E., Dar O, Rahman-Shepherd A., Hasan N., Hanefeld J, *et al.* (2019), Is the current surge in political and financial attention to One Health solidifying or splintering the movement? BMJ Glob Health, 4(1), e001102.

[37] Slade S., Sergent S.R. (2023), Language Barrier. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing, 2024 Jan-. PMID: 29939596.

[38] Kirsten Peremore; Causes of language barriers in healthcare 2024.

[39] Al Shamsi H., Almutairi A.G., Al Mashrafi S., Al Kalbani T. (2020), Implications of Language Barriers for Healthcare: A Systematic Review, Oman Med J., 35(2), e122, doi: 10.5001/omj.2020.40. PMID: 32411417; PMCID: PMC7201401.

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[41] Denefits; Bridging the Gap: Overcoming Language Barriers in Healthcare 2024 accessed from <https://www.denefits.com/overcoming-language-barriers-in-healthcare/> 22 November 2024.

[42] Managing false information in health emergencies: an operational toolkit 2024, <https://iris.who.int/bitstream/handle/10665/375783/WHO-EURO-2024-8271-48043-71198-eng.pdf> accessed on 23 November 2024.

areas[43]. Additionally, misinformation, particularly through social media, undermines public trust and hinders health initiatives[44]. Without clear, accurate, and timely communication, efforts to address zoonotic diseases or environmental threats can be significantly hampered. Researchers have noted the diffusion of health misinformation as well as its tendency to complicate decision making by patients and their families[45]. As the generation of information is theoretically free, the scope of misinformation is numerous and limitless. Consequently, medical and governing entities must ensure that accurate, evidence-based information dominates science and public health to control and limit the dissemination of falsities of misinformation[46].

### D. Political and Institutional Challenges

Weak governance, political instability, and lack of coordination between health authorities are significant impediments to effective communication and the One Health approach in Africa. Political interests and institutional barriers can delay decision-making processes and hinder the establishment of cohesive public health strategies[47]. Health policies in Africa are driven largely by political rather than technical interests backed by robust evidence[48]. Several studies have revealed that public health policies and systems appear to be built loosely on technical and scientific evidence, but with high political systems and ideologies[49]. Additionally, the lack of decentralization of policy formulation and implementation, poor resource mobilization and lack of political engagement with policy beneficiaries, implementers and other relevant stakeholders limit some policies throughout the continent[50].

## 4. The Role of Communication in Advancing the One Health Approach

### A. Promoting Interdisciplinary Collaboration

Effective communication is essential for fostering collaboration between different sectors. Communication strategies that emphasize shared goals, such as the prevention of zoonotic diseases, can encourage cross-sector cooperation. Joint initiatives like surveillance programs for diseases such as avian influenza or rabies have shown the potential of collaboration between public health, veterinary, and environmental experts[51]. Interdisciplinary collaboration provides a platform for diverse perspectives, enabling a more holistic understanding of the complexities inherent in One Health. However, it requires overcoming disciplinary boundaries, establishing effective communication channels, and creating a supportive institutional framework[52]. Institutions must also enhance support for interdisciplinary initiatives by breaking down departmental barriers that hinder collaboration. This can be achieved by fostering interdisciplinary faculty

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[43] Borges do Nascimento I.J., Pizarro A.B., Almeida J.M., Azzopardi-Muscat N., Gonçalves M.A., Björklund M., Novillo-Ortiz D. (2022), Infodemics and health misinformation: a systematic review of reviews. Bull World Health Organ, 100(9), 544-561, doi: 10.2471/BLT.21.287654. Epub 2022 Jun 30. PMID: 36062247; PMCID: PMC9421549.

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[45] Rodgers K., Massac N. (2020), Misinformation: a threat to the public's health and the public health system. *J Public Health Manag Pract*, 26(3), 294-296.

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[48] AbuAlRub R.F., Abdulnabi A., Involvement in health policy and political efficacy among hospital nurses in Jordan: a descriptive survey. J Nurs Manag. 2020, 28, 433-40.

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[51] Belay E.D., Kile J.C., Hall A.J., Barton-Behravesh C., Parsons M.B., Salyer S., Walke H. (2017), Zoonotic Disease Programs for Enhancing Global Health Security. Emerg Infect Dis, 23(13), S65-70, doi: 10.3201/eid2313.170544. PMID: 29155661; PMCID: PMC5711319.

[52] Andrawes L., Johnson T., Coleman M. (2021), Complexity in health: Can design help support interdisciplinary solutions? Glob Health Sci Pract, 9(Suppl 2), S217-25, doi: 10.9745/GHSP-D-21-00222, doi: 10.9745/GHSP-D-21-00222.

development, encouraging joint research initiatives, and reallocating resources to support One Health projects[53].

**B. Raising Public Awareness and Education**

Outreach initiatives and instructional efforts are two ways to increase awareness. These initiatives can provide information about the interconnectedness of humans, animals, and the environment. A fundamental element of collaboration involves the exchange of data and information. Public awareness campaigns are crucial in educating communities about the interconnectedness of human, animal, and environmental health. Education efforts that target both urban and rural populations can promote behaviors that prevent disease outbreaks, such as vaccination for both humans and livestock, proper sanitation practices, and environmental conservation. Raising awareness about One Health is a holistic approach to improving the health of both humans and animals. This can shift societal perspectives towards sustainable practices, improve disease surveillance for early outbreak detection, and support timely decision-making[54].

**C. Enhancing Policy Advocacy and Stakeholder Engagement**

Effective communication plays a critical role in influencing policy and mobilizing stakeholders. By using evidence-based communication, health leaders can advocate for the prioritization of One Health initiatives. According to the African Union's Inter-African Bureau for Animal Resources (AU-IBAR), "Building partnerships across sectors and disciplines is essential to address the intricate linkages between health systems, ensuring sustainable solutions to zoonotic diseases, antimicrobial resistance, and environmental degradation"[55].

The complexity of One Health requires active involvement from diverse stakeholders, including governments, civil society, academia, and the private sector. Effective advocacy demands clear communication of evidence to policymakers, aligning health priorities with national development agendas[56]. The World Health Organization (WHO) highlights that "multi-sectoral collaboration fosters innovative approaches to health challenges, leveraging resources and expertise across boundaries"[57].

Furthermore, stakeholder engagement involves not just consultation but empowerment, ensuring that communities, especially vulnerable populations, have a voice in decision-making processes. As stated by the One Health High-Level Expert Panel (OHHLEP)",Achieving meaningful stakeholder participation strengthens the legitimacy and sustainability of One Health interventions"[58].

**D. Crisis Communication and Emergency Response**

This refers to the strategic practice of disseminating clear and timely information to relevant stakeholders during a crisis or emergency situation, with the goal of mitigating damage, maintaining public trust, and facilitating effective response efforts while managing potential risks to an organization or community[59]. Health crises, such as the Ebola outbreak in West Africa or the COVID-19 pandemic, underline the importance

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[53] Chang Cai *et al.*, Advancing One Health education: integrative pedagogical approaches and their impacts on interdisciplinary learning <https://doi.org/10.1016/j.soh.2024.100079> accessed on 26 November 2024.

[54] Fatima Aziz Raising Awareness and Advocacy for One Health <https://isid.org/onehealthday2024/#:~:text=Raising%20awareness%20about%20One%20Health,and%20support%20timely%20decision%2Dmaking> accessed on 26November 2024.

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[56] Nabyonga-Orem J., Marchal B., Mafigiri D., Ssengooba F., Macq J., Campos da Silveira V., and Criel B. (2013), 'Perspectives on the role of stakeholders in knowledge translation in health policy development in Uganda', BMC Health Services Research, 13, 324, doi: 10.1186/1472-6963-13-324.

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[59] Kağan Cenk Mizrak, Crisis Management and Risk Mitigation: Strategies for Effective Response and Resilience, doi: 10.4018/979-8-3693-1155-4.ch013.

of timely and accurate communication[60]. Clear, consistent messaging from trusted sources can mitigate panic, prevent the spread of misinformation, and ensure that emergency response measures are properly understood and implemented[61]. During a response, crisis communications must be accessible to the public both in terms of content and of delivery. Accessibility looks different to different people and populations. Communicators should consider population characteristics such as age, reading level, language proficiency, disability status, functional needs, and cultural background[62]. It is also important to consider which message formats and delivery channels work best for different populations in the community[63].

## 5. Case Studies and Examples from Africa

### 5.1. Success Stories

#### A. Ebola Response in West Africa

The collaboration between human health, animal health, and environmental experts during the 2014-2016 Ebola outbreak in West Africa characterised by a rapidly spreading epidemic, demonstrated the power of interdisciplinary communication. Information sharing, coordinated response efforts and joint task forces were crucial in containing the outbreak.

The 2014-2016 outbreak in West Africa was the largest Ebola outbreak since the virus was first discovered in 1976[64]. There were more cases and deaths in this outbreak than all others combined, in total 28,616 cases and 11,310 deaths[65]. It started in Guinea then quickly spread to neighboring countries Sierra Leone and Liberia[66]. By July 2014, it had reached the capital cities of these three countries and in August 2014, WHO declared the outbreak a Public Health Emergency of International Concern[67].

Five years later, in 2021, Guinea experienced another outbreak that was controlled swiftly, much the same way as in Uganda in 2022[68]. The Democratic Republic of Congo, which had the largest number of EVD cases and deaths, experienced a protracted outbreak in 2018-2020 and another episode in 2021, despite the country's decades-long experience with EVD outbreaks[69]. The Ebola epidemic catalyzed the development of vaccines under urgent circumstances[70]. By utilizing a One Health approach, researchers recognized that both human and animal health could benefit from vaccine trials. The rVSV-ZEBOV vaccine was developed and tested during the outbreak, significantly reducing mortality rates among vaccinated individuals[71].

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[60] Allgaier J., Svalastog A.L. (2015), The communication aspects of the Ebola virus disease outbreak in Western Africa--do we need to counter one, two, or many epidemics?, Croat Med J., 56(5), 496-9, doi: 10.3325/cmj.2015.56.496. PMID: 26526888; PMCID: PMC4655935.

[61] Allgaier J., Svalastog A.L. (2015), The communication aspects of the Ebola virus disease outbreak in Western Africa--do we need to counter one, two, or many pidemics?, Croat Med J., 56(5), 496-9, doi: 10.3325/cmj.2015.56.496. PMID: 26526888; PMCID: PMC4655935.

[62] RHIhub. Public Safety and Crisis Communication in an Emergency or Disaster available from <https://www.ruralhealthinfo.org/toolkits/emergency-preparedness/3/public-safety> accessed on 24 April 2025.

[63] Rural Health Information Hub; Public Safety and Crisis Communication in an Emergency or Disaster retrieved fromhttps://www.ruralhealthinfo.org/toolkits/emergency-preparedness/3/public-safety#:~:text=During%20a%20response%2C%20crisis%20communications,different%20populations%20in%20the%20community accessed on 26 November 2024.

[64] WHO, 2016a.

[65] Oleribe O.O., Salako B.L., Ka MM, Akpalu A., McConnochie M., Foster M., Taylor-Robinson S.D. (2015), Ebola virus disease epidemic in West Africa: lessons learned and issues arising from West African countries, Clin Med (Lond), 15 (1), 54-7, doi: 10.7861/clinmedicine.15-1-54. PMID: 25650199; PMCID: PMC4954525.

[66] Bosa H.K., Kamara N., Aragaw M., Wayengera M., Talisuna A., Bangura J., Mwebesa H.G., Katoto PDMC, *et al.*, 'The west Africa Ebola virus disease outbreak: 10 years on' (2024) 12(7) The Lancet Global Health e1081-e1083, doi: 10.1016/S2214-109X(24)00129-3.

[67] Supra note 64.

[68] Supra note 66.

[69] Africa CDC; How to prepare for the next inevitable Ebola outbreak: lessons from West Africa, <https://africacdc.org/download/how-to-prepare-for-the-next-inevitable-ebola-outbreak-lessons-from-west-africa/> accessed on 23November 2024.

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[71] Capps B., Lederman, Z. One Health, Vaccines and Ebola: The Opportunities for Shared Benefits. *J Agric Environ Ethics* 28, 1011-1032 (2015), <https://doi.org/10.1007/s10806-015-9574-7>.

As an approach to biomedical enquiry, OH has been adopted as a broad heuristic for evidence-based policy involving the usual suspects from public health, as well as veterinarians, animal and plant biologists, ecologists, and environmental scientists[72]. Thereby, it has become a stimulus for collaborative research. Thus, it's trans-disciplinarily encouraging de-siloing of sectors, and engagement with bipartisan stakeholders, creates change by identifying and solving real-world ecological problems.

### B. Integrated Surveillance for Zoonotic Diseases

The East Africa region often faces challenges in maintaining strong veterinary and public health systems. The region is affected by stretched or scarce surveillance and reporting systems which make it harder to detect and respond to zoonotic disease outbreaks in a timely manner. Inadequate collaboration and coordination between veterinary and public health authorities further hinders effective disease control efforts[73]. In East Africa, integrated surveillance systems have been developed to track zoonotic diseases across both human and animal populations, demonstrating the benefits of cross-sector communication. The East African Integrated Disease Surveillance Network (EAIDSNet)[74] is a prominent regional initiative established to improve disease surveillance and response across East African countries. Formed in 2000, EAIDSNet focuses on the integration of human and animal health surveillance systems under the One Health approach[75].

The main objectives of the EAIDSNet[76] are to: i) enhance and strengthen cross-country and cross-institutional collaboration through regional coordination of activities for the prevention and control of diseases and through a One Health approach, ii) promote exchange and dissemination of appropriate information on Integrated Disease Surveillance (IDS) and disease control activities as per the WHO integrated disease surveillance and response strategy, iii) harmonize IDS systems, iv) strengthen capacity for implementing IDS and control activities, and v) ensure continuous exchange of expertise and best practices for IDS and control.

EAIDSNet has made significant successes since its inception enhancing disease surveillance and response across the region through a collaborative, One Health approach. One of its key achievements is the establishment of a regional health framework that has influenced policy by creating a dedicated Department of Health within the East African Community (EAC) Secretariat[77]. EAIDSNet has improved cross-border collaboration by facilitating integrated disease surveillance among member states and also strengthened laboratory capacity through initiatives like the East Africa Public Health Laboratory Networking Project (EAPHLNP)[78]. EAIDSNet continues to play a pivotal role in advancing public health in East Africa, ultimately contributing to better preparedness and response to emerging health threats.

### C. Africa CDC

Africa Centres for Disease Control and Prevention (Africa CDC) is a specialized technical institution of the African Union established to support public health initiatives of African Union Member States and to strengthen the

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[72] Leach M., & Scoones I. (2013), The social and political lives of zoonotic disease models: Narratives, science and policy. *Social Science and Medicine,* 88, 10-17.

[73] Current Zoonotic Diseases Challenges in The East Africa Region retrieved from <https://www.traffic.org/news/current-zoonotic-diseases-challenges-east-africa/> accessed on 26 November 2024.

[74] East African Integrated Disease Surveillance Network (EAIDSNet), <http://www.eac.int/eaidsnet> accessed on 26 November 2024.

[75] Ope M., Sonoiya S., Kariuki J., Mboera L.E., Gandham R.N., Schneidman M., Kimura M. (2013), Regional initiatives in support of surveillance in East Africa: The East Africa Integrated Disease Surveillance Network (EAIDSNet) Experience. Emerg Health Threats J., 6, doi: 10.3402/ehtj.v6i0.19948. Epub 2013 Jan 25. PMID: 23362409; PMCID: PMC3557906.

[76] <https://www.eac.int/health/disease-prevention/east-african-integrated-disease-surveillance-network> accessed 23 November 2024.

[77] East African Community (EAC) Secretariat, <https://www.eac.int/health#:~:text=Strategic%20Interventions,on%20Disease%20Prevention%20and%20Control> accessed 23 November 2024.

[78] EAC, East Africa Public Health Laboratory Networking Project 2024, <https://www.eac.int/health/disease-prevention/east-africa-public-health-laboratory-networking-project> accessed 23 November 2024.

capacity of their public health institutions to detect, prevent, control, and respond quickly and effectively to disease threats[79].

Africa CDC employs a One Health approach, which integrates human, animal, and environmental health to address interconnected health threats across the continent. The One Health Programme was established in 2018 as part of Africa CDC's commitment to enhancing public health through a collaborative framework[80]. The programme involves various divisions within Africa CDC, including Surveillance and Disease Intelligence, Emergency Preparedness and Response, Laboratory Systems, Public Health Institutes and Research, and Disease Control and Prevention[81]. This cross-divisional collaboration aims to implement effective disease surveillance, prevention strategies, and emergency response mechanisms to achieve the goals outlined in Agenda 2063[82]: The Africa We Want[83].

**D. Vaccination**

Vaccination initiatives in Africa are increasingly recognized as integral to the One Health approach. Africa CDC has adopted this transdisciplinary framework to address health threats that arise at the interface of these domains, particularly in the context of zoonotic diseases and emerging infectious diseases[84].

During African Vaccination Week, a campaign led by the World Health Organization, efforts are made to strengthen immunization across the continent. The theme for the 2024 event, "The Big Catch Up", underscores the urgent need to recover from the setbacks caused by the COVID-19 pandemic, which significantly disrupted vaccination services[85]. Reports indicate that over 8.4 million children in Africa missed vaccinations due to these disruptions, highlighting a critical gap in vaccine equity that needs addressing[86]. There is a serious need to integrate One Health principles into immunization campaigns in Africa, not only to enhance vaccine coverage but also to strengthen overall health systems across African nations[87]. Through this, Africa can improve its preparedness for future public health emergencies. As stated by the Africa CDC, "a One Health approach is necessary to deliver effective and efficient infectious disease surveillance, disease prevention and control" to achieve the goals set out in Agenda 2063: the Africa We Want[88]In some African regions, joint vaccination efforts targeting both humans and livestock have been implemented, fostering a stronger sense of shared responsibility and collaboration[89].

**5.2. Challenges and Lessons Learned**

Despite these successes, challenges such as political instability, logistical barriers, and misinformation persist. However, the lessons from these cases underscore the importance of strong communication strategies, continuous capacity building, and community engagement in ensuring the success of One Health initiatives.

**A. Coordination across Sectors**

One of the primary obstacles to implementing One Health in Africa is the siloed functioning of

[79] Technical Officer, One Health – Zoonotic Disease Programme, Africa CDC Retrieved from <https://www.giz.de/en/downloads_els/017-2024-Technical%20Officer-One%20Health%20Zoonotic%20Diseases%20Africa%20CDC.pdf> accessed 26 November 2024.

[80] Africa CDC (2022), 'Africa CDC's inaugural One Health Conference | Abstract Book', Journal of Public Health in Africa, 12(Supplement 1), doi: 10.4081/jphia.2021.s1.

[81] *Ibidem*.

[82] AU, Agenda 2063 – The Africa we want, <https://au.int/sites/default/files/documents/33126-doc-framework_document_book.pdf> accessed 26 November 2024.

[83] Africa CDC, One Health Program, <https://africacdc.org/programme/surveillance-disease-intelligence/one-health/> accessed 26 November 2024.

[84] *Ibidem*.

[85] AfricaCDC; Op-Ed: The Big Catch Up: Recovering the Gains Made in Africa through Vaccinations retreived from <https://africacdc.org/news-item/op-ed-the-big-catch-up-recovering-the-gains-made-in-africa-through-vaccinations/> 26 November 2024.

[86] WHO; Immunization retrieved from <https://www.afro.who.int/health-topics/immunization> accessed on 26th November 2024.

[87] One Health Central and Eastern Africa (OHCEA), *One Health Principles and Concepts: Facilitator Guide* (OHCEA 2019), >https://afrohun.org/wp-content/uploads/2021/01/ONE-HEALTH-PRINCIPLES-AND-CONCEPTS.pdf> accessed 24 April 2025.

[88] Supra note 15.

[89] Supra note 26.

various sectors, including human, animal, and environmental health concerns[90]. This fragmentation leads to poor communication and coordination among stakeholders, which is essential for a holistic approach to health that encompasses all three domains[91]. For instance, in Uganda[92], despite establishing a National One Health platform, collaboration remains limited, with many initiatives still operating independently rather than as part of a coordinated effort. The lack of an agreed mechanism for information sharing exacerbates this issue, resulting in disjointed responses to health threats[93] and thus the need to integrate the various sectors to streamline and attain the OH agenda.

**B. Data Management and Surveillance**

Effective surveillance systems are vital for the early detection and response to zoonotic diseases. However, many African nations struggle with inaccessible databases and inadequate data management systems that hinder the collection and sharing of crucial health information[94]. Data management within the One Health framework involves the systematic collection, integration, analysis, and dissemination of health-related data from multiple sectors[95]. Effective data management enables stakeholders to make informed decisions based on comprehensive insights into health trends and risks. However, in many African countries, health data often remains siloed within specific sectors, limiting the ability to conduct cross-sectoral analyses that are vital for understanding the complex interrelationships between human, animal, and environmental health[96]. Surveillance systems often face limitations such as insufficient coverage, especially in rural areas where access to healthcare services is poor. Additionally, many countries lack real-time data reporting capabilities, which can delay responses to emerging health threats[97]. The establishment of a Digital One Health Platform (DOHP)[98] aims to address these issues by providing a centralized system for data collection and analysis across member states

**C. Political Commitment and Governance**

Political will is crucial for the successful implementation of One Health strategies. However, there is a significant gap in political commitment at both national and regional levels in Africa[99]. Governance is frustrated by a series of factors such as the siloed approach, fragmented coordination, inconsistent political will, inadequate resource allocations, and weak and insufficient institutional frameworks[100]. Many governments prioritize immediate public health crises without investing in long-term strategies that integrate various health sectors. Several African nations have demonstrated strong political commitment to One Health. For instance, Namibia recently launched a five-year Tripartite One Health Strategic Plan (2024-2028) in collaboration with Africa CDC, FAO, WHO, and other

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[90] Alimi Y., Wabacha J. (2023), Strengthening coordination and collaboration of one health approach for zoonotic diseases in Africa. *One Health Outlook*, 5, 10, <https://doi.org/10.1186/s42522-023-00082-5>.

[91] Scaling up the One Health approach in Africa retrieved from <https://tdr.who.int/newsroom/news/item/13-03-2023-scaling-up-the-one-health-approach-in-africa> accessed on 25 April 2025.

[92] Buregyeya E., Atusingwize E., Nsamba P., Musoke D., Naigaga I., Kabasa J.D., Amuguni H., Bazeyo W. (2020), Operationalizing the One Health Approach in Uganda: Challenges and Opportunities. J Epidemiol Glob Health, 10(4), 250-257, doi: 10.2991/jegh.k.200825.001. Epub 2020 Aug 28. PMID: 33009732; PMCID: PMC7758849.

[93] *Ibidem*.

[94] Supra note 56.

[95] Oltean H., Lipton B., Black A., Snekvik K., Haman K., Buswell M., Baines A., Rabinowitz P., Russell S., Shadomy S., Ria R., Rekant S., Lindquist S., and Baseman J. (2025), 'Developing a one health data integration framework focused on real-time pathogen surveillance and applied genomic epidemiology', One Health Outlook, 7, doi: 10.1186/s42522-024-00133-5.

[96] GIZ; One Health Data Alliance Africa retrieved from <https://www.giz.de/en/downloads/giz2022-Factsheet-OHDAA.pdf> accessed on 28 November 2024.

[97] Supra note 95.

[98] GIZ; One Health Data Alliance Africa (OHDAA) retrieved from <https://www.compelling.works/projects-prototype/3q10mbeffbuwh0245mcl10znrggl74-22frf> accessed 28 November 2024.

[99] Okello A.L., Bardosh K., Smith J., Welburn SC (2014) One Health: Past Successes and Future Challenges in Three African Contexts, PLOS Neglected Tropical Diseases, 8(5), e2884, <https://doi.org/10.1371/journal.pntd.0002884>.

[100] One Health Rwanda retrieved from <https://faolex.fao.org/docs/pdf/rwa210402.pdf> accessed 26 November 2024.

stakeholders[101]. This plan aims to institutionalize a sustainable One Health approach by addressing zoonotic diseases, antimicrobial resistance (AMR), and environmental health risks[102].

The African Union (AU) has, on the other hand, taken significant steps to promote One Health through initiatives like the African Union Interagency Group on One Health[103]. This Group is tasked with the development of the AU One Health Strategy for zoonotic diseases; the development of a consensual road map for the implementation of One Health Strategy for zoonotic diseases in Africa; undertaking an inventory of Zoonotic Disease Prevention and Control related activities; coordinating, monitoring, and evaluating implementation of activities of the AU One Health Strategy Zoonotic Diseases; compiling an inventory of Zoonotic Disease Prevention and Control associated activities being undertaken by the different AU institutions, documenting the roles of the institutions in the control and prevention of Zoonotic diseases, and coordinating implement, monitoring and evaluation of the AU One Health Strategy Zoonotic Diseases activities[104].

### D. Surge in zoonotic diseases

Zoonotic diseases, which are transmitted from animals to humans, have seen a notable increase in Africa, driven by factors such as urbanization, climate change, and habitat destruction. For instance, the rapid urbanization across the continent has led to high-density living conditions that facilitate the spread of diseases like Ebola and Lassa fever[105]. Between 2016 and 2018, over 260 infectious disease epidemics were recorded in Africa, with zoonoses accounting for a significant portion of these outbreaks[106]. The emergence of pathogens such as the Marburg virus in Tanzania and Ebola in Uganda highlights the ongoing threat posed by zoonotic diseases in East Africa[107]. The challenge is further exacerbated by climate change[108], deforestation[109] and importantly increased Human-Animal contact[110].

## 6. Strategies for Improving Communication in the One Health Approach in Africa

### A. Culturally Sensitive Communication

Culturally sensitive communication is essential for eliminating cultural and linguistic barriers, particularly in diverse settings such as healthcare and education. This approach involves understanding and respecting the unique customs, traditions, and communication styles of different cultures. This includes; active listening[111], which fosters trust and respect; adapting language use to ensure clarity; and being aware of non-verbal cues that may vary across cultures[112]. Providing cultural awareness training can enhance individuals' ability to communicate effectively, while empathy and open-mindedness promote a safe environment

[101] Africa Centres for Disease Control and Prevention (Africa CDC), 'Namibia Launches National One Health Plan' (Africa CDC, 19 June 2024) <https://africacdc.org/news-item/namibia-launches-national-one-health-plan/> accessed 24 April 2025.

[102] Africa CDC, Namibia Launches One Health Platform Retrieved from <https://africacdc.org/news-item/namibia-launches-national-one-health-plan/> accessed on 29 November 2024.

[103] Africa CDC), 'African Union establishes One Health Coordination Group on Zoonotic Diseases' (Africa CDC, 14 June 2022), <https://africacdc.org/news-item/african-union-establishes-one-health-coordination-group-on-zoonotic-diseases/> accessed 24April 2025.

[104] African Union establishes One Health Coordination Group on Zoonotic Diseases.

[105] Dobson A.P., Carper E.R., Infectious diseases and human population history throughout history the establishment of disease has been a side effect of the growth of civilization [Internet]. 1996. Available from <https://academic.oup.com/bioscience/article/46/2/115/252374> accessed 25 November 2024.

[106] Clement MesekoChinwe Ochu; How a One Health approach can mitigate the social and economic burdens of zoonoses in Africa 2022.

[107] Current Zoonotic Diseases Challenges in the East Africa Region retrieved from <https://www.traffic.org/news/current-zoonotic-diseases-challenges-east-africa/> accessed 25November 2024.

[108] Alimi Y. *et al.*, supra.

[109] Otu A., Effa E., Meseko C. *et al.* (2021), Africa needs to prioritize One Health approaches that focus on the environment, animal health and human health. *Nat Med*, 27, 943-946, <https://doi.org/10.1038/s41591-021-01375-w> accessed 25 November 2024.

[110] Supra note 106.

[111] Cioffi R.N. (2003), Communicating with culturally and linguistically diverse patients in an acute care setting: Nurses' experiences, International Journal of Nursing Studies, 40, 299-306.

[112] *Ibidem*.

for dialogue[113]. Additionally, encouraging clarification when misunderstandings arise and avoiding sensitive topics can help maintain respectful interactions[114].

**B. Training and Education**

The integration of One Health (OH) into academic training and education is crucial for developing a workforce capable of addressing complex health challenges. Workshops and training programs should be established to teach health professionals, community leaders, and media personnel effective communication strategies to promote One Health principles. Lessons can be drawn from institutions such as One Health Workforce Academies[115] and AFROHUN One Health Academy[116] to provide a platform for students from diverse backgrounds to collaborate on complex health challenges, fostering teamwork and systems thinking essential for effective One Health practice[117].

**C. Building Communication Capacity**

Strengthening the capacity of health professionals and institutions to communicate across sectors is crucial. Training programs in health communication, leadership, and crisis management should be integrated into public health, veterinary and environmental science curricula. There is a need to establish platforms for feedback since it provides valuable insights into the effectiveness of communication efforts

**D. Leveraging Technology**

Digital platforms, mobile health (mHealth) tools, and social media can facilitate communication across remote regions. These technologies can be used to deliver health messages, gather data, and foster interaction between stakeholders[118]. The integration of various technological tools, such as virtual reality (VR) simulations, mobile applications, and online collaborative platforms, enhances engagement and facilitates a more interactive, student-centered learning experience. The impact of the COVID-19 pandemic accelerated the adoption of technology in education[119] and healthcare by necessitating a shift to online learning and telehealth services, prompting educators to develop competencies in digital health technologies. This transition not only improved accessibility but also emphasized the importance of training healthcare professionals in telehealth practices to ensure effective patient communication and care delivery.

**E. Strengthening Health Communication Networks**

National and regional networks for health communication should be developed to foster information sharing, provide ongoing training, and coordinate response efforts. These networks can also serve as platforms for the exchange of best practices and lessons learned. Strengthening health communication networks is essential for enhancing public health outcomes and ensuring that communities have access to accurate and timely health information. These networks facilitate the exchange of vital health-related messages among individuals, healthcare providers, and organizations, promoting awareness and encouraging preventive measures. Key elements of effective health communication networks include reliable information sources, diverse communication channels, a clear understanding of the target audience, and robust feedback mechanisms[120].

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[113] Laura A. *et al.*, Culturally sensitive communication in healthcare: A concept analysis, <https://doi.org/10.1016/j.colegn.2018.09.007> accessed 26 November 2024.

[114] *Ibidem*.

[115] East African Community (EAC) Secretariat, <https://onehealthworkforceacademies.org/> accessed on 2 May 2025.

[116] AFROHUN One Health Academy, <https://academy.afrohun.org/> accessed on 2 May 2025.

[117] Utmb One Health [Http; Www Utmb Edu; OneHealth; Gregory C. Gray retrieved from <https://www.utmb.edu/one-health/training> accessed on 25 November 2024.

[118] MGH Institute of Health Professions: Integrating Technology in Health Professions Education: Trends and Innovations retrieved from <https://www.mghihp.edu/news-and-more/opinions/health-professions-education-effects/integrating-technology-health-professions-education-trends-and-innovations> accessed 25 November 2024.

[119] Holly M., Satterfield M. (ed.), Technology Use in Health Education: A Review and Future Implications <https://tojdel.net/journals/tojdel/articles/v03i02/v03i02-09.pdf> accessed 25 November 2024.

[120] Health Communication Networks retrieved from <https://www.studysmarter.co.uk/explanations/media-studies/health-communication-in-media/health-communication-networks/> accessed 25 November 2024.

### F. Monitoring and Evaluation of Communication Efforts

Monitoring and evaluation are essential for assessing the effectiveness of communication strategies within Africa's One Health approach. Effective M&E identifies gaps, measures progress, and supports evidence-based adjustments to interventions. Standardized tools like the NEOH framework have been instrumental in evaluating OH platforms, especially in West Africa[121], by enhancing stakeholder engagement and communication assessment. Inclusive evaluation processes, involving diverse stakeholders, ensure comprehensive feedback and reliable insights into platform performance. Integrating M&E into national health strategies has shown significant benefits. For instance, Uganda's One Health risk communication strategy has improved coordination during health emergencies[122]. Continuous data collection and analysis are critical to ensuring OH initiatives remain adaptable to challenges such as zoonotic diseases and climate change.

## 7. Conclusion

### A. Summary of Key Points

Bridging silos through effective communication is crucial for advancing the One Health approach in Africa. This integrated framework acknowledges the interconnectedness of human, animal, and environmental health, emphasizing the need for cross-sector collaboration to address shared health challenges, such as zoonotic diseases and antimicrobial resistance. By fostering open dialogue and improving coordination among stakeholders, Africa can enhance its capacity for disease prevention and response. Initiatives like the Africa CDC's One Health Programme demonstrate a commitment to breaking down barriers and promoting a multisectoral approach. Additionally, investing in training and education that prioritizes culturally sensitive communication will empower health professionals to effectively engage with diverse populations. Strengthening communication networks not only improves public health outcomes but also supports the broader goals of sustainable development and resilience across the continent, aligning with the African Union's Agenda 2063 vision for a healthier Africa. Effective communication is critical to the success of the One Health approach in Africa. Overcoming barriers such as siloed health systems, cultural differences, misinformation, and political instability is essential for improving health outcomes. Communication strategies that promote collaboration, public education, and policy advocacy can significantly strengthen One Health efforts across the continent.

### B. Future Direction

First, there is a need for interdisciplinary collaboration that transcends traditional silos among human, animal, and environmental health sectors. This collaboration can be fostered through integrated training programs that equip professionals with the skills to navigate and address complex health issues. Additionally, strengthening communication networks and incorporation of technology in One Health initiatives are essential to ensure that information flows seamlessly among stakeholders, facilitating coordinated responses to health threats. Utilizing data analytics and digital tools to improve surveillance and response mechanisms for zoonotic diseases and other health risks. Addressing global health threats such as antimicrobial resistance and climate change requires a proactive approach that emphasizes prevention and preparedness at all levels. Finally, enhancing community engagement by involving local populations in decision-making processes will ensure that One Health strategies are culturally relevant and effective and ultimately achieve the SDGs.

### C. Call to Action

Governments, international organizations, and local communities must prioritize communication as a key enabler of the One Health approach. Only through stronger collaboration and more effective communication can Africa meet its health challenges and achieve better outcomes for people, animals, and the environment.

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[121] Abdoul Kader Ilboudo, Ahmadou Sow, Michel Dione, Guy Ilboudo, Valerie Raymonde Lallogo, Geoffrey Njenga and Bernard Bett; West African countries One Health platforms evaluation and launch workshop report retrieved from <https://cgspace.cgiar.org/server/api/core/bitstreams/7b2f5e08-3104-42c8-a3a3-4a8ce128c33a/content> accessed 25November 2024.

[122] Supra note 92.

It is imperative that all stakeholders governments, healthcare professionals, researchers, and communities come together to advance the One Health approach. This collaboration is essential for addressing complex health challenges. Strategies such as interdisciplinary collaboration, strengthening communication networks, leveraging technology for enhanced data collection and dissemination, engaging local communities in the development and implementation of One Health initiatives will ensure to prioritize One Health in health policies and funding allocations, ensuring sustained efforts toward integrated health solutions.

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SECTION I
ESSAYS

# On Climate Justice and One Health. An Introduction

*Andrea Giordano*

**Abstract.** The importance of climate has prompted the significant growth of climate justice. This paper addresses the question of whether climate claims can also be enforced in our procedural system. The aim is to provide some initial answers.

***Keywords:*** climate, climate change, ecological transition, One Health.

## 1. The basic premise

The climate[1] belongs to each of us and to all of us.

Its importance, particularly relevant in the One Health perspective[2], demands a legal response that provides effective protection.

There has indeed been no lack of responses when one looks at the number and range of climate obligations that have been created by supranational law and by the dedicated national laws passed by the various States.

It also goes without saying that urgent and appropriate measures need to be adopted to combat greenhouse gas emissions and the global warming that they create. And, it is equally obvious that failure to adopt these measures, and the (supposed) ineffectiveness of the measures that have been adopted, have in several cases led to claims brought 'in the name of climate change'[3].

One may, however, legitimately wonder whether legal action of this kind can in fact produce climate stability and, thus, promote human, animal and environmental health[4].

This is the question that underlies this investigation, which seeks to relate the cases – "Giudizio Universale" and "Greenpeace vs. Eni" – pending before the Court of Rome to the particular characteristics of Italian law and to the new frontiers of international climate law[5].

## 2. Climate protection

Since climate is justiciable, it merits protection.

The answer to the question of whether this is enforceable comes first of all from the European Court of Human Rights (ECHR).

While article 1 of the European Convention on Human Rights (ECHR) states that the contracting parties shall secure to everyone within their jurisdiction the rights and freedoms defined in section I of the Convention, article 2 states the right to life, implicitly rendering it the basis for all other rights[6].

[1] See for example: A. Giordano, *Introduzione alla tutela del clima come bene comune*, Napoli, 2024; E. Guarna Assanti, *Il contenzioso climatico europeo*, Milano, 2024; F. Scalia, *La giustizia climatica*, in *Federalismi*, 2021, 269-308; M.A. Sandulli, *Cambiamenti climatici, tutela del suolo e uso responsabile delle risorse idriche*, in *Riv. giur. dell'edilizia*, 2019, 291; S. Nespor, *L'adattamento al climate change: breve storia di un successo e di una sconfitta*, in *Riv. giur. amb.*, 2018, 29; M. Montini, *La disciplina settoriale sulla protezione dell'ambiente*, in P. Dell'Anno, E. Picozza (eds.), *Trattato di diritto dell'ambiente*, Turin, 2015, 43; V. Cavanna, *Il climate change globale: il Quinto Rapporto IPCC*, in *Riv. giur. dell'ambiente*, 2014, 425; F. Fracchia, M. Occhiena (eds.), Climate change*: la risposta del diritto*, Naples, 2010.

[2] See for example: F. Aperio Bella (edited by), One Health*: La tutela della salute oltre i confini nazionali e disciplinari*, Napoli, 2022.

[3] See: M. Schirripa, Climate Change Litigation and the Need for 'Radical Change', in *Federalismi*, 2022, 184-203; B. Pozzo, *La* climate change litigation *in prospettiva comparatistica*, in *Riv. giur. amb.*, 2021, 271-317; F. Scalia, *La giustizia climatica*, *op. cit.*, 269-308; S. Nespor, *I principi di Oslo: nuove prospettive per il contenzioso climatico*, in *Giorn. dir. amm.*, 2015, 750-755.

[4] One Health High-Level Expert Panel, *Annual Report 2021*, 13.

[5] For a definition, see: M. Carducci, *La ricerca dei caratteri differenziali della "giustizia climatica"*, in *DPCE Online*, 2020, 1345-1369.

[6] See: S. Bartole, P. De Sena, V. Zagrebelsky, *Commentario breve alla Convenzione Europea per la salvaguardia dei Diritti dell'Uomo e delle libertà fondamentali*, Padua, 2012, 36: "*The right to life is the first of the ECHR provisions concerning substantive rights in that, as the ECtHR has repeatedly stated, it enshrines*

The declaration that violations of the right to life are irreversible and that protection for this 'value of values'[7] is essential to the enjoyment of all other rights and confers a wide scope on protection as a concept[8] and imposes on States not just negative obligations to abstain from anything that might deliberately cause the death of anyone subject to their jurisdiction[9], but also a positive obligation to protect and repress[10].

As in the case of the right to life, the right to a personal life, which is protected under article 8 (that, like article 2, uses wide terms such as respect, private and family life and interference[11]), implies the coexistence of both negative and positive obligations. Arbitrary interference by public authorities and consequently laws, administrative orders and actions that restrict the exercise of guaranteed rights are prohibited and there are positive obligations to ensure the prerogatives secured under the Convention can be exercised and to protect them from interference by third parties[12].

While it is true that the term 'environment' does not appear in the Convention, respect for life and for the right to a personal life cannot exist unless such a significant asset is protected[13].

This has been many times stated by the European Court of Human Rights, which has not only ruled that the State is generally liable for human rights violations caused by damage to the environment[14] but has not hesitated to state this with specific regard to natural disasters, the occurrence of foreseeable

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*one of the fundamental values of the democratic societies that make up the Council of Europe. The right to life enjoys a special position within the Convention and failure to respect it is one of the most serious violations of human rights since if the right to life is not protected, there can be enjoyment of any of the other rights and liberties secured by the ECHR"*; C. Russo, *Le Droit à la vie dans le décisions de la Commission et la jurisprudence de la Cour Européenne*, in *Mélanges en l'honneur de Nicolas Valticos*, Paris, 1999, 509.

[7] In similar terms see: ECtHR, 24 February 2005, nos. 57947/00, 57948/00 and 57949/00, *Isayeva, Yusupova and Bazayeva*, esp. 168. On life as the main focus of the ECHR, see: R. Conti, *I giudici e il biodiritto*, Rome, 2014, 254.

[8] Subject of course to article 2(2) being mandatory and therefore subject to close interpretation (see: A. Allegria-D. Di Leo-F. Federici (eds.), *Commentario alla Convenzione Europea dei diritti dell'Uomo*, Padua, 2019, 8-9: *"Firstly, the list of exceptions is exhaustive and each requires close interpretation. Secondly, the interpretation of '*absolutely necessary' *must be even stricter and more tightly binding in the case of articles 8-11 ECHR. ECHR uses the term '*absolutely necessary' *rather than simply '*necessary' *deliberately. Finally, interpretation must take account not only of the limit imposed by 'absolute necessity' but also of the proportion required in the force used to achieve the purposes stated in the Convention, i.e. a '*use of force which is no more than absolutely necessary … in order to effect a lawful arrest or to prevent escape of a person lawfully detained')".*

[9] S. Bartole, P. De Sena, V. Zagrebelsky, *Commentario breve alla Convenzione Europea per la salvaguardia dei Diritti dell'Uomo e delle libertà fondamentali*, *op. cit.*, 36.

[10] S. Bartole, P. De Sena, V. Zagrebelsky, *Commentario breve alla Convenzione Europea per la salvaguardia dei Diritti dell'Uomo e delle libertà fondamentali*, *op. cit.*, 41-42: "*The first sentence of article 2 ECHR creates an obligation to protect life and it is from this requirement that Strasbourg has drawn a set of obligations upon Member States to adopt positive measures to implement in concrete and effective terms the values that article 2 protects. These obligations are not specified in the article but are implicit in article 2 when taken together with the general obligation created in article 1 ECHR to secure the rights and freedoms defined in the ECHR*".

[11] Article 8 ECHR: *"Everyone has the right to respect for his private and family life, his home and his correspondence".*

[12] See: European Court of Human Rights, 8 July 2004, 48787/99, *Ilaşcu*, 313. For doctrine, see for example: S. Bartole, B. Conforti, G. Raimondi, *Commentario alla Convenzione Europea per la tutela dei Diritti dell'uomo e delle libertà fondamentali*, Padua, 2001, 308: "*… interference occurs not only when a State takes positive action with respect to an individual but also when its failure to take such action that could harm protected legal positions".*

[13] See here: N. Lipari in R. Conti, *CEDU e cultura giuridica italiana. 5. La Convenzione Europea dei Diritti dell'Uomo e i civilisti*, in *www.giustiziainsieme.it*, 2020: "*Of course and however, the European Convention on Human Rights is gradually becoming a living entity that enables both the Court and national courts to extend protection to include rights that are not explicitly stated in the Convention".* On the environment as a value in European law, see: P. Dell'Anno, E. Picozza (eds.), *Trattato di diritto dell'ambiente. Principi generali*, Padua, 2012; M. Renna, *I principi in materia di tutela dell'ambiente*, in *Riv. quadr. di diritto dell'ambiente*, no. 1-2/2012, esp. 62-69.

[14] See: European Court of Human Rights, 9 December 1994, 16798/90, *López Ostra*.

risks and failure by the State concerned to use its best efforts to prevent them[15].

Recognition of the individual's rights and liberties, as secured under the Convention, depends however on effective remedies[16] and the ability of the individual to bring private actions before the European Court of Human Rights if those remedies prove ineffective[17]. Where international charters and European sources are generally directed at States and an international community made up of governors rather than the governed[18], the Convention[19] breaks with tradition in its focus on directly protecting the individual[20].

The foundations of climate protection would seem to flow from the various conventions on the fight against climate change.

Where the ECHR provides States with a basic framework that does not specify how strategies are to be applied, the other conventions flesh out the details to increase protection.

The United Nations Framework Convention on Climate Change – UNFCCC has assumed a central role thanks to its aim of stabilising the concentration of greenhouse gases in the atmosphere in order to prevent damaging human interference with the climate[21].

The means of achieving this was an undertaking given by the parties to the Convention to reduce CO2 emissions to 1990 levels. Mitigation policies – based on the view that since global climate change depends on the amount of greenhouse gas released into the atmosphere, reducing emissions will slow and eventually stop that change – prevailed over adaptation policies.

To the international framework was then added the Kyoto Protocol of 11 September 1997[22], that legally bound the signatories to reducing, in the period 2008-2012, total greenhouse gas emissions to 5.2% below 1990 levels[23].

The Protocol was based on three pillars for controlling emissions: International Emissions Trading (IET), which enabled signatories with a surplus of reduced emissions to sell that surplus to other countries[24]; Joint Implementation (JI) that allowed groups of countries that had given the undertaking, including countries named in Annex I to the Protocol, to work together to hit the targets by agreeing a different distribution of obligations, so long as the overall obligation was met; and the Clean Development Mechanism (CDM) assisting signatories not in Annex I to reduce their emissions[25].

The doubts expressed in the second report of the Intergovernmental Panel on Climate

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[15] On foreseeability of risk and the best efforts requirement, see: European Court of Human Rights, 20 March 2008, 15339/02, 21166/02, 20058/02, 11673/02 and 15343/02, *Budayeva* and European Court of Human Rights, 28 February 2012, 17423/05, 20534/05 and 20678/05, *Kolyadenko*.

[16] Such as *the 'right to effective State protection'* of material rights (R. Sapienza, *Il diritto ad un ricorso effettivo nella Convenzione europea dei diritti dell'uomo*, in *Riv. dir. int.*, no. 2/2001, 281).

[17] R. Sapienza, *op. cit.*

[18] B. Conforti, *Diritto internazionale*, Naples, 2006, 20.

[19] Which is an international treaty *sui generis* (see e.g. S. Mirate, *Giustizia amministrativa e Convenzione europea dei diritti dell'uomo: l'"altro" diritto europeo in Italia, Francia e Inghilterra*, Naples, 2007, 169).

[20] As required under article 1 ECHR. On the ECHR aim of not satisfying particular State interests but of protecting the rights of injured individuals, see: S. Bartole, P. De Sena, V. Zagrebelsky, *Commentario breve alla Convenzione Europea per la salvaguardia dei Diritti dell'Uomo e delle libertà fondamentali*, *op. cit.*, 11. For the general international personality of the individual, see also: B. Conforti, *op. cit.*, 20.

[21] See here: B. Pozzo, *Il nuovo sistema di* emission trading *comunitario. Dalla Direttiva 2003/87/CE alle novità previste dalla Direttiva 2009/29/CE*, Milan, 2010, 1; M. D'Auria, *L'*emission trading *e la negoziazione policentrica*, in S. Cassese, M. Conticelli (eds), *Diritto e amministrazioni nello spazio giuridico globale*, Milan, 2006, 247.

[22] On the Kyoto Protocol see for example: W. Th. Douma, L. Massai, M. Montini (eds), *The Kyoto Protocol and Beyond*, The Hague, 2007; M. Bothe, E. Rehbinder, *Climate Change Policy*, Utrecht, 2005; D. Freestone, C. Streck (eds.), *Legal Aspects of Implementing the Kyoto Protocol Mechanisms: Making Kyoto Work*, Oxford, 2005.

[23] 8% for Europe. The undertaking was later shared differently among individual States under the Burden Sharing Agreement of 16 June 1998 (Italy undertook to cut its emissions by 6.5% from 1990 levels in the period 2008-2012).

[24] On emissions trading see also: V. Jacometti, *Lo scambio di quote di emissione. Analisi di un nuovo strumento di tutela ambientale in prospettiva comparatistica*, Milan, 2010.

[25] Private citizens and governments of the countries in Annex I that provide this assistance can obtain certified emission reductions (CERs) for the cuts achieved by developing countries and can then use the CERs as offsets in their target-related calculations.

Change (IPCC) about the ability to stabilise emissions[26], the problems with the Kyoto Protocol (especially developing countries' exemption from the obligation to contain emissions, the huge costs facing developed countries and the impossibility of regulating global emissions through an international treaty[27]), the refusal by the USA to ratify the Protocol, and its delayed entry into force, gradually shifted policy towards adaptation or at least towards synergistically integrating mitigation with adaptation strategies[28].

Increasing promotion of adaptation strategies culminated in the UN's 2030 Agenda for Sustainable Development[29], which was unanimously adopted by all 193 of the organisation's member states on 25 September 2015, and with the 12 December 2015 Paris Agreement[30] that set the global goal of strengthening the response to climate change by holding "the increase in the global average temperature to well below 2°C above pre-industrial levels" (while pursuing efforts "to limit the temperature increase to 1.5°C above pre-industrial levels"[31]) and promoting adaptation[32].

And finally it is EU law that holds that the climate merits protection.

The EU has signed and ratified the Rio Convention and in 1998 implemented the Kyoto Protocol with the Burden Sharing Agreement[33].

The Agreement was followed by the Communication on Climate Change, which was adopted by the Commission, the Green Paper on greenhouse gas emissions trading within the European Union and Directive 2003/87 establishing a scheme for greenhouse gas emission allowance trading[34].

More specifically, and in line with international treaty law, the Directive introduced a system that gives facilities to the operators that do not exceed the cap placed on their total permitted emissions 'emission credits', which can be sold to States that have exceeded their own caps. Operators unable to cut their emissions have to buy credits from those that can, and may then use them to offset the excess emissions that caused them to break through their own cap[35].

The updated Emissions Trading System forms part of the wider 2020 Climate and Energy Package and therefore the 2030 Climate and Energy Framework, with which the EU has undertaken to reduce greenhouse gases emissions by at least 40% below their 1990 levels by 2030[36].

The target has recently become even more ambitious in the light of the growing importance of climate stability.

As the Commission announced in its 28 November 2018 Communication and outlined in greater detail in its 11 December 2019 Communication (the Green Deal), we are now

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[26] Various authors, *Climate change 1995: Economic and Social dimensions of Climate Change*, Cambridge, 1996, 183 and 187-188.

[27] On these limits, see: R.N. Cooper, *The Kyoto Protocol: A Flawed Concept*, in FEEM Working Paper No. 52.2001, 2001 in <https://ssrn.com/abstract=278536>.

[28] S. Nespor, *op. cit.*, 42-47.

[29] It is, however, necessary to point out that the 2030 Agenda falls under the so-called soft law.

[30] On the Paris Agreement see: S. Nespor, *La lunga marcia per un accordo globale sul clima: dal Kyoto Protocol all'Accordo di Parigi*, in *Riv. trim. dir. pubbl.*, 2016, 81.

[31] Art. 2.1 a): *"Holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change"*.

[32] *"Each Party should, as appropriate, submit and update periodically an adaptation communication, which may include its priorities, implementation and support needs, plans and actions, without creating any additional burden for developing country Parties"*.

[33] With the Burden Sharing Agreement agreed by the Environment Council 16-17 June 1998, the EU's target of reducing greenhouse gases by 8% below their 1990 levels over the period 2008-2012, in accordance with the Kyoto Protocol, was shared on a fair and proportionate basis among the then fifteen EU Member States.

[34] See especially: C. Fraterrigo, *Il diritto dell'energia in un sistema multilivello: legislatori e prassi a confronto*, Palermo, 2015, 42; V. Jacometti, *La direttiva* Emissions Trading *e la sua attuazione in Italia: alcune osservazioni critiche al termine della prima fase*, in *Riv. giur. ambiente*, 2008, 273; M. D'Auria, *L'*emission trading *e la negoziazione policentrica*, in S. Cassese, M. Conticelli (eds), *Diritto e amministrazioni nello spazio giuridico globale*, *op. cit.*, 247.

[35] See finally: Directive 2018/10 regulating the EU Emissions Trading System (EU-ETS) in phase IV of the System (2021-2030).

[36] *Https://ec.europa.eu/clima/policies/strategies/2030_it*; see also: M.A. Sandulli, *Cambiamenti climatici, tutela del suolo e uso responsabile delle risorse idriche*, *op. cit.*, 291 ff.

moving towards net zero greenhouse gas emissions by 2050, a target that is expressly mentioned in Regulation (EU) 2021/1119 of 30 June 2021.

The Regulation establishes a framework "for the irreversible and gradual reduction of anthropogenic greenhouse gas emissions by sources and enhancement of removals by sinks regulated in Union law", setting a binding target of climate neutrality "by 2050".

In line with international trends, this major mitigation plan is supplemented by the European Strategy on Adaptation to Climate Change[37], which aims to minimise the economic, environmental and social impact of climate change[38] and has recently been updated by the new EU strategy on adaptation to climate change as part of the above plan to achieve climate neutrality.

## 3. Climate justice models

The question of the merits of climate protection is linked to that of the remedies "in the name of climate change" that are actually available[39].

Of particular note is the controversial ability of the individual to enforce obligations created under international and EU law through the courts[40].

US and Indian law offer examples of how this might be applied in an innovative climate justice system.

Long-standing US practice is significant here as since the 1970s American lawyers practising public interest law have been representing the weakest sections of society in order to protect their rights and to give a voice to the voiceless.

The need for protection that is both effective and as wide as possible has given judges significant powers to make general and 'abstract' orders that overlap legislation[41], and has also broken through the 'two-party affair'[42] framework by extending the effect of judgments to apply ultra partes. While the plaintiff remains the holder of the enforced right and retains his own personal, real and current interest in the claim, the judgment itself affects society as a whole through orders that apply directly to the legislator[43].

Public interest litigation[44] is common in India, and allows cases to be brought before the high courts of the various states and the Supreme Court of the Republic if the government violates

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[37] M.A. Sandulli, *Cambiamenti climatici, tutela del suolo e uso responsabile delle risorse idriche*, *op. cit.*, 291 ff.

[38] See also the *European Commission Green Paper of 29 June 2007 on adapting to climate change in Europe – options for EU action*, at <http://eur-lex.europa.eu/legal-content/IT/TXT/?uri=LEGISSUM:l28193>, which states in its introduction: "*A certain degree of climate change is however inevitable, with significant impacts owing to increased temperatures and rainfall, water scarcity and more frequent storms. Therefore, for these impacts to be dealt with, mitigation measures must be complemented by adaptation efforts. Adaptation must revolve as much around current changes as around future and anticipated changes*".

[39] A. Giordano, *Introduzione alla tutela del clima come bene comune*, *op. cit.*

[40] A. Giordano, *Introduzione alla tutela del clima come bene comune*, *op. cit.*

[41] A. Chayes, *The Role of Judge in Public Law Litigation*, *op. cit.*, 1281. For a more general view, see: C.N. Tate, T. Vallinder, *The Global expansion of judicial power*, New York, 1997.

[42] See: M. Cappelletti, *Vindicating the Public Interest through the Courts: a Comparativist's Contribution*, in 25 *Buff. L. Rev.* 643 (1976), 647-648: "[…] *more and more frequently the complexity of modern societies generates situations in which a single human action can be beneficial or prejudicial to large numbers of people, thus making entirely inadequate the traditional scheme of litigation as merely a two-party affair.* […] *the individual alone is unable to protect himself efficiently against such injuries. Even if he has a legal cause of action, other factors may preclude judicial relief: his individual right may be too "diffuse" or too "small" to prompt him to seek its protection; excessive costs may obstruct his legal action in court; he may fear the powerful violator; he may even be unaware of his right. It is necessary to abandon the individualistic, essentially laissez-faire, 19th-century concept of litigation, a concept which awards the right to sue, if at all, solely to the subject personally aggrieved in his own narrowly-defined individual rights-for example, to the owner of a neighbouring property in a case of pollution or of a zoning violation. The new social, collective, "diffuse" rights and interests can be protected only by new social, collective, "diffuse" remedies and procedures. Indeed, the quest for these new remedies and procedures is, in my judgment, the most fascinating feature in the modern evolution of judicial law*".

[43] M. Caielli, *Cittadini e giustizia costituzionale. Contributo allo studio dell'*actio popularis, Turin, 2015, 27.

[44] A. Chayes (1976), *The Role of Judge in Public Law Litigation*, in *Harvard Law Review*, vol. LXXXIX, The Harvard Law Review Association, 1281.

rights[45] or performs actions or behaviours that are contrary to those rights[46].

These forms of protection rely on two main pillars: wide waiver of the ordinary rules on the bringing of legal actions, and equally significant judicial activism.

The need to protect classes that are disadvantaged or of different cultures and have been deprived of any real access to the law led the Indian superior courts to radically review the common law rules on the bringing of legal actions[47].

The result has been recourse to representative standing on behalf of persons belonging to classes suffering discrimination and citizen standing. While representative standing allows third parties to bring actions to protect the lowest Indian castes, citizen standing permits judges to denounce government abuses, without regard to the direct injury suffered by the plaintiff[48].

Judicial activism has made these forms of protection especially appealing. Far from simply imposing financial compensation orders, the Indian courts have gone further by imposing orders that are in fact rules of conduct intended to prohibit and correct[49].

These models and the principles that underlie them have produced the first, experimental notions of climate justice.

One basis for these legal initiatives lies not only in international conventions but also in the 1 March 2015 Oslo Principles on Global Climate Change Obligations[50].

The Oslo Principles, which were developed by a group of international experts from several countries, declare that, subject to binding treaties and the margin of discretion States enjoy in deciding how they will fulfil their obligations, international law – and the precautionary principle above all – and national laws require governments to take all necessary action to prevent climate change rising increasing global warming by more than 2°C above pre-industrial levels[51].

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[45] Which are fundamental and, according to increasingly consolidated case law, also social (D. Amirante (2018), *Giustizia ambientale e* green judges *nel diritto comparato: il caso del* National Green Tribunal of India, in *DPCE Online*, 960).

[46] See: P.M. Bakshi (2006), *Public Interest Litigation*, New Delhi.

[47] S. Divan, A. Rosencranz, *Environmental law and policy in India*. *Cases, Materials and Statutes*, Oxford, 2001, 120. On case law see: *Bandhua Mukti Morcha v. Union of India*, A.I.R. 1984 S.C. 802, 813 (India): *"When a person or class of persons to whom legal injury is caused by violation of a fundamental right is unable to approach the Court for judicial redress on account of poverty or disability or socially or economically disadvantaged position, any member of the public acting bona fide can move the Court for relief under Article 32* […] *so that the fundamental rights may become meaningful not only for the rich and the well-todo who have the means to approach the Court but also for the large masses of people who are living a life of want and destitution and who are by reasons of lack of awareness, assertiveness and resources unable to seek judicial redress"*.

[48] A. Giordano, *Introduzione alla tutela del clima come bene comune, op. cit.*

[49] V.Z. Holladay, *Public Interest Litigation in India as a Paradigm for Developing Nations*, in *Indiana Journal of Global Legal Studies*, 2012, 562: *"The remedies stage of a PIL suit is the most contentious stage of the dispute, as the courts have afforded themselves extensive leeway in deciding which remedies are appropriate. Some of the remedies the courts construct include the creation and implementation of regulations, the establishment of free legal services, and the formation of administrative bodies to oversee the remedies ordered. It is this stage of the PIL suit that attracts criticism that the courts are usurping the authority of the legislature by creating laws"*. On case law see: *M.C. Mehta v. State of Tamil Nadu*, A.I.R. 1997 S.C. 699 (India): *"It is often argued that the Supreme Court should maintain restraint and should not violate the legitimate limits in the exercise of powers. However, this argument fails to recognize the constant failures of governance taking place at the hands of other organs of State, and that it is the function of the Court to check balance and correct any failure arising out of any other State organ".*

[50] In <https://globaljustice.yale.edu/sites/default/files/files/OsloPrinciples.pdf>. It is, however, necessary to point out that such *Principles* fall under the so-called soft law.

[51] *"No single source of law alone requires States and enterprises to fulfil these Principles. Rather, a network of intersecting sources provides States and enterprises with obligations to respond urgently and effectively to climate change in a manner that respects, protects, and fulfils the basic dignity and human rights of the world's people and the safety and integrity of the biosphere. These sources are local, national, regional, and international and derive from diverse substantive canons, including, inter alia, international human rights law, environmental law and tort law"*.

The actions announced[52] and brought[53] against governments include the Dutch proceedings before the Dutch Supreme Court whose recent ruling on the question of climate emergency[54] ordered the Dutch government to cut CO2 and other greenhouse gas emissions by 25% below 1990 levels by 2020[55].

Despite the Ministry's contention that an order to create legislation would be inadmissible and would impact the separation of powers[56], the Court found that the State has a very real and positive obligation to protect the life and health of its citizens.

More specifically, the Court held that articles 93 and 94 of the Dutch constitution[57] place a duty on the State to comply with every provision of the European Convention on Human Rights, which is binding in its entirety. As the Netherlands fall within the jurisdiction of the European Court of Human Rights, Dutch courts must interpret the articles of the Convention using the same parameters as the Court of Strasbourg[58]. The guarantees enshrined in articles 2 and 8 ECHR (the rights to life and to a private and family life) imply a duty, particularly under the precautionary principle, to implement measures that will prevent the damage associated with climate change[59].

The logic behind the Court's ruling was therefore that since there is a need for mitigation measures[60] able to cut greenhouse gas emissions by at least 25%, the Court has the right to order adoption of such measures. Were this not the case, a fundamental rule of constitutional democracies and also the right to an effective remedy under article 13 of the European Convention on Human Rights (ECHR)[61] would be violated.

An order to create legislation was admissible because there is no general prohibition on interference by the courts in the political decision-making process and because of the need – imposed under article 94 of the Dutch constitution – to disapply laws contrary to international obligations.

The Dutch Supreme Court ruled that conflicts with the separation of powers principle can only arise from an order requiring specific content to be included in legislation[62]. Stating an aim

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[52] See: *Declaration on Climate Justice* issued by the representatives of the six Pacific countries (Philippines, Fiji, Vanuatu, Kiribati, Tuvalu and the Solomon Islands) on *www.greenpeace.org* – *"As the people most acutely vulnerable to the impacts of climate change, we will not let the big polluters decide and assign our fate. Our rights and ability to survive must not be dictated by the continued addiction to the burning of fossil fuels. We refuse to accept the "new normal" and demand for climate justice by holding the big polluters and their respective governments to account for their contribution to the climate crisis. Our people and our environment must be preserved for the generations to come"*.

[53] See the action brought in Pakistan by a farmer against the inadequate measures adopted by the State to combat climate change that led to a judgment from the Lahore High Court on 4.9.2015, *Leghari vs. Federation of Pakistan*, W.P. no. 25501. The court held that the State's delay in taking the necessary measures had violated constitutional rights to life, a healthy environment and human dignity. Of particular moment in Europe is the French 'case of the century' (*https://laffairedusiecle.net*) and the German case concerning the Federal Climate Protection Act (*Klimatschutzgesetz*) that led to a Federal Constitutional Court ruling on 24 March 2021 (see <https://www.bundesverfassungsgericht.de>).

[54] *Hoge Raad der Nederlanden*, 20 December 2019, no 19/00135, *op. cit.*

[55] M. Francesca Cavalcanti, M.J. Terstegge, *The Urgenda case: the Dutch path towards a new climate constitutionalism*, *op. cit.*, 1403.

[56] 2.2.2 of the decision.

[57] Article 93: *"Provisions of treaties and of resolutions by international institutions which may be binding on all persons by virtue of their contents shall become binding after they have been published.'* Article 94: *'Statutory regulations in force within the Kingdom shall not be applicable if such application is in conflict with provisions of treaties that are binding on all persons or of resolutions by international institutions"*.

[58] 5.6.1 of the decision: *"Pursuant to Articles 93 and 94 of the Dutch Constitution, Dutch courts must apply every provision of the ECHR that is binding on all persons. Because the ECHR also subjects the Netherlands to the jurisdiction of the ECtHR (Article 32 ECHR), Dutch courts must interpret those provisions as the ECtHR has, or interpret them premised on the same interpretation standards used by the ECtHR"*.

[59] 5.6.2 of the decision.

[60] On mitigation, see: S. Nespor, *L'adattamento al climate change: breve storia di un successo e di una sconfitta*, *op. cit.*, 30: *"Climate change can be faced using two different strategies: mitigation or adaptation. Mitigation works on the causes of climate change through actions to contain and reduce human greenhouse gas emissions until sustainable emission levels have been reached. Adaptation involves actions to reduce the impact and negative consequences of climate change and to exploit the positive consequences".*

[61] 8.2.1 of the decision.

[62] 8.2.4.

of cutting greenhouse gas emissions does not affect the legislator's freedom to create the best and most efficient means of achieving that aim[63].

## 4. The "Giudizio Universale" and the "Greenpeace vs. Eni" cases

The above examples of climate justice mean that the scope of our investigation must be extended in order to include Italian law.

The "Giudizio Universale" case, decided in February 2024[64], was brought before the Court of Rome for a declaration that the Italian State is liable for failing to adopt an appropriate climate policy.

The Prime Minister was summoned to appear before the Court on a charge that the Italian State was liable, under articles 2043[65], 2051[66], 1173 and 1218 Italian Civil Code[67], for failing to make sufficient efforts to achieve climate stability targets.

The plaintiffs, that include associations and individuals, are seeking an order requiring the State to "take all necessary action to reduce artificial domestic CO2-eq emissions by 92% with respect to 1990 levels by 2030, or by any higher or lower level that might be ascertained during the proceedings"[68].

A second case, also brought before the Court of Rome, was called the "Giusta Causa"[69].

Greenpeace sued Eni, the Ministry of Economy and Finance, and Cassa Depositi e Prestiti S.p.a. for a declaration that the defendants failed to comply with international climate goals.

The plaintiff alleged, in particular, that the defendants were jointly liable under articles 2043, 2050 and 2051 of the Italian Civil Code[70].

The said plaintiff sought an order to pay compensation and to reduce the annual volume of atmospheric CO2 emissions by at least 45 percent by the end of 2030 from 2020 levels[71].

The first question is whether such type of actions is admissible.

There is no equivalent in Italian law for the US and Indian public interest litigation we have discussed, and there are no positive bases for the extensive judicial powers that exist in these countries.

A claim for the State to be specifically ordered to adopt particular measures risks undermining the separation of powers principle if, as in the Italian legal system, judges who invade the political sphere are exceeding their jurisdictional powers.

The admissibility of another application in the summons – for a review of the National Integrated Energy and Climate Plan (PNIEC) – is also dubious since such a challenge can only (theoretically) be made through the administrative courts[72].

That leaves the question of the plaintiffs' locus standi.

While Italian law does not deny the locus standi of sufficiently stable and representative collective entities[73], it does not recognise any such standing for associations claiming ecological damage[74].

There is no formal equivalent for representative standing or citizen standing in Italian law and the differences between the Italian legal system and those of other even European nations (see Dutch law and article 3:305a Dutch Civil Code[75], and French law and article 1248 Civil Code combined with article 142-1

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[63] 8.2.7.

[64] Trib. Roma, sez. II civ., 26 February 2024, no.39415/2021, in <www.ambientediritto.it>.

[65] *Giudizio Universale* summons, 69, in <https://giudiziouniversale.eu/la-causa-legale/>.

[66] *Giudizio Universale* summons, 86, *op. cit.*

[67] *Giudizio Universale* summons, 89, *op. cit.*

[68] *Giudizio Universale* summons, 97, *op. cit.*

[69] *Giusta Causa* summons, in <https://www.greenpeace.org>.

[70] *Giusta Causa* summons, 132, *op. cit.*

[71] *Giusta Causa* summons, 133, *op. cit.*

[72] See Trib. Roma, sez. II civ., 26 February 2024, 14.

[73] That also have a connection with the invoked asset. The meeting of all these conditions must however be properly proved by the plaintiff. These views have recently been confirmed by the Council of State, Full Bench, 20 February 2020, no. 6, in <www.giustizia-amministrativa.it>.

[74] Adapted from article 1248 French Civil Code ("*Claims for ecological damage may be brought by anyone with the capacity and interest to sue, such as the State, the French Biodiversity Office, local authorities and their local groups, public institutions and associations that are either accredited or were created at least five years before the case was brought and whose purpose is the protection of nature and the defence of the environment*").

[75] Which protects interests that are similar to those of other persons (*"A foundation or association with full legal capacity can institute legal proceedings for the protection of similar interests of other persons, insofar as it promotes these interests under its articles of association and these interests are sufficiently safeguarded"*).

Environmental Code[76]) make it hard to import the results other systems achieve.

The grounds for claims also depend on a number of variables.

Generally speaking, despite the positive action on climate taken by the Italian State (and by other public bodies), we must wonder whether, given long-term climate targets – with respect to which States can adjust their policies at their own discretion (setting their own reduction targets through voluntary improvements[77] and combining mitigation and adaptation policies[78]) – and 'common' but 'differentiated'[79] liability as in the case of climate law, State actions can indeed be reviewed and precisely targeted by using convictions handed down by a court of law as the method.

Furthermore, legal actions must exist within the framework of the State being sued.

The specifics of claims involve complex balancing of the need for protection alleged in the claim against the actual ability of the courts to provide it. Judicial powers themselves reflect complex interactions in which the powers of the State play an equal part.

The boundaries of the case – a 'magic circle'[80] unable entirely to contain the full complexity of the problem (and can only represent it) – are set by inevitably scarce resources and cannot be extended for a particular claim. The balance of powers lies at the heart of the law and it is that balance that provides full protection to the individual (including in the face of climate change).

Climate stability can be achieved not through unorthodox compulsion of the State but through the synergy of legislation (setting targets that are in line with international and EU parameters), the administration (which must achieve those targets), supervision of the bodies involved (monitoring implementation) and civil society itself (which is involved in the decision-making process through democratic participation). The jurisdiction of the courts must not overarch or invade that synergy but instead support and promote it.

[76] A comparison is also useful with German law that, unlike Italian law, permits individuals themselves to bring claims before the Federal Constitutional Court for violation of their fundamental rights.

[77] This is the bottom-up principle created by the Paris Agreement in action.

[78] See 2 above.

[79] See 2 above.

[80] See: J. Huizinga, *Homo ludens* (1938), trans, Turin, 2002, 91. See also F. Cordero, *Riti e sapienza del diritto*, Bari, 1981, 310 and more recently: A. Garapon, *Del giudicare. Saggio sul rituale giudiziario* (1997), Milan, 2007, 7.

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SECTION I
ESSAYS

# Discovering Mediterranean Diet and One Health Beyond Care: An Example of Synergies*

*Elena Barbieri, Francesco Lucertini, Elena Viganò and Rita Emili*

**Abstract.** The Mediterranean diet has long been recognized as a model of healthy eating, characterized by a balanced consumption of fruits, vegetables, whole grains, legumes, nuts, olive oil, and a moderate intake of fish, and dairy, with a low consumption of red meat and red wine. Its health benefits extend beyond nutrition, encompassing physical and mental well-being, and contributing to disease prevention. However, recent approaches explore how the Mediterranean diet synergizes with the One-Health concept, which recognizes the interconnectedness of human, animal, and environmental health. This contribution explores how these two concepts merge, highlighting the synergies between the Mediterranean diet and the One-Health framework to create a wider approach to health and sustainability, from the historical context to relevant applications and clinical studies.

***Keywords:*** Mediterranean diet, One-Health, disease prevention.

## 1. Introduction

The concept of "One Health" recognizes the interconnectedness of human health, animal health, and environmental health. Although it has gained prominence in recent years, the roots of One Health can be traced back to the observations of ancient thinkers such as Aristotle and modern initiatives like Zoobiquity, highlighting the long-standing awareness of the interplay between different species and their environments[1].

This approach is essential for addressing the complex health challenges facing our world today, from zoonotic diseases to environmental sustainability, and is crucial for tackling issues like antimicrobial resistance, pandemics, and climate change, which require collaboration across multiple sectors[2].

### 1.2. Historical Context and Evolution

While the term "One Health" is relatively new, the principles it embodies have been acknowledged for centuries. The relationship between ecosystems, animals, and humans has long shaped human history. Since the 1800s, scientists have recognized the similarities in disease processes between animals and humans, but it wasn't until the 20th century that the fields of human and animal medicine began to integrate more closely[3]. This interdisciplinary approach has become more urgent in recent years, with growing recognition from public health and animal health communities of the necessity of working together to prevent, detect, and respond to health threats[4].

The COVID-19 pandemic underscored the need for a paradigm shift in how we approach

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[1] World Health Organization. (2022), One Health Joint Plan of Action (2022-2026): Working together for the health of humans, animals, plants and the environment. World Health Organization.

[2] Annual Report Center for Disease control and Prevention CDC Advances Health Equity Around the World 2022.

[3] Evans B.R. and Leighton F.A. (2014), A history of One Health, *Rev Sci Tech*, 33(2), 413-20.

[4] Several key publications support the relevance and development of the One Health approach and its role in understanding and preventing emerging zoonotic diseases, including: Taylor L.H. *et al.* (2001), Risk factors for human disease emergence, *Philosophical Transactions of the Royal Society of London*, 356, 983-989. Who examined risk factors

health. Human health can no longer be viewed in isolation (the anthropocentric view), but must be considered in relation to animals, plants, and the broader environment – a holistic perspective that aligns with the One Health approach. The World Health Organization (WHO) has long promoted a more comprehensive of health, which includes physical, mental, and social well-being.

In this context, health is evolving to encompass the interrelated well-being of humans, animals, plants, and the environment[5].

### 1.3. One Health and Global Challenges

One Health is critical for addressing emerging infectious diseases, 60% of which have zoonotic origins[6]. In the past decade, the risks posed by zoonotic diseases like SARS-CoV-2, avian influenza, and monkeypox have increased as environmental degradation, habitat loss, and illegal wildlife trade intensify human-animal interactions. Understanding these dynamics is key to preventing future pandemics.

The approach also emphasizes collaboration across disciplines, including human medicine, veterinary medicine, environmental science, and public health. This interdisciplinary effort is crucial for tackling challenges that extend beyond traditional healthcare systems, such as antimicrobial resistance (AMR), foodborne illnesses, and the impact of climate change on health[7]. The One Health approach helps mitigate AMR by promoting cross-sectoral collaboration to regulate antibiotic usage and improve hygiene practices in food production and healthcare[1]. Global initiatives have increasingly emphasized a One Health strategy to combat AMR through joint monitoring, regulation, and awareness programs[8].

Environmental factors play a critical role in shaping health outcomes across human, animal, and ecosystem levels, a core principle of the One Health framework. Among these, emerging contaminants such as microplastics and particulate matter (PM 2.5) have raised significant concern due to their widespread presence and potential adverse effects. Microplastics, small plastic particles resulting from the degradation of larger plastic debris, have been detected in diverse environmental matrices, including water, soil, and air. Recent studies highlight their potential for bioaccumulation and translocation in organisms, with implications for human health via food chains and direct inhalation[9]. Similarly, exposure to PM 2.5 has been associated with a range of pathophysiological effects, including systemic inflammation, oxidative stress, and cardiometabolic dysfunction, further reinforcing the need to assess air quality within a One Health context[10].

This holistic approach aligns with One Health principles by integrating environmental monitoring with risk assessment models that consider cross-species and cross-ecosystem impacts[11]. These perspectives are essential for developing mitigation strategies aimed at reducing exposure to environmental hazards and promoting sustainable health outcomes. Understanding these dynamics is key to preventing future pandemics[12].

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[6] Woolhouse M. *et al.* (2022), Emerging Zoonotic Diseases and Infectious Disease Risks, *Nature Reviews Microbiology*, 20(1), 12-24.

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[8] Murray, C.J. L. *et al.* (2022), Global Burden of Bacterial Antimicrobial Resistance in 2019: A Systematic Analysis, *The Lancet*, 399(10325), 629-655.

[9] Pulvirenti E. *et al.* (2022), Effects of Nano and Microplastics on the Inflammatory Process: In Vitro and In Vivo Studies Systematic Review, *Frontier in Bioscience (Landmark Ed)*, 27(10), 287.

[10] Cristaldi A. *et al.* (2024), In vitro exposure to PM2.5 of olfactory Ensheathing cells and SH-SY5Y cells and possible association with neurodegenerative processes, *Environmental Research*, 15(241), 117575.

[11] Rapisarda P. *et al.* (2025), Ecotoxicological evaluation of urban wastewater treatment plants: a Sicilian study, *Ecotoxicology*, 34(4), 511-521.

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## 2. The Mediterranean Diet: A Model for One Health

The Mediterranean diet is often cited as an exemplary model of sustainable development and an ideal representation of the One Health approach. It demonstrates how dietary choices can influence human health, animal welfare, and environmental sustainability[13]. The diet is rich in plant-based foods, such as fruits, vegetables, legumes, and olive oil, with moderate consumption of fish and dairy, and minimal intake of red meat. Recent studies reinforce its benefits for cardiovascular health, sustainability, and biodiversity[14]. In line with human health benefits induced by the Mediterranean diet, recent trials confirm that adherence to the Mediterranean diet reduces the risk of non-communicable diseases, including diabetes and cancer, while enhancing longevity.

The diet has been associated with lower rates of mortality from heart disease, highlighting its value in public health[15].

### 2.1. The Characteristics of the Mediterranean Dietary Pattern

The health benefits of the Mediterranean diet stem from several key characteristics, which go beyond individual food choices to include consumption frequency, food selection criteria, and preparation and preservation practices. These characteristics include:

- High daily fiber intake: The Mediterranean diet emphasizes the consumption of fiber-rich foods such as fruits, vegetables, legumes, and whole grains, which are associated with lower risks of chronic diseases such as cardiovascular disease and type 2 diabetes[16].
- Variety of seasonal plant-based products: A diverse array of fresh, seasonal vegetables, fruits, legumes, and nuts forms the foundation of the diet. This variety promotes a high intake of essential nutrients, antioxidants, and polyphenols, which are key in reducing inflammation and oxidative stress[14].
- Use of herbs and spices instead of salt: Flavor is added to dishes through herbs and spices rather than excessive salt, contributing to improved cardiovascular health by reducing hypertension risk[17].
- Predominance of monounsaturated fats: The diet is rich in healthy fats, particularly monounsaturated fats from sources like olive oil, which have been shown to lower LDL cholesterol and reduce cardiovascular disease risk[18].
- Balanced intake of polyunsaturated fats (omega-3 and omega-6): These facts are obtained through the consumption of fish, nuts, and seeds, promoting anti-inflammatory effects and supporting heart health[19].
- Frequent consumption of fermented foods: Fermented products, such as yogurt and preserved vegetables, contribute to a healthy gut microbiota, which plays a crucial role in overall health, including immune function and metabolism[20].
- Moderate consumption of high-fat dairy, meat, and related products: These are consumed in moderation to limit the intake of saturated fats, cholesterol, and salt, supporting cardiovascular health and lowering the risk of obesity and related disorders[13].

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[19] de Lorgeril, M. and Salen P. (2007), Mediterranean diet and n-3 fatty acids in the prevention and treatment of cardiovascular disease, *J Cardiovasc Med* (Hagerstown), 8 (1), S38-41.

[20] Marco M.L. *et al.* (2017), Health benefits of fermented foods: microbiota and beyond, *Current Opinion in Biotechnology,* 44, 94-102.

- Moderate wine consumption: Typically, a glass of red wine with meals is part of the Mediterranean tradition. Red wine contains polyphenols, particularly resveratrol, which is linked to improved heart health due to its antioxidant properties[21].
- Small portion sizes: one of the key principles of the Mediterranean Diet is not only the types of food consumed but also how much is eaten, with a focus on small portion sizes and mindful eating. This aspect of the diet helps to naturally regulate calorie intake and promote a healthy body weight without the need for strict calorie counting or deprivation. By consuming smaller portions, the body has time to signal satiety, allowing individuals to stop eating before they feel overly full. This pattern helps prevent overeating, which is often linked to weight gain and metabolic disorders[22]. As a result, even small portions provide sufficient nutrition to meet the body's needs. For example, a small serving of nuts or a moderate amount of olive oil can deliver essential fatty acids and antioxidants that contribute to long-term health benefits without excessive caloric intake.
- Eating as a Social and Mindful Activity: Another important cultural aspect of the Mediterranean way of eating is that meals are often enjoyed slowly and socially. This mindful approach to eating allows individuals to appreciate the flavors and textures of food, which can enhance satisfaction and reduce the likelihood of overeating. Eating in a relaxed, social environment encourages people to pay attention to hunger and fullness cues, further promoting portion control[23].
- Regular physical activity along with a physically active lifestyle, helps maintain a healthy weight and promotes overall well-being, a key aspect of the Mediterranean lifestyle[24].
- Adequate water consumption: Proper hydration is emphasized to ensure daily fluid needs are met, supporting bodily functions and metabolic health[25].

### 2.2. The Biochemical and Metabolic Effects of the Mediterranean Diet

When considering the Mediterranean diet as a dietary pattern rather than a collection of individual foods, several biochemical and metabolic effects have been observed:

i) Reduction of Lipid Levels and Modulation of Adverse Metabolic Effects. Indeed, the Mediterranean Diet is widely known for its clear association with lower LDL cholesterol levels and reduced cardiovascular risk. Studies have demonstrated that adherence to this dietary pattern leads to significant reductions in total cholesterol, LDL cholesterol, and triglycerides, which are linked to a decreased risk of cardiovascular diseases[18];
ii) Anti-inflammatory, Antioxidant, and Anti-aggregant Effects: The Mediterranean Diet is rich in polyphenols, abundant in plant-based foods such as fruits, vegetables, olives, whole grains, tea, coffee, extra virgin olive oil, and red wine. These polyphenols are primary antioxidants that combat oxidative stress. Additionally, the diet's low intake of trans fats and high intake of monounsaturated and polyunsaturated fats, particularly omega-3 and omega-6, contribute to its anti-inflammatory and antioxidant effects. Vitamins C, E, and folates, along with carotenoids and flavonoids from fruits and vegetables, further protect against oxidative damage and help prevent DNA damage[22];
iii) Modulation of Cancer-promoting Mediators: The Mediterranean Diet has been associated with reduced stimulation of hormones and growth factors involved in cancer progression. This effect is largely due to the diet's impact on amino acid metabolism and its influence on hormonal pathways. Studies suggest that the diet can alter levels of hormones such as

[21] Chiva-Blanch G. *et al.* (2013), Effects of wine, alcohol, and polyphenols on cardiovascular disease risk factors: evidence from human studies, *Alcohol and Alcoholism*, 48(3), 270-277.

[22] Di Daniele N. *et al.* (2017), The Mediterranean Diet for the Prevention of Cardiovascular Diseases: The Nutritional Characteristics of Olive Oil and Its Effects on Cardiovascular Risk Factors, *Annals of Nutrition and Metabolism*, 71(1), 12-18.

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[25] Santonocito D. *et al.* (2014), Mediterranean diet adherence among university students in Italy and Spain, *Nutrition Research*, 34(10), 955-963.

insulin and estrogen, which are linked to cancer risk[26, 27];

iv) Modulation of Gut Microbiota: The Mediterranean Diet is known to positively affect the gut microbiota, promoting the growth of beneficial bacteria and the production of health-supportive metabolites[28].

This dietary pattern's high fiber content and consumption of fermented foods contribute to a favorable gut microbiota profile, which can enhance digestive health and immune function.

### 2.3. Exercise at the base of the Mediterranean Diet

The nutritional value of the Mediterranean diet is widely recognized, and physical activity is key to the new system. Indeed, while the Mediterranean diet is renowned for its nutritional benefits, its positive effects on health are further enhanced when combined with physical activity. Any physical activity is helpful in this context; however, to entirely trigger its benefits, physical activity must be planned and performed regularly and purposefully to maintain or enhance health, corresponding to the definition of exercise.

Exercise is a crucial component that complements the dietary principles of the Mediterranean lifestyle, contributing to overall well-being and preventing and managing most chronic diseases due to its well-known effects on the cardiorespiratory and muscle-skeletal systems. Further, exercise is known to have positive effects on mental health, including reducing symptoms of depression and anxiety. When paired with the Mediterranean diet, which is rich in antioxidants and healthy fats that support brain health, this combination can enhance cognitive function and overall mood[29]. The diet's inclusion of omega-3 fatty acids and polyphenols, along with the mental health benefits of exercise, provides a comprehensive approach to mental well-being.

The synergistic effect of combining the Mediterranean diet with exercise has been linked to increased longevity and improved quality of life. Studies have shown that individuals who adhere to both a diet and an active lifestyle experience lower rate of chronic diseases, enhanced physical fitness, and a higher quality of life[16].

The holistic approach of complementing diet and exercise supports long-term health and vitality. This comprehensive approach, combining nutritious foods with mindful eating habits and an active lifestyle, forms the core of the Mediterranean diet's health-promoting effects, which have been extensively supported by various studies[14, 18].

## 3. Mediterranean diet and relevant clinical applications

The Mediterranean diet has garnered increasing attention in clinical and nutritional research due to its potential health benefits, particularly in reducing the incidence of cardiovascular diseases and chronic conditions. Randomized controlled trials (RCTs) focusing on nutritional interventions with clinical endpoints have surged, providing evidence supporting the protective effects of this dietary pattern.

The pioneering study in this area is the "Seven Countries Study" led by Ancel Keys in 1958 which highlighted the health-promoting potential of the Mediterranean diet, specifically noting the reduced mortality from cardiovascular events in populations living around

[26] The European Prospective Investigation into Cancer and Nutrition (EPIC) is a large-scale, multicenter cohort study investigating the relationships between diet, metabolic factors, and chronic diseases: González-Gil E.M. *et al.* (2024), Association of body shape phenotypes and body fat distribution indexes with inflammatory biomarkers in the European Prospective Investigation into Cancer and Nutrition (EPIC) and UK Biobank, *BMC Medicine*, 22(334), 1-14 Further information and related publications are available at the official EPIC website: <https://epic.iarc.fr>.

[27] Toledo E. *et al.* (2015), Mediterranean diet and invasive breast cancer risk among women at high cardiovascular risk in the PREDIMED trial, *Journal of the American Medical Association Internal Medicine,* 175(11), 1752-1760.

[28] Several studies highlight the role of the Mediterranean diet in modulating the gut microbiota and reducing inflammation: Merra G. *et al.* (2021), Influence of Mediterranean Diet on Human Gut Microbiota, *Nutrients*, 13(1), 7; Nagpal R. *et al.* (2019), Gut microbiome-Mediterranean diet interactions in improving host health, *F1000Research*, 21(8), 699; Bailey, M.A. and Holscher H.D. (2018), Microbiome-Mediated Effects of the Mediterranean Diet on Inflammation, *Advances in Nutrition*, 9(3), 193-206.

[29] Di Daniele N. (2017), The Mediterranean diet for the prevention of cardiovascular diseases: the nutritional characteristics of olive oil and its effects on cardiovascular risk factors, *Annals of Nutrition and Metabolism,* 71(1), 12-18.

the Mediterranean Sea[30]. This observational study compared dietary habits in the USA and Northern Europe – characterized by high consumption of meat and animal fats, such as butter – with those in Japan and Southern Europe, where plant-based foods and extra virgin olive oil (EVOO) dominated diets.

The study's findings marked the first identification of the Mediterranean diet's protective role against coronary heart disease and other chronic diseases. During World War II, Keys had a brief military stint in Castelnuovo Cilento, Italy, where he was struck by the longevity of the local population. He theorized that this well-being was due to their active lifestyle and diet. This early observation laid the groundwork for his later research, which would revolutionize nutritional science by emphasizing the health benefits of the Mediterranean diet[30].

The European Prospective Investigation into Cancer and Nutrition (EPIC), initiated in 1992, is one of the largest observational studies investigating the relationship between diet, nutrition, lifestyle, and environmental factors with cancer and other chronic diseases. EPIC-Europe, coordinated by Imperial College London and the International Agency for Research on Cancer (IARC) in Lyon, France, has generated over 3,000 publications to date[26]. The data from this long-term study have been instrumental in uncovering associations between lifestyle factors, such as body mass index and waist circumference, and inflammatory biomarkers like C-reactive protein, interleukins, and leptin[26].

These findings have profound implications for understanding the role of diet and body composition in the development of chronic diseases, including cancer[31].

The Mediterranean diet demonstrated its Role in Cardiovascular Disease Prevention also with the PREDIMED (Prevención con Dieta Mediterránea) study, conducted in Spain, designed to evaluate the Mediterranean diet's effectiveness in preventing cardiovascular disease in high-risk individuals. The study enrolled around 7,500 participants, aged 55 to 80, who were randomized into three dietary groups: a Mediterranean diet enriched with EVOO, a Mediterranean diet supplemented with nuts, and a low-fat control diet. Importantly, the participants had no prior history of cardiovascular events but were at high risk due to type 2 diabetes or other cardiometabolic risk factors. The study revealed a significant reduction in cardiovascular events in the Mediterranean diet groups, further solidifying the diet's role in the primary prevention of heart disease[13].

The Mediterranean diet has also shown promise in cancer prevention. For instance, in the PREDIMED trial, adherence to this diet was associated with a lower risk of invasive breast cancer among women at high cardiovascular risk[32]. Similarly, the DIANA 5 project, a multicentric randomized controlled trial led by researchers at the National Cancer Institute in Italy, explored the effects of a Mediterranean-style diet on women who had undergone surgery for breast cancer. The DIANA study series, which originally aimed to reduce blood androgen levels (hence the acronym DIANA, standing for Diet and Androgens), further cemented the Mediterranean diet's role in modulating hormonal levels associated with breast cancer risk. The diet, rich in whole grains, legumes, seasonal vegetables, fresh fruits, and seeds, and low in refined grains, sugars, and red or processed meats, along with moderate intensity exercise, resulted in a significant reduction in recurrence risk and metastasis[33].

Building on the growing body of evidence supporting the Mediterranean diet and lifestyle interventions, the MOVIS (Movement and Health Beyond Care) project in Urbino, Italy, focuses on improving the outcomes of breast

[30] The findings of the study have been presented in several publications, each focusing on specific countries, time periods, and thematic issues. See, for instance, the first publication: Keys A. *et al.* (1958), The Seven Countries Study*, American Journal of Clinical Nutrition*, 6(3), 400-414. Follow-up works include: Keys A.B. (1980), Seven Countries: A Multivariate Analysis of Death and Coronary Heart Disease, Harvard University Press, Cambridge (MA). Keys A., *et al.* (1984), The Seven Countries Study: 2,289 deaths in 15 years, *Preventive Medicine*, 13(2), 141-154. Kromhout D. (2001), Ancel Keys Lecture: Diet and cardiovascular diseases, *Public Health Nutrition*, 4(2B), 443-447. An overview of the project is available at <https: //www. sevencountriesstudy. com>.

[31] World Cancer Research Fund/American Institute for Cancer Research. (2018), *Diet, Nutrition, Physical Activity and Cancer: a Global Perspective*, Continuous Update Project Expert Report 2018, <https://www.wcrf.org>.

[32] Martínez-González M.A., A. Hernández Hernández (2024), Effect of the Mediterranean diet in cardiovascular prevention, *Revista Española de Cardiología* (English Edition), 77(7), 574-582.

[33] Berrino F. *et al.* (2024), The Effect of Diet on Breast Cancer Recurrence: The DIANA-5 Randomized Trial, *Clinical Cancer Research*, 30(5), 965-974.

cancer (BC) survivors through exercise training and dietary guidance[34]. BC is the most common invasive cancer among women, and exercise has been shown to significantly enhance the prognosis of survivors. MOVIS is a randomized controlled trial designed to assess the health benefits of an aerobic exercise training program combined with proper nutritional habits, specifically adherence to the Mediterranean diet. The trial will recruit 172 breast cancer survivors, aged 30-70, who are non-metastatic, physically inactive, and 6-12 months post-surgery and post-chemotherapy or radiotherapy. Participants are randomly assigned to either the intervention group, which includes lifestyle recommendations, and a 12-week supervised aerobic exercise program (MoviS Training), or a control group receiving only lifestyle recommendations[35]. The primary outcome of this study is the improvement of quality of life, while secondary outcomes include improvements in health-related factors such as adherence to the Mediterranean diet, physical fitness, fatigue, cardiopulmonary function, and biomarkers related to metabolic, endocrine, and inflammatory pathways[35, 36]. The MOVIS Project aims to respond to the needs of oncological patients, who perceive their lifestyle as unhealthy, but lack the necessary tools to orient themselves toward proper nutrition and exercise.

Results from this study could significantly inform cancer care practices, providing evidence that supervised exercise training programs can improve prognosis, quality of life, and survival rates for high-risk breast cancer survivors.

## 4. Environmental Impact of the Mediterranean diet

Several studies show that the Mediterranean diet has a lower environmental impact than Western diets, especially in terms of protecting ecosystems and reducing climate-changing gas emissions and water consumption[37]. This is mainly due to the indication of adopting a predominant consumption of plant products that could significantly mitigate global environmental degradation and protect biodiversity[13, 38].

In this regard, however, it must be emphasized that the extent of these effects is closely linked to the production model by which food is obtained. In fact, industrial agriculture and intensive livestock farming involve the use of synthetic chemical inputs that are responsible for the contamination of natural resources and foodstuffs, loss of biodiversity and soil fertility, and compromise the health of workers, the rural population and consumers, as well as animal welfare[39]. On the climate change front,

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[34] National and international guidelines emphasize the role of nutrition and physical activity in cancer care and survivorship, supported by both institutional documents and scientific evidence: Campbell K.L. *et al.* (2019), Exercise Guidelines for Cancer Survivors: Consensus Statement from International Multidisciplinary Roundtable, *Medicine & Science in Sports & Exercise,* 51, 2375-2390. Ministero della Salute. Linee di Indirizzo Percorsi Nutrizionali Nei Pazienti Oncologici. Available online at <https://www.salute. gov.it/imgs/C_17_pubblicazioni_2682_allegato.pdf>; Ministero della Salute. Linee di Indirizzo Sull'attività Fisica per le Differenti Fasce D'età e con Riferimento a Situazioni Fisiologiche e Fisiopatologiche e a Sottogruppi Specifici di Popolazione. Available online at <https://www.salute.gov.it/imgs/C_17_pubblicazioni_2828_allegato.pdf>; Holmes M.D. *et al.* (2005), Physical activity and survival after breast cancer diagnosis, *Journal of the American Medical Association,* 293(20), 2479-2486.

[35] Natalucci N. *et al.* (2023a), Movement and health beyond care, MoviS: study protocol for a randomized clinical trial on nutrition and exercise educational programs for breast cancer survivors, *Trials,* 24, 134.

[36] Natalucci V. *et al.* (2023b), Effect of a lifestyle intervention program's on breast cancer survivors' cardiometabolic health: Two-year follow-up, *Heliyon*, 29, 9(11), e21761.

[37] Bôto J.M. *et al.* (2022), Sustainability Dimensions of the Mediterranean Diet: A Systematic Review of the Indicators Used and Its Results, *Advances in Nutrition*, 13(5), 2015-2038.

[38] This is mainly supported by the recommendation to prioritize the consumption of plant-based foods, a shift that can significantly reduce global environmental degradation and help preserve biodiversity as reported by: EAT-Lancet Commission. (2019), Food in the Anthropocene: The EAT-Lancet Commission on Healthy Diets from Sustainable Food Systems, *The Lancet*, 393(10170), 447-492 and Ripoll-Bosch R. *et al.* (2020), Environmental Sustainability of Mediterranean Dairy Sheep Systems, *Journal of Cleaner Production*, 254, 120125.

[39] European Parliament (2016), *Human health implications of organic food and organic agriculture*, Brussels, <http://www.europarl.europa.eu/RegData/etudes/STUD/2016/581922/EPRS_STU(2016)581922_EN.pdf>. Viganò, E. (2020), Agricoltura, in Treccani, Enciclopedia Italiana di Scienze, Lettere e Arti, X Appendice – Parole del XXI secolo.

moreover, agriculture produces about 11% of anthropogenic greenhouse gas emissions, which rise to almost 25% when considering the so-called AFOLU (Agriculture, Forestry and Other Land Use)[40].

Particularly serious are the responsibilities of intensive livestock farming, which supplies most of the animals for consumption. The metabolic cycle of livestock is responsible for about 14.5% of the total greenhouse gases (mainly methane and nitrous oxide[41]). The environmental impact is even higher if one considers that the creation of pastures for livestock is the main cause of deforestation, which, in turn, leads to further GHG emissions and contraction of photosynthetic fixation[42].

In addition, nearly 60 percent of the arable land is used to support intensive livestock farming for the production of fodder, about 30 percent of the drinking water and 70 per cent of the antibiotics produced annually, resulting in the pollution of natural resources and antibiotic resistance[43]. An alternative that is truly sustainable in an environmental, economic and social sense and fully consistent with the One Health approach[44] is the various types of organic farming/farming as outlined by the European Commission's Communication "A Farm to fork Strategy"[45].

These models, based on the principles of health, ecology, fairness and care codified by the International Federation of Organic Agriculture Movements and precisely regulated worldwide, are characterised by the renunciation of the use of synthetic fertilisers and pesticides, as well as GMOs, the conscious use of local natural resources, and the exaltation of natural cycles and positive interactions between the different organisms that cohabit the agro-ecosystem, including human beings[46].

This is why the choice, in terms of production and consumption, in favour of organic farming and animal husbandry is the most effective way to guarantee human, animal and ecosystem health. The moderate consumption of animal products in the Mediterranean diet aligns with One Health by reducing the demand for industrial farming, thus promoting animal welfare and decreasing the likelihood of zoonotic disease transmission[47].

## 5. Cultural and Social Aspects

Culturally, the Mediterranean diet supports traditional food systems that are more resilient and aligned with sustainable agricultural practices[48]. These systems promote biodiversity, seasonal consumption, and the preservation of local varieties, contributing not only to environmental sustainability but also to the safeguarding of culinary heritage. Such traditions foster a sense of identity and continuity, particularly in rural and coastal communities where food practices are deeply intertwined with cultural rituals, festivities, and intergenerational knowledge transmission.

The social aspects of communal eating have gained new attention in public health, as recent

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research underscores the mental health benefits of shared meals and social interaction[49]. Regular participation in shared meals has been associated with stronger social bonds, reduced feelings of loneliness, and protective effects against anxiety and depression. Furthermore, communal eating settings provide opportunities for promoting healthy eating behaviors, as they encourage mindful eating, portion moderation, and the transmission of positive dietary habits, especially among children and adolescents. In the context of the Mediterranean diet, these social dimensions also help reinforce equitable food distribution and interdependence within communities, supporting broader One Health goals that link human well-being with social cohesion and environmental stewardship.

## 6. Challenges and Opportunities

One Health faces challenges in implementation due to fragmented governance systems and the difficulty of integrating diverse sectors. However, the 2022 One Health Joint Plan of Action (OHJPA) spearheaded by WHO, the Food and Agriculture Organization (FAO), the World Organisation for Animal Health (WOAH), and the United Nations Environment Programme (UNEP) has formed a Quadripartite plan of action, as a critical step toward operationalizing this framework on a global scale[37]. It calls for coordinated action across human, animal, and environmental health sectors, emphasizing the need for policy coherence, to address health threats by fostering cooperation among governments, institutions, and professionals across sectors[50].

Effective surveillance and early detection systems are central to the One Health framework. These systems monitor the interactions between environmental changes, human health, and animal populations to predict and prevent the spread of diseases. As demonstrated by the COVID-19 pandemic, strengthening surveillance at the human-animal-environment interface is crucial for mitigating the risk of future pandemics. Improving global surveillance systems is paramount for early detection and prevention of zoonotic diseases.

The advent of digital tools, artificial intelligence, and genomic sequencing has transformed disease tracking, enabling real-time monitoring of pathogens across species[51]. However, the development of integrated human-animal-environment monitoring systems is still in at the beginning.

The One Health approach also emphasizes prevention through policies that address the drivers of zoonotic spillovers, such as deforestation, climate change, and intensive farming. Recent research stresses that reducing human encroachment into wildlife habitats is critical for mitigating the risk of future pandemics[52].

One Health offers a comprehensive strategy to address the complex, interconnected health challenges of the 21st century. Through interdisciplinary collaboration, better surveillance systems, and sustainable practices like the Mediterranean diet, One Health can lead the way in preventing future pandemics, curbing AMR, and fostering a healthier planet for all species.

Recent advancements, including the One Health Joint Plan of Action and digital surveillance tools, provide opportunities to accelerate these goals and enhance global health outcomes.

## 7. Synergies Between Mediterranean Diet and One Health

The Mediterranean diet, rich in fruits, vegetables, whole grains, nuts, and olive oil, has been widely recognized for its role in preventing cardiovascular diseases, diabetes, and other chronic conditions[53]. The MOVIS trial at Urbino

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[51] Harrison L.H. *et al.* (2021), *AI and whole genome sequencing improve quick detection of infectious disease outbreaks*, News-Medical.net. Retrieved from <https://www.news-medical.net/news/20211117/AI-and-whole-genome-sequencing-improve-quick-detection-of-infectious-disease-outbreaks.aspx>.

[52] Cross-species viral transmission and zoonotic outbreaks are increasingly linked to environmental changes such as climate change and habitat fragmentation. See: Carlson C.J. *et al.* (2022), Climate Change Increases Cross-species Viral Transmission Risk, *Nature*, 607(7919), 555-562; Rulli M.C. *et al.* (2021), The Nexus Between Forest Fragmentation in Africa and Ebola Virus Disease Outbreaks, *Scientific Reports*, 11(1), 19040.

[53] Dinu M. *et al.* (2022), Mediterranean Diet and Multiple Health Outcomes: An Umbrella Review of Meta-Analyses of Observational Studies and Randomised Trials, *European Journal of Clinical Nutrition*, 76(1), 171-186.

University in Italy further confirmed these findings, showing significant improvements in participants' metabolic markers and cardiovascular health after adhering to this dietary pattern for two years during the pandemic emergency[28].

The trials also emphasized the environmental benefits of the Mediterranean diet, which is inherently plant-based and reduces the environmental burden associated with high meat consumption[29]. By promoting seasonal, local foods and limiting resource-intensive products, the diet aligns with sustainable agricultural practices. Participants in the MOVIS trial with a significant increase in adherence to the Mediterranean diet[28] indirectly favored also a reduction in their carbon footprint compared to baseline diets.

The One Health framework underlines the importance of food systems that reduce intensive animal farming, a key driver of zoonotic diseases and antimicrobial resistance[38]. The trials explored how dietary shifts, such as a reduction in meat and processed foods, could mitigate the risk of zoonotic disease emergence by promoting more humane and sustainable farming practices[54]. Moreover, these studies provided critical insights into how local food systems and diets could be leveraged to promote environmental sustainability. Participants who adopted the Mediterranean diet exhibited a significant decrease in the consumption of processed foods and animal products, highlighting the diet's potential for reducing reliance on intensive agricultural systems[30].

The Mediterranean One-Health Vision and Intervention Studies from international and local contexts provide an exemplary case of integrating the Mediterranean diet with the One Health approach. The trial sought to examine the synergies between dietary patterns, environmental sustainability, and overall public health, contributing to the growing body of evidence that a Mediterranean lifestyle aligns with One Health principles.

These trials have inspired further interdisciplinary research and interventions, calling for the widespread adoption of One Health principles in dietary guidelines and public health strategies. It shows that addressing global challenges is achievable through sustainable, health-promoting diets that prioritize planetary health alongside human health[6].

By connecting human health outcomes with environmental sustainability, the trial serves as a vital reference point for future research and policy aimed at mitigating global health challenges. The trial's findings reinforce the need for integrative approaches in health care and nutrition, where the benefits extend beyond the individual to encompass broader ecological and societal impacts.

## 8. The Mediterranean Diet: A Model for One Health and COVID-19

The ongoing COVID-19 pandemic has further highlighted the relevance of diets that support immunity, reduce inflammation, and promote overall well-being, making the Mediterranean Diet a key area of interest in both prevention and recovery from infectious diseases like COVID-19[55].

This dietary pattern offers various health benefits that are particularly relevant in the context of COVID-19. Indeed, the Mediterranean diet is high in antioxidants, vitamins, and minerals that support immune function. Vitamins A, C, E, and zinc, along with omega-3 fatty acids found in fish and nuts, help the immune system fight infections effectively[56].

Many COVID-19 patients suffer from an overactive inflammatory response, known as a cytokine storm[57]. The MD's rich content of polyphenols, omega-3 fatty acids, and antioxidants have proven anti-inflammatory properties, which may help reduce this excessive inflammation. Individuals with pre-existing conditions like obesity, diabetes, and cardiovascular diseases are at higher risk of severe COVID-19 outcomes[58].

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The Mediterranean diet is well-known for reducing the risk of these chronic diseases through its favorable effects on lipid profiles, insulin sensitivity, and blood pressure. Moreover, COVID-19 has underscored the importance of environmental sustainability and the role of human behaviour in the emergence of zoonotic diseases.

The Mediterranean Diet provides an excellent framework for addressing human, animal, and environmental health through the One Health approach. In the era of COVID-19, its role in reducing inflammation, supporting immune health, and promoting sustainability makes it a powerful model for both prevention and recovery. By encouraging a shift towards plant-based foods, local and seasonal produce, and reduced meat consumption, the Mediterranean diet not only enhances individual health but also contributes to global efforts to protect the environment and reduce the risk of future pandemics.

## 9. Conclusions

Despite the wealth of evidence supporting the Mediterranean diet's health benefits, its practice has waned, even in its birthplace. Traditional Mediterranean dietary habits, as described by Ancel Keys, involved a diet rich in plant-based foods, whole grains, fish, and olive oil, with minimal consumption of red and processed meats and refined sugars. However, the dietary landscape has shifted dramatically, with processed foods and sedentary lifestyles becoming more prevalent[24]. This has led to a disconnect between the theoretical benefits of the Mediterranean diet and its actual implementation in modern society.

Keys' original observations were based on a population of rural farmers who led physically demanding lives and consumed fresh, locally sourced foods. In contrast, contemporary populations face different challenges, such as increased consumption of processed foods and reduced physical activity, which dilute the Mediterranean diet's benefits. As such, modern adaptations of the Mediterranean diet must account for these changes in lifestyle and food availability to remain relevant and effective.

The Mediterranean diet has stood the test of time as a dietary pattern that promotes longevity and protects against a range of chronic diseases. From Ancel Keys' groundbreaking work in the mid-20th century to contemporary large-scale studies like EPIC and PREDIMED, evidence consistently supports the Mediterranean diet's role in preventing cardiovascular disease, cancer, and other chronic conditions. However, to fully realize its benefits in today's world, the diet must be adapted to current lifestyles and environmental factors.

Only by bridging the gap between traditional dietary practices and modern realities can the Mediterranean diet continue to serve as a model for healthy living.

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SECTION I
ESSAYS

# One Health Conference Activity on Human Rights and Climate Justice

*Margherita Ferrante*

**Abstract.** Climate change is one of the most urgent and complex challenges of our time, as highlighted by the recent European Climate Risk Assessment report. This phenomenon impacts human health both directly, through rising temperatures and the consequent increase in heat-related mortality and morbidity, and indirectly, by deteriorating vital conditions such as water quality and quantity, food, and nutritional security, and by altering ecosystems and vector distribution, with an increase in disease and misuse of antimicrobials. The One Health approach, with its integrated and unifying vision, can effectively manage these impacts, optimizing the health of people, animals, and ecosystems and promoting interdisciplinary collaboration to address global environmental challenges. COP 27 and COP 28, and the One Health 2022 and 2023 International Conferences, play a crucial role in mobilizing global action against the climate crisis, highlighting the importance of community engagement, the symbiotic relationship between basic needs, sustainable lifestyles, and empowerment, and promoting global sustainable development to improve health and well-being. Policymakers need to strike the right balance between reactive measures and proactive climate change mitigation and adaptation strategies, promoting an energy transition that fosters a more resilient, inclusive and climate-secure system. Moreover, the unequal distribution of climate risks, which affects vulnerable populations the most, has highlighted the links between climate change and human rights, proposing the recognition of the human right to a stable and safe climate, supported by the growing role of climate justice litigation for Safety Planetary Health.

***Keywords:*** climate change, one health, energy transition, climate justice.

## 1. Introduction to Climate Change

Climate change is one of the most urgent and complex challenges of our time, as highlighted by the recent European Climate Risk Assessment Report (EUCRA) which identified 36 potential threats to the European continent, affecting energy and food security, ecosystems, infrastructure, water resources, financial stability and public health. This report highlights that many of these risks are already at a critical stage and could reach catastrophic proportions without immediate and determined action[1].

## 2. The One Health Approach

An integrated approach, such as that proposed by the One Health paradigm, can be key to effectively addressing climate change challenges. The One Health definition of the One Health High-Level Expert Panel (OHHLEP) is comprehensive and promotes a holistic view that links human, animal, and ecosystem health, recognizing the interdependence between these elements[2]. Although health, food, water, energy, and environment are all broader topics with sectoral and specialized concerns that go beyond the scope of One Health approaches, their interdependence highlights where multiple sectors have responsibilities and relevance in protecting health, addressing health challenges such as the emergence of infectious diseases and promoting the health and integrity of our ecosystems. After the 2014-2016 Ebola outbreak in West Africa and the global COVID-19 pandemic in 2020, the One Health approach quickly gained political and financial support. A series of articles in 'The Lancet' examines the adoption of One Health approaches to improve health security through an analysis of the current landscape of prevention, surveillance, and response measures in the face of emerging and re-emerging zoonotic infectious disease outbreaks with epidemic potential,

[1] European Climate Risk Assessment report, EEA Report No 1/2024.

[2] One Health High-Level Expert Panel Annual Report 2023, <https://www.who.int>.

as well as other potential public health emergencies such as neglected endemic diseases, antimicrobial resistance, environmental and chemical hazards, and natural disasters[3]. The One Health Joint Plan of Action (2022-2026), developed by a combination of international organizations (FAO, UNEP, WHO, and WOAH), highlights the commitment of the four-party organizations to collectively promote and support the implementation of One Health. It builds on, complements, and enriches existing One Health and coordination initiatives at global and regional levels to strengthen the capacity to address complex multidimensional health risks through more resilient health systems at global, regional, and country levels. The One Health Joint Action comprises six lines of action: 1) to improve countries' capacity to strengthen health systems with a One Health approach; 2) to reduce risks from emerging or re-emerging zoonotic epidemics and pandemics; 3) to control and eliminate zoonotic, tropical and endemic vector-borne diseases; 4) to strengthen food safety risk assessment, management and communication; 5) to combat the silent pandemic of antimicrobial resistance (AMR); and 6) to better integrate the environment into the One Health approach[4]. The Italian Government also adopted the term 'One Health' in Decree No. 36 of April 2022 (converted with amendments into Law No. 79/2022), by which it established the 'National System for the Prevention of Health from Environmental and Climatic Risks' (SNPS) in Article 27[5]. The objectives of the SNPS are more related to health promotion and the prevention and control of health risks associated, both directly and indirectly, with environmental and climate factors, including those resulting from socio-economic changes. The SNPS also emphasizes the protection needs of vulnerable communities and people in vulnerable situations, while respecting the principles of equity and proximity'[6].

## 3. The Climate Crisis as a Threat to Global Health

The climate crisis is a major health issue for people and all living things. According to 'The Lancet', climate change is 'the greatest threat to global health in the 21st century'. Future climate change scenarios indicate increased health risks associated with natural disasters, extreme events, water availability concerns, food security, and the spread of infectious diseases. Increased exposure to high temperatures causes numerous adverse health effects, and those particularly at risk are the elderly, people with pre-existing chronic diseases, urban populations, outdoor workers (often disproportionately immigrants), the socially disadvantaged, pregnant women, and newborns[7].

As highlighted in the UNEP Report, the current climate crisis could further exacerbate the already critical issue of antimicrobial resistance (AMR)[8]. Climate change affects human health both directly and indirectly, with an alarming growth predicted for this century. Direct effects include rising temperatures and heat waves, which intensify mortality and morbidity, overburdening the health care system, and worsening air quality. This worsening is accompanied by an increase in particulate pollution, which facilitates the inhalation of metals and increases respiratory and cardiovascular mortality, as well as promoting thrombotic events by activating haemostatic biomarkers[9, 10].

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[3] The Lancet Series on One Health and Global Health Security; Published: January 19, 2023.

[4] One health joint plan of action (2022–2026), <https://www.who.int>, 14 October 2022, ISBN: 978-92-4-005913-9.

[5] Decreto legge 30 aprile 2022, n. 36. Ulteriori misure urgenti per l'attuazione del Piano nazionale di ripresa e resilienza (PNRR). (22G00049) (GU Serie Generale n. 100 del 30-04-2022).

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Indirect effects of climate change affect several environmental conditions, including water quality and quantity, food and nutrition security, changing ecosystems, and the distribution of disease vectors. These changes lead to an increase in water-borne diseases and in the risk of foodborne diseases and vectors of typically tropical pathogens, such as Zika virus, Chikungunya, and Dengue fever, leading to an increase also in the use of antimicrobials[11]. The climate crisis and antimicrobial resistance are already having a significant impact on public health. Every year, the number of deaths linked to both the negative consequences of climate change (such as heat waves, extreme events, food and water insecurity) and the spread of drug-resistant bacteria and other microbes is rising[12].

Climate change may also favour spread of antimicrobial resistance without directly affecting pathogenic microorganisms. For example, during prolonged heat waves, people's habits and lifestyles change, causing them to spend more time indoors, thus creating ideal conditions for the spread of pathogens[13]. Although antimicrobial resistance is a natural phenomenon, the main factors behind its development and spread are anthropogenic, including the misuse and overuse of antimicrobials in humans, animals, and plants[14].

In aquatic ecosystems (marine, freshwater, wastewater and solid substrates) microplastics are emerging as effective hubs and vectors of microbial pathogens alongside their AMR genes (ARGs). Drug-resistant bacteria interact with microplastics to form synthetic plastispheres that become ideal niches for biofilm formation which in turn facilitates the transfer of ARGs via horizontal gene transfer and further increases the presence and levels of antimicrobial resistance[15]. Therefore, addressing plastic pollution is of high priority for human health.

In addition, storms and heavy rainfall can damage wastewater and sewage infrastructure, increasing the risk of floodwater pollution. In particular, wastewater is a reservoir for antibiotic resistance genes (ARGs), which have been identified as emerging pollutants in both soil and water. Antimicrobial-resistant bacteria and ARGs are not completely removed during wastewater treatment, thus being discharged into the environment[16]. Furthermore, there is an urgent need to address industrial practices in aquaculture, in particular the use of antibiotics for treatment and prophylaxis with high levels of these compounds in the surrounding sediments and water column. Antimicrobials are often added to the feed or drinking water of food-producing animals to reduce susceptibility to infection, accelerate weight gain, or reduce the amount of food required for weight gain[17]. Although some compounds have been banned for food safety reasons, for other agents the US Food and Drug Administration (FDA) has initiated a plan with industry to phase them out[18]. However, data show that feed and fish from aquaculture may still contain banned antimicrobials, thus exposing consumers to potential risks and contributing to the growth of antibacterial resistance[19].

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[18] The Lancet (2024), Public Health Our environment, our health, Editorial, The Lancet, 9(7e411), Open access.

[19] Oliveri Conti G., Copat C., Wang Z., D'Agati P., Cristaldi A., Ferrante M. (2015), Determination of illegal antimicrobials in aquaculture feed and fish: An ELISA study, Food Control, 50, 937-941, ISSN 0956-7135, <https://doi.org/10.1016/j.foodcont.2014.10.050>.

To protect human health, it is essential to develop innovative strategies for the effective removal of antibiotic contaminants. Among these, photodegradation using TiO2 activated by solar irradiation represents a promising and sustainable solution[18]. Moreover, at the international level, to control drug residues in food, maximum residue limits (MRLs) have been established and must be met at the national level; not the same in all Countries in Iran, for example, specific legislation for MRLs in livestock animals has not yet been implemented[20].

## 4. The Role of International Conferences in Combating the Climate Crisis

COP27 and COP28, together with the International One Health Conferences in 2022 and 2023, played a crucial role in mobilizing global action against the climate crisis, emphasizing the importance of community engagement, the symbiotic relationship between basic needs, sustainable lifestyles and empowerment, and promoting global sustainable development to improve health and well-being. COP28 marked an important step forward in the implementation of the Paris Agreement through the first global stocktake assessment of progress towards climate goals. This assessment highlighted the urgency of peaking global greenhouse gas emissions by 2025, followed by a 43% reduction by 2030 and 60% by 2035, compared to 2019 levels, to limit global warming to 1.5°C.In parallel, the annual Global Carbon Budget[21] report forecasts fossil carbon dioxide emissions of 36.8 billion tonnes in 2023, an increase of 1.1 percent from 2022[22].

In this context, the One Health Conferences in 2022 and 2023 are of great importance. The 2022 One Health International Conference in Catania, aiming at addressing and exploring the issues One Health, antimicrobial resistance and epidemiological models, One Health in transition cities, big data and urban metabolism, One Health as part of adaptation and human rights, and One Health vision on environmental hazards and toxicology. The 2023 One Health International Conference in Barcelona emphasized the integration of the One Health framework into the health sectors, highlighting the interconnections between health, climate change, and decision-making. The conference focused on a five-domain framework (Environmental, Digital, Social, Political/Economic, and Active Participation) designed to address the complex dimensions of One Health. This framework offered new perspectives and strategies to address the problem of microplastics and arboviruses in the context of climate change and environmental challenges[23].

## 5. Interactions between Climate Change and Cardiovascular Health

The interactions between climate change and health outcomes are multiple and complex, involving different exposure pathways that may also favour the development of non-communicable diseases, such as cardiovascular disease.

The DPSEEA (Driving Force, Pressure, State, Exposure, Effect, and Action) model helps contextualize the range of factors that should be considered when assessing health effects and adaptations to climate change. Reading the DPSEEA model according to the classical concepts of the epidemiological model, the Driving forces and Pressure factors can be recognized as the determinants of disease (which can be further separated into determinants acting on the context and the individual), while State, Exposure, and Effect represent the measure of the problem (in terms of emissions, exposure and health effects, respectively)[24].

Direct exposure to extreme weather events, ambient temperatures, heat waves, cold spells, and a wide range of pollutants has the potential

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[24] Ferrante M., Oliveri Conti G., Vito D., Fernandez G., Maione C., Lauriola P., Piscitelli P., Jimenez Gomes Tagle M., Dora C., Serrano Pons J. *et al.* (2024), Preface and Abstracts of the 2nd International One Health Conference, Med. Sci. Forum, 25, 5, <https://doi.org/10.3390/msf2024025005>.

to exacerbate disease in individuals with cardiovascular conditions and contribute to the development of disease in those who do not already have one. The indirect effects of climate change on cardiovascular health involve multiple and complex exposure pathways, including access to healthy food and clean water, transport, housing, living and working conditions, electricity, communication systems, medical care, and other social determinants of health, all of which are essential for maintaining cardiovascular health[25]. Temperature extremes, both high and low, can significantly affect cardiovascular events, although those living in enclosed, air-conditioned environments may not be directly affected. However, vulnerable populations exposed to such conditions are at risk. At high temperatures, increased core body temperature can cause tachycardia, dehydration, and hypercoagulability, increasing the risk of thrombosis and myocardial infarction[26]. Conversely, hypothermia can cause hypercoagulability due to increased viscosity and clotting factor abnormalities, along with vasoconstriction and increased blood pressure, increasing the risk of ischemia and heart attack. These effects are particularly dangerous for individuals with pre-existing cardiovascular disease. Extreme heat could also alter the endothelial function of cells and cause changes in the conformation of proteins, particularly the chaperone proteins of the heat shock protein family, which could lead to systemic inflammation and multi-organ failure[27].

## 6. Multilevel Intervention to Address Climate Change

Climate change represents one of the most urgent and complex challenges of our time, requiring multilevel intervention involving different disciplines and sectors. The threats associated with climate change prompted 190 countries to join the Paris Agreement, signed in 2015, which aims to limit global warming to less than 2°C compared to pre-industrial levels, with a more ambitious goal of keeping the increase below 1.5°C[28].

The Paris Agreement emphasized the importance of the involvement of sub-state actors, such as local authorities, civil society and the private sector, to tackle climate change[29]. Multilevel policy is essential to respond to specific regional and local conditions. Research on 451 locations in 23 countries has shown that keeping global temperatures within the Paris Agreement targets can prevent significant increases in heat- and cold-related mortality[30]. However, it is crucial to explore strategies to reduce cardiovascular deaths even under the best warming scenarios (1.5°C and 2.0°C). The 'Net Zero' report outlines a pathway to achieve net zero emissions by 2050, highlighting the crucial role of the energy sector, which is responsible for about three-quarters of global greenhouse gas emissions[31]. Mandatory policies to reduce fossil fuel emissions have proven to be very effective and can decrease cardiovascular events[32]. For effective implementation of mitigation strategies, a patient-, community- and climate-specific risk assessment is required.

Climate adaptation is a crucial element in the global response to the effects of climate change, with particular reference to cardiovascular health. Climate resilient infrastructure must be designed to anticipate, prepare for and adapt to significant environmental stressors, responding effectively and in a timely manner to disruptions caused by extreme weather events.

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Management adaptation measures, such as the installation of air conditioning, heating and air purifiers, play a key role in protecting vulnerable populations. Such interventions, while operating at the individual level, require systemic support through local and regional policies[33]. The latter, if well aligned with the objectives of the Paris Agreement, can compensate for the lack of significant initiatives by federal governments, showing how local action can also be effective in a context of multi-level governance.

## 7. Global Warming: Causes and Impacts

Global warming of the Earth is steadily increasing, with human activity and solar effects identified as the main causes of this phenomenon. Events such as record-high temperatures, melting glaciers, and devastating floods are becoming increasingly frequent globally[34]. In addition to rising temperatures, global warming is causing significant changes in wind patterns, changes in humidity and alterations in precipitation rates. These phenomena have a major impact on the social, economic and health aspects of human life and are therefore the subject of in-depth studies. An innovative approach for analyzing global warming trends is the application of dynamical systems and fractional computing, as described by Machado *et al.* (2012)[35].

## 8. Energy transition and sustainability

The energy sector is responsible for about three-quarters of global greenhouse gas emissions, making its role in mitigating climate change crucial. Following the 2015 Paris Agreement, achieving the goal of limiting the global temperature increase to below 2°C by 2030 requires the implementation of structured policies to decarbonize energy, transport, construction, industry, and agriculture. The transition to a low-emission economy will involve radical transformations in technology, industry, and society. According to the Global Carbon Budget 2019, 45% of CO2 emissions come from the energy sector, 23% from industry, 19% from domestic transport, and the rest from other activities.

To reach the targets, action is needed on several fronts, with a significant acceleration in the electrification of transport, the use of renewables and energy efficiency. This complex process requires action for a socially equitable and economically sustainable transition to a climate-resilient economy, with the goal of zero greenhouse gas emissions by 2050[31]. Every year, the gap between what is achieved and what would be needed for an efficient energy transition increases. IRENA's (International Renewable Energy Agency) energy transition indicators show that a significant acceleration in all energy sectors and technologies is indispensable, from increased electrification of transport and heating to the direct use of renewables, to energy efficiency and infrastructure development[33].

Policymakers need to balance reactive measures and proactive strategies to promote a resilient, inclusive, and climate-secure energy system, overcoming infrastructural and political barriers. By 2050, 91% of electricity is expected to be generated from renewable sources, a threefold increase from 2020, and electricity will account for more than 50% of final energy consumption[36]. Recent global crises, such as the pandemic and international conflicts, have put energy systems under strain, highlighting the need for a robust and sustainable energy transition[37].

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## 9. Energy transition and climate justice

The unequal distribution of climate risks, which affects vulnerable populations the most, has highlighted the links between climate change and human rights, leading to the proposed recognition of the human right to a stable and safe climate, supported by the growing role of climate justice litigation for planetary security and health[38]. The term climate justice first appeared in 1999, in an essay on the responsibilities of industrialized countries for pollution to the detriment of states suffering from the effects of climate change and global warming due to fossil fuel companies[39].

It is necessary to tackle climate change with justice and equity, by abandoning fossil fuels and rethinking energy demand, by integrating climate justice and equity into all mitigation strategies, and by accelerating funding and support for vulnerable communities.

Climate justice promotes sustainable development and human well-being, to ensure food security, clean water, adequate housing, and access to healthcare and education for all[40].

## 10. Urban planning

To counteract the relentless warming of the planet, we must reduce emissions of climate-altering gases, which will have a profound impact on the economies of nations. This action will take a long time before appreciable results are achieved. However, in the meantime, we can absorb a good percentage of the CO2 in the atmosphere. The most efficient system to date to absorb CO2 from the atmosphere is the use of trees and algae. We should consider urban health and sustainability from the earliest stages of urban planning, as urban planning can and should act as primary prevention and collaboration in promoting health and climate mitigation, emphasizing the need for a holistic approach to city building. Strategies, actions, and design policies identified to improve public health and well-being confirm that the connection between morphological and functional characteristics of the urban context and public health is crucial for contemporary cities and modern societies[41].

COVID-19 accelerated several social, environmental, and digital challenges, underlining the importance of certain issues related to housing, urban mobility, green areas, and health service networks, urban health policies, and actions. A multidisciplinary approach to the development of systemic operational capacities and health literacy is considered crucial to increase awareness and participation[42].

It also appears necessary to identify places with the lowest health status by performing a comprehensive assessment through data analysis and risk modelling to implement environmental health in urban institutions and public places[43]. Information technology (IT) helps to realize the systematic analysis of health data, which leads to safer urban health policy-making[44].

## 10. Conclusions

The challenge of energy transition and climate justice requires global engagement and cooperation between countries, international

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institutions, the private sector, and civil society[45]. Policymakers need to balance reactive measures and proactive strategies for an energy transition that promotes a more resilient, inclusive, and climate-safe system. Climate justice, linked to human rights, requires that those most responsible for climate change contribute proportionately to mitigation and adaptation efforts. Only through coordinated and just action will it be possible to effectively address climate change, ensuring a sustainable future for all populations.

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SECTION I
ESSAYS

# Climate Resilient Development of Cities: A One Health Perspective

*Domenico Vito*

**Abstract.** In the face of escalating climate change impacts, the imperative for resilient urban development has never been more urgent. This article explores the symbiotic relationship between climate resilience and the One-Health approach within the context of urban development. As cities continue to burgeon, they become epicenters of both innovation and vulnerability. Adapting urban landscapes to withstand the multifaceted challenges posed by climate change demands a holistic framework that encompasses not only environmental considerations but also human health and animal welfare. The One-Health paradigm recognizes the interconnectedness of environmental, human, and animal health, offering a comprehensive lens through which to address the complex dynamics of climate resilience. By integrating principles of sustainability, equity, and ecosystem health, cities can forge pathways towards resilience that safeguard the well-being of all inhabitants, both human and non-human. The article will delve into the key pillars of a One-Health approach to climate-resilient urban development, highlighting the importance of interdisciplinary collaboration and community engagement. Drawing on models, frameworks and best practices from around the globe, it will showcase innovative strategies for enhancing urban resilience while promoting health equity and biodiversity conservation. Furthermore, the speech will underscore the imperative of policy coherence and investment in green infrastructure as essential components of a climate-resilient future. By fostering synergy between urban planning, public health, and environmental conservation, cities can emerge as vanguards of sustainability and resilience, demonstrating the transformative power of a One-Health perspective in shaping a more harmonious relationship between humanity and the natural world.

***Keywords:*** One-Health, urban development, sustainability, green infrastructure, climate resilient development.

## 1. Introduction

In the wake of escalating climate change impacts, the need for resilient urban development has become increasingly urgent. Cities, as dynamic hubs of economic activity and social progress, simultaneously represent centers of innovation and heightened vulnerability to environmental and health challenges. Rapid urbanization exacerbates risks such as extreme weather events, pollution, and biodiversity loss, necessitating integrated frameworks that enhance urban resilience[1]

This discussion explores the interplay between climate resilience and the One-Health approach within urban development. One Health – an interdisciplinary model recognizing the interconnections between human, animal, and environmental health – offers a holistic strategy to mitigate climate-related risks and foster sustainable urban ecosystems[2]. By integrating this approach into urban planning, cities can enhance adaptive capacity, reduce health disparities, and promote biodiversity conservation[3].

As urban populations continue to grow, addressing climate resilience through systemic, science-driven policies is imperative. A multidisciplinary perspective that aligns public health, environmental sustainability, and urban planning is essential to building cities that are both livable and prepared for future climate challenges[4].

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## 2. From sustainability to One-Health approach

The concept of sustainable development was first introduced in the Brundtland Report, also known as Our Common Future, published in 1987 by the World Commission on Environment and Development (WCED)[5]. The report, commissioned by WCED president Gro Harlem Brundtland, defined sustainable development as "development that satisfies the needs of the present without compromising the ability of future generations to satisfy their own"[5].

Building on this foundation, the planetary boundaries framework was introduced in 2009 when Johan Rockström and a team of 28 internationally recognized scientists identified nine critical processes that regulate the stability and resilience of the Earth system[6]. These planetary boundaries define the environmental limits within which humanity can safely operate, warning that exceeding them could trigger large-scale, abrupt, or irreversible environmental changes[7]. In response to these challenges, the United Nations established the Sustainable Development Goals (SDGs), a universal framework aimed at guiding nations and engaging civil society, entrepreneurs, non-governmental organizations (NGOs), and public actors toward achieving peace, prosperity, partnership, and justice for all[8]. The 17 SDGs are often categorized into five key dimensions – the "five Ps": people, planet, prosperity, partnership, and peace[8].

Recognizing the interconnectedness of human, animal, and environmental health, the One Health concept emerged in the early 2000s, emphasizing that human well-being is intrinsically linked to the health of animals and ecosystems[9]. This approach evolved further with the introduction of Planetary Health in 2015 by the Rockefeller Foundation and The Lancet, expanding the perspective to encompass "the health of human civilization and the state of the natural systems on which it depends"[5].

Moreover after the pandemic theres has been an increased recognition of the One-Health concept and the connection between human, animal and environmental health.

## 3. Localizing SDG 3 at urban level: frameworks for Climate Resilient Development

For the Sustainable Development Goals (SDGs) to be truly effective, they must be adapted to local contexts, ensuring alignment with the realities of civil society and urban governance. However, achieving this localization remains a complex challenge, particularly in addressing the interconnected issues of health, environment, and resilience in cities.

One of the most comprehensive approaches to integrating health into urban policy is Health in All Policies (HiAP), which promotes cross-sectoral governance by systematically considering the health implications of decisions. This framework aligns closely with SDG 3, emphasizing the need for integrated, equity-driven health strategies at the city level[10]. Given that urban areas are key centers of anthropization – where emissions from transport, energy, and food systems are concentrated – implementing such approaches is crucial to mitigating health and environmental risks (Figure 1).

Beyond health policies, the broader challenge lies in reshaping the metabolic balance of cities. The dominant linear economic model – where natural resources are extracted, consumed, and turned into waste – exacerbates urban vulnerability, as cities depend heavily on external hinterlands for resource supply and pollution assimilation[11]. Urban metabolism (UM) provides a critical framework for understanding these resource flows, offering insights into how cities can transition toward more sustainable and resilient structures (Figure 2). By analyzing the interactions between urban economies, environmental impacts, and socio-economic behaviors, UM can inform climate-resilient development

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**Figure 1.** Health in All Policies (HiAP Framework).

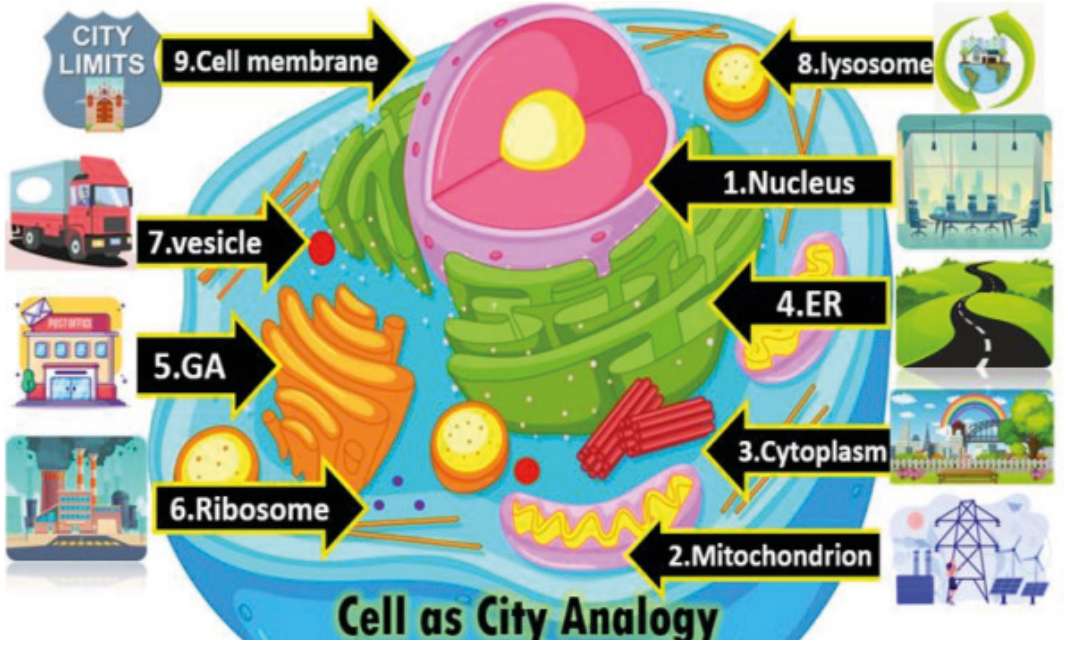


**Figure 2.** The metaphor of Metabolism of a City.

strategies that both reduce vulnerabilities and enhance long-term sustainability[12].

## 4. COVID-19: Health and ecosystemic crises

COVID-19 health crisis outbreaked as a new generation disease which reveals the several interconnections among human and planetary health. The origins of pandemic are a starting element to consider COVID-19 a health crisis intertwined with an ecological crisis. The contact points occur in causes, effects as well as in responses.

COVID-19 is a zoonotic disease that was rapidly transmitted and turned into a pandemic echoed by highly anthropized agglomerations and thanks to unprecedented and hyper-used world-wide connections. Prevention measures should rather consider better relationships among and within human settlements and ecosystems through better management and restoration.

The effects of COVID-19 provided a rare example of how a biotic element disrupted the economy and human activities in a pervasive way, touching their interaction with the environment.

The impacts of restriction measures on air quality and the speculated relationships between COVID-19 transmission and air pollution showed how the pandemic turned on the way of ecosystem self regulation. Studies on the effects of the lockdown and air quality in some of the most affected regions as Northern Italy and Wuhan provided valuable case studies on this ongoing scientific inquiry.

Understanding the ecology and the diffusion of the SARS-COV2 through epidemiological and Malthusian models like SIR (Susceptible-Infected-Recovered) beca me essential to drive lockdown measures both at the local and global scale.

COVID-19 health crisis showed several similarities with the climate crisis: both have stimulated the community resilience of societies toward transformational changes which, admittedly, could represent an evolution. The pandemic crisis urged human societies to rediscover their routine, constraining them to rediscover new ways to, to work, to build relationships and to empower.

Thinking for example about smart working, and conference call platforms, they gave a different approach to the daily time management and help to foster working activity regardless of the lockdown.

The pandemic obliged us to find new ways to work, to connect and to live.

More generally and profoundly, individuals have been forced to rethink and redesign social relationships, professional goals, and last but not least their future within a "common house" where interdependencies are essential[13].

Despite the immense suffering of the patients – tragic and atrocious in frightening numbers – individuals have rediscovered the sense of community, or at least an interesting debate is rising on this.

Facing a common threat, they have rediscovered community resilience.

The concept of community resilience has been studied by several research areas since the last three decades[14], but it has been more frequently related to environmental disasters Even though, there is not still a precise definition or framework accepted as a whole reference[13, 14].

Certainly, community resilience has a multidimensional and multidisciplinary nature, and its full understanding combines complex interactions between the physical, social and economic dimensions[15].

Similarly to environmental extreme events, community resilience triggered by COVID-19 has been expressed as the ability of communities to cope with and recover from large-scale emergencies[16].

Magis[17] collected several definitions of community resilience in literature in relationship to different dimensions as system disruption and

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response, activation of the community, community stability and resources.

In public health and crisis management, systems disruptions[18] are happening and act like stressors in physiological, psycho-social, socio-cultural, and environmental forms that increase the risk of violence and injuries. Community resilience by systems theory and socio-ecological studies, is indeed strictly connected to the concept of change

Among COVID-19 responses, several initiatives worldwide have been classified as expressions of community resilience practices.

In conclusion, COVID-19 represented a new generation of disease that turned the conception from interventive to preventive medicine.

To cope with the pandemic the conceptual framework of One Health within a context of Planetary Health could support design adaptation measures and pandemic strategies.

It could help to see health crises through an ecological point, and a One-Health oriented point of view, rediscovering the importance of epidemiology and related models to grant community wellness.

## 5. Conclusions

Building strong partnerships and implementing impactful policies at the city level is crucial to addressing the energy, transport, and food systems that drive climate change. Such actions are not merely aligned with the Paris Agreement's long-term goal of a net-zero society by 2050, as emphasized after COP26 in Glasgow, but also serve as a means to integrate climate action with broader sustainability objectives. Strengthening the connection between the Paris Agreement and the Sustainable Development Goals (SDGs) can amplify climate mitigation co-benefits, particularly in reducing poverty and inequality[19].

However, studies indicate that while ambitious mitigation policies are essential, they may pose short-term socio-economic challenges. Campagnolo *et al.* found that full implementation of Nationally Determined Contributions (NDCs) could slow global poverty reduction efforts, with an estimated 4.2% increase in people living below the poverty line by 2030, especially in countries facing higher policy costs due to stringent targets[20].

Indeed, to maximize effectiveness, mitigation strategies must be integrated into broader development agendas, ensuring that climate policies align with social equity and public health goals.

Such an approach is even included into the IPCC AR6 Summary Report for Urban Policymakers that provides a Climate-Resilient Development model that incorporates One Health, fostering synergies between climate adaptation, mitigation, and sustainable development goal[21].

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# List of Authors

**Barbieri Elena**, Associate Professor of Human Biology and Applied Biology, University of Urbino Carlo Bo.

**Bullon Carmen**, Legal Officer at FAO.

**Celati Benedetta**, Postdoctoral Researcher in Administrative Law at the University of Bologna.

**Coli Francesca**, Postdoctoral Researcher in International Trade and Food Security, Sant'Anna School of Advanced Studies, Pisa, and International Legal Consultant, Food and Agriculture Organization of the United Nations (FAO).

**Di Giovanni Luca**, Tenured Track Researcher in Administrative Law at the University of Urbino Carlo Bo.

**Dominici Allegra**, PhD Candidate in Constitutional Law at the University of Urbino Carlo Bo.

**Emili Rita**, Oncology Unit, AST Pesaro e Urbino, Urbino, Italy.

**Ferrante Margherita**, Full Professor of General and Applied Hygiene, University of Catania, Co-Chair of the OneHealthConference.

**Giordano Andrea**, Magistrate of the Court of Auditors, Head of the Legislative Office of the Ministry of Health.

**Gnes Matteo**, Full Professor of Administrative Law at the University of Urbino Carlo Bo, Director of the Institute for Global Health Emergencies Response (IGHER) of the European Public Law Organization (EPLO).

**Gómez Jiménez María Luisa**, Professor of Administrative Law at the University of Málaga.

**Harrington Alexandra**, Lecturer in Law, Lancaster University Law School.

**Kasimbazi Emmanuel**, Professor of Law at the School of Law at Makerere University, Uganda.

**Kezaabu Annette**, Deputy Vice Chancellor for Academic Affairs at Karamoja Peace and Technology University, Senior Lecturer of Journalism, Media and Communication.

**Lauri Cristiana**, Researcher in Administrative Law at the University of Macerata, Lecturer in Global Environmental Law.

**Lucertini Francesco**, Associate Professor of Exercise Science Research, University of Urbino Carlo Bo.

**Pandey Shubham**, Assistant Professor of Law, School of Law, Forensic Justice and Policy Studies, National Forensic Sciences University, Gandhinagar, Gujarat.

**Pecchioli Niccolò**, Senior Researcher in Administrative Law at the University of Urbino Carlo Bo.

**Saygilar Yasemin F.**, Assistant Professor of Criminal and Criminal Procedure Law at TC Istanbul Kultur University, Faculty of Law.

**Scotti Elisa**, Full Professor of Administrative Law and Global Environmental Law at the University of Macerata, Director of the Master in Administrative Science and Innovation in Public Administration.

**Shankar Uday**, Professor of Law at Rajiv Gandhi School of Intellectual Property Law, Indian Institute of Technology Kharagpur.

**Sulistiawati Linda Yanti**, Senior Research Fellow at Asia-Pacific Centre for Environmental Law (APCEL), National University of Singapore, Singapore, and Associate Professor of Law in Universitas Gadjah Mada, Indonesia.

**Viganò Elena**, Full Professor of Economics of the agricultural and food system, University of Urbino Carlo Bo.

**Vito Domenico**, Climate Consultant, Environment and Health Data Analyst, Co-Chair of the OneHealthConference.

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