LUISS

Master's Degree in International Relations

Chair of International Organizations and Human Rights

The Emergence of the One Health Principle in the Law and Practice of International Organizations

One Health at the Crossroads of Law and Crisis: Lessons from COVID-19 and Emerging Risks

Supervisor

Prof. Donato Greco

Co-supervisor

Prof. Duccio Maria Tenti

Candidate

Carla Rendano - 654912

Academic year 2024/2025

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Abstract

This thesis examines the role of international law in operationalizing the One Health approach, which recognizes the interdependence between human, animal, and environmental health. Despite growing scientific consensus on the need for integrated governance, international legal regimes addressing these domains remain fragmented, thereby limiting the effectiveness of global mechanisms for preventing and responding to health threats. Adopting a doctrinal and interdisciplinary legal analysis, the research assesses the extent to which existing international legal frameworks incorporate preventive obligations relevant to the One Health paradigm. The study first explores the conceptual and normative foundations of One Health within international environmental and global health law. It then analyses the principles of prevention and due diligence as key legal tools capable of supporting integrated health governance, drawing on jurisprudence from international courts and tribunals. Two case studies are examined to illustrate the practical implications of these legal challenges: the *Terra dei Fuochi* in Italy and the COVID-19 pandemic. These cases highlight both the consequences of failures in preventive governance and the structural limitations of current global health frameworks. Particular attention is devoted to the role of international institutions and to the recently adopted WHO Pandemic Agreement, which seeks to strengthen global preparedness through enhanced cooperation, surveillance, and equitable access to medical countermeasures.

Introduction

The present thesis examines the One Health approach within the framework of international governance, contending that, despite its consolidation as a cornerstone of 21st-century global health security, its transformative potential remains severely constrained by the fragmented nature of the international legal order and the enduring disconnect between its inherently multisectoral requirements and existing institutional architectures. The primary aim is to understand its origins, its evolution, and its implementation. As a relatively recent concept, it is still constantly changing, but gradually the various international organizations are beginning to recognize its relevance. In fact, since its formalisation in the early 2000s, One Health has rapidly evolved from a primarily scientific paradigm to a central element of global policy, culminating in the establishment of the Quadripartite Alliance (WHO, FAO, WOAH, UNEP) and its explicit integration into major health, agricultural, and environmental agendas.

The thesis is structured in three chapters. The first chapter traces the conceptual genesis and historical development of "One Health", it analyses the respective mandates and collaborative mechanisms of the Quadripartite organizations, and identifies the principal legal and institutional obstacles to its effective operationalisation. There is an analysis of existing tools and those that are emerging and developing to make the One Health approach as concrete as possible. The second chapter shifts to a normative perspective, articulating the concept of "deep prevention" as the indispensable legal response to the One Health imperative and evaluating the extent to which customary international law, treaty obligations, soft law instruments, and emerging jurisprudence (including the ITLOS Advisory Opinion of 2024 and the Grand Chamber judgment in *Verein KlimaSeniorinnen Schweiz v. Switzerland*, 2024) impose binding preventive duties on States. The latter case is used to demonstrate the establishment of state human rights liability for climate inaction, thereby strengthening the legal link between environmental determinants and protective state duties (article 8 ECHR). In fact, a theme that is faced during this thesis is the evolving obligation to prevent environmental risks and the gaps that currently limit the full functioning of the One

Health approach in the environmental field. Finally, in the third chapter, there is a practical example, the case study of the “COVID-19” pandemic, its zoonotic origins, the interdependence between ecosystem health and urgent policy, international institutional responses, the role of FAO and UNEP, and their involvement. From the middle of the chapter, the focus is on the regulatory alignment of the pandemic response with respect to the One Health Approach, with its successes and failures. There is, moreover, a precise analysis of the negotiations and the final text of the WHO Pandemic Agreement (2025) with particular attention to the opportunities and risks involved in it. Finally, the third chapter discusses the objectives of the new instrument and how to consolidate the responses resulting from its implementation. The study concludes by advancing specific proposals aimed at overcoming regulatory fragmentation and strengthening the legal architecture of One Health. These solutions could address future challenges more decisively, compactly, coherently, and unitedly. The present research employs a normative and critical analysis methodology. The first phase involves a doctrinal analysis of international hard law and soft law instruments concerning health and environment. The second phase uses a case law analysis (i.e. *Verein KlimaSeniorinnen Schweiz and Others v. Switzerland*) and case study approach (COVID-19 pandemic) to test the capacity of existing legal frameworks to implement the integrated One Health mandate. In conclusion, this thesis argues that One Health is no longer merely a policy framework, but is progressively crystallizing into a normative paradigm capable of reshaping States’ preventive obligations under international law.

Chapter 1

"The One Health Approach in International Governance"

Summary: 1. The Concept of One Health: Definition and Scope; 1.1 Historical evolution and recognition in legal discourse; 1.2 International organizations and their competences (WHO, FAO, WOAH, UNEP); 2. The international legal framework: current instruments and challenges; 2.1. Binding legal tools; 2.2. Existing instruments and those under development; 2.3 Strengths, limitations, overlaps, and the need for regulatory harmonization.

1. The Concept of One Health: Definition and Scope

The contemporary One Health paradigm constitutes both a conceptual and operational evolution of the earlier "One Medicine" approach developed by Calvin W. Schwabe in the 1980s, which emphasised the scientific and clinical synergies between human and veterinary medicine.[1] From the early 2000s onward, successive zoonotic crises, most notably the 2002–2004 SARS outbreak and the persistent threat of highly pathogenic avian influenza (H5N1), demonstrated that purely biomedical responses were inadequate.

These events revealed that approximately 75% of emerging infectious diseases in humans are zoonotic in origin and that their primary drivers lie in anthropogenic ecological disruption: habitat destruction, biodiversity loss, intensive animal husbandry, wildlife trade, and climate change.[2] This realisation prompted the progressive integration of the environmental dimension, transforming One Health into an integrated approach founded on the recognition of the indivisible interdependence of human, animal, and ecosystem health.

The authoritative definition now universally accepted in global governance and international legal discourse is that formulated in 2021 by the One Health High-Level

[1] Calvin W. Schwabe, Veterinary Medicine and Human Health, 3rd ed., Williams & Wilkins, Baltimore, 1984, pp. 1–37.

[2] IPBES Workshop Report on Biodiversity and Pandemics, 2020, p. 11; WHO–CBD, Connecting Global Priorities: Biodiversity and Human Health – A State of Knowledge Review, 2015, p. 8.

Expert Panel (OHHLEP), established by the Quadripartite organisations (WHO, FAO, WOAH, and UNEP):

"One Health is an integrated, unifying approach that aims to sustainably balance and optimise the health of people, animals and ecosystems. It recognises that 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"[3].

Adopted verbatim in the One Health Joint Plan of Action (2022–2026),[4] this definition has been formally endorsed by the governing bodies of all four organisations and is routinely invoked in resolutions of the World Health Assembly, the FAO Conference, the WOAH World Assembly, and the United Nations Environment Assembly.[5]

The practical application of this paradigm within global health governance is guided by a specific conceptual architecture, characterized by a set of interrelated pillars.[6] First, the principle of equity between sectors requires that human, animal and ecosystem health be accorded an equal normative weight in policy-making and resource allocation, directly challenging the traditional Western legal hierarchy that has historically treated animals and the environment as instruments for human health protection or economic exploitation.[7] It emphasises fairness and justice in balancing the needs and responsibilities of all disciplines, advocating for an equitable balance that recognises the interconnected health and welfare of humans, animals and ecosystems.[8] This is complemented by the principle of socio-political and

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[3] One Health High-Level Expert Panel (OHHLEP), One Health Definition, November 2021.
[4] Quadripartite (FAO, UNEP, WHO, WOAH), One Health Joint Plan of Action (2022–2026), Rome, 17 October 2022, p. 5.
[5] World Health Assembly Resolution WHA76.5 (2023), para. 12; UNEA Resolution 6/16 (2024).
[6] One Health High-Level Expert Panel (OHHLEP), Adisasmito WB, Almuhairi S, Behravesh CB, Bilivogui P, Bukachi SA, et al. (2022) One Health: A new definition for a sustainable and healthy future. PLoS Pathog 18(6): e1010537. https://doi.org/10.1371/journal.ppat.1010537
[7] Bullón Caro C. One Health, sustainable development and the principle of integration: legal synergies for effective implementation. *Research Directions: One Health*. 2025;3:e5. doi:10.1017/one.2025.1 DOI: https://doi.org/10.1017/one.2025.1
[8] *Ibidem*

multicultural parity, which calls for the active inclusion and engagement of communities and marginalized voices in One Health decision-making processes. This principle aligns with the ILA New Delhi Declaration principle 2 of equity and eradication of poverty[9] but also with the human right to non-discrimination enshrined in Article 1 of the United Nations Declaration of Human Rights[10], and Article 26 of the International Covenant on Civil and Political Rights (ICCPR)[11]. In addition, this principle aligns with Rio Declaration principle 10[12] on public participation and access

[9] Principles 2 of equity and eradication of poverty: "2.1 The principle of equity is central to the attainment of sustainable development. It refers to both inter-generational equity (the right of future generations to enjoy a fair level of the common patrimony) and intra-generational equity (the right of all peoples within the current generation of fair access to the current generation's entitlement to the Earth's natural resources). 2.2 The present generation has a right to use and enjoy the resources of the Earth but is under an obligation to take into account the long-term impact of its activities and to sustain the resource base and the global environment for the benefit of future generations of humankind. 'Benefit' in this context is to be understood in its broadest meaning as including, inter alia, economic, environmental, social and intrinsic benefit. 2.3 The right to development must be implemented so as to meet developmental and environmental needs of present and future generations in a sustainable and equitable manner. This includes the duty to co-operate for the eradication of poverty in accordance with Chapter IX on International Economic and Social Co-operation of the Charter of the United Nations and the Rio Declaration on Environment and Development as well as the duty to co-operate for global sustainable development and the attainment of equity in the development opportunities of developed and developing countries. 2.4 Whilst it is the primary responsibility of the State to aim for conditions of equity within its own population and to ensure, as a minimum, the eradication of poverty, all States which are in a position to do so have a further responsibility, as recognized by the Charter of the United Nations and the Millennium Declaration of the United Nations, to assist States in achieving this objective." Available at: http://www2.ecolex.org/server2neu.php/libcat/docs/LI/MON-070850.pdf

[10] All human beings are born free and equal and should be treated the same way. According to Article 1, OHCHR: "All human beings are born free and equal in dignity and rights. They are endowed with reason and conscience and should act towards one another in a spirit of brotherhood". Available at: https://www.ohchr.org/en/universal-declaration-of-human-rights/illustrated-universal-declaration-human-rights

[11] Article 26 ICCPR: "All persons are equal before the law and are entitled without any discrimination to the equal protection of the law. In this respect, the law shall prohibit any discrimination and guarantee to all persons equal and effective protection against discrimination on any ground such as race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth or other status." Available at: https://www.ohchr.org/en/instruments-mechanisms/instruments/international-covenant-civil-and-political-rights

[12] Principle 10 was adopted in 1992 as a part of the Rio Declaration, stating that: "Environmental issues are best handled with participation of all concerned citizens, at the relevant level. At the national level, each individual shall have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision-making processes. States shall facilitate and encourage public awareness and participation by making information widely available. Effective access to

to information and justice, reinforced by the Aarhus Convention, which emphasises the right to express opinions and access appropriate information.[13] The principle of socio-ecological equilibrium further affirms the importance of ecosystem integrity, promoting a harmonious balance between human-animal-environment interactions and acknowledging the importance of biodiversity, access to sufficient natural space and resources, and the value of all living beings and species within the biosphere. It acknowledges the intrinsic value of animals and other living species, not as private goods, but as sentient beings that possess their own dignity and are integral to a broader ecosystem that humans must preserve. It also extends the environmental principle and shared responsibility, ensuring that obligations resulting from environmental law are shared across multiple public and private actors.[14] Closely linked to this is the principle of stewardship, which underscores the imperative for humans to change behaviour and adopt sustainable solutions that respect animal welfare and the integrity of the entire ecosystem, thereby extending the classical notion of intergenerational equity to encompass inter-species equity. This principle also aligns with the Principle 1 of sustainability in the ILA New Delhi Declaration.[15]

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judicial and administrative proceedings, including redress and remedy, shall be provided." Available at: https://www.unep.org/civil-society-engagement/partnerships/principle-10

[13] For more details see: https://unece.org/DAM/env/pp/documents/cep43e.pdf

[14] Bullón Caro C. One Health, sustainable development and the principle of integration: legal synergies for effective implementation. *Research Directions: One Health*. 2025;3:e5. doi:10.1017/one.2025.1 DOI: *https://doi.org/10.1017/one.2025.1*

[15] Principle 1, ILA New Delhi Declaration: "The duty of States to ensure sustainable use of natural resources":1.1 It is a well-established principle that, in accordance with international law, all States have the sovereign right to manage their own natural resources pursuant to their own environmental and developmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause significant damage to the environment of other States or of areas beyond the limits of national jurisdiction. 1.2 States are under a duty to manage natural resources, including natural resources within their own territory or jurisdiction, in a rational, sustainable and safe way so as to contribute to the development of their peoples, with particular regard for the rights of indigenous peoples, and to the conservation and sustainable use of natural resources and the protection of the environment, including ecosystems. States must take into account the needs of future generations in determining the rate of use of natural resources. All relevant actors (including States, industrial concerns and other components of civil society) are under a duty to avoid wasteful use of natural resources and promote waste minimization policies. 1.3 The protection, preservation and enhancement of the natural environment, particularly the proper management of climate system, biological diversity and fauna and flora of the Earth, are the common concern of humankind. The resources of outer space and celestial bodies and of the sea-bed, ocean floor and subsoil thereof beyond the limits of national jurisdiction are the common heritage of humankind. http://www2.ecolex.org/server2neu.php/libcat/docs/LI/MON-070850.pdf

The balance between developmental and environmental needs and the reduction of unsustainable consumption is also reflected in Rio Declaration principles 3 and 8.[16] Furthermore, it echoes the principles of biodiversity safeguarding, sustainable use, non-degradation and with principles of prevention and precaution, that commit States, international organizations and civil society.[17]

These principle of prevention is also enshrined in Rio Declaration principle 14 and the principle of precaution is recognised in Rio Declaration principle 15[18] and ILA New Delhi Declaration principle 4.[19]

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[16] Principle 3 Rio Declaration: "The right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations";
Principle 18 : "States shall immediately notify other States of any natural disasters or other emergencies that are likely to produce sudden harmful effects on the environment of those States. Every effort shall be made by the international community to help States so afflicted." Available at: https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_CONF.151_26_Vol.I_Declaration.pdf

[17] For more details see: https://wedocs.unep.org/rest/api/core/bitstreams/92605a4e-5faf-4571-8865-c1a9bd06aa0f/content

[18] Principle 14 Rio Declaration: "States should effectively cooperate to discourage or prevent the relocation and transfer to other States of any activities and substances that cause severe environmental degradation or are found to be harmful to human health."
Principle 15 Rio Declaration: "In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation." Available at: https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_CONF.151_26_Vol.I_Declaration.pdf

[19] Principle 4, ILA New Delhi Declaration: "The principle of the precautionary approach to human health, natural resources and ecosystems. 4.1 A precautionary approach is central to sustainable development in that it commits States, international organizations and the civil society, particularly the scientific and business communities, to avoid human activity which may cause significant harm to human health, natural resources or ecosystems, including in the light of scientific uncertainty. 4.2 Sustainable development requires that a precautionary approach with regard to human health, environmental protection and sustainable utilization of natural resources should include: (a) accountability for harm caused (including, where appropriate, State responsibility); (b) planning based on clear criteria and well-defined goals; (c) consideration in an environmental impact assessment of all possible means to achieve an objective (including, in certain instances, not proceeding with an envisaged activity); and (d) in respect of activities which may cause serious long-term or irreversible harm, establishing an appropriate burden of proof on the person or persons carrying out (or intending to carry out) the activity. 4.3 Decision-making processes should always endorse a precautionary approach to risk management and in particular should include the adoption of appropriate precautionary measures. 4.4 Precautionary measures should be based on up-to-date and independent scientific judgment and be transparent. They should not result in economic protectionism. Transparent structures should be established which involve all interested parties, including non-state actors, in the consultation process. Appropriate review by a judicial

Finally, the principle of transdisciplinary and multisectoral collaboration mandates systematic knowledge exchange across all relevant disciplines integrating both modern and traditional forms and a broad, representative array of perspectives.[20] It requires binding institutional arrangements to facilitate data sharing, joint surveillance, and accountable multi-stakeholder governance, recognising that the complexity of current planetary crises demands an intersectoral and multidisciplinary approach.

It aligns with the ILA New Delhi Declaration principle 6[21], and Rio Declaration principle 27.[22] Furthermore, this is also aligned with the Quadripartite One Health Joint Plan of Action, which recommends that countries set up national multisectoral One Health coordination mechanism to oversee governance.[23]

In conclusion, the OHHLEP framework introduces pivotal innovations by transcending anthropocentric perspectives and elevating non-human health sectors to an equivalent normative standing, the framework provides the necessary basis for a truly integrated approach.

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or administrative body should be available." For more details, see: http://www2.ecolex.org/server2neu.php/libcat/docs/LI/MON-070850.pdf

[20] One Health High-Level Expert Panel (OHHLEP). (2022). One Health theory of change. World Health Organization. https://www.who.int/publications/m/item/one-health-theory-of-change

[21] ILA New Delhi, Principle 6: "The principle of good governance 6.1 The principle of good governance is essential to the progressive development and codification of international law relating to sustainable development. It commits States and international organizations: (a) to adopt democratic and transparent decision-making procedures and financial accountability; (b) to take effective measures to combat official or other corruption; (c) to respect the principle of due process in their procedures and to observe the rule of law and human rights; and (d) to implement a public procurement approach according to the WTO Code on Public Procurement. 6.2 Civil society and non-governmental organizations have a right to good governance by States and international organizations. Non-state actors should be subject to internal democratic governance and to effective accountability. 6.3 Good governance requires full respect for the principles of the 1992 Rio Declaration on Environment and Development as well as the full participation of women in all levels of decision-making. Good governance also calls for corporate social responsibility and socially responsible investments as conditions for the existence of a global market aimed at a fair distribution of wealth among and within communities." http://www2.ecolex.org/server2neu.php/libcat/docs/LI/MON-070850.pdf

[22] Rio Declaration, Principle 27: "States and people shall cooperate in good faith and in a spirit of partnership in the fulfilment of the principles embodied in this Declaration and in the further development of international law in the field of sustainable development". For details see: https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_CONF.151_26_Vol.I_Declaration.pdf

[23] For more details see: https://iris.who.int/server/api/core/bitstreams/578db93c-0ada-4c37-bcb5-e1dff68f4a0d/content

The following figure reinforces the need for practical action, using the "4Cs": communication, collaboration, coordination, and capacity building.

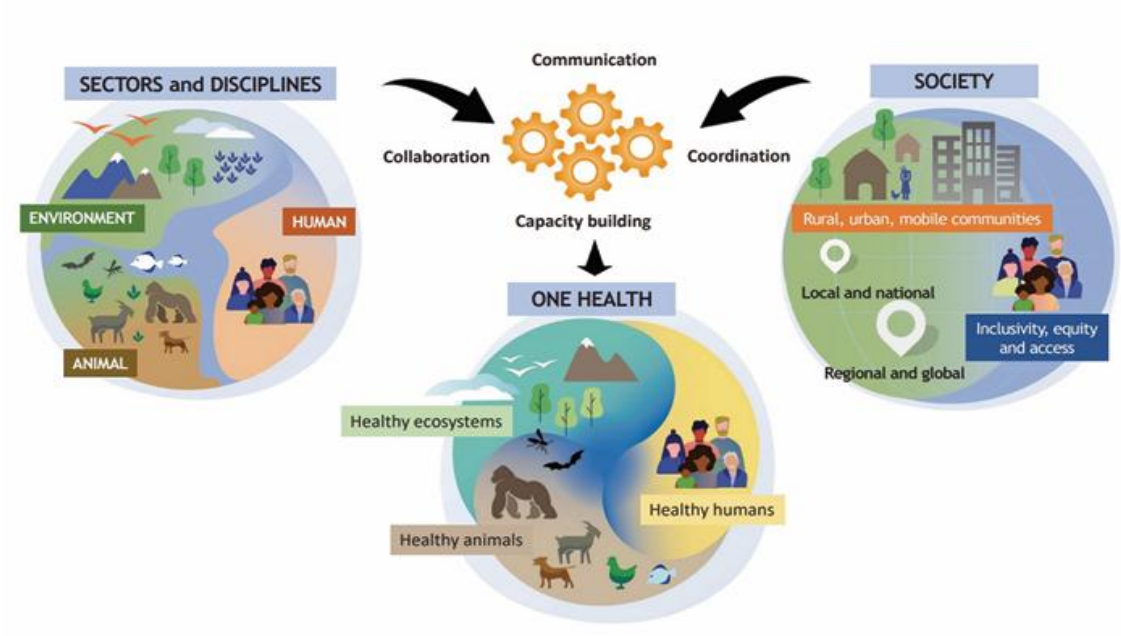

Fig 1. One Health toward a sustainable healthy future as developed by the OHHLEP.[24]

Far from being merely methodological preferences, the aim of these pillars is to generate concrete legal implications, compelling States and international organisations to overcome the sectoral fragmentation that still characterises most treaty regimes and institutional mandates and cooperate, sharing data and resources.

1.1 Historical evolution and recognition in legal discourse

The One Health concept has deep historical roots, even though the term itself is relatively recent. Thinkers like Hippocrates and Aristotle already recognized the links between human, animal, and environment health, and indigenous peoples have long reflected holistic conceptions of health principles.[25] Subsequently, during the 19th

[24] From *One Health: A new definition for a sustainable and healthy future*, by One Health High-Level Expert Panel (OHHLEP) et al., 2022, *PLOS Pathogens, 18*(6), e1010537, available at the following link: https://doi.org/10.1371/journal.ppat.1010537

[25] Zinsstag, J., et al., "From One Medicine to One Health and Systemic Approaches to Health and Well-being," *Preventive Veterinary Medicine*, vol. 101, no. 3-4, 2011, pp. 148-156.

century, pioneering physicians and scientists observed the close similarity of disease processes across species. Rudolf Virchow, the German pathologist who coined the term "zoonosis" in the 1860s, famously declared that "between animal and human medicine there are no dividing lines – nor should there be".[26] A few decades later, William Osler, regarded as the father of veterinary pathology in North America, taught both medical and veterinary students and repeatedly stressed the unity of the two disciplines. Despite these early insights, human and veterinary medicine largely evolved in parallel silos until the second half of the 20th century.[27]

In fact, the modern One Health movement began to take shape in the 1960s–1980s through the work of Calvin Schwabe**,** who pioneered the "One Medicine"[28], advocated a unified human–veterinary approach to combat zoonoses (infections that spread from animals to humans or between species).

The SARS epidemic (2003), and outbreaks of avian influenza (1997, 2004), Ebola (1996, 2000, 2003) and other zoonotic diseases galvanized international action to develop integrated, multi-sectoral approaches. Between 2004 and 2008 FAO partnered with OIE and WHO to establish key mechanisms to coordinate global surveillance, research, and control of HPAI (Highly-Pathogenic Avian Influenza) in poultry and human populations that became the basis for a new multisectoral strategy for pandemic preparedness and prevention. The strategy laid to the formation of the Tripartite collaboration in 2010.[29]

The decisive turning point occurred in 2004 when the Wildlife Conservation Society and Rockefeller Foundation convened a landmark symposium in New York, including FAO, OIE, and WHO to set priorities for an integrated and interdisciplinary approach to combat SARS, avian influenza, Ebola and other emerging zoonotic threats.

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[26]See CDC (Centers for Disease Control and Prevention), "One Health History", available at: https://www.cdc.gov/one-health/about/one-health-history.html

[27] Latino, A. *Il paradigma One Health nell'ordinamento internazionale: un'analisi critica di origini, protagonisti, strumenti normativi*.

[28] Calvin W. Schwabe, Veterinary Medicine and Human Health, 3rd ed., Williams & Wilkins, Baltimore, 1984

[29] For a comprehensive historical overview see "One Health timeline", available at the following link: https://www.fao.org/one-health/highlights/one-health-timeline/en

The outcome of this meeting was the Twelve Manhattan Principles[30], widely considered the founding document of contemporary One Health thinking. These principles provided a comprehensive framework that operationalized the holistic vision of One Health through four key thematic axes: the recognition of socio-ecological interdependencies, the integration of wildlife into global health surveillance, the regulation of anthropogenic drivers of disease, and the promotion of transdisciplinary stewardship. By explicitly linking biodiversity loss, habitat degradation, climate change to the emergence of infectious diseases, the Manhattan Principles called for a coordinated international response aimed at preventing epizootics and epidemics while preserving ecosystem integrity.

Between 2005 and 2008, the Inter-ministerial Conferences on Avian and Pandemic Influenza (subsequently renamed the International Ministerial Conference on Animal and Pandemic Influenza), served as an international platform for the normative elaboration of the One World One Health concept. The years that followed saw rapid institutionalisation. In 2007 the American Medical Association passed a historic One Health resolution[31], and international ministerial conferences in New Delhi (2007)[32] and Sharm el-Sheikh (2008)[33] formally recommended One Health strategies for pandemic preparedness. In 2008 FAO, OIE (now WOAH), WHO, UNICEF, UNSIC, and the World Bank jointly published the strategic framework "Contributing to One World, One Health".[34] While not creating legal obligations, the Framework marked

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[30] Wildlife Conservation Society, "The Manhattan Principles on 'One World, One Health'," New York, 2004. Available at: https://oneworldonehealth.wcs.org/About-Us/Mission/The-Manhattan-Principles.aspx

[31] Resolution 530 (A -07) by the American Medical Association (AMA) officially committed to the "One Health" concept, urging collaboration between human and veterinary medicine to tackle shared health threats like emerging zoonotic diseases, antimicrobial resistance, and food safety, by promoting joint education research (surveillance, diagnostics, vaccines), and clinical efforts to improve public health outcomes and recognizing the interconnectedness of human, animal, and environmental health.

[32] Prepared by FAO, WHO, OIE, UN System Influenza Coordinator (UNSIC), UNICEF and the World Bank for the fifth IMCAPI meeting in New Delhi in December 2007, the Roadmap proposes that the broad principles of One World, One Health form the basis for a medium-term international strategy, which places health issues in broader socio-ecological context to address the drivers and causes of infectious diseases. Available at: https://www.woah.org/app/uploads/2021/03/newdelhi-roadmapfinal.pdf

[33] International Ministerial Conference on Animal and Pandemic Influenza. (2008). *Sharm el-Sheikh Declaration*. Sharm el-Sheikh, Egypt, October 24–26, 2008.

[34] A strategic framework for reducing risks at the animal-human-ecosystems interface**.** This is the first One Health framework adopted by the international community to address zoonotic

the first coordinated operationalisation of One Health at the international level. The pivotal year 2010 witnessed the release of the FAO–OIE–WHO Tripartite Concept Note, the unanimous adoption of the Hanoi Declaration by 71 countries, the Stone Mountain Meeting that defined seven concrete actions to operationalise One Health[35], and explicit endorsements from the European Union, the United Nations, and the World Bank to shift from emergency responses to permanent, multisectoral capacity-building.[36]

The Tripartite Concept Note of 2010 formally introduced the "One Health approach"[37] as a common programmatic framework and recommended the establishment of permanent coordination mechanisms at both global and national levels.

The momentum continued with the first International One Health Congress in Melbourne (2011)[38], the inaugural One Health Summit in Davos and its resulting Action Plan (2012), and the largest congress to date in Bangkok (2013). Throughout this period USAID launched the Emerging Pandemic Threats programme, the CDC established its One Health Office, and governments began creating national platforms until, in November 2015, the One Health Platform was founded at the third international One Health Congress in Amsterdam.[39]

The full integration of the environmental dimension, initially marginal, became irreversible after 2015. The joint WHO–Secretariat of the Convention on Biological Diversity report Connecting Global Priorities: Biodiversity and Human Health (2015) and, above all, the 2020 IPBES Workshop Report on Biodiversity and Pandemics

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and animal diseases at the animal-human-ecosystem interface. For more details see: https://www.fao.org/4/aj137e/aj137e00.pdf

[35] Centers for Disease Control and Prevention (CDC), *Operationalizing "One Health": A Strategy for Fortune-Steering*, Summary of the Stone Mountain Meeting, May 4–6, 2010. The seven concrete actions identified included: training and education, global information sharing, networks and partnerships, organizational structure, research, and policy. See also the Hanoi Declaration, *Final Declaration of the International Ministerial Conference on Animal and Pandemic Influenza*, Hanoi, Vietnam, April 20-21, 2010. This declaration was endorsed by 71 countries and reinforced the commitment to transition from crisis-driven responses to long-term, multisectoral capacity-building.

[36] World Bank, *People, Pathogens, and Our Planet: Operationalizing One Health*, 2010.

[37] WHO, OIE (now WOAH) and FAO launch a strategic partnership recognising their shared responsibility in addressing health risks at the human–animal–environment interface, with avian influenza, rabies, and antimicrobial resistance as priorities. The Tripartite reframes its collaborative concept as "One Health".

[38] Hosted by Australia's Commonwealth Scientific and Industrial Research Organisation

[39] For more details see: https://iohc2015.com/about/

provided conclusive scientific evidence that anthropogenic alteration of ecosystems constitutes the primary driver of zoonotic spillover risk.[40]

In October 2019, the Wildlife Conservation Society partnered with the Climate and Environmental Foreign Policy Division at the German Foreign Office to convene a "One Planet, One Health, One Future*"* conference[41], attended by individuals from government, academia, policy and civil society. Prior to the meeting a group of twelve experts from diverse fields, including policy, sociology, economics, ecology, human and veterinary medicine prepared a Call to Action, the "Berlin Principles*";* these principles were discussed and agreed during the session.[42]

The 2019 Berlin Principles represent an 'update' of the 2004 Manhattan Principles, adapting the One Health framework to the complex challenges of the 21st century. Central to this evolution is the prioritization of "Environmental Integrity and Climate Action". While the 2004 framework primarily addressed infectious disease emergence, the Berlin Principles elevate biodiversity and ecosystem services as the "foundational infrastructure" of life.[43] The document explicitly introduced the climate crisis as a primary threat multiplier, acknowledging that environmental degradation causes systemic health issues, such as respiratory conditions, alongside traditional zoonotic threats.[44]

Beyond ecological concerns, the framework advocates for institutional and policy integration, moving from theoretical advocacy to the development of robust institutions capable of translating scientific knowledge into actionable policy.[45] This

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[40] WHO–Secretariat of the Convention on Biological Diversity, Connecting Global Priorities: Biodiversity and Human Health: A State of Knowledge Review, Geneva/Montreal, 2015; IPBES Workshop Report on Biodiversity and Pandemics, Bonn, 2020.

[41] For more details see: https://oneworldonehealth.wcs.org/About-Us/Mission/The-2019-Berlin-Principles-on-One-Health.aspx

[42] For more details see: https://oib.web.ox.ac.uk/the-berlin-principles-on-one-health

[43] Gruetzmacher, K., et al., "The Berlin Principles on One Health – Bridging Global Health and Conservation," *Science of the Total Environment*, vol. 764, 2021, available at: https://doi.org/10.1016/j.scitotenv.2020.142919

[44] Whitmee, S., et al., "Safeguarding Human Health in the Anthropocene Epoch: Report of The Rockefeller Foundation–Lancet Commission on Planetary Health," *The Lancet*, 386(10007), 2015, pp. 1973-2028.

[45]The Berlin Principles, Principle 2: "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". Available at: https://oib.web.ox.ac.uk/the-berlin-principles-on-one-health

objective is supported by an emphasis on cross-sectoral intelligence and surveillance, which mandates transparent, real-time information sharing across human, animal, and environmental sectors.[46] Such integration is vital for shifting global health governance from reactive crisis management to a proactive, forward-looking mitigation strategy. Finally, a defining feature of the Berlin update is its commitment to social equity, reflecting a more inclusive vision of health.[47] By integrating these socio-political dimensions, the Berlin Principles transform One Health from a clinical veterinary strategy into a comprehensive political and ethical paradigm.[48]

The institutional consolidation of this framework, from Tripartite to Quadripartite Governance, occurred in 2021–2022. In October 2021 the United Nations Environment Programme (UNEP) formally joined the existing collaboration, transforming the Tripartite alliance into the current Quadripartite One Health Alliance. This expansion was formalized in March 2022 through a Memorandum of Understanding, which recognized UNEP as an equal partner and reaffirmed that the environmental dimension is inseparable from human and animal wellbeing. A central pillar of this new governance structure was the establishment of the One Health High-Level Expert Panel (OHHLEP).[49] In October 2022, the Quadripartite Alliance launched the One Health Joint Plan of Action (2022–2026), which constitutes the most comprehensive operational soft law framework currently guiding the implementation of One Health approach. It is defined as a global framework for addressing health threats, it is not binding but it aims to influence national and international governance.

[46] The Berlin Principles, Principle 8: "Enhance capacity for cross-sectoral and trans-disciplinary health surveillance and clear, timely information sharing to improve coordination of responses among governments and NGOs, health, academia and other institutions, industry and other stakeholders". Available at: https://oib.web.ox.ac.uk/the-berlin-principles-on-one-health

[47] The Berlin Principles, Principle 9: "Form participatory, collaborative relationships among governments, NGOs, and Indigenous Peoples and local communities while strengthening the public sector to meet the challenges of global health and biodiversity conservation". Available at: https://oib.web.ox.ac.uk/the-berlin-principles-on-one-health

[48] For more details see: https://oxfordinberlin.eu/the-berlin-principles-on-one-health

[49] Comprised of 26 independent experts, the OHHLEP serves as a permanent advisory body to the Quadripartite, providing scientific guidance on the implementation and definition of One Health policies.

The plan is built around six interdependent action tracks that aimed to achieve resilient health:

(i) strengthening One Health capacities and health systems;
(ii) reducing risks from emerging and re-emerging zoonotic epidemics and pandemics;
(iii) controlling and eliminating endemic zoonotic, neglected tropical and vector-borne diseases;
(iv) strengthening the assessment, management and communication of food-safety risks;
(v) curbing the silent pandemic of antimicrobial resistance (AMR);
(vi) integrating ecosystems and biodiversity to prevent and address health risks at the human–animal–environment interface.[50]

To support these tracks, the Quadripartite Alliance further conducted the One Health Intelligence Scoping Study, with the aim to harmonize technical systems and strengthen global surveillance capabilities.[51] In less than two decades, One Health thus transformed from a visionary concept into one of the central organising principles of 21st-century international health governance. These developments rapidly found reflection in instruments of general international law. The United Nations General Assembly Resolution 76/300 of 28 July 2022, by recognising the existence of a human right to a clean, healthy and sustainable environment, and the preamble and operative provisions of the WHO Pandemic Agreement adopted on 20 May 2025, which repeatedly invoke ecosystem health and cross-sectoral prevention, represent the clearest evidence to date of the progressive penetration of One Health principles into the normative fabric of the international legal order.[52] From a theoretical perspective,

[50] FAO, UNEP, WHO and WOAH. 2022. *One Health Joint Plan of Action (2022–2026). Working together for the health of humans, animals, plants and the environment.* Rome. https://doi.org/10.4060/cc2289en
[51] FAO, UNEP, WHO, and WOAH. 2023. *Quadripartite One Health Intelligence Scoping Study - Final report.* Rome. https://doi.org/10.4060/cc4480en
[52] UNGA Res. 76/300, 28 July 2022; WHO Pandemic Agreement (A77/9), adopted 20 May 2025, Preamble, para. 8 and Article 4(2).

the distinction drawn by Robert Alexy[53] between rules and principles is particularly useful. While rules are definitive commands that are either fulfilled or not, principles are optimisation requirements that must be realised to the greatest extent possible within the legal and factual possibilities.[54] The OHHLEP principles clearly belong to the second category: they function as overarching normative guidelines that must orient the interpretation of existing treaties (Art. 31(3)(c) VCLT),[55] with the aim of creating new legal norms. Their repeated invocation in the preamble and operative parts of the WHO Pandemic Agreement (2025) and in successive UNEA and World Health Assembly resolutions[56] provides concrete evidence that States and international organisations are beginning to treat them as authoritative interpretative tools. The practical operationalization of the "optimisation requirements" mentioned above, is best exemplified by the principle of systemic integration[57]. This principle stands as one of the cornerstones of both international environmental law and the broader framework of sustainable development. It is enshrined in seminal instruments such as the 1972 Stockholm Declaration, the 1992 Rio Declaration on Environment and

[53] Alexy R (2021) Law's Ideal Dimension. Oxford University Press. ISBN 978-0 19-879683-1

[54]54 Bullón Caro C. One Health, sustainable development and the principle of integration: legal synergies for effective implementation. *Research Directions: One Health*. 2025;3:e5. doi:10.1017/one.2025.1 DOI: https://doi.org/10.1017/one.2025.1

[55] Vienna Convention on the Law of Treaties (VCLT), May 23, 1969, 1155 U.N.T.S. 331. Article 31(3)(c) establishes that, in the interpretation of a treaty, "any relevant rules of international law applicable in the relations between the parties" shall be taken into account. In this context, the OHHLEP principles serve as a "systemic integration" tool to harmonize disparate legal regimes (environmental, health, and trade) under a unified One Health framework.

[56] World Health Assembly, Resolution WHA74.7 (2021), "Strengthening WHO preparedness for and response to health emergencies"; and United Nations Environment Assembly (UNEA), Resolution 5/11 (2022), "Enhancing Circular Economy as a contribution to achieving sustainable consumption and production." Furthermore, the WHO Pandemic Agreement (2025) explicitly incorporates the One Health approach in its preamble and Article 5, elevating these principles to a primary interpretive framework for global health security.

[57] International Law Association (ILA), *New Delhi Declaration of Principles of International Law Related to Sustainable Development* (2002), as further elaborated in the London Resolution (2006). The Principle of Integration enshrined therein has been consistently affirmed in international jurisprudence to prevent isolation of legal regimes. International Law Association (ILA), *Report of the Toronto Conference (2006)*, including ILA Resolutions on International Law and Sustainable Development (London, 2006), available at: https://www.ila-hq.org/en_GB/documents/conference-report-toronto-2006

Development, and the Convention on Biological Diversity.[58] Notably, this integrative logic has transcended environmental law to permeate health-related regimes, as evidenced by the WHO Framework Convention on Tobacco Control (2003).[59] Moreover, the legal weight of this principle has been consistently affirmed in the jurisprudence of the International Court of Justice (ICJ, 1996, 1997),[60] the WTO Appellate Body (WTO, 2001)[61], and the Permanent Court of Arbitration (2005).[62]

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[58] UN Declaration on the Human Environment (Stockholm Declaration), June 16, 1972, U.N. Doc. A/CONF.48/14/Rev.1; Principle 11 of the Stockholm Declaration affirms: "The environmental policies of all States should enhance and not adversely affect the present or future development potential of developing countries, nor should they hamper the attainment of better living conditions for all, and appropriate steps should be taken by States and international organizations with a view to reaching agreement on meeting the possible national and international economic consequences resulting from the application of environmental measures"*;* see Rio Declaration on Environment and Development, June 14, 1992, U.N. Doc. A/CONF.151/26 (Vol. I). Principle 4 of the Rio Declaration explicitly states: "*In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it.*" See also Convention on Biological Diversity (CBD), June 5, 1992, 1760 U.N.T.S. 79, Article 6(b): "Integrate, as far as possible and as appropriate, the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes and policies"; available at: https://treaties.un.org/doc/Treaties/1992/06/19920605%200844%20PM/Ch_XXVII_08p.pdf

[59] WHO Framework Convention on Tobacco Control (FCTC), May 21, 2003, 2302 U.N.T.S. 166. The FCTC is widely regarded as a model for normative integration, as it requires parties to harmonize public health measures with international trade and environmental obligations. For an analysis of its integrative nature, see McGrady, B., *Trade and Public Health: The WTO, Tobacco, Alcohol, and Diet*, Cambridge University Press, 2011, pp. 82-88. See also Article 18 of the FCTC, which specifically integrates environmental protection by requiring parties to have due regard for the protection of the environment and the health of persons in relation to tobacco cultivation and manufacture.

[60] Gabcíkovo-Nagymaros is considered the first ICJ case where the concept of sustainable development is discussed from a legal perspective, even though it is not formalized as binding law. According to the Press Release ICJ/549: "The Court held that newly developed norms of environmental law are relevant for the implementation of the Treaty and that the Parties could, by agreement, incorporate them through the application of several of its articles. It found that the Parties, in order to reconcile economic development with protection of the environment, "should look afresh at the effects on the environment of the operation of the Gabcikovo power plant. In particular, they must find a satisfactory solution for the volume of water to be released into the old bed of the Danube and into the side-arms of the river".
For more details see: https://press.un.org/en/1997/19970926.icj549.html;
https://www.icjcij.org/files/case-related/92/092-19970925-JUD-01-00-EN.pdf

[61] The Appellate Body has confirmed that national measures aimed at protecting human health (such as the asbestos ban) can be justified under the public health exception despite trade restrictions. This is an example of the integration of health and environmental principles into international trade law. See: https://www.wto.org/english/tratop_e/dispu_e/135abr_e.pdf

[62] Award in the Arbitration regarding the Iron Rhine ("Ijzeren Rijn") Railway between the Kingdom of Belgium and the Kingdom of the Netherlands Decision of 24 May 2005: "Environmental measures–relevance of international environmental law to the relation

The functional relationship with existing principles of international law become clearer when the OHHLEP framework is compared with the three dimensions of the principle of integration identified by the International Law Association (ILA) in its 2006 London Resolution.[63] First, the dimension of systemic integration pursues the equitable implementation of the economic, environmental and social pillars of sustainability. This directly corresponds to OHHLEP's equity and socio-ecological equilibrium. Second, institutional integration mandates the mainstreaming of environmental and social considerations into all levels of governance and decision-making[64], mirroring the OHHLEP pillar of transdisciplinarity and multisectorality. involving environmental and agricultural authorities as equal partners. Third, normative integration fosters coherence and synergies among distinct legal domains, such as environmental law, trade law, and human-rights law[65], a goal advanced by the OHHLEP principles of stewardship and socio-political parity. This demonstrates that the five OHHLEP principles do not stand in a normative vacuum. They constitute a conscious refinement and extension of the earlier conceptualisations while providing

between the Parties–obligation to take into account environmental emerging principles under international law despite their imprecise current status: conservation, management, prevention and sustainable development, protection for future generations– between development law and environmental law mutually reinforcing themselves: concept of sustainable development–prevention of significant harm to the environment considered as current principle of general international law–reactivation of railway not isolated from environmental protection measures required by its intended intensive use–compatibility between the right of transit of Belgium and the environmental measures under Dutch national law not imposing unreasonable difficulties for the exercise of this right–legitimate exercise of sovereignty by the Netherlands–not a task of the Arbitral Tribunal to investigate questions of considerable scientific complexity as to the necessity and forms of the most adequate environmental measures." Available at: https://legal.un.org/riaa/cases/vol_xxvii/35-125.pdf

[63] International Law Association (ILA), *Report of the Toronto Conference (2006)*, including ILA Resolutions on International Law and Sustainable Development (London, 2006).

[64] This requirement is reflected *inter alia* in Article 13.2(c) of the IUCN Draft International Covenant on Environment and Development and is intrinsically linked to the participatory rights emphasized in the Preamble to the Aarhus Convention (UNECE, 1998), which ensures public access to environmental information and decision-making.

[65]On the role of normative integration, see International Law Commission (ILC), *Fragmentation of International Law: Difficulties arising from the Diversification and Expansion of International Law*, UN Doc. A/CN.4/L.682 (2006), para. 410-480. This mechanism, operationalized through Article 31(3)(c) of the VCLT, ensures that One Health principles serve as a "bridge" between the WHO's health mandate and the CBD's conservation obligations, preventing legal fragmentation. Cf. Viñuales, J. E. (2018).

a more contemporary, operational framework.[66] They build upon the seven principles of international law relating to sustainable development set forth in the International Law Association's New Delhi Declaration of Principles of International Law Relating to Sustainable Development (ILA, 2002) and foundational Rio Principles.[67] The Principle of Sociopolitical and Multicultural Parity, for example, aligns closely with Principle 2 of the ILA New Delhi Declaration and with the prohibition of discrimination enshrined in Article 1 of the Universal Declaration of Human Rights and Article 26 of the International Covenant on Civil and Political Rights.[68] Furthermore, it operationalizes the participatory rights enshrined in Principle 10 of the Rio Declaration and the Aarhus Convention, ensuring access to information and justice.[69] The Principle of Stewardship corresponds to Principle 1 of the ILA New Delhi Declaration.[70] At the domestic level, its effective implementation demands regulatory mechanisms capable of preventing the mismanagement of natural resources, including extended environmental, social, and health impact assessments (ESIAs)[71], capable of evaluating systemic risks to both human and animal populations

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[66] Bullón Caro C. One Health, sustainable development and the principle of integration: legal synergies for effective implementation. *Research Directions: One Health*. 2025;3:e5. https://doi.org/10.1017/one.2025.1

[67] *Ibidem*

[68] International Law Association (ILA), *New Delhi Declaration of Principles of International Law Related to Sustainable Development*, 2002, Principle 2: "*The Principle of Equity and Poverty Eradication*". See also Universal Declaration of Human Rights (UDHR), G.A. Res. 217A (III), Dec. 10, 1948, Art. 1: "*All human beings are born free and equal in dignity and rights. They are endowed with reason and conscience and should act towards one another in a spirit of brotherhood*"; and International Covenant on Civil and Political Rights (ICCPR), Dec. 16, 1966, 999 U.N.T.S. 171, Art. 26: "All persons are equal before the law and are entitled without any discrimination to the equal protection of the law. In this respect, the law shall prohibit any discrimination and guarantee to all persons equal and effective protection against discrimination on any ground such as race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth or other status".

[69] Rio Declaration on Environment and Development (1992), U.N. Doc. A/CONF.151/26 (Vol. I), Principle 10; and UNECE Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention), June 25, 1998, 2161 U.N.T.S. 447. The operationalization of these rights within health governance is discussed in Morgera, E., "The Ecosystem Approach under the Convention on Biological Diversity: A Legal Research Agenda", in *Review of European, Comparative & International Environmental Law*, 2011, which highlights the necessity of public participation for holistic ecosystem management.

[70] "*The duty of States to ensure sustainable use of natural resources*", available at: https://www.ila-hq.org/en_GB/documents/conference-resolution-english-new-delhi-2002-3

[71] Environmental and Social Impact Assessment

in accordance with Rio Principle 17[72]. It further requires rigorous application of the Principle of Prevention where scientific evidence of harm exists (Rio Principle 14) and of the Precautionary Principle in situations of scientific uncertainty, such as emerging zoonotic threats (Rio Principle 15; ILA New Delhi Principle 4).[73] Finally, the Principle of Transdisciplinary and Multisectoral Collaboration – understood as a problem-solving approach grounded in knowledge exchange among diverse stakeholders and embracing both modern and traditional epistemologies[74]– resonates with Good Governance requirements of the ILA (Principles 5 and 6), Rio Declaration (Principles 10, 18, 19 and 27).[75] At the national level, the mentioned principle mandates administrative procedures and binding institutional arrangements that facilitate data-sharing and expertise-pooling, establish accountable multi-stakeholder bodies, and ensure their long-term viability. Such arrangements fully accord with the internationally recognised attributes of good governance, including participation, accountability, rule of law, transparency, responsiveness, consensus-orientation, equity, inclusiveness, effectiveness, efficiency, and the fight against corruption.[76] Within this framework, the principle of integration is no longer treated as an abstract legal aspiration, but as a functional necessity to address the human–animal–

[72] Rio Principle 17: "*Environmental impact assessment, as a national instrument, shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority*." Available at: https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_CONF.151_26_Vol.I_Declaration.pdf

[73] Rio Declaration on Environment and Development (1992), UN Doc. A/CONF.151/26 (Vol. I). Principle 14 establishes the principle of prevention, Principle 15 codifies the Precautionary Approach, This is complemented by ILA New Delhi Declaration (2002), Principle 4, which extends the precautionary approach specifically to the management of "living resources" and ecosystems, a crucial link for the prevention of zoonotic spillovers in One Health governance.

[74] Jahn, T., Bergmann, M., & Keil, F. (2012). "Transdisciplinarity: Between mainstreaming and marginalization". *Ecological Economics*, 79, pp. 1-10.

[75] These provisions collectively establish the procedural and structural foundations of One Health. ILA Principles 5–6 and Rio Principle 10 mandate that governance move beyond scientific circles to ensure public participation and the inclusion of local and indigenous knowledge. This is reinforced by the requirements of transparency and accountability, which demand that national ministries dismantle administrative "silos." Furthermore, Rio Principles 18, 19, and 27 provide the legal mandate for international cooperation and good faith data-sharing, which are essential for managing transboundary zoonotic risks.

[76] UNESCAP (United Nations Economic and Social Commission for Asia and the Pacific), *What is Good Governance?*, 2009. These attributes are considered the "*gold standard*" for effective public administration. Within the One Health framework, they ensure that the multisectoral collaboration between health, environment, and agriculture is not merely informal, but grounded in a robust, transparent, and legally accountable institutional structure.

environment interface. The recognition of the OHHLEP principles in legal discourse is also evident when they start to be implemented in different State documents such as the 2008 Constitution of Ecuador (Arts. 10 and 71–74) the 2010 Bolivian Law of the Rights of Mother Earth,[77] the 2017 New Zealand Te Awa Tupua Act granting legal personhood to the Whanganui River, and the 2018 Colombian Supreme Court judgment declaring the Amazon River ecosystem a subject of rights.[78] Although these remain domestic developments, they provide evidence of an evolving *opinio iuris* that now elevate to the global level, demonstrating a bottom-up approach.[79]

1.2 International organizations and their competences (WHO, FAO, WOAH, UNEP)

The international governance structure of the One Health paradigm is centrally coordinated by the Quadripartite alliance composed of the World Health Organization (WHO), the Food and Agriculture Organization of the United Nations (FAO), the World Organisation for Animal Health (WOAH), and the United Nations Environment Programme (UNEP).[80] This collaboration is governed by the One Health Joint Plan of Action (OHJPA)[81]. Each one of these organisations contributes distinct yet

[77] Constitution of the Republic of Ecuador (2008), English translation available at Political Database of the Americas. Articles 71–74 are particularly significant as they formally recognize *Pacha Mama* (Nature) as a legal entity with the right to exist, persist, and regenerate. See also plurinational State of Bolivia, *Ley de Derechos de la Madre Tierra* (Law of the Rights of Mother Earth), Law No. 071, 2010. This statute defines Mother Earth as a "dynamic living system" and a collective subject of public interest

[78] New Zealand Parliament, *Te Awa Tupua (Whanganui River Claims Settlement) Act 2017*. This landmark legislation reflects Māori legal traditions by granting the Whanganui River the status of a legal person (*Te Heuheu*) with all the corresponding rights, duties, and liabilities. See also Corte Suprema de Justicia de Colombia, *Sentencia STC 4360-2018*. This ruling recognized the Colombian Amazon as a "subject of rights" entitled to protection, conservation, maintenance, and restoration. It followed the legal precedent set by the Constitutional Court in Sentencia T-622/16, which had previously granted similar status to the Atrato River.

[79] On the concept of *opinio iuris* in the context of emerging environmental norms, cf. Viñuales, J.E., *The Organisation of the Anthropocene: In Search of the General Part of International Environmental Law*, in "Netherlands Yearbook of International Law", 2018. The transition of these principles from domestic constitutions to global discourse suggests an emerging "green" customary international law.

[80] Quadripartite Collaboration for One Health (WHO, FAO, WOAH, UNEP), established by the signing of the Memorandum of Understanding on 17 March 2022.

[81] One Health Joint Plan of Action (2022–2026): Working together for the health of humans, animals, plants and the environment (FAO, UNEP, WHO, WOAH, 2022), available at: https://iris.who.int/server/api/core/bitstreams/578db93c-0ada-4c37-bcb5-e1dff68f4a0d/content

complementary legal and technical competences that, taken together, span the entire human–animal–environment nexus and provide the institutional architecture necessary to overcome longstanding legal and sectoral fragmentation. While One Health lacks a single dedicated binding treaty, it draws regulatory anchorage from a patchwork of hard law instruments – such as the International Health Regulations (IHR) (2005) and the WTO Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement) – alongside soft law mechanisms, including the OHJPA itself and UNEA resolutions addressing the "triple planetary crisis" of climate change, biodiversity loss, and pollution.[82]

The WHO, established in 1948, exercises primary responsibility for international public health under Articles 1 and 2 of its Constitution[83]. It draws decisive legal authority from the International Health Regulations (IHR) (2005), which oblige Member States to develop core capacities for surveillance and response, with particular attention to zoonotic events that may constitute a Public Health Emergency of International Concern (PHEIC).[84] Although the IHR text does not explicitly reference One Health, its requirements for multisectoral surveillance and response to zoonoses position it as the cornerstone for national-level implementation of the approach, as affirmed by PAHO/WHO frameworks and the OHHLEP definition.[85] One Health is now explicitly recognised as a foundational principle in the WHO Pandemic Agreement, adopted on 20 May 2025 at the 78th World Health Assembly, which mandates coordinated action across human, animal, and environmental sectors for

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[82] International Health Regulations (2005), 3rd ed., WHO, 2016; Agreement on the Application of Sanitary and Phytosanitary Measures (Annex A, para. 3(b)–(c)), Marrakesh Agreement Establishing the World Trade Organization, 15 April 1994; UNEP/EA.5/Res.11 (2022) on One Health.

[83] Constitution of the World Health Organization, adopted 22 July 1946, entered into force 7 April 1948. Article 1 states the objective and Article 2 delves into the functions.

[84] International Health Regulations (2005), 3rd ed., WHO, 2016. See particularly Annex 1, Para. 4, which mandates States Parties to develop, strengthen, and maintain the capacity to detect, assess, notify, and report events in accordance with Articles 6 to 11. The operationalization of these capacities for zoonotic events is further detailed in the IHR-PVS Bridging Workshops, a joint initiative by WHO and WOAH to align human and animal health surveillance systems.

[85] Pan American Health Organization (PAHO)/WHO, 'One Health' (2023), available at: https://www.paho.org/en/one-health.

pandemic prevention, preparedness, and response (PPR).[86]

The OIE, founded in 1924 and renamed as WOAH in 2003, remains the principal global standard-setting body for animal health and welfare[87]. Its Terrestrial Animal Health Code and Aquatic Animal Health Code constitute the international benchmarks recognised by the WTO Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement)[88], thereby conferring on the Organisation a quasi-regulatory role in veterinary public health and in facilitating safe international trade in animals and animal products while controlling diseases at source. Specific chapters in the Terrestrial Code – such as those on disease notification and zoonotic controls for rabies and avian influenza – require mandatory reporting by Members and exert strong influence in trade law, effectively anchoring One Health's animal-health components.[89] Complementing these standards, the Performance of Veterinary Services (PVS) Pathway evaluates national veterinary capacities, identifying gaps in One Health implementation through tools like the IHR-PVS National Bridging Workshops, which foster human–animal sector synergies for zoonotic risk management.[90]

The FAO, created in 1945, integrates One Health into agri-food systems by promoting food safety, sustainable livestock production, and the management of health risks arising at the human–animal interface within food and agriculture value chains – competences that are indispensable for global food security and for addressing upstream drivers of zoonotic spillover in intensive farming and wildlife-utilisation systems.[91] These efforts align with the Codex Alimentarius (jointly with WHO), which provides quasi-regulatory food-safety standards referenced in the WTO SPS

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[86] WHO Pandemic Agreement (adopted 20 May 2025, WHA78/Res.1), Arts. 5 and 6. "One Health approach for Pandemic Prevention, Preparedness and Response"; "Preparedness, readiness and health system resilience". Available at the following link: https://apps.who.int/gb/ebwha/pdf_files/WHA78/A78_R1-en.pdf

[87] WOAH Organic Statutes and Basic Texts (2023 edition).

[88] Agreement on the Application of Sanitary and Phytosanitary Measures (Annex A, para. 3(b) and (c)), Marrakesh Agreement Establishing the World Trade Organization, 15 April 1994.

[89] WOAH, Terrestrial Animal Health Code (32nd ed., 2024), Chapters 1.1, 8.14, 10.4, available at: https://www.woah.org/en/what-we-do/standards/codes-and-manuals/.

[90] WOAH, Performance of Veterinary Services (PVS) Pathway (2023), available at: https://www.woah.org/en/what-we-offer/improving-veterinary-services/pvs-pathway/; WHO/WOAH, IHR-PVS National Bridging Workshops (2023).

[91] Constitution of the Food and Agriculture Organization of the United Nations, signed 16 October 1945.

Agreement, thereby embedding One Health principles into international trade frameworks for animal-derived products.[92]The UNEP, established in 1972[93] and incorporated into the Quadripartite in 2022[94], anchors the environmental pillar of One Health. It contributes expertise on the ecological drivers of disease emergence, notably climate change, pollution, land-use change, and biodiversity loss, and promotes the systematic integration of ecosystem health and environmental law into global health governance.[95] UNEP's mandate is advanced through resolutions of the United Nations Environment Assembly (UNEA), such as UNEA-5.2's Ministerial Declaration (2022), which urged adoption of One Health to mitigate pandemic risks from environmental degradation, and subsequent calls for multisectoral action.[96] Furthermore, the Nature4Health (N4H) initiative, a €50 million Multi-Partner Trust Fund hosted by UNEP, exemplifies this by supporting pilot countries (e.g., Ecuador, Rwanda, Ghana) in implementing systems-based One Health strategies to reduce zoonotic spillover through biodiversity conservation and participatory governance.[97] This institutional arrangement represents the most advanced expression to date of systemic, institutional, and normative integration in the One Health domain and provides a concrete,operational platform for translating the non-anthropocentric OHHLEP principles into policy, legal reform, and coordinated global action.

2. The international legal framework: current instruments and challenges

The international legal framework for One Health remains fragmented, asymmetrical, relying on a mosaic of existing treaties, regulations, and soft-law instruments rather

[92] Codex Alimentarius Commission (FAO/WHO), Procedural Manual (2023 ed.); WTO SPS Agreement, Annex A(3)(c).
[93] UNGA Res. 2997 (XXVII), Institutional and financial arrangements for international environmental co-operation, 15 December 1972.
[94] Quadripartite Memorandum of Understanding on One Health Cooperation, 17 March 2022.
[95] UNEP, 'UNEP One Health' (2023), available at: https://www.unep.org/topics/chemicals-and-pollution-action/pollution-and-health/unep-one-health.
[96] UNEP/EA.5/Res.10 (2022) and UNEP/EA.6/L.13 (2024) on Biodiversity and Health and Regional Cooperation on Air Pollution; UNEA-5.2 Ministerial Declaration (2022).
[97] UNEP, Nature4Health Initiative (launched 2022, €50M MPTF), available at: https://nature4health.org/about; supporting pilots in Ecuador, Rwanda, Ghana, Zambia, Vietnam, Mongolia.

than a single, dedicated binding convention.[98] This patchwork reflects the historical separation of human health, animal health, food safety, and environmental law, and continues to pose significant obstacles to the holistic implementation of the One Health paradigm. Hard-law instruments provide the strongest normative foundation, although their coverage across the three pillars is uneven.

Precisely, the structural fragmentation generates three interrelated challenges:

(i) institutional and normative asymmetry between a relatively robust human- and animal-health regime and a comparatively weak environmental-health regime;
(ii) persistent coordination deficits among specialised agencies and within States, leading to duplication, gaps, and inefficient allocation of resources; and
(iii) compliance weaknesses, particularly the absence of effective enforcement mechanisms and sustained financing for multisectoral capacity-building.[99]

Overlapping mandates of WHO, WOAH, FAO and UNEP often lead to redundant efforts, inter-agency rivalry and governance lacunae, particularly at the national level, where multisectoral coordination is required.[100] This disarray limits long-term investments that demand predictable financing and sustained political commitment beyond episodic emergency responses.[101] Taken together, these institutional, normative, and compliance deficiencies underscore the urgent need for greater harmonisation of global health governance.

2.1. Binding legal tools

Within the field of human-health, the primary binding instrument is the International Health Regulations (2005), adopted under Articles 21 and 22 of the WHO Constitution. The IHR establish the legally binding framework for human-health

[98] Fidler, D.P., 'From the Margins to the Mainstream? One Health Law in Global Health Governance' (2024).
[99] Daniele Sandra Yopa et al., *Barriers and enablers to the implementation of one health strategies in developing countries: a systematic review*, *Frontiers in Public Health* 11 (2023): e1252428, https://pubmed.ncbi.nlm.nih.gov/PMC10701386/
[100] Laura H. Kahn, One Health and the Politics of Interdisciplinary Collaboration (Routledge 2019) 87–102.
[101] See WHO, FAO, WOAH and UNEP, 'Joint Tripartite and UNEP Strategic Framework for One Health 2022–2026' (2022), emphasising the need for sustainable financing mechanisms.

security[102], requiring all 196 States Parties the obligation to develop and maintain core capacities for surveillance, reporting, and response to events that may constitute a public health emergency of international concern, including zoonotic and ecosystem-mediated threats.[103] Although the Regulations encourage intersectoral coordination, their primary lens remains oriented toward human-health protection and outbreak containment, rather than upstream prevention at the animal–ecosystem interface.[104] For this reason, the One Health perspective and the scope of these obligations remains functionally limited. The IHR acknowledge that public health may arise but they do not impose binding duties related to prevention, such as ecosystem protection, wildlife surveillance, or regulation of environmental spillover. A complementary set of binding obligations relevant to animal health arises under the WTO Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement, 1994)[105] recognizes the standards set by the World Organisation for Animal Health (WOAH)[106] and Codex Alimentarius as international benchmarks for animal health and food safety measures.[107] The SPS Agreement requires WTO members to ensure that sanitary and phytosanitary measures are based on scientific principles and international standards, creating legally reviewable obligations under international trade law. By formally recognising the standards developed by the WOAH and the Codex Alimentarius Commission, the Agreement confers indirect but significant normative force on technical rules governing animal health and food safety but also plants life through the recognition of the International Plant Protection Convention.[108]This effect is reinforced by the WTO dispute settlement mechanism, though which non-compliant measures may result in binding rulings and trade sanctions, making the SPS

[102] International Health Regulations (2005), WHO, 3rd ed. 2016.
[103] Ibid., Arts. 5–13 and Annex 1 (core capacity requirements).
[104] Stefania Negri, 'Beyond the Silos: Toward a One Health Legal Framework' (2023) 32 Review of European, Comparative & International Environmental Law 315, 319–321.
[105] Agreement on the Application of Sanitary and Phytosanitary Measures, 15 April 1994, 1867 UNTS 493.
[106] The WOAH Terrestrial and Aquatic Animal Health Codes occupy a hybrid position: they are non-binding in themselves but acquire quasi-regulatory force through Article 3 of the SPS Agreement;https://www.worldtradelaw.net/document.php?id=uragreements/spsagreement.pdf&mode=download
[107] WTO Agreement on the Application of Sanitary and Phytosanitary Measures, Annex A(3)(b)–(d); WOAH, Terrestrial Animal Health Code (2024).
[108] For more details see: https://www.wto.org/english/tratop_e/sps_e/spsagr_e.htm

Agreement one of the most enforced instruments indirectly supporting One Health paradigm.[109]

2.1.1 Non-binding legal tools

The environmental pillar and genuine cross-sectoral collaboration lack equivalent hard-law instruments and rely instead on influential soft-law tools. Among these, the Quadripartite One Health Joint Plan of Action (2022–2026), constitutes the most comprehensive and politically authoritative soft-law framework currently in place.[110] It serves as the primary global reference point for operationalising One Health and has catalysed the establishment of national multisectoral platforms in more than sixty countries.[111] Nevertheless, its implementation remains entirely voluntary and heavily reliant on external financing.[112] Environmental law contributes through multilateral agreements such as the Convention on Biological Diversity (1992), and its protocols, the Paris Agreement (2015), but also the Convention on International Trade in Endangered Species (CITES, 1973), and the oldest international treaty dedicated to nature conservation - the Ramsar Convention (1971)[113]. However, none of these instruments explicitly frames ecosystem protection as a legal obligation for pandemic prevention, and their provisions about pathogen spill-over, biodiversity loss, climate change and pollution, remain largely disconnected from health-security regimes. Consequently, the environmental contribution to One Health remains indirect and

[109] See WTO Panel Report, Australia – Apples, WT/DS367/R (2010); Appellate Body Report, EC – Hormones, WT/DS26/AB/R (1998).
[110] FAO, UNEP, WHO and WOAH, One Health Joint Plan of Action (2022–2026): Working Together for the Health of Humans, Animals, Plants and the Environment (FAO 2022).
[111] Quadripartite, Third Annual Progress Report on the Implementation of the One Health Joint Plan of Action (2025) 14–18 (reporting 62 formal national One Health platforms as of October 2025).
[112] Ibid 22–25 (funding gap estimated at 78 % for 2024–2025).
[113] Villarreal, P. A., "Pandemic Risk and International Law: Laying the Foundations for Proactive State Obligations", in *Yearbook of International Disaster Law Online*, Vol. 3, Issue 1, 2022, pp. 154–179. Villarreal argues that while the CBD, CITES, and Ramsar provide a framework for conservation, they lack "primary law obligations" that frame ecosystem protection as a proactive duty to mitigate pandemic risk. This creates a "fragmented set of norms" where the environmental drivers of zoonotic spillover remain largely outside the binding surveillance and response requirements of the IHR (2005). Available at https://brill.com/view/journals/yido/3/1/article-p126_5.xml See also Scanlan, J., "CITES reform: Enhanced wildlife trade regime needed to avoid next pandemic," *EJIL: Talk!* (2020), noting that the CITES Secretariat has historically maintained a narrow mandate that excludes public health considerations.

dependent on domestic policy choices.[114]

Alongside this framework, additional soft-law instruments shape the normative environment including high-level political declarations adopted by United Nations General Assembly addressing antimicrobial resistance (2016)[115] and pandemic preparedness (2023)[116]. From a systemic perspective, World Health Assembly (WHA)[117] and United Nations Environment Assembly (UNEA) resolutions[118] contribute to the progressive integration of One Health across fragmented legal regimes. In conclusion both UNGA political declarations and resolutions adopted by WHA and UNEA fall within the category of soft law. However, they differ in their normative function: while high-level political declarations adopted by the United Nations General Assembly constitute agenda-setting instruments aimed at generating political momentum and consensus, often paving the way for future legal developments, acting as precursor of hard law; resolutions adopted by the World Health Assembly (WHA) and the United Nations Environment Assembly (UNEA) perform a more operational and interpretative function, supporting sectoral governance and facilitating the integration of One Health paradigm into existing legal regimes. [119]

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[114] Pedro Villarreal, 'Pandemic Prevention and the Legal Vacuum in Ecosystem Protection' (2024) 35 European Journal of International Law 421, 429–435.

[115] United Nations General Assembly. (2016). Political Declaration of the High-Level Meeting of the General Assembly on Antimicrobial Resistance. A/RES/71/3. Available at: https://digitallibrary.un.org/record/842813?ln=en&v=pdf

[116] United Nations General Assembly. (2023). Political Declaration on Pandemic Prevention, Preparedness and Response. Press release GA/12533. Available at the following link: https://press.un.org/en/2023/ga12533.doc.htm

[117] Wernli D, Falcone J- L, Davidshofer S, et al. Emergent patterns in global health diplomacy: a network analysis of the resolutions adopted by the World Health Assembly from 1948 to 2022. BMJ Global Health 2023;8:e011211. doi: 10.1136/ bmjgh-2022-011211; available at: https://gh.bmj.com/content/bmjgh/8/4/e011211.full.pdf

[118] For more details see: https://www.unep.org/environmentassembly/un-environment-assembly-and-governing-council-sessions

[119] Abbott, K. W., & Snidal, D. (2000). *Hard and Soft Law in International Governance*. International Organization, 54(3), 421–456. See at: https://doi.org/10.1162/002081800551280

2.2. Existing instruments and those under development

The One Health architecture isn't static. Rather than operating through pre-existing treaties and standards originally designed for sectoral purposes, One Health is increasingly shaped by legal processes that seek to institutionalise intersectoral integration across existing regimes. At present, the International Health Regulations (2005), remain the only universally binding treaty, constituting the primary hard-law foundation for the human-health pillar of One Health, even if their focus remains predominantly on outbreak containment rather than upstream prevention.[120]A complementary, though indirect, normative function is performed by the WTO Agreement on the Application of Sanitary and Phytosanitary Measures. This mechanism transforms compliance with veterinary surveillance and disease-notification standards into a matter of trade discipline, thereby reinforcing animal-health capacities that are structurally relevant to One Health without formally articulating it as such.[121]Furthermore, the COVID-19 pandemic has catalysed normative recalibration. It initiated two parallel negotiating processes explicitly designed to elevate One Health from conceptual framework to operational legal principle. First, the WHO Pandemic Agreement, under negotiation since 2021 by the Intergovernmental Negotiating Body (INB), intended to become a new framework under Article 19 of the WHO Constitution.[122] Successive drafts consistently designate One Health as a core guiding principle (most recently in Article 4 of the October 2025 consolidated text) and oblige States Parties to develop multisectoral national pandemic prevention and preparedness plans that integrate human, animal, and environmental surveillance.[123] Second, the ongoing amendments to the International Health

[120] Gian Luca Burci and Mark Eccleston-Turner, 'The International Health Regulations (2005): Limitations and Opportunities' in Lawrence O. Gostin and Benjamin Mason Meier (eds), Foundations of Global Health & Human Rights (OUP 2020) 287–290.
[121] David P. Fidler, 'From International Sanitary Conventions to Global Health Security: The New International Health Regulations' (2005) 4 Chinese Journal of International Law 325, 359–362.
[122] Decision SSA2(5) (1 December 2021) establishing the INB; WHO Constitution, art 19.
[123] WHO Intergovernmental Negotiating Body, Consolidated Draft of the WHO Pandemic Agreement (16 October 2025) art 4; see also earlier versions A/INB/9/3 (2024) and A/INB/11/5 (2025).

Regulations (2005), negotiated in parallel by the Working Group on Amendments to the IHR (WGIHR), aim to strengthen provisions on zoonotic events, equity in access to countermeasures, and mandatory collaboration with WOAH and FAO.[124] Supporting multisectoral coordination, the One Health Joint Plan of Action (2022–2026) has assumed a bridging role by facilitating convergence between existing health, veterinary, and environmental frameworks.[125] In addition, also recent soft-law developments, including UNEA resolutions on biodiversity and health (UNEA-5.2/2022, UNEA-6/2024)[126], have increasingly embrace One Health as a guiding principle.[127]

2.3 Strengths, limitations, overlaps, and the need for regulatory harmonization

The International Health Regulations and the WTO SPS Agreement produced trade-linked enforcement mechanism which has generated powerful incentives for veterinary capacity-building, extending far beyond what a standalone animal-health treaty could achieve.[128] These instruments have collectively produced decades of technical expertise, near-universal membership, and proven operational mechanisms

[124] Report of the Working Group on Amendments to the International Health Regulations (2005), A/WGIHR/7/6 (2025).
[125] FAO, UNEP, WHO, and WOAH. 2022. One Health Joint Plan of Action (2022-2026). Working together for the health of humans, animals, plants and the environment. Rome. https://doi.org/10.4060/cc2289en
[126] UNEA-5.2 (2022) and UNEA-6 (2024) are key soft-law instruments in global environmental governance. They adopt resolutions that, while not legally binding, provide normative guidance, foster multisectoral coordination, and promote integration of environmental considerations into broader policy and legal frameworks. In the context of One Health, these sessions are particularly relevant as they encourage systemic approaches linking environmental sustainability with human and animal health, supporting the implementation of integrated policies at international and national levels. For more details see: https://www.unep.org/resources/resolutions-treaties-and-decisions/UN-Environment-Assembly-5-2;https://www.unep.org/environmentassembly/unea6; https://www.unep.org/environmentassembly/ru/documents-and-resolutions
[127] Resolution 5/6 on "Biodiversity and Health," adopted by the United Nations Environment Assembly at its Fifth Session (UNEA-5.2) on 2 March 2022, recognizes the interlinkages between biodiversity and human health and promotes integrated, multisectoral approaches consistent with the One Health paradigm.
[128] WTO Agreement on the Application of Sanitary and Phytosanitary Measures, 15 April 1994, art 3; WOAH Terrestrial and Aquatic Animal Health Codes (31st/27th edns, 2024).

for outbreak containment.[129] The parallel consolidation of political consensus through the Quadripartite alliance further reinforces this institutional foundation. Notwithstanding these achievements, the regime suffers from profound structural restrictions that severely constrain its preventive potential. The combined effect of sectoral strengths, institutional rivalry, and legal asymmetry is a governance system that is simultaneously over-regulated in narrow reactive domains and dramatically under-regulated in the integrative preventive space.[130] Regulatory harmonisation is therefore not merely desirable but imperative. Such harmonisation must move beyond ad hoc cooperation to achieve genuine legal integration through explicit cross-references and hierarchy clauses in revised or new instruments.[131] The ongoing negotiations on the WHO Pandemic Agreement and IHR amendments offer the most credible vehicle for this transformation. To succeed, they must explicitly mandate multisectoral national plans, impose measurable ecosystem-protection obligations linked to pandemic prevention, and institutionalise Quadripartite joint governance with binding coordination rules, converting One Health from aspirational paradigm to accountable, legally sustained practice.[132]

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[129] Lawrence O. Gostin and Rebecca Katz, 'The International Health Regulations: The Governing Framework for Global Health Security' (2016) 94 Milbank Quarterly 264, 278–282.

[130] Kovacic, W. E. (2013). Global health law and governance: Institutional fragmentation. *Journal of Law, Medicine & Ethics, 41*(suppl 1), 61–67; available at: https://www.cambridge.org/core/journals/journal-of-law-medicine-and-ethics/article/global-health-law-between-hard-and-soft-law/17720CA0B5F10D8964CFF1A29241C4A1

[131] Mark Eccleston-Turner and Harry Upton, 'Towards Legal Harmonisation in One Health Governance' (2025) 33 Review of European, Comparative & International Environmental Law (forthcoming).

[132] Consolidated Draft of the WHO Pandemic Agreement (16 October 2025) arts 4, 18, 19 (proposed multisectoral obligations and coordination mechanism); proposed IHR amendments A78/10 (2025) new arts 44bis–44quater on Quadripartite joint governance.

Chapter 2

"Prevention as a Legal Paradigm in the One Health Approach"

Summary: 1. Binding Obligations in International Law; 1.1 The duty to prevent environmental and zoonotic harm (customary law, multilateral treaties); 1.2 Procedural obligations: monitoring, surveillance and impact assessment; 2. The notion of Deep Prevention; 2.1 From prevention to deep prevention: conceptual evolution; 2.2. Deep prevention as an expanded interpretation of due diligence; 3. Recognition of Preventive Obligations in Environmental and Health Law; 3.1 The ITLOS Advisory Opinion on climate change; 3.2 Justification for the use of external rules and materials; 3.3 ECtHR case law Verein *KlimaSeniorinnen Schweiz v. Switzerland*; 4. The "*Terra dei Fuochi*": A One Health Case Study of Failed Prevention";4.1 Environmental contamination and impacts on health; 4.2 Breakdown of preventive governance and due diligence obligations; 4.3 Lessons for the One Health approach; 5. Fragmentation, structural gaps, limited enforceability and lack of formal recognition.

1. Binding Obligations in International Law

Binding obligations in international law derive notably from customary international law and international treaties, as reflected in article 38(1) of the Statute of the International Court of Justice.[133] At present, international law does not recognise a general customary obligation explicitly aimed to the prevention of health risks. Accordingly, the central legal question lies in determining whether, and to what extent, the general obligations of due diligence and prevention under international law may be interpreted as giving rise to corresponding duties in the fields of environmental protection and public health. In this context, it results fundamental to clarify the principle of due diligence.[134] According to it, States are required to take all reasonable and appropriate measures to anticipate, assess, and minimize foreseeable risks, rather

[133]Statute of International Court of Justice, Article 38.1 (a)(b): "The Court, whose function is to decide in accordance with international law such disputes as are submitted to it, shall apply: a. international conventions, whether general or particular, establishing rules expressly recognized by the contesting states; b. international custom, as evidence of a general practice accepted as law".

[134] Brunnée, J. (2025, August 6). *The advisory opinion on obligations of states in respect of climate change: Harm prevention under customary international law*. Völkerrechtsblog. https://voelkerrechtsblog.org/the-advisory-opinion-on-obligations-of-states-in-respect-of-climate-change/

than guaranteeing a specific outcome or absolute absence of harm.[135] The duty to prevent transboundary harm is therefore understood as an obligation of conduct rather than one of result.[136] This interpretation has recently been confirmed and further elaborated at the judicial level. On 23 July 2025 the International Court of Justice (ICJ) delivered its Advisory Opinion on *Obligations in Respect of Climate Change*, providing significant clarifications on the scope and content of States' duties under customary international law.[137] Referring to its 1996 Advisory Opinion on *Legality of Nuclear Weapons*, the Court reaffirmed that the obligations to prevent harm extend to global environment concerns, applying to areas beyond national jurisdiction.[138] The ICJ confirmed that the duty to prevent is triggered whenever there exists a risk of significant environmental harm.[139] Departing from earlier case law[140], which appeared to require the materialization of harm to establish a breach, the Court held that a State's failure to take appropriate preventive measures to protect the climate system may constitute an internationally wrongful act even in the absence of proven damage.[141]Accordingly, States that do not adopt measures commensurate with the

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[135] See, for example, United Nations Convention on the Law of the Sea (UNCLOS) 1982, art. 194(1); Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972, arts I–II, VII(2); Vienna Convention for the Protection of the Ozone Layer 1985, art. 2; Convention on the Regulation of Antarctic Mineral Resource Activities 1988, art. 7(5); Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention) 1991, art. 2(1); Convention on the Protection and Use of Transboundary Watercourses and International Lakes 1992, art. 2(1).

[136] International Court of Justice (ICJ), *Pulp Mills on the River Uruguay* (Argentina v. Uruguay), Judgment, ICJ Reports, 20 April 2010, paras. 101, 187, 192, 197; *Draft Articles on Prevention of Transboundary Harm from Hazardous Activities*, ILC, 2001, commentary to Art. 3.

[137] International Court of Justice (ICJ), (2025), *Obligations of States in Respect of Climate Change,* Advisory Opinion. Paras. 309-315.

[138] International Court of Justice (ICJ). (1996, July 8) *Legality of the threat or use of nuclear weapons*, Advisory opinion, para 29; International Court of Justice (ICJ) (1997, September 25). *Gabčíkovo–Nagymaros Project (Hungary/Slovakia),* Judgment*,* para. 53; International Court of Justice (ICJ), *Pulp Mills on the River Uruguay* (Argentina v. Uruguay), (2010, April 20), Judgment, para. 193.

[139] International Court of Justice (ICJ), (2025), *Obligations of States in Respect of Climate Change,* Advisory Opinion, para. 274.

[140] International Court of Justice (ICJ), *Pulp Mills on the River Uruguay* (Argentina v. Uruguay), (2010), paras. 197-199; Certain Activities Carried Out by Nicaragua in the Border Area (Costa Rica v. Nicaragua) (2015), paras. 125-127

[141] International Court of Justice (ICJ), (2025), *Obligations of States in Respect of Climate Change,* Advisory Opinion, paras. 427, 433; International Court of Justice (ICJ), *Pulp Mills on the River Uruguay* (Argentina v. Uruguay), (2010, April 20), Judgment, para. 204.

foreseeable risks of climate harm, may incur international responsibility.[142] The Court clarified that standard of conduct depends on both the likelihood and severity of potential harm. Given the overwhelming scientific evidence of the urgency and magnitude of climate risks, it concluded that the standard of due diligence is exceptionally stringent, requiring States to employ all reasonably available means.[143] Importantly, the Court rejected arguments attempting to dilute State responsibility on the basis of the cumulative nature of climate harm.[144] In a landmark pronouncement, it further declared that obligations to protect the climate system, including the duty to prevent significant transboundary environmental harm, constitute obligations *erga omnes*.[145] This represents the first explicit recognition by the ICJ of the *erga omnes* character of environmental protection duties, reinforcing their fundamental status within the international legal order.[146] The Court ultimately observed that climate change is not merely a legal issue, but an existential challenge of planetary scale, threatening all forms of life and the very health of the Earth, a reasoning that aligns closely with the One Health approach.[147]

1.1 The duty to prevent environmental and zoonotic harm (customary law, multilateral treaties)

The duty to prevent transboundary environmental harm is widely recognised as a principle of customary international law, requiring States to take all appropriate measures, in respect of activities within their jurisdiction or control, to prevent

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[142] Brunnée, J. (2025, August 6). *The advisory opinion on obligations of states in respect of climate change: Harm prevention under customary international law*. Völkerrechtsblog. https://voelkerrechtsblog.org/the-advisory-opinion-on-obligations-of-states-in-respect-of-climate-change/

[143] International Court of Justice (ICJ), (2025), *Obligations of States in Respect of Climate Change,* Advisory Opinion, paras, 137, 290.

[144] International Court of Justice (ICJ), (2025), *Obligations of States in Respect of Climate Change,* Advisory Opinion, paras. 133, 134, 273.

[145]International Court of Justice (ICJ), (2025), *Obligations of States in Respect of Climate Change,* Advisory Opinion, para. 440.

[146] Brunnée, J. (2025, August 6). *The advisory opinion on obligations of states in respect of climate change: Harm prevention under customary international law*. Völkerrechtsblog. https://voelkerrechtsblog.org/the-advisory-opinion-on-obligations-of-states-in-respect-of-climate-change/

[147] International Court of Justice (ICJ), (2025), *Obligations of States in Respect of Climate Change,* Advisory Opinion, para. 456.

significant environmental damage.[148] Although originally articulated in the context of environmental protection, this duty has progressively been interpreted as extending beyond the mere avoidance of environmental harm to encompass the prevention of foreseeable risks to public health arising from environmental degradation, including risks linked to zoonotic diseases.[149] As affirmed by the International Court of Justice, the environment "is not an abstraction but represents the living space, the quality of life and the very health of human beings, including generations unborn."[150] This holistic understanding underscores the intrinsic connection between environmental protection and human health, thereby supporting an integrated interpretation of preventive obligations. The customary character of the duty to prevent is established by consistent State practice accompanied by *opinio iuris*, as evidenced by international jurisprudence and reflected in relevant international instruments.[151] This formulation is codified in Article 38(1)(b) of the Statute of the International Court of Justice, and has been consistently reaffirmed in the Court's jurisprudence.[152] Furthermore, international instruments such as the Stockholm Declaration (1972) and the Rio Declaration (1992) demonstrate States' recognition of an obligation to prevent transboundary environmental harm, thereby consolidating the normative status of this

[148] See Pulp Mills on the River Uruguay (Argentina v. Uruguay), ICJ Reports 2010, paras. 101–104, 197; Corfu Channel (United Kingdom v. Albania), ICJ Reports 1949, p. 22; Certain Activities Carried Out by Nicaragua in the Border Area, ICJ Reports 2015, paras. 104–105; International Law Commission, *Draft Articles on Prevention of Transboundary Harm from Hazardous Activities* (2001), commentary to art. 3; A. Boyle & C. Redgwell, *International Law and the Environment*, 4th ed., OUP, 2021, pp. 145–150.

[149]International Institute for Sustainable Development (IISD), (2025, January 29). *Healthy Environment: A Human Right and Customary International Law.* SDG Knowledge Hub. Available at: https://sdg.iisd.org/commentary/guest-articles/healthy-environment-a-human-right-and-customary-international-law/

[150] International Court of Justice, (1996), *Legality of the Threat or Use of Nuclear Weapons*, Advisory Opinion, ICJ p. 242, para 29.

[151] International Institute for Sustainable Development (IISD), (2025, January 29). *Healthy Environment: A Human Right and Customary International Law.* SDG Knowledge Hub. Available at: https://sdg.iisd.org/commentary/guest-articles/healthy-environment-a-human-right-and-customary-international-law/

[152] Statute of the International Court of Justice, Art 38(1)(b); International Court of Justice. (1969). *North Sea Continental Shelf Cases (Federal Republic of Germany v Denmark; Federal Republic of Germany v Netherlands),* Judgment, ICJ Reports, p. 3, paras 70–74; International Court of Justice. (1986). *Military and Paramilitary Activities in and against Nicaragua (Nicaragua v United States of America),* Merits, Judgment, ICJ Reports, p. 14, paras 183–184; International Court of Justice. (2010).*Pulp Mills on the River Uruguay (Argentina v Uruguay)*, Judgment, ICJ Reports, p. 14, paras 101–103.

principle within the international legal order.[153] Since the *Trail Smelter* arbitration, international law has affirmed that States may not use their territory in a manner that causes serious environmental harm to other States.[154] This foundational principle has been reaffirmed by the International Court of Justice in subsequent jurisprudence, notably in *Corfu Channel* and *Certain Activities carried out by Nicaragua in the Border Area*.[155]At the treaty level, the International Health Regulations (2005) constitute the most comprehensive legally binding instrument for the control of the global spread of disease. With near-universal participation (196 States Parties, including the 194 WHO Member States), the IHR impose duties directly relevant to the prevention of zoonotic and environmentally driven health risks, effectively translating the principle of due diligence into concrete duties of surveillance,

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[153] United Nations Conference on the Human Environment. (1972). *Declaration of the United Nations Conference on the Human Environment* (Stockholm Declaration), principle 21. In Report of the United Nations Conference on the Human Environment. U.N. Doc. A/CONF.48/Rev.1; United Nations. (1992) *Rio Declaration on Environment and Development,* principle 2. In Report of the United Nations Conference on Environment and Development. U.N. Doc. A/CONF.151/26 (Vol. I). United Nations.

[154] United Nations. (1941). *Trail Smelter Arbitration (United States v Canada),* Reports of International Arbitral Awards, Vol. III., pp.1905-1964. This arbitration case between the United States (U.S) and Canada is the foundational decision for the development of the prohibition of significant transboundary environmental damage in international environmental law. Precisely, the tribunal stated that "under the principles of international law, as well as of the law of the United States, no State has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory of another or the properties or persons therein, when the case is of serious consequence and the injury is established by clear and convincing evidence".https://legal.earthrefuge.org/the-trail-smelter-arbitration-case-united-states-vs-canada/2/

[155] International Court of Justice, *Corfu Channel (United Kingdom of Great Britain and Northern Ireland v Albania)* Judgment, (Merits), 9 April 1949, para 22: "The obligations incumbent upon the Albanian authorities consisted in notifying, for the benefit of shipping in general, the existence of a minefield in Albanian territorial waters and in warning the approaching British warships of the imminent danger to which the minefield exposed them. […] and every State's obligation not to allow knowingly its territory to be used for acts contrary to the rights of other States." https://icj-cij.org/case/1/judgments. See also: International Court of Justice. (ICJ). (2015, December 16). *Certain Activities Carried Out by Nicaragua in the Border Area (Costa Rica v. Nicaragua),* Judgment, para 228: "To conclude, the Court notes that Costa Rica has begun mitigation works in order to reduce the adverse effects of the construction of the road on the environment. It expects that Costa Rica will continue to pursue these efforts in keeping with its due diligence obligation to monitor the effects of the project on the environment. It further reiterates the value of ongoing co-operation between the Parties in the performance of their respective obligations in connection with the San Juan River." https://www.icj-cij.org/case/150/judgments;

notification and response.[156] In parallel, the Convention on Biological Diversity (1992) represents a cornerstone of international environmental law.[157] Although not explicitly focused on public health, it establishes a set of obligations that are directly relevant to disease prevention and the mitigation of zoonotic spillover risks.[158] The Convention pursues three main goals: the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits from the use of genetic resources.[159] These objectives are operationalised through core provisions, notably Article 8 on in situ conservation and ecosystem protection, and Article 14, which requires States to conduct environmental impact assessments (EIAs) for activities likely to have adverse effects on biological diversity.[160] Taken together, the IHR and the CBD, along with other sector-specific treaties, including the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, form a fragmented yet functionally interconnected legal architecture that links human, animal, and environmental health.[161] This normative framework reinforces States' obligations across multiple legal regimes and provides robust support for a One Health-oriented approach to the prevention of environmental and zoonotic harm, while strengthening the protective scope of international human rights law.[162]

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[156] World Health Organization, International Health Regulations (2005) Article 2: "The purpose and scope of these Regulations are to prevent, prepare for, 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 risk and which avoid unnecessary interference with international traffic and trade."

[157] United Nations Environment Programme. (1992). *Convention on biological diversity*. https://digitallibrary.un.org/record/223428?v=pdf

[158] Convention on Biological Diversity (1992). Convention on Biological Diversity, arts.8,9. United Nations Environment Programme. https://www.cbd.int/doc/legal/cbd-en.pdf

[159] Ibid., art.1.

[160] Ibid., arts.8,14.

[161] Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, March 22, 1989, 1673 U.N.T.S. 57; UNEP/FAO/CHW Secretariat. (2021). *Study on the interlinkages between chemicals and waste multilateral environmental agreements and biodiversity*. Basel Convention Secretariat, pp. 22,25,40,44; Morin, JF., Blouin, C. How environmental treaties contribute to global health governance. *Global Health* 15, 47 (2019), p.4. https://doi.org/10.1186/s12992-019-0493-7

[162] United Nations Environment Programme. (2021). *Preventing the next pandemic: Zoonotic diseases and how to break the chain of transmission*. UNEP. pp.40-45.

1.2. Procedural obligations: monitoring, surveillance and impact assessment

The duty to prevent transboundary environmental and zoonotic harm is fundamentally procedural. Rather than requiring States to guarantee the absence of harm, international law obliges them to establish and implement decision-making processes capable of identifying, assessing and managing foreseeable risks. In this sense, procedural obligations constitute the operational core of the preventive duty, translating abstract standards of conduct into concrete legal requirements.[163] In this context, Environmental Impact Assessment (EIA) and Health Impact Assessment (HIA) are key procedural instruments for anticipating and managing potential environmental and human health risks.[164] While EIA primarily addresses environmental impacts, integrating HIA expands this scope to systematically evaluate the potential effects of policies, programmes, and projects on human health.[165] Through structured processes of risk identification, scientific evaluation, stakeholder participation, monitoring, and follow-up, EIA and HIA operationalize the principle of due diligence, ensuring that health and environmental considerations are embedded in both public and private investment decisions.[166] Prevention is recognized both as a legal obligation and a governance standard. Although Health Impact Assessment (HIA) is not codified as a standalone legal institution, it arises at the intersection of environmental law, human rights law, and judicial interpretation.[167] Consequently, conducting an impact assessment is considered obligatory under general international law, even when not explicitly required by national legislation.[168] International

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[163]Sands, P., Peel, J., Fabra, A., & MacKenzie, R. (2018). *Principles of International Environmental Law* (4th ed.). pp. 195-210; 213-240. Cambridge: Cambridge University Press. https://www.cambridge.org/highereducation/books/principles-of-internationalenvironmental-law/B32CA39427B24F1947BDC5F884CCADC0#contents

[164]Fehr, Rainer, Viliani, Francesca, Nowacki, Julia & Martuzzi, Marco (2014). *Health in impact assessments: opportunities not to be missed.* World Health Organization. Regional Office for Europe. p.99 https://iris.who.int/handle/10665/137369

[165] Pakowski, M., & Garus-Pakowska, A. (2021). *Health Impact Assessment as an essential element of environmental law in the national legal order: Considerations on the basis of international law*. Problemy Ekorozwoju / Problems of Sustainable Development, 16(2), p.200, 206. https://ph.pollub.pl/index.php/preko/article/view/5184/4072

[166]Fehr, Rainer, Viliani, Francesca, Nowacki, Julia & Martuzzi, Marco (2014). Health in impact assessments: opportunities not to be missed. World Health Organization. Regional Office for Europe. p.99. https://iris.who.int/handle/10665/137369

[167] Ibid., p.117

[168] Pakowski, M., & Garus-Pakowska, A. (2021). *Health Impact Assessment as an essential element of environmental law in the national legal order: Considerations on the basis of*

jurisprudence, including decisions of the International Court of Justice, has reinforced EIA as a customary obligation, supporting the integration of health considerations.[169] Within the European Union, HIA is operationalized through the EIA Directive, SEA Directive, and Aarhus Regulation, with the Court of Justice of the European Union affirming the inseparable link between environmental protection, human health, and quality of life.[170] Procedural obligations are further reinforced by requirements of transparency, public participation and access to information.[171] Instruments such as the Aarhus Convention enhance preventive governance by ensuring that environmental decision-making processes are open to public scrutiny and informed by stakeholders.[172] These procedural reinforce the forward-looking approach to risk governance, contributing both to the prevention of environmental degradation and the mitigation of the likelihood of zoonotic disease emergence.[173]

2.The Notion of Deep Prevention

Building on the duty to prevent transboundary harm, the concept of "deep prevention" extents this obligation by emphasizing proactive, anticipatory measures aimed at addressing the root causes of environmental and health risks. Although the expression "deep prevention", is primarily used in the scientific and policy-oriented discourse, it can be understood as denoting a governance strategy. The purpose of this analysis is to examine whether, and to what extent, such a strategy may find a legal foundation within existing obligations, particularly in light of evolving principles of international

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international law. Problemy Ekorozwoju / Problems of Sustainable Development, 16(2), p. 207. https://ph.pollub.pl/index.php/preko/article/view/5184/4072

[169]Fehr, Rainer, Viliani, Francesca, Nowacki, Julia & Martuzzi, Marco (2014). Health in impact assessments: opportunities not to be missed. World Health Organization. Regional Office for Europe. p.63. https://iris.who.int/handle/10665/137369

[170] *Ibidem*.

[171] World Health Organization. International Health Regulations (2005), Art. 6(1). Each State Party have to notify WHO within 24 hours of any event that may constitute a public health emergency of international concern, using the National IHR Focal Point and the most efficient communication means available. https://www.who.int/publications/i/item/9789241580496

[172] United Nations Economic Commission for Europe. (1998, June 25). *Convention on access to information, public participation in decision-making and access to justice in environmental matters (Aarhus Convention),* Art. 1. Aarhus, Denmark. Entered into force 30 October 2001. The Convention is relevant as it links access to information and participatory governance with preventive environmental and health-related decision-making. https://unece.org/environment-policy/public-participation/aarhus-convention/text

[173] World Health Organization. International Health Regulations (2005), arts.1, 5-13, Annex 1. https://www.who.int/publications/i/item/9789241580496

environmental law, public health law and standards of due diligence. To understand deep prevention functioning and applicability, it is necessary to start from the interpretation of the expression itself. In this framework, it is used to refer to regulatory and governance approaches that address both upstream structural drivers, such as climate change, and midstream risk factors, including zoonotic spillover and disease emergence.[174] In contrast, downstream prevention is typically understood from a public health perspective, focusing on controlling disease spread after and outbreak occurs. Traditional public health prevention often addresses disease transmission, but not the initial emergence of pathogens from their natural reservoirs.[175] Deep prevention emphasizes upstream prevention, for which there is a link between certain key drivers of environmental degradation, such as illicit wildlife traffic or land-use change, and the increased frequency of zoonotic disease outbreaks. It also incorporates midstream strategies focused on the early detection through surveillance, preparedness and rapid response mechanisms to contain emerging risks before they become widespread.[176] The International Health Regulations (IHRs) are largely built on the assumption that disease outbreaks cannot be fully prevented, only contained and responded once they occur.[177] Consequently, the objective of deep prevention is neither included in the IHR (2005), nor in existing environmental agreements.[178] Rather than deriving from a single codified instrument, the legal force of deep prevention emerges from the cumulative effect of binding regimes (CITES[179], UNFCCC[180], CBD[181], UNCCD[182],

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[174] Ginevra Le Moli and others, *The Deep Prevention of Future Pandemics through a One Health Approach: What Role for a Pandemic Instrument?*, Global Health Centre, Graduate Institute of International and Development Studies, Policy Brief, 2022. pp.356-357.
[175] *Ibidem*.
[176] *Ibidem*.
[177] Viñuales, J., Moon, S., Le Moli, G., & Burci, G. L. (2022). *A global pandemic treaty should aim for deep prevention*. The Lancet*, 397*(10287), 1791–1792. Available at the following link: https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(21)00948-X/fulltext
[178] *Ibidem*.
[179] Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), 1973, 27 U.S.T. 1087.
[180] United Nations Framework Convention on Climate Change (UNFCCC), 1992, 1771 U.N.T.S. 107.
[181] Convention on Biological Diversity (1992). *Convention on Biological Diversity*. United Nations Environment Programme. https://www.cbd.int/doc/legal/cbd-en.pdf
[182]United Nations (1994). *United Nations Convention to Combat Desertification* (UNCCD). https://www.unccd.int/convention/overview

and the Paris Agreement[183]) and non-binding standards adopted in the field of animal health, food safety and plant protection.[184] In this context standards developed by the World Organisation for Animal Health (WOAH)[185], the Codex Alimentarius Commission[186] and the International Plant Protection Convention (IPPC)[187] play a key role in operationalising preventive obligations through risk-based approaches targeting upstream drivers of health threats. Notable instruments adopted by Codex Alimentarius Commission, such as the *Guidelines for Risk Analysis and Foodborne Antimicrobial Resistance*, illustrate how preventive governance is translated into concrete practice, before the disease emergence.[188] Moreover, Articles 3 and Annex A of the WTO Agreement on Sanitary and Phytosanitary Measures (SPS)[189] explicitly recognise such international standards as a reference point for national measures, thereby conferring them indirect binding force and integrating preventive risk management into States' due diligence obligations.[190]

2.1. From prevention to deep prevention: conceptual evolution

Prevention lies at the core of a One Health approach.[191] It requires taking into account risk factors at the human-animal-environment interface and at the origin of zoonotic

[183]United Nations Framework Convention on Climate Change (UNFCCC). (2015). *Paris Agreement*. https://unfccc.int/sites/default/files/english_paris_agreement.pdf

[184] Sands, P., & Peel, J. (2018). *Principles of international environmental law* (4th ed. pp.195-214, 223-240). Cambridge: Cambridge University Press.

[185] World Organization for Animal Health (WOAH). (2021). *Terrestrial Animal Health Code*. https://www.woah.org/en/what-we-do/standards/codes-and-manuals/

[186] Food and Agriculture Organization of the United Nations (FAO) & World Health Organization (WHO). *About the Codex Alimentarius Commission (CAC)*. Codex Alimentarius . https://www.fao.org/fao-who-codexalimentarius/committees/cac/about/en/

[187] Food and Agriculture Organization of the United Nations (FAO). International Plant Protection Convention (IPPC), 1997. https://www.ippc.int/en/publications/1997-international-plant-protection-convention-new-revised-text/

[188] Food and Agriculture Organization of the United Nations (FAO) & World Health Organization. (2011) Codex Alimentarius Commission. *Guidelines for Risk Analysis of Foodborne Antimicrobial Resistance (CAC/GL 77-2011)*.

[189] World Trade Organization, *Agreement on the Application of Sanitary and Phytosanitary Measures*, arts. 3 and Annex A, which recognize international standards, guidelines and recommendations adopted by the Codex Alimentarius Commission, the World Organization for Animal Health (WOAH) and the International Plant Protection Convention (IPPC) as reference points for Members' sanitary and phytosanitary measures.

[190] Koivurova, T., & Singh, K. (2010). *Due diligence*. In R. Wolfrum (Ed.), *Max Planck Encyclopedia of Public International Law*. Oxford University Press. Available at the following link: https://opil.ouplaw.com/display/10.1093/law:epil/9780199231690/law-9780199231690-e1034

[191] FAO, WHO, WOAH and UNEP, *One Health Joint Plan of Action (2022–2026).*

disease outbreaks, and to enhance, from a legal perspective, the coherence between environmental treaties, the International Health Regulations (IHR) and animal health regulations.[192] The complexity and interconnectedness of contemporary health challenges require holistic, integrated solutions grounded in a systemic approach that incorporates both wider structural factors and forward-looking preventive measures.[193] The One Health Joint Plan of Action (OHJPA) operationalize this approach by, providing a comprehensive framework for assessing health challenges and facilitating the development of appropriate preventive and management strategies capable of strengthening social, ecological and economic resilience.[194] Similarly, prevention and mitigation strategies grounded in the One Health paradigm are embedded in the Global Framework for the Progressive Control of Transboundary Animal Diseases (GF TADs).[195] A critical conceptual distinction must be drawn between the ways in which the notion of "prevention" is employed in public health and environmental governance. In public health, "prevention" is used to describe measures that prevent the spread of disease once an outbreak in humans has occurred.[196] In the field of environmental policy, by contrast, "prevention" refers to avoiding the occurrence of the harmful event in the first place, trough the anticipation and regulation of risks.[197] Transported to the public health context, this latter understanding is conceptualized as "deep prevention".[198] Furthermore, prevention is recognized as a cornerstone of international environmental law.[199] Finally, the environmental concept of the implication of structural measures rather than reactive responses represents an evolution of the classic

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[192] Le Moli, G. (2023). One Health and the Prevention of Pathogens' Spillover. *Yearbook of International Disaster Law Online*, *4*(1), 334-357. Available at the following link: https://doi.org/10.1163/26662531_00401_016

[193]FAO, WHO, WOAH and UNEP, *One Health Joint Plan of Action (2022–2026)*, p.9.

[194] FAO, WHO, WOAH and UNEP, *One Health Joint Plan of Action (2022–2026)*, pp.8-10.

[195] FAO and World Organization for Animal Health (WOAH), *Global Framework for the Progressive Control of Transboundary Animal Diseases (GF-TADs) Strategy* 2021-2025, pp. 3-6. Available at: https://openknowledge.fao.org/server/api/core/bitstreams/7dd6191d-9375-4e11-9a87-1d14dc61cb1f/content; https://www.gf-tads.org/

[196] Le Moli, G. et al., *The Deep Prevention of Future Pandemics through a One Health Approach*, Global Health Centre, Graduate Institute, Policy Brief, 2022 (p.13).

[197] P.-M. Dupuy and J. E. Viñuales, *International Environmental Law*, 2nd ed., Cambridge University Press, 2018, pp. 63–75.

[198] Le Moli, G. et al., *The Deep Prevention of Future Pandemics through a One Health Approach*, Global Health Centre, Graduate Institute, Policy Brief, 2022 (p.13).

[199] International Court of Justice, *Pulp Mills on the River Uruguay (Argentina v. Uruguay)*, Judgment, 2010, paras. 101–102.

prevention principle and helps justify the reason why prevention needs to be deep.[200] The containment of disease spread, viewed through a deep prevention lens, involves managing harmful events that have already occurred, such as pathogen spillover or disease outbreaks.[201] Regulatory efforts can target the underlying "drivers" of disease emergence at different levels. At the macro level, environmental policy actions are particularly important from a One Health perspective.[202] These include land-use change, greenhouse gas emissions and climate change impacts, desertification.[203] At a micro level, activities such as trade in endangered species or specific farming are relevant too.[204] Between the "upstream" regulation of macro and micro-drivers and the "downstream" detection and reporting of disease outbreaks and containment, there is a wide regulatory area which is not sufficiently regulated by international instruments.[205] The prevention of pathogen spillover and mutation may be pursued through regulation of specific high-risk settings, including farms, wildlife, markets and research facilities, with the aim of ensuring practices that minimise the likelihood of pathogen emergence.[206] Regulatory interventions may also target activities that contribute to spillover and mutation dynamics, such as wildlife trade, host species

[200]Viñuales, J., Moon, S., Le Moli, G., & Burci, G. L. (2022). *A global pandemic treaty should aim for deep prevention*. The Lancet*, 397*(10287), 1791. Available at the following link: https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(21)00948-X/fulltext.

[201]Globalization and Health. (2023). *Policies to prevent zoonotic spillover: a systematic scoping review of evaluative evidence*, 19, Article 82.

[202]Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), *Workshop Report on Biodiversity and Pandemics: Executive Summary*, at 2–6, 12–17 (2020). Available at: https://www.ipbes.net/pandemics

[203] Dobson, A., Pimm, S. L., Hannah, L., Kaufman, L., Ahumada, J., Ando, A., & Zoë, T. (2020). *Ecology and economics for pandemic prevention. Science, 369*(6502), 379–381. https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2022RG000785

[204] Rush, E. R., Dale, E., & Aguirre, A. A. (2021). Illegal wildlife trade and emerging infectious diseases: Pervasive impacts to species, ecosystems and human health. *Animals, 11*(6), 1821.https://pmc.ncbi.nlm.nih.gov/articles/PMC8233965/

[205] World Health Organization. (2023). *Prevention of zoonotic spillover: From relying on response to reducing the risk at source* (One Health High-Level Expert Panel White Paper). At 5–8, 18–21. https://www.who.int/publications/m/item/prevention-of-zoonotic-spillover.

[206] World Health Organization. (2023). *Prevention of zoonotic spillover: From relying on response to reducing the risk at source* (One Health High-Level Expert Panel White Paper). At 9-14. https://www.who.int/publications/m/item/prevention-of-zoonotic-spillover

management, farming and feeding practices, or wildlife consumption, to reduce associated epidemic risks.[207]

2.2. Deep prevention as an expanded interpretation of due diligence

The concept of deep prevention, developed within the One Health paradigm, finds a functional parallel in the evolving landscape of due diligence obligations concerning foreseeable risks generated by economic activities in industrial sectors. At this juncture, the analytical focus shifts from the State-centered obligations examined thus far to regulatory frameworks primarily addressing the conduct and responsibilities of private actors and corporate entities.[208] Deep prevention can be understood as a strengthened interpretation of due diligence, as it has evolved within international standards on business and human rights.[209] Under the UN Guiding Principles on Business and Human Rights (UNGPs), due diligence is defined as an ongoing process through which business enterprises identify, prevent, mitigate and account for how they address adverse human rights impacts.[210] While this formulation already moves beyond a reactive approach, scholarly analysis has highlighted the conceptual ambiguity between due diligence as a managerial process and due diligence as a normative standard of conduct, potentially allowing preventive obligations to be reduced to formal or procedural compliance.[211] Deep prevention responds to this limitation by emphasising the substantive dimensions inherent in the UNGPs framework, interpreting due diligence as a continuous, forward-looking and structural obligation aimed at preventing foreseeable and systemic harms before they materialise,

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[207] Astbury, C., et al. (2023). *Policies to prevent zoonotic spillover: A systematic scoping review of evaluative evidence. Globalization and Health, 19*, 82. Available at the following link: https://pmc.ncbi.nlm.nih.gov/articles/PMC10634115/

[208]Ruggie, J. G. (2013). *Just business: Multinational corporations and human rights.* W.W. Norton.pp.225-230. Retrieved from: https://www.cambridge.org/core/journals/ethics-and-international affairs/article/just-business-multinational-corporations-and-human-rights-john-gerard-ruggie-new-york-w-w-norton-company-2013-225-pp-2495-cloth/CD1E878A3B7CFD8D02055CA176C8F71E

[209]United Nations. (2011). *Guiding Principles on Business and Human Rights: Implementing the United Nations "Protect, Respect and Remedy" Framework.* United Nations. pp. 5-7. https://www.ohchr.org/sites/default/files/documents/publications/guidingprinciplesbusinesshren.pdf

[210] Ibid., Principles 15-17, pp. 15-18.

[211] Backer, L. C., (2025). *Human Rights Due Diligence in the U.N. Guiding Principles for Business and Human Rights*. pp 12-18. Available at: http://dx.doi.org/10.2139/ssrn.5241321

rather than mitigating impacts ex post.[212] This approach is reinforced by the OECD Due Diligence Guidance for Responsible Business Conduct, which frames due diligence as a risk-based continuous and adaptive process integrated into core business operations and decision-making, rather than as a one-off assessment or static compliance exercise.[213]More recently, the Corporate Sustainability Due Diligence Directive (CSDDD) has codified this evolution at the EU level by requiring companies to embed due diligence into their corporate policies, with an explicit focus on prevention and mitigation of adverse impacts on human rights and the environment.[214] The CSDDD reflects a shift from a minimal standard of reasonable conduct towards a model of deep prevention, in which due diligence operates as a structural and ongoing obligation of harm avoidance.[215] Thus, deep prevention can be understood as a normative evolution of due diligence, reflecting emerging expectations in international standards and regulatory frameworks that underscore a heightened responsibility for managing systemic and foreseeable risks.[216]

3. Recognition of Preventive Obligations in Environmental and Health Law

As stated before, international environmental law recognises that certain risks require regulatory intervention before harm materialises.[217] This logic is embodied in the principles of prevention and precaution, which require States to act with due care whenever activities pose a risk of significant or irreversible harm, even in the absence

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[212] Backer, L.C., & Methven O'Brien, C. (2024). *Introduction: The Current State and Future Trajectories of Human Rights Due Diligence Laws.* Social Science Research Network, pp.5-12. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4929209

[213] Organization for Economic Co-operation and Development (OECD). (2018). *OECD Due Diligence Guidance for Responsible Business Conduct.* OECD Publishing. pp.7-15. Available at the following link: https://www.oecd.org/en/publications/oecd-due-diligence-guidance-for-responsible-business-conduct_15f5f4b3-en.html

[214] European Commission. (2022). *Proposal for a Corporate Sustainability Due Diligence Directive* (CSDDD). *71* Final, arts. 3 -7. *https://eur-lex.europa.eu/eli/dir/2024/1760/oj*

[215] Ibid, arts. 10, 15-16.

[216] For more details see: Working Group on Business and Human Rights. (2018). *Corporate human rights due diligence – identifying and leveraging emerging practices* (Background note). Office of the United Nations High Commissioner for Human Rights. Available at the following link: https://www.ohchr.org/en/special-procedures/wg-business/corporate-human-rights-due-diligence-identifying-and-leveraging-emerging-practices

[217] Sands, P., Peel, J., Fabra, A., & MacKenzie, R. (2018). *Principles of International Environmental Law* (4th ed. pp.105-112). Cambridge University Press. Available at the following link: https://doi.org/10.1017/9781108355728

of full scientific certainty.[218] The precautionary principle is widely incorporated in treaties and soft law instruments, although its legal status remain contested.[219] Judicial and quasi-judicial bodies have approached the principle differently. ITLOS and the Court of Justice of the European Union have increasingly affirmed its normative relevance, while the International Court of Justice and WTO dispute settlement bodies have generally adopted a more cautious stance, rejecting any automatic shift in the burden of proof. Despite these divergent approaches, the precautionary principle is progressively gaining influence as a guiding standard of conduct, rather than a fully crystallised binding rule of general international law.[220] Nevertheless, together with the principle of prevention, precaution has fostered a forward-looking, adaptive framework of obligations, focused on anticipatory risk management rather than ex post responsibility.[221] Similarly, in the context of health-related human rights, international and regional bodies have increasingly interpreted States' positive obligations as encompassing duties to regulate, monitor and mitigate environmental and industrial risks that threaten life and health.[222] This interpretation resonates closely with the principles of prevention and precaution discussed above, translating anticipatory, risk-oriented standards into concrete regulatory duties. Jurisprudence has emphasised that where harm is foreseeable and systemic, State responsibility may arise not from a single harmful act, but from failures in regulatory frameworks, policy coordination and long-term planning.[223]Against this background, recent judicial developments in

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[218] United Nations. (1992). *Rio Declaration on Environment and Development*, art.15.

[219] European Parliament. (2015). *The precautionary principle* (Study for the EMPL Committee). pp. 4,5.

[220] Brunnée, J. (2025, August 6). *The advisory opinion on obligations of states in respect of climate change: Harm prevention under customary international law*. Völkerrechtsblog. https://voelkerrechtsblog.org/the-advisory-opinion-on-obligations-of-states-in-respect-of-climate-change/

[221] Naik, G. D. (2020). *Leslie-Anne Duvic-Paoli, The Prevention Principle in International Environmental Law* (Book review). *Yearbook of International Environmental Law, 29*, 522–525. Available at: https://doi.org/10.1093/yiel/yvz068

[222] See, for example: Inter-American Court of Human Rights. (2025). *Advisory Opinion on the Human Right to a Healthy Environment and its Relationship to the Protection of Other Human Rights* (OC-32/25); pp.20,21,79,82; paras. 52, 53, 216, 228-229, 231. Available at the following link: https://www.corteidh.or.cr/docs/opiniones/seriea_32_en.pdf

[223]Monnheimer, M. (2021*). Establishing state responsibility for human rights violations: Proposal for a conduct-based typology of human rights obligations.*, p.64. Cambridge University Press. https://doi.org/10.1017/9781108894784.003

climate change litigation can be understood as part of a broader consolidation of preventive obligations within environmental and health law.[224]

3.1 The ITLOS Advisory Opinion on climate change

On 21 May 2024, the International Tribunal for the Law of the Sea (ITLOS) delivered its Advisory Opinion on Climate Change and International Law concerning the obligations of States Parties to the United Nations Convention on the Law of the Sea (UNCLOS) in relation to climate change.[225] The request for an advisory opinion had been submitted on 12 December 2022 by the Commission of Small Island States on Climate Change and International Law (COSIS), which asked ITLOS to clarify the specific obligations incumbent upon States Parties under UNCLOS in light of the adverse effects of climate change on the marine environment.[226] In particular, COSIS sought guidance on whether and to what extent States are required, under Part XII UNCLOS, to prevent, reduce and control marine pollution and to protect and preserve the marine environment from climate change-related impacts such as ocean warming and acidification, and sea-level rise caused by anthropogenic greenhouse gas (GHG) emissions.[227] In its Advisory Opinion, ITLOS affirmed that States Parties to UNCLOS have the obligation to take measures to prevent, reduce and control pollution of the marine environment and to protect and preserve it from the harmful effects of climate change.[228] The Tribunal specified that these are obligations of due diligence, the

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[224] European Court of Human Rights. (2024). *Verein KlimaSeniorinnen Schweiz and Others v. Switzerland* (Application No. 53600/20). See also: International Tribunal for the Law of the Sea. (2024). *Advisory Opinion No. 31 — Protection of the marine environment in relation to climate change and anthropogenic greenhouse gas emissions* (UNCLOS, Case No. 31, 21 May 2024).

[225] International Tribunal for the Law of the Sea (ITLOS), *Request for an Advisory Opinion Submitted by the Commission of Small Island States on Climate Change and International Law (COSIS)*, Advisory Opinion, Case No 31, 21 May 2024, paras. 1-100; United Nations Convention on the Law of the Sea (adopted 10 December 1982, entered into force 16 November 1994) 1833 UNTS 397 (UNCLOS).

[226] International Tribunal for the Law of the Sea (ITLOS), *Request for an Advisory Opinion Submitted by the Commission of Small Island States on Climate Change and International Law (COSIS)*, Advisory Opinion, Case No 31, 21 May 2024.

[227]United Nations Convention on the Law of the Sea (UNCLOS), Part XII, *Protection and Preservation of the Marine Environment* (1982).

[228] International Tribunal for the Law of the Sea (ITLOS), *Advisory Opinion on Climate Change and International Law* (21 May 2024), paras 55–78. On this matter, see Rioseco S., 'The ITLOS Advisory Opinion on Climate Change and International Law: A Deep Dive into External Rules and Materials' (2025) 74(S1) *International and Comparative Law Quarterly* 195–213, doi:10.1017/S0020589325101206;

standard of which is stringent given the seriousness of the threat. Furthermore, it held that States Parties must ensure that GHG emissions originating within their jurisdiction or control do not cause harm beyond areas where they exercise sovereign rights.[229] The content of these obligations depends on the source of emissions and includes duties to cooperate and assist developing States dealing with the effects of climate change, to conduct environmental impact assessments, protect fragile ecosystems and to conserve living marine resources.[230] In reaching its conclusions, ITLOS analyzed scientific evidence of climate change and legal materials. It drew on Intergovernmental Panel on Climate Change (IPCC) reports,[231] and examined the broader international climate change regime, including the United Nations Framework Convention on Climate Change (UNFCCC) considered the cornerstone.[232] The Tribunal also outlined the States Parties' commitments under the Kyoto Protocol, the Doha Amendment and the Paris Agreement, highlighted the latter's temperature goal and the central role of Nationally Determined Contributions (NDCs).[233] Additional reference was made to relevant instruments adopted within other international frameworks, including those addressing aviation, maritime transport, and ozone protection.[234] ITLOS further referred to the Convention on Biological Diversity (CBD) and the Convention on International Trade of Endangered Species of Wild Fauna and Flora (CITES).[235] The

[229] International Tribunal for the Law of the Sea (ITLOS), *Advisory Opinion on Climate Change and International Law* (21 May 2024), paras 79–92.
[230] International Tribunal for the Law of the Sea (ITLOS), *Advisory Opinion on Climate Change and International Law* (21 May 2024), paras 79–92 and 99–118.
[231]Intergovernmental Panel on Climate Change (IPCC), *Sixth Assessment Report (AR6), Synthesis Report* (2023). Available at: https://www.ipcc.ch/report/ar6/syr/
[232] United Nations Framework Convention on Climate Change (UNFCCC), 1771 UNTS 107 (adopted 9 May 1992, entered into force 21 March 1994). Available at the following link: https://unfccc.int/resource/docs/convkp/conveng.pdf
[233] Paris Agreement (2015), art. 4.
[234]International Tribunal for the Law of the Sea (ITLOS), *Advisory Opinion on Climate Change and International Law* (21 May 2024), paras 55-78; International Civil Aviation Organization (ICAO), *Convention on International Civil Aviation* (Chicago Convention, 7 December 1944); International Maritime Organization (IMO), International Convention for the Prevention of Pollution from Ships (MARPOL 73/78) (2 November 1973); United Nations, *Montreal Protocol on Substances that Deplete the Ozone Layer* (16 September 1987, entered into force 1 January 1989).
[235] Convention on Biological Diversity (CBD) 1760 UNTS 79 (adopted 5 June 1992, entered into force 29 December 1993); Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), 993 UNTS 243 (adopted 3 March 1973, entered into force 1 July 1975).

Tribunal underlined that all these instruments may assist in the determination of protection and preservation measures. However, they are not considered as lex specialis overriding UNCLOS.[236] In conclusion, the International Tribunal for the Law of the Sea's Advisory Opinion on climate change represents a historic turning point, emphasizing the central role of ecosystem protection in mitigating climate impacts.[237] By conceptualizing the environment as dynamic functional units, the Tribunal underscores a holistic understanding of ecosystems and their critical contribution to health at multiple levels.[238] Overall, while the Tribunal does not explicitly invoke the One Health paradigm, its reasoning implicitly reflects its core principles, particularly the interdependence of marine ecosystem integrity, human health, and biodiversity protection.[239]

3.2 Justification for the use of external rules and materials

In interpreting UNCLOS, ITLOS relied on Articles 31 and 33 of the Vienna Convention on the Law of the Treaties (VCLT)[240] and emphasized Article 237 UNCLOS, which requires "consistency and mutual supportiveness" between the rules contained in Part XII UNCLOS and other rules of international law relating to the preservation and protection of the marine environment.[241] The most relevant interpretative question was whether anthropogenic GHG emissions constitute "pollution of the marine environment" under UNCLOS.[242] To address this issue, ITLOS looked at the definition contained in Article 1(1)(4) UNCLOS and interpreted

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[236] International Tribunal for the Law of the Sea (ITLOS), *Advisory Opinion No. 31. Protection of the Marine Environment in Relation to Climate Change and Anthropogenic Greenhouse Gas Emissions*, Case No. 31, 21 May 2024, paras. 55–78,

[237]Sebbio, A. Il paradigma One Health nella giurisprudenza: *Il paradigma One Health nel parere consultivo dell'ITLOS sul cambiamento climatico: proteggere gli oceani per tutelare la salute umana*. *Corti Supreme e Salute*. (pp.1126-1128). Available at the following link: https://www.cortisupremeesalute.it/article/il-paradigma-one-health-nel-parere-consultivo-dellitlos-sul-cambiamento-climatico-proteggere-gli-oceani-per-tutelare-la-salute-umana/

[238]Ibid., p.1117

[239]Ibid*.,* pp.1125, 1130

[240] Vienna Convention on the Law of Treaties (adopted 23 May 1969, entered into force 27 January 1980) 1155 UNTS 331, arts 31–33.

[241] United Nations Convention on the Law of the Sea (UNCLOS), art 237; International Tribunal for the Law of the Sea (ITLOS), (2024, May 21), *Advisory Opinion on Climate Change and International Law*, paras 48–54.

[242] International Tribunal of the Law Of the Sea (ITLOS) (2024, May 21), *Advisory Opinion on Climate Change and International Law*, paras 55–60.

its terms in light of external rules and scientific materials.[243] This led the Tribunal to consider that the GHG emissions do constitute pollution of the marine environment, enabling the application of Article 194 UNCLOS in the context of climate change.[244] More broadly, ITLOS clarified that climate change-related obligations under UNCLOS derive primarily from Articles 192, 194, as well as from other provisions spread across the Convention, which can be largely categorized as rules of reference.[245] In this context, the Tribunal adopted a broad interpretation of the necessity requirement, clarifying that although UNCLOS grants States a margin of discretion in choosing the measures to prevent, reduce and control marine pollution, such discretion is not unlimited. Rather, the measures adopted must satisfy an objective standard of necessity.[246] This understanding is reflected in the interpretation of Articles 207 and 212 UNCLOS.[247] According to ITLOS, these provisions do not impose a general obligation to transpose international rules and standards into domestic law, but require States to give them due regard in good faith. At the same time, the Tribunal underlined that States remain bound to comply with those internationally agreed rules and standards that are legally binding upon them.[248] A more stringent role for the international rules is illustrated by Article 211 UNCLOS, which governs pollution from vessels and explicitly links national legislation to internationally agreed regulations.[249]

The Tribunal clarified that the obligations under Articles 192 and 194 UNCLOS are obligations of due diligence subject to a "stringent" standard, in line with its earlier

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[243] Rioseco S., 'The ITLOS Advisory Opinion on Climate Change and International Law: A Deep Dive into External Rules and Materials' (2025) 74(S1) *International and Comparative Law Quarterly* 195–213.

[244] United Nations Convention on the Law of the Sea (UNCLOS), art. 194; ITLOS, *Advisory Opinion on Climate Change and International Law* (21 May 2024), paras 79–92.

[245] United Nations Convention on the Law of the Sea (UNCLOS), arts. 192 and 194; ITLOS, *Advisory Opinion on Climate Change and International Law* (21 May 2024), paras 93–104.

[246] International Tribunal of the Law Of the Sea (ITLOS) (2024, May 21), *Advisory Opinion on Climate Change and International Law*, paras 105–112.

[247] United Nations Convention on the Law of the Sea (UNCLOS), arts. 207 and 212; International Tribunal of the Law of the Sea (ITLOS) (2024, May 21), *Advisory Opinion on Climate Change and International Law*, paras 113–118.

[248] International Tribunal of the Law Of the Sea (ITLOS) (2024, May 21), *Advisory Opinion on Climate Change and International Law*, paras 116–118.

[249] United Nations Convention on the Law of the Sea (UNCLOS), art 211; International Tribunal of the Law Of the Sea (ITLOS) (2024, May 21), *Advisory Opinion on Climate Change and International La*w, paras 119–122.

Advisory Opinion on the Responsibilities and Obligations of States Sponsoring Persons and Entities with respect to Activities in the Area[250]. ITLOS linked this standard to the principle of prevention and the precautionary approach, emphasizing that the content of due diligence is not fixed but depends on a range of factors and circumstances, including available scientific and technological information, international rules and standards, as well as the level of risk and urgency involved.[251] Furthermore, ITLOS' interpretative approach, grounded in the principle of systemic integration and drawing on multiple sources of international law, demonstrates that external materials were employed not only to clarify the meaning of specific terms, but also to shape the content and scope of existing UNCLOS obligations as applied to climate change.[252] While this approach raises unresolved questions, particularly concerning the criteria for relying on external rules under Article 31(3)(c) VCLT, and the role attributed to scientific knowledge in defining treaty obligations, it nonetheless provides significant guidance for the development of international law and may serve as a useful model for future climate regulations.[253]

3.3 ECtHR case law Verein KlimaSeniorinnen Schweiz v. Switzerland

The judgement of the European Court of Human Rights (ECtHR) in *Verein KlimaSeniorinnen Schweiz v. Switzerland* represents a landmark development in climate litigation under human rights law.[254] For the first time, the Court explicitly recognized that States' positive obligations under the European Convention on Human Rights extend to the prevention and management of foreseeable and systemic risks

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[250] International Tribunal for the Law Of the Sea (ITLOS) (2011, February 1), *Responsibilities and Obligations of States Sponsoring Persons and Entities with Respect to Activities in the Area*, Advisory Opinion, paras 117–122; International Tribunal for the Law Of the Sea (ITLOS) (2024, May 21), *Advisory Opinion on Climate Change and International Law*, paras 123–130.

[251] International Tribunal for the Law Of the Sea (ITLOS), (2024, May 21), *Advisory Opinion on Climate Change and International Law*, paras 131–140; Rioseco S., 'The ITLOS Advisory Opinion on Climate Change and International Law: A Deep Dive into External Rules and Materials' (2025) 74(S1) *International and Comparative Law Quarterly* 195–213.

[252] International Tribunal for the Law Of the Sea (ITLOS) (2024, May 21) , *Advisory Opinion on Climate Change and International Law*, paras 141–146.

[253] Rioseco, S. (2025). *The ITLOS Advisory Opinion on Climate Change and International Law: A Deep Dive into External Rules and Materials*. *International & Comparative Law Quarterly*, 74(S1), 195–213.

[254] European Court of Human Rights (ECtHR), *Verein KlimaSeniorinnen Schweiz and Others v. Switzerland*, Grand Chamber, Judgment of 9 April 2024, Applications no. 53600/20.

arising from climate change, assessed in light of scientific evidence.[255] While the Court had previously considered human rights in the context of environmental issues, this case marks its first engagement with climate change as a distinct human rights concern.[256]

On April 9, 2024, the Grand Chamber of the ECtHR released its judgement in the *Verein KlimaSeniorinnen Schweiz v. Switzerland.*[257] Noting that climate change is an international human rights issue, the Court found that Switzerland's climate policy failed to meet the protection standards required by the European Convention on Human Rights.[258] In 2016, four elderly women, together with a co-plaintiff association, Verein KlimaSeniorinnen Schweiz, representing more than 2,000 women over the age of 64, requested the Swiss Federal Council (Switzerland's highest executive body) and three other national authorities to take adequate measures to protect them from the adverse impacts of climate change.[259] The plaintiffs relied on scientific evidence showing that heat waves are associated with increased mortality and morbidity, particularly among senior women, and that several Swiss summers in recent years have been among the warmest ever recorded in the country.[260] The Swiss national authorities decided to dismiss the appeals. Consequently, on 1 December 2020, the plaintiffs filed a complaint with the ECtHR in Strasbourg, alleging violations of Article 2 (right to life), Article 8 (rights to private life and well-being), Article 6 (right to a fair trial), and Article 13 (right to an effective remedy) of the ECHR.[261] The Grand Chamber of the ECtHR found that Switzerland had breached its positive duties

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[255] Ibid., paras 410, 437, 544–546.

[256]Lavrysen L., "*The European Court of Human Rights and Climate Change: Striking a Balance between Human Rights Protection and Judicial Restraint*", Review of European, Comparative & International Environmental Law, 2023, p. 4.

[257] Intergovernmental Panel on Climate Change. (2022). *Climate Change 2022: Impacts, adaptation, and vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (H.O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem & B. Rama, Eds.). Cambridge University Press. Available at the following link: https://www.ipcc.ch/report/ar6/wg2/

[258] European Court of Human Rights (ECtHR), *Verein KlimaSeniorinnen Schweiz and Others v. Switzerland*, Grand Chamber, Judgment of 9 April 2024, Applications no. 53600/20. paras 418–421, 543–548. https://hudoc.echr.coe.int/?i=001-233206

[259] Ibid., paras 410, 420.

[260] Ibid., paras 548–549

[261] Ibid., para 552.

under the ECHR by failing to take sufficient action to mitigate the adverse effects of climate change on human rights. The Court found violations of Article 6 and Article 8 in an almost unanimous decision.[262] Having established these violations, it deemed it unnecessary to examine the respect of Articles 2 and 13 ECHR.[263] The Grand Chamber's decision is formally binding on Switzerland and cannot be appealed, pursuant to Articles 44(1) and 46(1) ECHR, and the Court refrained from prescribing specific measures for compliance.[264] Unlike in environmental pollution cases, individuals have standing in climate complaints only if they are personally and directly affected by the State's failure to protect their rights.[265] In this case, the individual complainants were denied victimhood status, whereas KlimaSeniorinnen association, of which they were members, was granted standing.[266] The Court emphasized that States retain wide discretion in environmental policy but introduced a two-tier approach to the margin of appreciation in climate matters: while States maintain broad discretion in selecting the means to achieve climate objectives, their margin is reduced when setting targets due to binding international obligations.[267] This approach reflects the urgency and severity of the climate crisis, with intergenerational equity highlighted as a primary consideration.[268] The judgement is particularly notable for its detailed articulation of States' positive obligations under the ECHR.[269] Domestic climate law must ensure effective protection of individuals against foreseeable and systemic risks posed by climate change.[270] While mitigation measures are prioritized under Article 8, adaptation measures remain an integral part of States' obligations.[271] States are required to adopt a binding regulatory framework that establishes a pathway toward

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[262] European Court of Human Rights (ECtHR), *Verein KlimaSeniorinnen Schweiz and Others v. Switzerland*, Grand Chamber, Judgment of 9 April 2024, Applications no. 53600/20. paras 572–574, 633-638.
[263] Ibid., paras 292, 537, 644 .
[264] Council of Europe. (1950). *European Convention on Human Rights*, Articles 44(1) and 46(1).
[265]European Court of Human Rights (Grand Chamber). (2024, April 9). *Verein KlimaSeniorinnen Schweiz and Others v. Switzerland* (Application no. 53600/20), paras 483, 485-488.
[266] Ibid., paras 489, 495-499, 504-505.
[267] Ibid., paras 543, 550, 572.
[268] Ibid.; paras 419-420, 499.
[269] Ibid; paras 508, 538-549, 555-573.
[270] Ibid.; paras. 413, 519-520.
[271] Ibid.; 544-551, 552-558.

achieving net neutrality within approximately three decades, supported by intermediate reduction targets capable of reasonably leading to the long-term goal.[272] States are also expected to specify their remaining carbon budgets and provide clear evidence demonstrating compliance with their targets, which must be grounded in the best available scientific evidence and regularly updated with due diligence.[273] Procedural safeguards, including public access to information and opportunities for participation in decision-making processes, are essential.[274] The Court unequivocally recognized climate change as one of the most pressing issues of our time, emphasizing its implications for intergenerational justice and highlighting how short-term political interests often prevail over the pressing need for sustainable policymaking, with serious consequences for future generations.[275]

Although the ECHR does not explicitly protect the environment, the Court has consistently addressed environmental issues insofar as they affect the enjoyment of Convention rights, requiring a demonstrable harmful effect on individuals.[276] Article 8 applies not only when environmental harm is directly caused by the State but also when State responsibility arises from a failure to regulate private actors.[277] This "duty to regulate" concerns both actual harm and foreseeable risks.[278] In other words, States must adopt regulations and measures capable of mitigating existing and potentially irreversible future effects and implement them effectively.[279] This obligation derives from States' commitments under the UNFCCC and the Paris Agreement as well as scientific evidence.[280] Each Contracting State is required to undertake substantial and progressive reductions in greenhouse gas emissions to achieve net neutrality within, in principle, the next three decades.[281]

Regarding Article 6(1), the Court found that it applied to the association's application but not to the individual applicants, who had failed to demonstrate that mitigation

[272]Ibid.; paras 545-550, 560-565.
[273] Ibid.; paras 518, 521-526, 551.
[274] Ibid.; paras 527-532.
[275] Ibid; paras. 416-419, 518.
[276] Ibid., paras 519–554.
[277] Ibid., paras 520–525.
[278] Ibid., paras 526–530; see also Lopez-Ostra v. Spain, 3030/96, ECHR 1994-95.
[279] Ibid., paras 531–540.
[280]Ibid., paras 541–547; United Nations Framework Convention on Climate Change (UNFCCC, 1992); Paris Agreement (2015).
[281] Ibid., paras. 545–547.

measures alone would have created sufficiently imminent and certain effects on their rights.[282] The association sought to defend the civil rights of its members against the adverse effects of climate change, and the Court emphasized the importance of its role in environmental matters.[283] As Article 6 is *lex specialis* to Article 13, the Court found it unnecessary to examine Article 13 separately.[284] Finally, although the judgement is formally binding only on Switzerland, it sends a strong normative signal to all Contracting Parties.[285] By setting out detailed substantive and procedural requirements for climate mitigation under human rights law, *Verein KlimaSeniorinnen* is likely to influence domestic courts and stimulate further rights-based climate litigation across Europe, particularly through actions brought by associations and NGOs, which may find it easier to establish standing at the domestic level before the ECtHR.[286] Finally, in the *KlimaSeniorinnen Schweiz* case, the European Court of Human Rights (ECtHR) highlighted the scientific evidence on climate change in order to show its direct impacts on human well-being and planetary health.[287] While the Court did not explicitly refer to the One Health paradigm, its reasoning reflects its integrated logic, emphasizing the interdependence of environmental protection, human health, and well-being.[288]

4. The "*Terra dei Fuochi*": A One Health Case Study of Failed Prevention

The case of the *Terra dei Fuochi* ("Land of Fires") in Campania region represents a paradigmatic example of systemic failure in preventive governance at the intersection of environmental protection, public health, and human rights.[289] The expression "Terra dei Fuochi" refers to decades of illegal dumping, uncontrolled abandonment, burial

[282] Ibid., paras 550–552.
[283] Ibid., paras 553–554.
[284] Ibid., para 553, 644.
[285] Ibid., paras 546-549.
[286] Ibid., paras 558–562.
[287] Bertoldi, C. (2024). *Il paradigma One Health nel caso Verein KlimaSeniorinnen Schweiz c. Svizzera: implicazioni e prospettive per l'ordinamento giuridico italiano*. Corti Supreme e Salute, 3, p.1031.
[288] Ibid., p. 1023.
[289] Di Cicco, G., & Barbieri, F. (2018). *Terra dei Fuochi: environmental, public health and governance implications*. Naples: Italian Senate, 12th Committee on Health and Hygiene, p. 49.

and incineration of hazardous waste .[290] According to a report of 19 January 2018 by the Italian Senate's 12th Committee (Health and Hygiene), specified that Terra dei Fuochi comprised ninety municipalities between the province of Naples and Caserta, affecting a significant portion of Campania's populations[291] The Senate Committee also highlighted the importance of developing a rigorous interdisciplinary methodology, and the need to avoid fragmented actions to tackle it.[292] In this context, the judgement of the European Court of Human Rights (ECtHR), developed a preventive reading that resonates with core elements of the One Health paradigm, despite not explicitly invoking it.

4.1 Environmental contamination and impacts on health

Decades of illegal waste trafficking and incineration provoked by the organised crime group, the Camorra, resulted in extensive contamination of land to agricultural use, groundwater and air quality, producing a chronic exposure of local populations to hazardous substances and contaminated food.[293] Epidemiological studies conducted at both national and international level identified a clear geographical correlation between negative health outcomes and territories most affected by unlawful waste management practices.[294] From a One Health perspective, the case evidenced the close interconnections between environmental degradation, food safety and human health.

4.2. Breakdown of preventive governance and due diligence obligations

At the core of the legal assessment lies the judgement of the European Court of Human rights (ECtHR), which found that Italy had violated Article 2 of the Convention by failing to adopt timely, coherent and effective measures to address a known and foreseeable environmental threat to life of residents in the *Terra dei Fuochi.* The

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[290] Campania Regional Agency for Environmental Protection (ARPAC). (2018). *Relazione annuale sui rifiuti e l'inquinamento nel territorio della Terra dei Fuochi*. Available at the following link: https://www.arpacampania.it/

[291] Italian Senate, 12th Committee on Health and Hygiene. (2018, January 19). *Rapporto sul fenomeno Terra dei Fuochi*, pp. 49–50.

[292] Ibid., pp.8, 18, 58.

[293] European Court of Human Rights (ECtHR). (2023). *Case of Cannavacciuolo and Others v. Italy*, pp.53-54, para 45. https://www.echr.coe.int/w/judgment-concerning-italy-11

[294] Musmeci, L., Comba, P., & Ziemacki, G. (2015). *Studi epidemiologici relativi al ciclo dei rifiuti nelle province di Napoli e Caserta* (Rapporti ISTISAN 15/26). Istituto Superiore di Sanità; Conti, B., et al. (2004). Environmental pollution and cancer mortality in Campania, Italy. *The Lancet Oncology, 5*(12), 737–742.

ECtHR considered unnecessary to examine Article 8 separately, as the applicants' arguments regarding the protection of health were already substantially addressed under Article 2.[295] Furthermore, the Court emphasized that Italian authorities had been aware of the phenomenon since at least 1988, yet meaningful legislative and regulatory were not implemented for more than two decades.[296] The case was brought by forty-one individual applicants, several of whom had developed serious illnesses, including cancer, while living in the affected area; they alleged that the measures adopted by the Government to tackle illegal dumping and waste burning were inadequate.[297] The ECtHR held that State responsibility arose not from a single harmful act, but from prolonged institutional inertia, fragmented regulatory frameworks and systemic failures in waste management governance. In particular, the Court criticized the absence of comprehensive risk assessment, the lack of effective monitoring mechanisms, insufficient coordination among public authorities, and inadequate public information. Taken cumulatively, these omissions, confirmed to have exposed residents to a real and imminent risk to life. Overall, the judgement reflects a consolidated understanding of preventive due diligence as a continuous obligation requiring Italian government to establish coherent regulatory frameworks, adopt anticipatory measures, ensure effective monitoring and provide transparent public information.[298] At the European Union level, the gravity of the situation had already been recognized by the Court of Justice of the European Union, which, in its

[295] European Court of Human Rights (ECtHR). (2025, January 30). *Cannavacciuolo and Others v. Italy*. Judgment. Paras. 45-48.
[296] Lieto, S., & Troisi, M. (2025). *The right to life in the Land of the Fires: The European Court of Human Rights in Cannavacciuolo and Others v. Italy*. *Osservatorio Costituzionale*. P.304. Available at: https://www.osservatorioaic.it/images/rivista/pdf/2025_3_02_LietoTroisi.pdf
[297] European Court of Human Rights (ECtHR). (2025, January 30). *Cannavacciuolo and Others v. Italy*, paras 54-55.
[298] European Court of Human Rights (ECtHR). (2025, January 30). , *Cannavacciuolo and Others v. Italy*, para 56.

judgements of 2007[299] and 2010,[300] found that Italy had failed to comply with EU waste management legislation. These findings reinforced the characterization of the Terra dei Fuochi not as an isolated anomaly, but as a persistent governance failure rooted in institutional, regulatory and enforcement deficits. The illegal dumping, burying, and uncontrolled incineration of waste were repeatedly described as criminal, irresponsible and out of control.[301] The temporal and geographical scale of these practices, as the Court of Justice of the European Union underlined, excludes any episodic or accidental reading of the phenomenon.[302] This factual background was ultimately reflected in the assessment carried out by the European Court of Human Rights, describing the phenomenon as "systemic".[303] This judicial assessment aligns with the conclusions of multiple parliamentary commissions of inquiry conducted between 1995 and 2018, which documented deep structural dysfunctions of waste management in Campania.[304] These inquiries attributed widespread pollution to weak regulatory enforcement, and inadequate criminal sanctions,[305] characterizing the situation as a persistent environmental and health emergency, exacerbated by the involvement not only of organized crime but also of industries and private

[299] On 26 April 2007 the Court of Justice of the European Union handed down its judgment in the proceedings initiated by the Commission on 22 March 2005 (Commission v Italy, C-135/05, EU:C:2007:250). In this judgment, the CJEU noted the Italian Republic had failed to fulfil its obligations under the provisions cited by the Commission, in that it had failed to adopt all the necessary measures to ensure that waste was recovered or disposed of without endangering human health and without using processes or methods which could harm the environment.

[300] On 4 March 2010 the Court of Justice handed down its judgment in Commission v. Italy (C-297/08, EU:C:2010:115). While noting that Italy had taken measures in 2008 to tackle the "waste crisis", the CJEU concluded that there existed in Italy a "structural deficit in terms of the installations necessary for the disposal of the urban waste produced in Campania, as evidenced by the considerable quantities of waste which [had] accumulated along the public roads in the region".

[301] Alberti P. (2022). The 'land of fires': epidemiological research and public health policy during the waste crisis in Campania, Italy. *Heliyon*, *8*(12), available at the following link: https://doi.org/10.1016/j.heliyon.2022.e12331

[302] Court of Justice of the European Union. (2007, May 8). *Commission v. Italy* (Case C-135/05, EU:C:2007:250); Court of Justice of the European Union. (2010, March 4). *Commission v. Italy* (Case C-297/08, EU:C:2010:115).

[303] European Court of Human Rights. (ECtHR). (2025). *Cannavacciuolo and Others v. Italy.* Judgement. Paras 540-542.

[304] Italian Senate. (1998). *Seconda Commissione d'inchiesta sul ciclo dei rifiuti in Campania*. Rome: Senato della Repubblica. (p.32)

[305] Italian Senate. (1996). *Prima Commissione d'inchiesta sul ciclo dei rifiuti in Campania*. (pp. 29,44,49).

citizens.[306]Although the Italian authorities formally acknowledged the crisis in 2013 and adopted urgent legislative and regulatory measures,[307] subsequent action remained fragmented, and largely ineffective.[308] Against this background, the ECtHR required the Italian Government to adopt a comprehensive remediation strategy, supported by independent monitoring mechanisms and transparent public information systems.

4.3. Lessons for the One Health approach

Although the European Court of Human Rights does not explicitly adopt the One Health paradigm, the *Terra dei Fuochi* case offers important lessons for the operationalization of the One Health approach, particularly with regard to preventive governance and human rights in situations of environmental risk.[309] According to the Court, States authorities are required to do everything reasonably within their power, through appropriate measures to the circumstances, the nature of danger and the state of the scientific and technical knowledge, to prevent, reduce and mitigate risks capable of endangering human life.[310] The duty of prevention (or duty of care) is triggered by the mere existence of a real and imminent risk to life that is known or at least foreseeable, irrespective of whether the source of the risk is public or private.[311] A significant innovation introduced by the Court lies in its interpretation of Article 2 of the Convention in environmental contexts.[312] The ECtHR clarified that the occurrence of actual damage, as well as the full proof of a causal link between State action is not an indispensable element for establishing a violation.[313] This preventive reading of the right to life marks a departure from previous environmental case law and aligns closely with the One Health paradigm, which emphasizes early intervention to prevent harm

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[306] Rivista Italiana di Economia Demografia e Statistica. (2023). *Ageing and pollution in the "terra dei fuochi"*, *RIEDS – Vol. LXXVII-2*. Available at the following link: https://www.rieds-journal.org/rieds/article/view/173

[307] Italian Government. (2014). *Decree-Law No. 136 of 10 December 2013, converted into Law No. 6 of 2014*. *Gazzetta Ufficiale*.

[308] Italian Senate.12th Committee on Hygiene and Health. (2018)

[309] European Court of Human Rights (ECtHR). (2025, January 30). *Cannavacciuolo and Others v. Italy*. Judgement.

[310] Ibid., paras 454-456, 460-462.

[311] Ibid., paras 454-456;

[312] Ibid., paras 513, 537-538.

[313] Ibid., paras 454-456, 490; see also Greco, D. (2025). *Diritto alla vita, obblighi positivi e approccio precauzionale*. In De Santis Di Nicola F., *CEDU e "Terra dei fuochi": a proposito della sentenza Cannavacciuolo et al. v. Italy*, Università degli Studi di Napoli Federico II, 27 February 2025, p.63.

at the human-animal-environment interface rather than reacting once damage has materialized.[314] The judgement further contributes to the consolidation of substantive principles of international environmental law. While in KlimaSeniorinnen the central principle was intergenerational equity, in the present case the European Court emphasized the precautionary principle.[315] In doing so, the Court did not hesitate to refer to external precedents from other regional jurisdictions, such as the Court of Justice of the European Union and the Inter-American Court of Human Rights, thereby promoting the consolidation, as a rule of general international law, of the principle enshrined in article 15 of the 1992 Rio Declaration on Environment and Development.[316]

From a One Health perspective, the decision underscores the need of integrated, interdisciplinary governance frameworks capable of addressing environmental contamination as a complex systemic risk affecting ecosystems, food safety and human health simultaneously.[317] It also highlights the importance of coordinated action among environmental authorities, public health institutions, scientific bodies and law enforcement agencies, as well as the value of transparent information-sharing and early risk communication.[318] In this sense, the judgement strengthens the legal foundations for One Health-oriented preventive strategies affirming that delays, fragmentation and institutional inertia in the face of known environmental risks are incompatible with States' human rights obligations.[319]

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[314] World Health Organization, Food and Agriculture Organization of the United Nations, United Nations Environment Programme, World Organization for Animal Health, & One Health High-Level Expert Panel. (2022). *One Health Joint Plan of Action (2022–2026)* (pp. 6–10).

[315] Greco, D. (2025). *Diritto alla vita, obblighi positivi e approccio precauzionale*. In De Santis Di Nicola F., *CEDU e "Terra dei fuochi": a proposito della sentenza Cannavacciuolo et al. v. Italy*, Università degli Studi di Napoli Federico II, 27 February 2025, p.70.

[316] United Nations. (1992). *Rio Declaration on Environment and Development* (1992), Principle 15; see also CJEU case law on precaution (e.g. Case C-157/96, National Farmers' Union).

[317] World Health Organization, Food and Agriculture Organization of the United Nations, United Nations Environment Programme, World Organization for Animal Health, & One Health High-Level Expert Panel. (2022). *One Health Joint Plan of Action (2022–2026)* (pp. 6–10).

[318] Italian Senate, 12th Standing Committee (Hygiene and Health), Report on Terra dei Fuochi (2018), pp.7-8 (interdisciplinary methodology; information-sharing)

[319]European Court of Human Rights. (ECtHR). (2025). *Cannavacciuolo and Others v. Italy.* Judgement, paras. 460-464, 490.

5. Fragmentation, structural gaps, limited enforceability and lack of formal recognition

The cases analysed in this chapter reveal a common structural pattern that transcends their specific factual contexts.[320] Despite the progressive recognition of preventive obligations in international environmental law, human rights law and EU law, the effective implementation of a genuinely integrated One Health approach remains hindered by persistent fragmentation, structural gaps and limited enforceability.[321] Key international instruments governing hazardous waste, environmental protection and public health operate within partially overlapping but poorly coordinated frameworks.[322] For example, the Basel Convention, despite its near-universal participation, coexists with parallel regulatory systems, such as the OECD control mechanism on transboundary movements of waste, that allow significant derogations and asymmetries in obligations, diluting coherence of preventive governance.[323] Structural gaps further emerge at the institutional and operational level.[324] Across the cases examined, obligations relating to monitoring, surveillance, data collection and risk assessment are formally recognised, yet their execution is often dispersed among multiple authorities with overlapping competences.[325] This institutional dispersion hampers the timely identification of cumulative and cross-sectoral risks.[326] While international and regional courts have progressively affirmed State responsibility even

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[320] Garcia, K. K., & Gostin, L. O. (2012). One Health, One World—The Intersecting Legal Regimes of Trade, Climate Change, Food Security, Humanitarian Crises, and Migration. *Laws*, *1*(1), 4-38, esp. pp.8-14. Available at: https://doi.org/10.3390/laws1010004

[321] Lee, K., & Brumme, Z. L. (2013). Operationalizing the One Health approach: the global governance challenges. *Health policy and planning*, *28*(7), 778–785. Available at the following link: https://doi.org/10.1093/heapol/czs127

[322] Phelan, A. L., Negri, S., & Hesselman, M. (2025). *Environmental health: Towards synthesis in global law and governance*. *Journal of Law, Medicine & Ethics, 53*(S1), 41–45. Available at: https://doi.org/10.1017/jme.2025.10

[323] Kummer, K. (1998). The Basel Convention: Ten years on. *Review of European Community & International Environmental Law*, 7(3), 227–236. https://doi.org/10.1111/1467-9388.00154

[324] Garcia, K. K., & Gostin, L. O. (2012). One Health, One World—The Intersecting Legal Regimes of Trade, Climate Change, Food Security, Humanitarian Crises, and Migration. *Laws*, *1*(1), 4-38, esp. pp.8-14. Available at: https://doi.org/10.3390/laws1010004

[325] European Court of Human Rights. (2024). *Verein KlimaSeniorinnen Schweiz and Others v. Switzerland,* Judgement. Paras 180-185. European Court of Human Rights. (2025). *Cannavacciuolo and Others v. Italy.* Judgement. Paras 245-252.

[326] Sharan, M., Vijay, D., Yadav, J. P., Bedi, J. S., & Dhaka, P. (2023). *Surveillance and response strategies for zoonotic diseases: A comprehensive review. Science in One Health, 2*, Article 100050. https://doi.org/10.1016/j.soh.2023.100050

in the absence of proven individual harm, compliance with judicial findings frequently depends on fragmented administrative responses and lacks sustained coordination.[327] Empirical assessments at the EU level have shown that, even where extensive information is formally available, the absence of a clear and coherent legal and regulatory framework assigning responsibilities and regulating interactions among authorities results in fragmented, outdated and inconsistent implementation.[328] Ultimately, these shortcomings point to a more fundamental issue: the absence of an explicit and binding legal recognition of the One Health approach.[329] Although scientific evidence and judicial reasoning increasingly rely on the interdependence of environmental, animal and human health, One Health remains largely a policy-oriented concept rather than a structuring legal principle, so preventive obligations continue to be articulated and enforced within sectoral silos, limiting their capacity to address complex, long-term and systemic risks.[330] The persistence of structural gaps and weak enforceability explains why, notwithstanding important jurisprudential advances, preventive governance remains largely reactive.[331] Bridging this gap requires not only the judicial recognition of preventive duties, but also the formal integration of One Health into legal frameworks capable of ensuring coordination, accountability and effective early action.[332]

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[327] European Court of Human Rights. (2025). *Cannavacciuolo and Others v. Italy.* Judgement. Paras 401, 460-462.
[328] *Ibidem*.
[329]Bullón Caro C (2025). Legal elements to operationalise One Health: from principles to practice. *Research Directions: One Health*. 3, e4, 1–11, esp. p. 1. Available at the following link: https://doi.org/10.1017/one.2025.2
[330] Ibid., pp.1,4,7.
[331] Faijue, D. D., Osorio Segui, A., Shringarpure, K., Razavi, A., Hasan, N., Dar, O., & Manikam, L. (2024). Constructing a One Health governance architecture: A systematic review and analysis of governance mechanisms for One Health. *European Journal of Public Health, 34*(6), 1086–1094. https://doi.org/10.1093/eurpub/ckae124
[332] Bullón Caro C (2025). Legal elements to operationalise One Health: from principles to practice. *Research Directions*: One Health. 3, e4, 1–11. https://doi.org/10.1017/one.2025.2.

Chapter 3

"The COVID-19 Pandemic as a Case Study for the One Health Approach"

Summary: 1. Zoonotic origins of SARS-CoV-2 and legal implications; 2. Health ecosystem interdependence and policy urgency; 3. International institutional responses and alignment with One Health; 3.1 WHO actions and emergency legal tools; 3.2. FAO response; 3.3 UNEP response; 3.4 WOAH response and multiagency involvement; 4. Strengths and shortcomings of the global governance framework; 5.The WHO Pandemic Agreement: opportunities and risks; 5.1. Objectives of the new instrument and prospects for consolidating One Health; 5.2 Risks of legal incoherence and normative weakness; 6. Recommendations for strengthening the legal dimension of One Health.

1. Zoonotic origins of SARS-CoV-2 and legal implications

On 31 December 2019, the Chinese government notified the World Health Organization (WHO) of an outbreak of severe pneumonia of unknown origin in Wuhan. Subsequent investigations identified a novel coronavirus, later named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) as the causative agent to the disease later named COVID-19.[333] Early epidemiological studies revealed that a significant proportion of the initial cases had direct links to the Huanan Seafood Wholesale Market, suggesting a possible association between the market and the early transmission dynamics of the virus. Further analyses confirmed the hypothesis that the market played a significant role in the transmission of the virus.[334] This led to the closure and sanitization of the market on 1 January 2020, alongside the collection of environmental samples from vendors' stalls.[335] In addition to seafood and poultry, the Huanan market sold a variety of live, wild-captured or farmed, mammal species. Spatial analyses revealed that SARS-CoV-2 positive environmental samples, including cages, carts, and freezers, were associated with activities in specific market areas, in

[333] World Health Organization. (2020, January 5). *Pneumonia of unknown cause – China*. Available at the following link: https://www.who.int/emergencies/disease-outbreak-news/item/2020-DON229

[334] Michael Worobey *et al.* The Huanan Seafood Wholesale Market in Wuhan was the early epicenter of the COVID-19 pandemic. *Science* 377,951-959(2022). Available at the following link: https://www.science.org/doi/10.1126/science.abp8715

[335] Liu, W.J., Liu, P., Lei, W. *et al.* Surveillance of SARS-CoV-2 at the Huanan Seafood Market. *Nature* 631, 402–408 (2024). https://doi.org/10.1038/s41586-023-06043-2

particular from one stall that sold live mammals.[336] These findings strongly suggest that infected animals were present at the Huanan market at the beginning of the COVID-19 pandemic.[337] The live animal trade and live animal markets are widely recognized as high-risk environment for zoonotic spillover events, as they facilitate repeated and close interactions between human and wildlife, increasing the likelihood of cross-species transmission.[338] Importantly, this context provide a coherent explanatory framework for the genetic diversity observed at the beginning of the pandemic. In fact, as the original outbreak spread to other countries, the diversity of SARS-CoV-2 quickly increased and led to the emergence of multiple variants.[339] Phylogenetic analyses suggest that the virus entered the human population through at least two independent zoonotic transmission events, giving rise to the progenitor lineages A and B, both connected to the market.[340] These lineages appear to have circulated in non-human mammalian hosts prior to their introduction into humans.[341] Once an animal virus acquires the capacity for human infection and transmission, a primary remaining barrier to spillover is contact between humans and pathogen. Thereafter, a single zoonotic transmission event indicates the conditions necessary for spillovers to have been met, which portends additional jumps.[342] Current scientific evidence does not provide evidence in support of laboratory origin of the virus. Bats

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[336] Xiao X, Newman C, Buesching CD, Macdonald DW, Zhou ZM. "Animal sales from Wuhan wet markets immediately prior to the COVID-19 pandemic." Scientific Reports 11, no.1 (2021) :11898. https://doi.org/10.1038/s41598-021-91470-2

[337] Michael Worobey *et al.* The Huanan Seafood Wholesale Market in Wuhan was the early epicenter of the COVID-19 pandemic. *Science* 377,951-959(2022). Available at the following link: https://www.science.org/doi/10.1126/science.abp8715

[338] World Health Organization, WHO-convened global study of origins of SARS-CoV-2: China part- Annexes. p.112, "Direct zoonotic transmission." Available at the following link: https://www.who.int/docs/default-source/coronaviruse/who-convened-global-study-of-origins-of-sars-cov-2-china-part-annexes.pdf

[339] Michael Worobey *et al.* The Huanan Seafood Wholesale Market in Wuhan was the early epicenter of the COVID-19 pandemic. *Science.* Available at the following link: https://www.science.org/doi/10.1126/science.abp8715

[340] Rambaut, A., Holmes, E. C., O'Toole, Á., Hill, V., McCrone, J. T., Ruis, C., du Plessis, L., & Pybus, O. G. (2020). A dynamic nomenclature proposal for SARS-CoV-2 lineages to assist genomic epidemiology. *Nature microbiology*, *5*(11), 1403–1407. https://doi.org/10.1038/s41564-020-0770-5

[341] Michael Worobey *et al.* The Huanan Seafood Wholesale Market in Wuhan was the early epicenter of the COVID-19 pandemic. *Science.* Available at the following link: https://www.science.org/doi/10.1126/science.abp8715

[342] Olival, K., Hosseini, P., Zambrana-Torrelio, C. *et al.* Host and viral traits predict zoonotic spillover from mammals. *Nature* 546, 646–650 (2017). https://doi.org/10.1038/nature22975

are widely considered the natural carrier of coronaviruses, as demonstrated by previous outbreaks of SARS and MERS.[343] Despite that, available data suggest that bat coronaviruses are unlikely to represent the direct progenitors of SARS-CoV-2, pointing instead to the involvement of one or more intermediate hosts.[344] Several studies have identified coronaviruses closely related to SARS-CoV-2 in pangolins, although no conclusive evidence supports a direct transmission from them to humans. Alternative hypotheses propose recombination events involving bat and pangolin coronaviruses in an as-yet unidentified intermediate species.[345] Overall, the prevailing scientific consensus indicates a zoonotic origin of SARS-CoV-2 most plausibly linked to wildlife trade and live animal markets.[346] In order to reduce the risk of future pandemics, it is fundamental to understand and then limit, the routes and opportunities for virus spillover.[347] From a binding legal perspective, the International Health Regulations (2005) impose on States Parties obligations to develop, strengthen, and maintain capacities for the prevention, detection, and response to public health risks, including those arising from zoonotic pathogens.[348] The continued operation of high-risk wildlife markets may therefore raise concerns regarding compliance with these preventive obligations. Furthermore, while the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) provides a regulatory framework for the protection of threatened species, it is not designed to address zoonotic disease risks and remains limited in its capacity to regulate domestic wildlife markets.[349] Thus, the SARS-CoV-2 pandemic thus highlights a normative gap at the intersection of international public health law, environmental law.

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[343] Ye, Z. W., Yuan, S., Yuen, K. S., Fung, S. Y., Chan, C. P., & Jin, D. Y. (2020). Zoonotic origins of human coronaviruses. *International journal of biological sciences*, *16*(10), 1686-1687; 1690-1695. https://doi.org/10.7150/ijbs.45472

[344] Ye, Z. W., Yuan, S., Yuen, K. S., Fung, S. Y., Chan, C. P., & Jin, D. Y. (2020). Zoonotic origins of human coronaviruses. *International journal of biological sciences*, *16*(10), 1694.

[345] Ibidem.

[346] Michael Worobey *et al.* The Huanan Seafood Wholesale Market in Wuhan was the early epicenter of the COVID-19 pandemic. *Science* 377,951-959(2022). Available at the following link: https://www.science.org/doi/10.1126/science.abp8715

[347] Plowright, R., Parrish, C., McCallum, H. *et al.* Pathways to zoonotic spillover. *Nat Rev Microbiol* 15, 502–510 (2017). https://doi.org/10.1038/nrmicro.2017.45

[348] See: https://www.who.int/publications/i/item/9789241580496

[349] Borsky, S., Hennighausen, H., Leiter, A. *et al.* CITES and the Zoonotic Disease Content in International Wildlife Trade. *Environ Resource Econ* 76, 1001–1017 (2020). Available at: https://doi.org/10.1007/s10640-020-00456-7

2. Health ecosystem interdependence and policy urgency

The human, animal environmental interdependence requires an integrated and urgent health policy, capable of coordinating zoonotic prevention measures, animal trade regulation, and global epidemiological surveillance. In the absence of specific treatment during the initial phases of the pandemic, governments were compelled to rely on non-pharmaceutical interventions (NPIs) to mitigate transmission. Public health responses worldwide have generally focused on four main domains: monitoring, public education, crowd controlling, and care facilities.[350] Monitoring strategies encompassed both community-level surveillance and targeted interventions at points of entry, including airports and borders crossings. Online platforms were also developed for self-monitoring, early detection, thereby enabling timely intervention and epidemiological tracking.[351] Public education was the second essential pillar. Authorities sought to provide transparent, accurate, and timely information through multiple channels, including mass media, messaging services, and official websites, fostering public compliance with health measures, infection control through prevention practices, such as mask-wearing, hand hygiene, and social distancing. Effective risk communication proved instrumental in shaping individual conduct and collective responsibility.[352] Crowd control measures represented a further component of containment strategies. Governments introduced social distancing mandates, quarantines, school and university closures, cancellation or postponement of events, restrictions on public gatherings, and the temporary closure of non-essential businesses.[353] Finally, the preparation of care facilities involved the rapid expansion or

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[350] Tabari, P., Amini, M., Moghadami, M., & Moosavi, M. (2020). International Public Health Responses to COVID-19 Outbreak: A Rapid Review. *Iranian journal of medical sciences*, *45*(3), 157–169. https://doi.org/10.30476/ijms.2020.85810.1537

[351] Countries like South Korea and Singapore effectively controlled COVID-19 through digital surveillance, contact tracing, and strict quarantine measures. South Korea stabilized the outbreak by isolating patients in quarantine centers, using GPS and credit card data to track movements, and mobilizing volunteer healthcare workers and military teams. Singapore leveraged a robust case monitoring and contact tracing system, implemented border controls, and drew on its prior experience with the 2003 SARS outbreak, ensuring that hospitals and Intensive Care Units (ICUs) were well prepared for rapid response. https://doi.org/10.30476/ijms.2020.85810.1537

[352] Tabari, P., Amini, M., Moghadami, M., & Moosavi, M. (2020). International Public Health Responses to COVID-19 Outbreak: A Rapid Review. *Iranian journal of medical sciences*, *45*(3), 157–169. https://doi.org/10.30476/ijms.2020.85810.1537

[353] Ibid.

adaptation of healthcare infrastructure to accommodate the surge of COVID-19 patients.[354] This included the designation of major hospitals, the establishment of temporary facilities such as the designation of major hospitals, the establishment of temporary facilities such as Fangcang shelter hospitals in China, and the allocation of resources to intensive care units, ensuring capacity for critical care.[355] Italy, China and United States are few examples of the national response to the Pandemic. In Italy, the pandemic exerted severe pressure on healthcare systems; the rapid escalation of cases during the early months of 2020 highlighted gaps in preparedness and coordination.[356] Despite a well-developed health system, the Italian government struggled with insufficient data on asymptomatic cases and the overwhelming demand for hospital and intensive care services.[357] Following the detection of the first major outbreak in Lombardy on 21 February 2020, an emergency task force was established, and measures such as international travel restrictions, airport screenings, and quarantines were implemented.[358] On 8 March, Northern Italy entered an emergency shutdown followed shortly by a nationwide quarantine and the designation of all regions as "red zones", entailing stringent restrictions on public events, hospital access, and non-essential medical procedures.[359] Similarly, China initially experienced the highest transmission rates, prompting the government to impose, on 23 January 2020, extraordinary containment measures, including border closures, suspension of trains and flights, city-wide lockdown, closure of schools and

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[354] Ibid.

[355] Chen S, Zhang Z, Yang J, Wang J, Zhai X, Barnighausen T, et al. Fangcang shel ter hospitals: a novel concept for respond ing to public health emergencies. Lancet. 2020. doi: 10.1016/S0140-6736(20)30744-3. PubMed PMID: 32247320.

[356] Sorbello M, El-Boghdadly K, Di Giacinto I, Cataldo R, Esposito C, Falcetta S, et al. The Italian coronavirus disease 2019 outbreak: recommendations from clinical practice. Anaesthesia. 2020. doi: 10.1111/anae.15049. PubMed PMID: 32221973.

[357] Tabari, P., Amini, M., Moghadami, M., & Moosavi, M. (2020). International Public Health Responses to COVID-19 Outbreak: A Rapid Review. *Iranian journal of medical sciences*, *45*(3), 157–169. https://doi.org/10.30476/ijms.2020.85810.1537

[358] Grasselli G, Pesenti A, Cecconi M. Critical Care Utilization for the COVID-19 Outbreak in Lombardy, Italy: Early Experience and Forecast During an Emergency Response. JAMA. 2020. doi: 10.1001/jama.2020.4031. PubMed PMID: 32167538.

[359] BBC News. (2020, March 9). *Coronavirus: Italy expands quarantine to entire country*. https://www.bbc.com/news/world-middle-east-51787238

workplaces, and restrictions on wildlife trade.[360] Suspected and confirmed cases were assigned to designated hospitals, contacts were traced using a bio-data network, and high-risk individuals were monitored of quarantined. The implementation of large-scale Fangcang shelter hospitals facilitated the isolation and treatment of patients.[361] Although initial delays in reporting and containment contributed to early transmission, the subsequent adoption of stringent population-wide interventions significantly curbed the viral spread.[362] In the United States, the decentralized federal system resulted in heterogenous policy responses across States.[363] Overall, comparative analyses suggest that the timing of interventions, public compliance, and clarity of risk communication played a decisive role in determining epidemiological outcomes, often outweighing democratic or geographic factors.[364]

3. International institutional responses and alignment with One Health

International cooperation and the systematic collection and analysis of epidemiological data are essential for improving pandemic response and enhancing global readiness for future outbreaks. As COVID-19 rapidly evolved into a global crisis, the United Nations mobilized international scientific cooperation and open information exchange to accelerate research and disseminate knowledge, illustrating the importance of multilateral collaboration in health emergencies.[365] WHO's policy briefs on COVID-19 surveillance reported epidemiological and laboratory data to inform risk assessment and response strategies.[366] Within this context, the COVID-19

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[360] Chen S, Yang J, Yang W, Wang C, Barnighausen T. COVID-19 control in China during mass population movements at New Year. Lancet. 2020;395:764-6. doi: 10.1016/ S0140-6736(20)30421-9. PubMed PMID: 32105609.

[361] Ibid.

[362]Tabari, P., Amini, M., Moghadami, M., & Moosavi, M. (2020). *International Public Health Responses to COVID-19 Outbreak: A Rapid Review.* Iranian journal of medical sciences, 45(3), 157–169. https://doi.org/10.30476/ijms.2020.85810.1537

[363] While certain jurisdictions, such as California, achieved relative success through the early implementation of preventive measures, others, notably New York, experienced more pronounced outbreaks. https://doi.org/10.30476/ijms.2020.85810.1537

[364] Stokes DC. Senior Medical Students in the COVID-*19 Response: An Opportunity to Be Proactive.* Acad Emerg Med. 2020;27:343 5. doi: 10.1111/acem.13972. PubMed PMID: 32215977.

[365] United Nations. (2020). *UN mobilizes global cooperation in science-based COVID-19 responses*.https://www.un.org/en/un-coronavirus-communications-team/un-mobilizes-global-cooperation-science-based-covid-19-responses

[366] World Health Organization. (2024). *WHO policy brief:* COVID-19 surveillance. https://www.who.int/emergencies/diseases/novel-coronavirus-2019/covid-19-policy-briefs

Law Lab, was jointly developed by the WHO, the United Nations Development Programme (UNDP), the Joint United Nations Programme on HIV/AIDS (UNAIDS), and the O'Neill Institute for National and Global Health Law, as a comprehensive repository of national legal measures adopted in response to the pandemic.[367] Overall, the global nature of the COVID-19 pandemic placed international institutions at the forefront of crisis management.

3.1 WHO actions and emergency legal tools

The COVID-19 pandemic generated un unprecedented wave of legislative, regulatory, and institutional action, underscoring the central role of legal frameworks in global health governance. As emphasized by the Director-General of the World Health Organization (WHO), Dr.Tedros Adhanom Ghebreyesus, "strong legal frameworks are critical for national COVID-19 responses" particularly in light of the transnational nature of public health threats and the need to ensure coherence between domestic legal orders and international obligations.[368]

From a normative perspective, the WHO's response to COVID-19 was primarily structured within the normative architecture of the International Health Regulations (IHR, 2005) which constitute the central binding legal instrument governing international disease surveillance, notification, and response coordination.[369] Following the notification by Chinese authorities on 31 December 2019, concerning cases of pneumonia of unknown origin in Wuhan, the WHO promptly activated its surveillance and verification mechanisms pursuant to Articles 5, 6, and 9 IHR.[370] In early January 2020, the Organization issued technical guidance on diagnostics, epidemiological surveillance, and clinical management, in accordance with its coordinating mandate.[371] On 30 January 2020, after consultation with the Emergency

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[367] World Health Organization. (2020, July 22). *New COVID-19 Law Lab to provide vital legal information and support for the global COVID-19 response*. https://www.who.int/news/item/22-07-2020-new-covid-19-law-lab-to-provide-vital-legal-information-and-support-for-the-global-covid-19-response; https://covidlawlab.net/

[368] World Health Organization. (2020, July 22). *New COVID-19 Law Lab to provide vital legal information and support for the global COVID-19 response*.

[369] World Health Organization, International Health Regulations (2005). Available at the following link: https://www.who.int/publications/i/item/9789241580496

[370] Ibid, Part. II, "Information and Public Health Response", artt.5, 6 and 9.

[371] Ibid. Art.2.

Committee[372], COVID-19 was formally declared a Public Health Emergency of International Concern (PHEIC), thereby activating the global emergency response regime.[373] In this context, the WHO launched the Strategic Preparedness and Response Plan (SPRP),[374] the Solidarity Response Fund,[375] the UN-COVID-19 Supply Chain Task Force,[376] and the Solidarity Trial[377]. These mechanisms applied under article 13 and 44 IHR, facilitated technical assistance, resource mobilization, research coordination, and clinical trials aimed at identifying potential and effective treatments.[378] In parallel, the Organization co-led the establishment of the Access to COVID-19 Tools (ACT) Accelerator[379] and the COVAX Facility,[380] in partnership with Gavi and the Coalition for Epidemic Preparedness Innovations (CEPI), with the objective of accelerating vaccine development and ensuring equitable global access.[381] In this regard, the first Emergency Use Listing (EUL) of a COVID-19 vaccine on 31 December 2020 marked a turning point in the global response strategy, consolidating

[372] the Emergency Committee, established under art. 48 and 49 IHR (2005), provides scientific advice to the Director-General regarding the declaration, continuation, and termination of a PHEIC. Its institutional role ensures expert oversight, procedural accountability, and scientific legitimacy within global emergency governance.

[373] The declaration of a PHEIC represents the highest level of global health alert under international law. Grounded in Articles 12, 48 and 49 IHR, it activates extraordinary coordination powers, legitimizes emergency public health interventions, and triggers enhanced international obligations. https://www.who.int/publications/m/item/covid-19-public-health-emergency-of-international-concern-%28pheic%29-global-research-and-innovation-forum

[374] World Health Organization. (2020, June 5). *Monitoring and evaluation framework: COVID-19 strategic preparedness and response*. Available at the following link: https://www.who.int/publications/i/item/monitoring-and-evaluation-framework.

[375] World Health Organization. (2020, March 13). *WHO, UN Foundation and partners launch first-of-its-kind COVID-19 Solidarity Response Fund.* https://www.who.int/news/item/13-03-2020-who-un-foundation-and-partners-launch-first-of-its-kind-covid-19-solidarity-response-fund

[376] United Nations. (2020, April). *Supply chain and COVID-19: UN rushes to move vital equipment to frontlines*. https://www.un.org/en/coronavirus/supply-chain-and-covid-19-un-rushes-move-vital-equipment-frontlines

[377] World Health Organization. WHO COVID-19 Solidarity Therapeutics Trial. https://www.who.int/emergencies/diseases/novel-coronavirus-2019/global-research-on-novel-coronavirus-2019-ncov/solidarity-clinical-trial-for-covid-19-treatments

[378] World Health Organization. International Health Regulations (2005). Art. 13: "Public health response", art. 44: "Collaboration and assistance".

[379] World Health Organization. (2020). *The Access to COVID-19 Tools (ACT) Accelerator. https://www.who.int/initiatives/act-accelerator*

[380] World Health Organization (2020). COVAX, *Working for global and equitable access to COVID.19 vaccines.* https://www.who.int/initiatives/act-accelerator/covax

[381] See: https://www.gavi.org/covax-facility; https://cepi.net/equitable-access/

vaccination as a central pillar of pandemic containment.[382]

The WHO exercised its normative authority through the issuance of temporary and standing recommendations pursuant to Articles 15 and 16 IHR.[383] Although formally non-binding, these instruments exert significant normative influence by guiding national policies.[384] Their implementation is constrained by the principles of scientific evidence, necessity, proportionality, and the least restrictive means.[385] Standing recommendations, in particular, provide longer-term normative guidance and facilitate regulatory consolidation and preparedness reinforcement, promoting institutional learning.[386]

The Strategic Preparedness and Response Plans identified core objectives including transmission suppression, exposure reduction, community empowerment, infodemic management, protection of vulnerable populations, and reduction of morbidity and mortality.[387] Recognizing that transmission dynamics and preparedness capacities vary significantly across countries, WHO promoted adaptive governance models calibrated to different epidemiological scenarios, based on levels of transmission intensity, ranging from sporadic outbreaks to sustained community spread.[388] This approach was operationalized through an integrated preparedness framework structured around five core Health Emergency Preparedness and Response and Resilience (HEPR) capacities: emergency coordination, collaborative surveillance,

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[382]World Health Organization. (2020, December 31). *WHO issues its first emergency use validation for COVID-19 vaccine and emphasized need for equitable access.* https://www.who.int/news/item/31-12-2020-who-issues-its-first-emergency-use-validation-for-a-covid-19-vaccine-and-emphasizes-need-for-equitable-global-access

[383] World Health Organization. (2005). *International Health Regulations (2005)*. Art. 15 "Temporary recommendations"; art. 16 "Standing recommendations".

[384] World Health Organization (2023, August 9). *Standing recommendations*. https://www.who.int/teams/ihr/standing-recommendations

[385] World Health Organization. (2005). *International Health Regulations (2005)* (2nd ed.). Art. 15 "Criteria for recommendations". https://apps.who.int/gb/IHR/pdf_files/IHR_IGWG2_2-en.pdf

[386] World Health Organization. (2023, August 9). *Standing recommendations*. https://www.who.int/teams/ihr/standing-recommendations

[387] World Health Organization, *Strategic preparedness, readiness and response plan to end the global COVID-19 emergency in 2022*, 30 March 2022, pp.6-11. Available at : https://www.who.int/publications/i/item/WHO-WHE-2021.02

[388] Ibid.

clinical care, community protection, and access to countermeasures.[389] These capacities were designed to function both horizontally across governance levels and vertically between local, national, and global institutions. The effectiveness of the COVID-19 response depends on the full functioning of all five subsystems and their interconnections, all of which must be underpinned by the principles of equity, inclusiveness and coherence.[390] Overall, the Strategic Preparedness and Response Plans Monitoring and Evaluation Framework enhanced accountability by tracking WHO's technical assistance, operational milestones, and country-level progress through scientific and standardized indicators.

Core components of WHO's Strengthening global architecture for health emergency preparedness, response, and resilience	Pillars of the COVID-19 SPRP operational planning guidelines
Coordination	☐ Pillar 1: Coordination, planning, financing, and monitoring
Collaborative surveillance	☐ Pillar 3: Surveillance, epidemiological investigation, contact tracing, and adjustment of public health and social measures
	☐ Pillar 5: Laboratories and diagnostics
Community protection	☐ Pillar 2: Risk communication, community engagement (RCCE), and infodemic management
	☐ Pillar 4: Points of entry, international travel and transport, mass gatherings and population movement
	☐ Pillar 10: Vaccines research, policy, and strategy
Safe and scalable care	☐ Pillar 6: Infection prevention and control, and protection of the health workforce
	☐ Pillar 7: Case management, clinical operations, and therapeutics
	☐ Pillar 9: Strengthening essential health services and systems
Countermeasures and research	☐ Pillar 8: Operational support and logistics, and supply chains
	☐ Pillar 10: Vaccines research, policy, and strategy

Table 1. Alignment of the 2020-2022 SPRP pillars of the COVID-19 responses with the 5 core components of the global health architecture.[391]

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[389] World Health Organization. (2025). *Global Health emergency corps framework.* https://iris.who.int/server/api/core/bitstreams/9ee35231-f838-4fba-b8ba-e8ee67f31136/content

[390] Ibid.

[391] World Health Organization. (2023, September 4). Emergency response to long-term COVID-19 disease management. Ending the COVID-19 emergency and transitioning from emergency phase to longer-term disease management: Guidance on calibrating the response. https://iris.who.int/server/api/core/bitstreams/0da191bb-4b5c-4163-95e7-2dd7e9cac5f7/content

Moreover, alongside operational and regulatory efforts, the WHO released a series of policy briefs addressing critical aspects of pandemic management, including risk communication and community engagement (RCCE), infodemic management[392], and long-term surveillance strategies.[393] These documents highlighted the importance of building public trust, combating misinformation, and sustaining surveillance capacities to ensure early detection and rapid response to evolving pandemic threats. Throughout the emergency, the WHO consistently emphasized that extraordinary public health measures must comply with international human rights standards. In fact, even under declared states of emergency, restrictions on fundamental freedoms were required to satisfy principles of legality, necessity, proportionality, and non-discrimination.[394] Core rights, including the right to life, access to healthcare, food, housing, education, social protection, fair trial guarantees, were reaffirmed as non-derogable. Emergency powers were explicitly framed as temporary instruments that must remain subject to transparency, judicial oversight, and democratic accountability.[395] Despite this normative and rights-based framework, the unprecedented scale of the pandemic revealed critical deficiencies in global health governance, triggering renewed efforts toward legal reform and institutional accountability. In May 2020, the World Health Assembly (WHA) mandated an independent evaluation of the international response, leading to recommendations for reforming global preparedness and emergency governance.[396] This process culminated in the launch of negotiations for a new international pandemic preparedness treaty in November 2021, intended to enhance compliance mechanisms, early warning systems,

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[392] World Health Organization (2024, December 10). WHO policy brief: Building trust through risk communication and community engagement and infodemic management. Available at : https://www.who.int/publications/m/item/who-policy-brief-building-trust-through-risk-communication-and-community-engagement-and-infodemic-management

[393] World Health Organization. (2024, December 10). WHO policy brief: COVID-19 surveillance. Available at:https://www.who.int/publications/m/item/who-policy-brief-covid-19-surveillance

[394] Office of the United Nations High Commissioner for Human Rights. (2020, April 27). *Emergency measures and COVID-19: Guidance*. United Nations.

[395] For more details see the following link: https://www.ohchr.org/sites/default/files/Documents/Events/EmergencyMeasures_COVID19.pdf

[396] World Health Organization. (2020, May 19). *Historic health assembly ends with global commitment to COVID-19 response. https://www.who.int/news/item/19-05-2020-historic-health-assembly-ends-with-global-commitment-to-covid-19-response*

data sharing, and equitable access to medical countermeasures.[397] In August 2023, WHO issued standing recommendations guiding the transition from emergency response to long-term COVID-19 management, consolidating lessons learned and promoting sustainable preparedness frameworks anchored in international cooperation, transparency, One Health surveillance, and regulatory strengthening.[398]

3.2. FAO response

The COVID-19 pandemic has severely disrupted all dimensions of food system.[399] While global food supply remained mostly stable, local production, distribution and marketing systems were heavily affected, especially in low-income regions. Access to food suffered the most, as job and income losses reduced purchasing power and increased hunger among vulnerable populations.[400] Nutrition declined as households relied on cheaper, less healthy diets. Food stability weakened due to trade disruptions, price volatility, and economic uncertainty. At the same time, workers, women, youth, and small farmers lost agency because of unsafe conditions, restricted mobility, and reduced job security. Environmental sustainability has also been undermined, increasing risks to long-term food system resilience. Overall, the pandemic has intensified hunger, inequality, and fragility in global food systems, with serious long-term consequences for nutrition, livelihoods, and sustainability.[401] It highlighted the urgent need for comprehensive policy reform to ensure food security, adequate nutrition, and the right to food. Four major policy shifts are required. First, food

[397] World Health Organization. (2020, May 19). *World Health Assembly journal, Seventy-third World Health Assembly: Journal No. 2* (WHA73 JRN-A73-2). Available at the following link: https://apps.who.int/gb/Journal/e/WHA73/JRN-A73-2_en.html

[398] World Health Organization (2023, August 9). Standing recommendations for COVID-19 issued by the Director-General of the World Health Organization (WHO) in accordance with the International Health Regulations (2005) (IHR). Available at the following link: https://www.who.int/publications/m/item/standing-recommendations-for-covid-19-issued-by-the-director-general-of-the-world-health-organization-(who)-in-accordance-with-the-international-health-regulations-(2005)-(ihr)

[399] High Level Panel of Experts on Food Security and Nutrition (HLPE). (2020). *Impacts of COVID-19 on food security and nutrition: Developing effective policy responses to address the hunger and malnutrition pandemic* (Issues Paper). Committee on World Food Security, Food and Agriculture Organization of the United Nations. Full text available at the following link: http://www.fao.org/3/cb1000en/cb1000en.pdf

[400] HLPE, 2020, p.8.

[401] HLPE, 2020, p.9.

systems must be fundamentally transformed, moving beyond a narrow focus on increasing production towards more diverse, inclusive, and environmentally sustainable systems that protect vulnerable populations.[402] Second, policies should recognize the strong interconnections between food, environmental, health, and economic systems, ensuring coordinated approaches that reduce risks and strengthen resilience.[403] Third, strategies must address the multiple and overlapping forms of malnutrition, including hunger, micronutrient deficiencies, and obesity, which increase vulnerability to disease. Finally, policies must remain flexible and context-specific to reflect diverse social, economic, and ecological conditions.[404] The Food and Agriculture Organization of the United Nations (FAO) positioned its COVID-19 response within the framework of the United Nations Office for the Coordination of Humanitarian Affairs (OCHA)-led Global Humanitarian Response Plan.[405] FAO's interventions focused on anticipatory action and emergency livelihood support, aiming to mitigate immediate shocks while strengthening long-term resilience, in line with the Organization's Hand-in-Hand initiative and the broader objectives of the 2030 Agenda for Sustainable Development.[406] Core operational priorities included the systematic collection and analysis of real-time data to monitor risk factors affecting local food supply chains and the identification of emerging trends; the stabilization of food access for the populations experiencing acute food insecurity; the preservation of critical food distribution networks, and the protection of worders throughout the supply chain in order to reduce the virus transmission and to ensure continuity of food supplies.[407] Governments and international institutions adopted a range of policy measures aimed

[402] HLPE, 2020, p.10.
[403] HLPE, 2020, p.11.
[404] Ibidem.
[405] Food and Agriculture Organization of the United Nations. 2020. *FAO COVID-19 Response and Recovery Programme: Global Humanitarian Response Plan: Addressing the impacts of COVID-19 and safeguarding livelihoods in food crisis contexts*. Rome. https://doi.org/10.4060/cb0285en
[406] Food and Agriculture Organization of the United Nations. 2020. *FAO COVID-19 Response and Recovery Programme: Boosting smallholder resilience for recovery: Protecting the most vulnerable, promoting economic recovery and enhancing risk management capacities*. Rome. https://doi.org/10.4060/cb0286en
[407] Food and Agriculture Organization of the United Nations. 2020. *FAO COVID-19 Response and Recovery Programme: Global Humanitarian Response Plan: Addressing the impacts of COVID-19 and safeguarding livelihoods in food crisis contexts*. Rome. https://doi.org/10.4060/cb0285en

at sustaining food access and stabilizing markets, including the facilitation of transport through special permits, sanitary protections for workers, support for retail operations and promotion of e-commerce and home delivery services.[408] At the international level, enhanced coordination mechanisms were activated, with the Committee on World Food Security playing a central role in promoting inclusive governance, information-sharing and policy coherence.[409] At the same time, the crisis reinforced calls for structural reforms to build more resilient food systems though the strengthening of local and regional markets, support for small and medium enterprises, and the promotion of environmentally sustainable production models such as agroecology, urban agriculture and responsible fisheries.[410] Within this context, FAO developed a comprehensive and holistic COVID-19 Response and Recovery Programme, in line with the UN approach to "build to transform" and in pursuit of the Sustainable Development Goals.[411] The Programme pursued two overarching goals: mitigating the immediate socio-economic and food security impacts of the pandemic and strengthening the long-term resilience of agrifood systems and livelihoods. These objectives were operationalized through seven priority areas: (1) humanitarian response in food crisis contexts; (2) data generation and policy support for decision-making; (3) economic inclusion and social protection; (4) facilitation of trade and food safety standards; (5) strengthening smallholder resilience; (6) prevention of future zoonotic pandemics through a One Health approach; and (7) food systems transformation.[412] Moreover, a real-time independent evaluation of the Programme,

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[408] Food and Agriculture Organization of the United Nations (FAO). (2020, March 29). *COVID-19 and the risk to food supply chains: How to respond?* FAO Policy Brief. Available at: https://digitallibrary.un.org/record/3859778?v=pdf

[409] High Level Panel of Experts on Food Security and Nutrition (HLPE). (2020). *Impacts of COVID-19 on food security and nutrition: Developing effective policy responses to address the hunger and malnutrition pandemic*. Committee on World Food Security, FAO. Available at: http://www.fao.org/3/cb1000en/cb1000en.pdf

[410] High Level Panel of Experts on Food Security and Nutrition (HLPE). (2020). *Impacts of COVID-19 on food security and nutrition: Developing effective policy responses to address the hunger and malnutrition pandemic*. Committee on World Food Security, FAO. Available at: http://www.fao.org/3/cb1000en/cb1000en.pdf

[411] Food and Agriculture Organization of the United Nations. (2021). *FAO COVID-19 Response and Recovery Programme*. Available at the following link: https://openknowledge.fao.org/server/api/core/bitstreams/2fc9e519-5758-4b03-b8ba-e55d134b3f2a/content

[412] Food and Agriculture Organization of the United Nations. (2022). *Real-time evaluation of FAO's COVID-19 response and recovery programme – final report*. Available at the following

conducted by the Office of Evaluation (OED), found that it represented a pioneering initiative, being the first integrated framework developed by FAO to simultaneously implement emergency humanitarian assistance and long-term development intervention.[413] Key achievements included provision of humanitarian assistance to vulnerable populations through cash transfers, food distribution, safety equipment, and livelihood protection measures; the real-time data to guide policy makers enabling governments to allocate scarce public resources strategically.[414] Trade facilitation efforts reduced food supply disruptions, while smallholder resilience programmes enhanced food security and economic recovery.[415] Finally, One Health interventions strengthened surveillance systems, countered misinformation regarding zoonotic risks, and improved regulatory frameworks, and promoting transformation to support long-term sustainability and resilience.[416] However, the evaluation also identified challenges, notably regarding resource allocation, limited long-term recovery funding and inadequate preparedness at country level.[417] The Programme was designed as an umbrella framework to enhance internal coordination, streamline governance, reduce organizational silos, and mobilize resources more effectively.[418] In conclusion, the evaluation advanced three main recommendations: ensuring a more equitable distribution of resources in future crisis response, improving the timeliness of the acquisitions of goods and services and strengthening the implementation of business

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link:https://openknowledge.fao.org/server/api/core/bitstreams/53055d9b-d477-48be-bb30-e151d69009da/content

[413] The evaluation was conducted in two phases: an initial phase assessing FAO's immediate humanitarian response, data services, and knowledge products, and a second phase focusing on transition and recovery. The first phase highlighted good practices in rapid priority-setting, real-time data use, evidence-based guidance, and coordination, while the second examined country-level impact, accountability, and institutional learning across the full duration of the Programme. https://openknowledge.fao.org/server/api/core/bitstreams/53055d9b-d477-48be-bb30-e151d69009da/content

[414] Food and Agriculture Organization of the United Nations. (2022). *Real-time evaluation of FAO's COVID-19 response and recovery programme – final report*. Available at the following link:https://openknowledge.fao.org/server/api/core/bitstreams/53055d9b-d477-48be-bb30-e151d69009da/content

[415] Ibid., para 11.

[416] By December 2021, FAO and the Ministry of Agriculture – with financial support from the European Union - had produced more than 40 bulletins of the Emergency Agriculture and Food Security Surveillance System (EmA-FSS).

[417] [417] Food and Agriculture Organization of the United Nations. (2022). *Real-time evaluation of FAO's COVID-19 response and recovery programme – final report*. Para 52.

[418] Ibid., para 11

continuity plans at national and local levels.[419] It highlights the need for improved financial sustainability and coordination frameworks, integrating crisis preparedness into institutional planning. Together, these measures aim to enhance FAO's operational effectiveness, institutional resilience, and capacity to respond to future global emergencies.[420]

3.3 UNEP response

UNEP Executive Director, Inger Anderson, affirmed: "In COVID-19, the planet has delivered its strongest warning to date that humanity must change. Shutting down economies is a short term response to this warning. It cannot endure. Only by building functioning economies that work with nature, not against it, can the world's nations thrive."[421]

In fact, COVID-19 has been a reminder that human health is linked to the planet's health. For this reason, in order to prevent future outbreaks, we must address the threats to ecosystems and wildlife, including habitat loss, illegal trade, pollution and climate change.[422]

The United Nations Environment Programme (UNEP) structured its response to the COVID-19 pandemic around a comprehensive and integrated strategy, highlighting how environmental degradation, biodiversity loss, climate change, and ecosystem disruption significantly increase the risk of zoonotic diseases, reinforcing the need for a systemic and preventive approach to global health governance.[423] UNEP's COVID-19 response strategy was built around four main pillars. The first pillar addressed the medical and humanitarian emergency phase, aimed to mitigate the adverse impacts of the pandemic response on both human and environmental health.[424] Particular

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[419] Ibid., paras. 56-62
[420] Ibid., paras 61, 62.
[421] United Nations Environment Programme. (2020). *Working with the environment to protect people: UNEP's COVID-19 response*. Available at the following link: https://wedocs.unep.org/rest/api/core/bitstreams/2c036c99-4904-4f82-a50b-98d35ad2fdee/content
[422] United Nations Environment Programme. (2020, May 14). *Working with the environment to protect people: UNEP's COVID-19 response*. United Nations Environment Programme. https://www.unep.org/resources/working-environment-protect-people-covid-19-response
[423] Ibid., p.2.
[424] United Nations Environment Programme. (2020). *Working with the environment to protect people: UNEP's COVID-19 response*. Available at the following link:

attention was given to the unprecedented surge in hazardous waste, including personal protective equipment, electronic waste, and pharmaceuticals, as well as to the increased volumes of wastewater, detergents, disinfectants, and antimicrobial substances.[425] UNEP provided technical assistance, policy guidance, and capacity-building support. A key contribution in this area was the publication of the report *Waste Management during the COVID-19 Pandemic: from response to recovery* in August 2020, which offered practical recommendations for healthcare and municipal waste management, promoted circular economy principles, and supported countries in strengthening both short-term emergency responses and long-term preparedness strategies.[426] The second pillar focused on promoting a transformational change for nature and people, recognizing that ecosystem degradation and biodiversity loss constitute central drivers of zoonotic disease emergence.[427] UNEP advanced science-based policy solutions to better understand and reduce zoonotic risks, including the design of integrated risk assessment frameworks that incorporate environmental considerations.[428] A milestone initiative was the publication of the report *Preventing the Next Pandemic: Zoonotic Diseases and How to Break the Chain of Transmission*, developed in collaboration with the International Livestock Research Institute and other partners.[429]The report advocated the adoption of the One Health approach, considered the optimal method for preventing as well as responding to zoonotic disease outbreaks and pandemics.[430] UNEP also promoted increased investment in nature as a

https://wedocs.unep.org/rest/api/core/bitstreams/2c036c99-4904-4f82-a50b-98d35ad2fdee/content

[425] Ibid., p.2.

[426] United Nations Environment Programme & IGES Centre Collaborating with UNEP on Environmental Technologies. (2020). *Waste management during the COVID-19 pandemic: From response to recovery*. https://www.unep.org/resources/report/waste-management-during-covid-19-pandemic-response-recovery

[427] United Nations Environment Programme. (2020). *Working with the environment to protect people: UNEP's COVID-19 response*. Available at the following link: https://wedocs.unep.org/rest/api/core/bitstreams/2c036c99-4904-4f82-a50b-98d35ad2fdee/content

[428] Ibid., p.3.

[429] This report is one of the first that specifically focuses on the environmental side of the zoonotic dimension of disease outbreaks during the COVID-19 pandemic. It tries to fill a critical knowledge gap and provide policymakers with a better understanding of the context and nature of potential future zoonotic disease outbreaks. https://wedocs.unep.org/items/426976c7-ee73-4cd8-a3f2-8659d1e88b04

[430] Ibid., p.7.

foundation for improved human health, sustainable socio-economic recovery, poverty reduction, and livelihood restoration.[431] This included initiatives aimed at ecosystem restoration, sustainable agriculture, and nature-based solutions, supported by dedicated funding mechanisms such as the Multi-Partner Trust Fund for the UN Decade on Ecosystem Restoration, Euro Seed Capital Assistance Facility for Forest and Landscape Restoration and the Community-Based Resilience Fund, and the AGRI3 Fund.[432] The third pillar, centered on investing to build back better, aimed to green economic recovery efforts.[433] UNEP supported the design and implementation of green fiscal stimulus packages, sustainable finance mechanisms, and policy reforms that prioritize green employment, circular economy models, and low-carbon development pathways.[434] A flagship initiative in this area was the Partnership for Action on Green Economy (PAGE), which assisted its partner countries in integrating green recovery strategies into national COVID-19 response plans.[435] UNEP also engaged ministries of finance, investors, and banks to redirect capital flows toward nature-based and climate-neutral strategies, notably through platforms such as the Net-Zero Asset Owner Alliance[436] and the Green Fiscal Policy Network.[437] The fourth pillar addressed the modernization of global environmental governance in response to the pandemic-related disruptions.[438] As international negotiations and high-level meetings were postponed or cancelled, UNEP explored innovative approaches to ensure continuity in multilateral environmental cooperation, including virtual and hybrid negotiation formats and digital governance tools. In coordination with the Secretariats of

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[431] United Nations Environment Programme. (2020). *Working with the environment to protect people: UNEP's COVID-19 response*. Available at the following link: https://wedocs.unep.org/rest/api/core/bitstreams/2c036c99-4904-4f82-a50b-98d35ad2fdee/content

[432] Ibid., p.4.

[433] Ibid., p. 5.

[434] Ibidem.

[435] PAGE played a key role in aligning national recovery efforts with the Sustainable Development Goals and climate targets, in close coordination with UN Resident Coordinators and international financial institutions. For more details see: https://archive.un-page.org/page-holds-first-dialogue-advance-green-recovery-un-economists-and-page-agencies

[436] See: https://www.unepfi.org/net-zero-alliance/

[437] See: https://greenfiscalpolicy.org/

[438] United Nations Environment Programme. (2020). *Working with the environment to protect people: UNEP's COVID-19 response*. Available at the following link: https://wedocs.unep.org/rest/api/core/bitstreams/2c036c99-4904-4f82-a50b-98d35ad2fdee/content

Multilateral Environmental Agreements (MEAs).[439] Overall, by promoting science-based policies, strengthening multilateral cooperation, and mobilizing investments in nature and green economies, UNEP has positioned the pandemic not merely as a crisis to be managed, but as a critical opportunity to accelerate the transition towards more sustainable and equitable development models.[440]

3.4 WOAH response and multiagency involvement

The animal health sector, particularly Veterinary Services, played a crucial role in the global response to the COVID-19 pandemic.[441] Veterinary laboratories used their expertise to support the diagnostic capacity of human health services, donating essential materials, including personal protective equipment and ventilators.[442] Veterinary epidemiologists supported their counterparts in the public health response through the development of effective interventions.[443] At the international level, the World Organization for Animal Health (WOAH) developed a response mechanism in collaboration with the World Veterinary Association (WVA) by providing scientific guidance on research priorities and on the implications of COVID-19 for animal health, emphasizing the public health responsibilities of the veterinary profession, particularly in the field of disease prevention and emergency management.[444] The integration of veterinary laboratories into the public health response, occurred within coordinated, government-led frameworks and in compliance with national regulatory requirements.[445] Harmonized testing procedures, validated diagnostic assays, and

[439] Ibid., p.6.
[440] United Nations Environment Programme. Inventing to build back better. For a development model example, see: ://www.unep.org/unepmap/covid-19/investing-build-back-better
[441] World Organization for Animal Health (WOAH) (n.d), SARS-CoV-2. Available at the following link: https://www.woah.org/en/disease/sars-cov-2/#ui-id-3
[442] World Organization for Animal Health (WOAH) (2020, April 24) Responding to the COVID-19 crisis: the contribution of the veterinary profession. Available at the following link: https://www.woah.org/en/responding-to-the-covid-19-crisis-the-contribution-of-the-veterinary-profession/
[443] Ibid.
[444] World Organization for Animal Health & World Veterinary Association. (2020, March 18) Covid and veterinary activities designed as essential. Joint press release. Available at : https://worldvet.org/wp-content/uploads/2020/03/wva_oie_pr_covid_final.pdf
[445] World Organization for Animal Health (WOAH) (n.d), SARS-CoV-2. Available at the following link: https://www.woah.org/en/disease/sars-cov-2/#ui-id-3

robust laboratory information management systems were essential to ensure analytical accuracy, operational efficiency, and traceability of results.[446] This structured involvement expanded diagnostic capacity, strengthened pandemic preparedness and response systems, and provided a concrete demonstration of the operational value of the One Health approach in managing public health emergencies.[447] WOAH's experts played a crucial role in collecting, analyzing and disseminating veterinary scientific information, avoiding misinformation and disinformation.[448] In fact, as soon as a link was made between early human cases of SARS-CoV-2 and a market in Wuhan, known to sell animal products and some live animals, WOAH convened an expert group, composed of leading epidemiologists, virologists, disease ecologists, wildlife experts, laboratory diagnostic experts and public health experts.[449] They analyzed the animal infection and transmission models; results of surveillance and epidemiological studies and advised WOAH on policies relating to risk management and emergency response.[450] Coordination between WOAH, WHO, the FAO, Codex Alimentarius Commission, International Plant Protection Convention and other partners ensured the consistency and accuracy of advice provided, including guidance documents.[451] However, the involvement of multiple actors beyond national veterinary and public health authorities, including NGOs and academic institutions, revealed significant challenges in coordination and data sharing. Fragmentation across surveillance systems contributed to gaps between official and unofficial reports and delayed notification in some countries, highlighting structural weaknesses in global health governance.[452] No continent was free from the spread of the virus to animals, demonstrating that this phenomenon was both widespread and globally significant.[453]

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[446] World Organisation for Animal Health**.** (2020, April 1). *A guidance for animal health laboratories. (Version 1), Guidance Document.* Available at the following link: https://www.woah.org/app/uploads/2021/03/a-guidance-for-animal-health-laboratories-1april2020.pdf
[447] Ibid.
[448] Lina, A., Keith, H., Jenny, H., Mariana, M., Gregorio, T., Laure, W.-V., & Paolo, T. (2024). FacingSARS-CoV-2 emergence on the animal health perspective: The role of the World Organization for Animal Health in preparedness and official reporting of disease occurrence. Zoonoses and Public Health, 71, 683–695. https://doi.org/10.1111/zph.13133
[449] Ibid., p.689.
[450] Ibidem.
[451] Ibid., p.690.
[452] Ibid., p.691.
[453] Ibidem.

Timely detection and reporting are crucial for implementing effective prevention and control measures to mitigate disease transmission and impact.[454] Addressing existing gaps is therefore essential and to achieve this, WOAH emphasized the critical role of cross-sectoral cooperation.[455]

4. Strengths and shortcomings of the global governance framework

The pandemic catalyzed unprecedented levels of cooperation, innovation and resource mobilization.[456] Key successes included rapid internal coordination within development agencies, the use of existing channels to deploy resources quickly, timely funding to vulnerable countries, and effective country-level coordination through national response plans and multi-partner mechanisms.[457] However, challenges persisted, including inefficient and inequitable resource allocation, missed opportunities to institutionalize crisis measures, and incoherence between development cooperation and policy actions.[458] Eight key lessons can guide improvements in crisis response: governments should develop rapid, coordinated response plan; deploy funding based on evidence and adaptability; leverage existing partnerships and coordination mechanisms for resource distribution; align financial tools to local needs; strengthen and integrate national health and social systems rather than creating parallel structures; prioritize multilateral and pooled funding for flexibility; and ensure national policies support, rather than conflict with, broader development and humanitarian objectives.[459] While international cooperation enabled rapid, large-scale pandemic responses though political commitment and technical

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[454] Bernstein, A. S., Ando, A. W., Loch-Temzelides, T., Vale, M. M., Li, B. V., Li, H., Busch, J., Chapman, C. A., Kinnaird, M., Nowak, K., & Castro, M.C. (2022). The costs and benefits of primary prevention of zoonotic pandemics. Science Advances, 8(5), eabl4183

[455] Lina, A., Keith, H., Jenny, H., Mariana, M., Gregorio, T., Laure, W.-V., & Paolo, T. (2024). FacingSARS-CoV-2 emergence on the animal health perspective: The role of the World Organization for Animal Health in preparedness and official reporting of disease occurrence. Zoonoses and Public Health, 71, 683–695. https://doi.org/10.1111/zph.13133

[456] OECD (2025), Strategic Joint Evaluation of the Collective International Development and Humanitarian Assistance Response to the COVID-19 Pandemic, OECD Publishing, Paris, https://doi.org/10.1787/680e2786-en

[457] Ibid.

[458] Williamson, A. et al. (2022), "Effective post-pandemic governance must focus on shared challenges", The Lancet, Vol. 399/10340, pp. 1999-2001, https://doi.org/10.1016/s0140 6736(22)00891-1.

[459] OECD (2025), Strategic Joint Evaluation of the Collective International Development and Humanitarian Assistance Response to the COVID-19 Pandemic, OECD Publishing, Paris. P.13. https://doi.org/10.1787/680e2786-en

expertise, there are persistent weaknesses. The COVID-19 pandemic highlighted the lack of integration, prevention and response efforts, even in well-resourced countries.[460] It revealed four key challenges in global health governance: siloed coordination across human, animal and environmental sectors; weak One Health frameworks due to legal fragmentation and power imbalances; donor-driven priorities that neglect endemic disease in low-and middle-income countries (LMICs); and chronic underinvestment in prevention and health infrastructure, with funding reactive, focused on the emergency response rather than long-term resilience.[461] Multilateral systems were further hampered by nationalist policies; esport restrictions, as reported by the WTO with 80 countries, including the EU, imposing limits on medical supplies; protectionism; and geopolitical tensions, notably the US-China rivalry, which hindered collective action.[462] These challenges disproportionately affected vulnerable countries.[463] To address them, multilateralism must evolve into inclusive, networked approaches engaging states, non-states actors, and communities, supported by stronger global governance, sustained investment, transparent surveillance, and equitable access to health tools.[464]

5. The WHO Pandemic Agreement: opportunities and risks

The devastating impact of the COVID-19 pandemic revealed significant gaps and inequities in the world's ability to prevent and respond to health emergencies, prompting nations to take action.[465] The WHO Pandemic Agreement was adopted by the World Health Assembly on 20 May 2025, marking a historic moment for global

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[460] Elnaiem, A., Mohamed-Ahmed, O., Zumla, A., Mecaskey, J., Charron, N., Abakar, M. F., Raji, T., Bahalim, A., Manikam, L., Risk, O., Okereke, E., Squires, N., Nkengasong, J., Rüegg, S. R., Abdel Hamid, M. M., Osman, A. Y., Kapata, N., Alders, R., Heymann, D. L., Kock, R., & Dar, O. (2023). *Global and regional governance of One Health and implications for global health security*. The Lancet, 401(10377), 688–704. Available at the following link: https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(22)01597-5/fulltext

[461] Ibid.

[462] World Trade Organization (WTO). (2020, April 23). *Export prohibitions and restrictions during the COVID-19 pandemic*.

[463] World Trade Organization. (2020, April 23). *Export prohibitions and restrictions*. P.8: "Possible economic impact of the new export prohibitions and restrictions". https://www.wto.org/english/tratop_e/covid19_e/export_prohibitions_report_e.pdf

[464] The Independent Panel for Pandemic Preparedness and Response. (2021). *COVID-19: Make it the last pandemic*. Available at the following link: https://theindependentpanel.org/wp-content/uploads/2021/05/COVID-19-Make-it-the-Last-Pandemic_final.pdf

[465] Ibid.

public health.[466] Launched in 2021, the negotiation process involved three years of intensive work by governments, in consultation with relevant stakeholders and experts.[467] The aim of the Intergovernmental Negotiating Body established for this process was to draft and negotiate a WHO convention, agreement or other international instrument on pandemic prevention, preparedness and response, that would culminate in a legally binding international instrument designed to make the world safer and more equitable in the face of future pandemics.[468] The WHO Pandemic Agreement outlined a comprehensive framework to help countries prevent, prepare for, and respond to future pandemics, built on principles of equity, solidarity, and respect for national sovereignty.[469] The Agreement covers key areas, including strengthening disease surveillance and a One Health approach; strengthening health systems; safeguarding the health and care workforce; coordinating research and development; improving local production capacity, including through technology transfer; better coordination across governments and societies; improved communication with the public; stronger international cooperation; and sustainable financing.[470] A central pillar is the Pathogen Access and Benefit-Sharing (PABS) System, which will aim to ensure the rapid and timely sharing of pathogens with pandemic potential for public health purposes and, on an equal footing, the rapid, timely, fair and equitable sharing of benefits arising from the sharing and/or utilization of these materials and sequence information based on public health need.[471]

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[466] World Health Organization. *WHO pandemic agreement*.https://www.who.int/health-topics/who-pandemic-agreement#tab=tab_1

[467] World Health Organization. (2025, April 16). *WHO member states conclude negotiations and make significant progress on draft pandemic agreement*. Available at: https://www.who.int/news/item/16-04-2025-who-member-states-conclude-negotiations-and-make-significant-progress-on-draft-pandemic-agreement

[468] Ibid.

[469] World Health Organization. *WHO pandemic agreement*. https://www.who.int/health-topics/who-pandemic-agreement#tab=tab_1

[470] World Health Organization. (2025, April 16). *WHO member states conclude negotiations and make significant progress on draft pandemic agreement.* Available at: https://www.who.int/news/item/16-04-2025-who-member-states-conclude-negotiations-and-make-significant-progress-on-draft-pandemic-agreement

[471] World Health Organization. *WHO pandemic agreement*. Available at the following link: https://www.who.int/health-topics/who-pandemic-agreement#tab=tab_1

5.1. Objectives of the new instrument and prospects for consolidating One Health

The WHO Pandemic Agreement aims to prevent, prepare for, and respond to pandemics, guided by the sovereign rights of States, respect for human dignity and rights, equity, solidarity, inclusivity, transparency, accountability, and science-based public health decisions.[472] It emphasizes international cooperation to strengthen pandemic prevention, surveillance, and response in line with the International Health Regulations (2005)[473], taking national and regional capacities into account. Parties are encouraged to develop comprehensive, multisectoral national plans addressing early detection, zoonotic spillover, coordinated surveillance, vaccination, infection control, laboratory safety, water and sanitation, antimicrobial resistance, and vector-borne diseases through a One Health approach while considering social, economic, and environmental drivers of pandemics.[474] The Agreement promotes resilient and equitable health systems,[475] focusing on primary health care, universal health coverage, clinical care, supply chains, laboratory capacity, risk communication, health information systems, and periodic preparedness assessments. It underscores the protection and development of a skilled health workforce, ensuring safety, well-being, training, ethical recruitment, and priority access to essential medical products[476]. Strengthening regulatory systems, ensuring the quality and safety of pandemic-related health products, and promoting international cooperation in research, development, production, and technology transfer, particularly for developing countries, are key objectives.[477] The WHO Pathogen Access and Benefit-Sharing (PABS) System and the Global Supply Chain and Logistics (GSCL) Network ensure equitable access to pathogens, health products, vaccines, therapeutics, and diagnostics, emphasizing

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[472] World Health Organization (2025, May 20), Who Pandemic Agreement. Artt. 2 and 3. https://apps.who.int/gb/ebwha/pdf_files/WHA78/A78_R1-en.pdf
[473] Ibid., art.4
[474] Ibid., art.5
[475] Ibid., art.6
[476] Ibid.art.7
[477]Ibid., artt.8-11: In particular, Article 11 promotes the transfer of technology, knowledge, and technical expertise to support sustainable and geographically diversified production of pandemic-related health products, particularly in developing countries. It emphasizes voluntary licensing, transparency, fair royalty practices, intellectual property flexibilities under TRIPS, international cooperation, and WHO-coordinated technology transfer mechanisms to enhance equitable access, affordability, and global manufacturing capacity during pandemics.

transparency, collaboration, and prioritization of vulnerable populations.[478] The Agreement directs Parties to pursue transparent and equitable procurement and distribution,[479] avoid excessive stockpiling and trade barriers, rationalize use, and coordinate through the GSCL Network. Whole-of-government and whole-of-society approaches are encouraged, with active engagement of communities, Indigenous Peoples, and relevant stakeholders, particularly in vulnerable populations.[480] Public awareness, science communication, risk communication, and research on factors influencing public trust are emphasized, with technical support from WHO as needed.[481] International cooperation, technology transfer, capacity-building, and sustainable, predictable financing, supported through a Coordinating Financial Mechanism,[482] are central to implementation, especially for developing countries. The Conference of the Parties serves as the governing body,[483] reviewing implementation, making decisions, establishing subsidiary bodies, and creating a facilitative mechanism to support Parties. Moreover, Parties have to regularly report to the Conference of the Parties on their implementation of the WHO Pandemic Agreement, with the Secretariat also reporting on its activities.[484]

5.2 Risks of legal incoherence and normative weakness

The WHO Pandemic Agreement presents several risks and weaknesses. A central concern is the lack of strong enforcement mechanisms: although the Agreement introduces reporting and coordination systems, it relies largely on voluntary compliance, meaning that countries may fail to meet their obligations without facing

[478] Ibid., artt.12-13
[479] Ibid., art.14
[480] Ibid., art.15
[481] Ibid., art.16
[482]Ibid., artt.17,18.Coordinating Financial Mechanism, based on the existing IHR (2005) mechanism, to manage these funds, support capacity-building, and provide rapid financing during pandemics. This mechanism operates under the guidance of the Conference of the Parties, which defines its rules and ensures accountability. It is responsible for identifying funding needs, tracking available resources, harmonizing financing efforts, advising Parties, and leveraging voluntary contributions. The article 18 also calls for a five-year financial and implementation strategy that is periodically reviewed to ensure that resources are effectively aligned with global and national pandemic preparedness and response priorities.
[483] Ibid., art.19
[484] Ibid. art.21

real consequences.[485] Another major risk involves persistent global inequality, particularly in access to vaccines, medicines, and diagnostics. Low- and middle-income countries may continue to face delays due to intellectual property barriers, limited technology transfer, and insufficient manufacturing capacity.[486] In this context, the proposed Pathogen Access and Benefit-Sharing (PABS) system remains unresolved, generating uncertainty about whether fair and equitable access and benefit-sharing mechanisms will be effectively guaranteed.[487] The Agreement also shows limited progress on binding financial commitments. Funding mechanisms are largely aspirational rather than mandatory, raising concerns that poorer countries may not receive sustained financial support to strengthen their health systems and pandemic preparedness capacities.[488] Furthermore, governance challenges persist, including excessive centralization and limited inclusion of regional and local authorities, which may weaken responsiveness, accountability, and public trust.[489] The treaty may also reinforce existing global power imbalances, allowing wealthier countries to retain greater control over decision-making, thereby undermining equity and global solidarity.[490] More broadly, the WHO Pandemic Agreement faces critical legal, governance, and equity challenges that must be addressed if it is to effectively strengthen global health security. While the treaty represents a significant advancement in international health cooperation, its success ultimately depends on the effective implementation of its key provisions, particularly the operationalization of the PABS mechanism and sustained investments in equitable and resilient health

[485] Abdel-Motaal, K. A., El Kheir-Mataria, W. A., & Chun, S. (2025). Global Health Governance and the WHO Pandemic Agreement: A Scoping Review of Challenges and Analysis of Reforms. *International journal of environmental research and public health*, *22*(12), 1807. https://doi.org/10.3390/ijerph22121807

[486] World Trade Organization. (2020, April 23). *Export prohibitions and restrictions during the COVID-19 pandemic*. https://www.wto.org/english/news_e/news20_e/rese_23apr20_e.htm

[487] For more details see: https://www.globalpolicy.org/en/event/2026-01/pabs-pathogen-access-and-benefit-sharing-negotiations-final-stretch-towards-fair

[488] Abdel-Motaal, K. A., Abu El Kheir-Mataria, W., & Chun, S. (2025). *Global health governance and the WHO Pandemic Agreement: A scoping review of challenges and analysis of reforms*. International Journal of Environmental Research and Public Health, 22(12), Article 1807. Available at the following link: https://doi.org/10.3390/ijerph22121807

[489] Ibid., p.30

[490] Ibidem.

systems.[491] In conclusion, the WHO Pandemic Agreement persistent gaps remain in enforcement, technology transfer, and inclusive implementation. Strengthening these domains is crucial to achieving equitable and resilient preparedness.

6. Recommendations for strengthening the legal dimension of One Health

A robust legal framework is fundamental for translating the One Health approach from a guiding principle into practical, coordinated action.[492] Current international legal frameworks for One Health are weak, often flexible in interpretation, and politically complex, limiting compliance.[493] Law plays a critical role in health by organizing systems, assigning responsibilities, setting standards, regulating services and products, shaping markets, and influencing public behavior.[494] Effective legal frameworks require multisectoral collaboration, alignment with international health commitments, regular updates based on evidence, adequate resources, enforcement, and monitoring. Recognizing this need, WHO developed the Western Pacific Regional Action Agenda on Strengthening Legal Frameworks for Health (endorsed 2018) and established the first dedicated health law unit in the region to support countries in implementing and evaluating health-related laws under the SDGs.[495] Legal frameworks must be tailored to each country's context. Key priorities include improving health system governance, protecting the right to health, especially for vulnerable groups; ensuring access to quality health services; managing public health risks; and promoting multisectoral action on social determinants of health.[496] Strengthening legal frameworks involves the full law cycle: problem analysis, evidence evaluation, stakeholder engagement, drafting, enactment, implementation, and evaluation, while accounting for technical, political, and cultural factors.[497] Capacity-building for policymakers, regulators, health providers, and communities is essential, with transdisciplinary approaches helping to

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[491] Berman, A.; Kantiana, I.D. The Pandemic Agreement: A Milestone in Global Health, but Will It Work? EJIL:Talk! 12 June 2025. Available online: https://www.ejiltalk.org/the-pandemic-agreement-a-milestone-in-global-health-but-will-it-work/

[492] Bullón Caro C (2025). Legal elements to operationalise One Health: from principles to practice. Research Directions: One Health. 3, e 4, 1–11. https://doi.org/10.1017/one.2025.2

[493] Ibid.,p.3

[494] Ibidem.

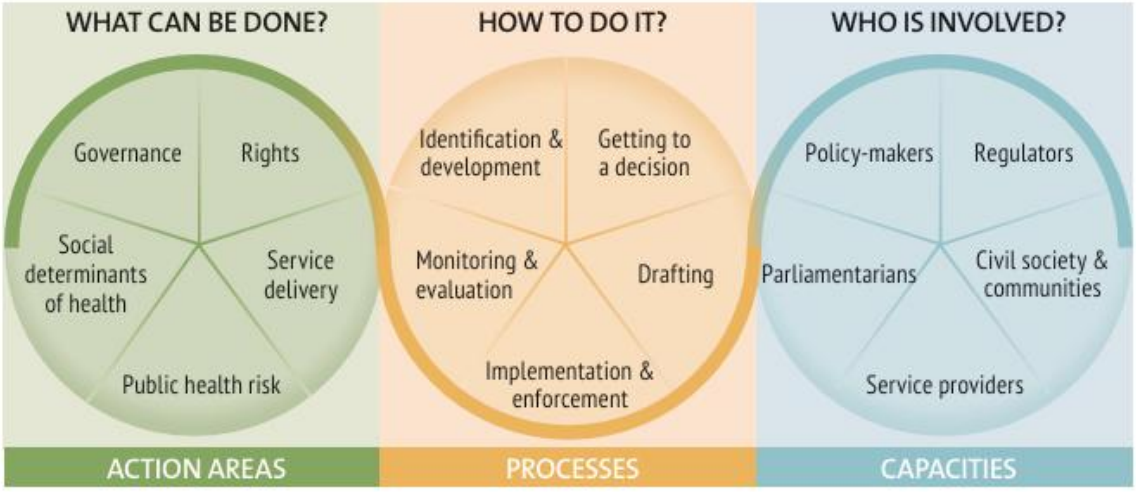
[495] World Health Organization. (2020, March 19). Better laws for better health: Western Pacific regional action agenda on strengthening legal frameworks for health in the Sustainable Development Goals. https://www.who.int/publications/i/item/9789290619041

[496] Ibid., p. ix.

[497] Ibid., p. x.

overcome barriers and ensure effective public health law. Figure 1 illustrates the three strategic pillars to underpinning efforts to strengthen legal frameworks for health encompassing action areas, core processes, and stakeholders capacities.[498]

Figure 1.



Beyond regional initiatives such as the WHO Wester Pacific Action Agenda, the European Union provides one of the most advanced examples of legally embedded One Health governance.[499] Through binding regulations on antimicrobial resistance, veterinary medicine, animal health, and environmental protection, the EU demonstrates how integrated legal frameworks can translate One Health from a guiding principle into enforceable practice.[500] At the global level, several frameworks illustrate the growing recognition of law as a cornerstone of One Health governance. In particular, the Quadripartite One Health Joint Plan of Action (2022–2026) explicitly calls for legal and regulatory reform to strengthen multisectoral coordination, integrated surveillance, wildlife trade regulation, and emergency preparedness.[501]

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[498] Ibid., p.2

[499] For more details see "One Health Governance in the European Union", available at: :https://www.feam.eu/wp-content/uploads/one-health-governance-in-the-european-union-KI0124065ENN.pdf

[500] European Union. (2019). *Regulation (EU) 2019/6 of the European Parliament and of the Council on veterinary medicinal products*. Official Journal of the European Union. http://data.europa.eu/eli/reg/2019/6/oj

[501] World Health Organization et al. (2022). *One Health Joint Plan of Action (2022–2026): working together for the health of humans, animals, plants and the environment. https://www.who.int/publications/i/item/9789240059139*

Similarly, the Independent Panel on Pandemic Preparedness and Response highlights the legal shortcomings of the International Health Regulations and strongly advocates the adoption of a the WHO Pandemic Agreement, which aims to establish legally binding obligations for pandemic prevention, preparedness, and response, grounded in One Health principles.[502] In light of these developments, a set of targeted recommendations emerges to strengthen the legal dimension of One Health governance. At the national level, each Member State should consider a range of actions tailored to its specific needs and capacities, including reviewing and aligning national health laws with strategies for universal health coverage (UHC) and the Sustainable Development Goals (SDGs), setting priorities and developing programs to reinforce legal frameworks, and improving processes for the development, implementation, and evaluation of health laws.[503] Building the capacity of stakeholders both within and beyond the health sector is essential, alongside enhanced international cooperation to integrate health considerations into trade, investment, and environmental agreements and enabling legal responses to cross-border health risks.[504]At the global level, the World Health Organization (WHO) can support Member States in these efforts by raising awareness and advocating for stronger health laws, providing evidence and knowledge to support national priority-setting, offering technical assistance to improve legal processes and stakeholder capacities, facilitating dialogue, regional collaboration, and joint action on cross-border health issues, and mobilizing legal expertise to support national health initiatives.[505]

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[502] Independent Panel for Pandemic Preparedness and Response. (2021). *COVID-19: Make it the last pandemic* (Report to the Secretary-General of the United Nations). World Health Organization. https://theindependentpanel.org/covid-19-make-it-the-last-pandemic_final/

[503] World Health Organization. (2020, March 19). Better laws for better health: Western Pacific regional action agenda on strengthening legal frameworks for health in the Sustainable Development Goals. https://www.who.int/publications/i/item/9789290619041

[504] World Health Organization; Food and Agriculture Organization of the United Nations; World Organization for Animal Health; United Nations Environment Programme. (2023, December 6). *A guide to implementing the One Health Joint Plan of Action at national level*. WOAH/FAO/WHO/UNEP. https://www.who.int/publications/i/item/9789240082069

[505] World Health Organization. (2020, March 19). Better laws for better health: Western Pacific regional action agenda on strengthening legal frameworks for health in the Sustainable Development Goals. https://www.who.int/publications/i/item/9789290619041

Conclusion

The growing frequency and complexity of global health crises demonstrate that human health can no longer be addressed in isolation from environmental integrity and animal health. The One Health approach has emerged as a scientifically grounded framework capable of capturing this interdependence and providing a holistic perspective on the drivers of emerging health threats. However, as this thesis has demonstrated, the translation of this conceptual paradigm into effective legal governance remains incomplete. While One Health has gained increasing visibility in scientific discourse and international policy debates, the legal structures necessary to fully operationalize its principles remain fragmented and insufficiently coordinated across different regulatory domains.

The first chapter highlighted how the One Health approach has progressively gained recognition within international policy frameworks and institutional practice. Over the past two decades, major international organizations have increasingly acknowledged the interconnected nature of human, animal, and environmental health, promoting collaborative strategies aimed at preventing emerging infectious diseases and strengthening global health resilience. Despite these developments, the normative foundations of the One Health paradigm remain dispersed across multiple international legal regimes, including international environmental law, global health law, and biodiversity governance. Each of these regimes addresses specific dimensions of the broader problem, yet they often operate through separate institutional structures, regulatory instruments, and policy priorities. This fragmentation limits the ability of international law to effectively address the systemic drivers of zoonotic disease emergence, such as ecosystem degradation, deforestation, biodiversity loss, wildlife trade, and climate change. As a result, the legal framework governing these interconnected risks remains incomplete, lacking the coherence necessary to support truly integrated health governance at the global level.

The second chapter demonstrated that the principle of prevention and the due diligence obligation provide a promising legal basis for strengthening the legal dimension of the One Health approach. These principles have long been recognized as central components of international environmental law and have increasingly been interpreted

in ways that extend their relevance to public health protection. International jurisprudence has progressively affirmed that states bear both procedural and substantive obligations to prevent environmental harm and mitigate risks that may threaten human well-being. Such obligations include conducting environmental impact assessments, ensuring effective monitoring systems, promoting transparency and information-sharing, and engaging in international cooperation when risks may have transboundary implications. The emerging evolution toward a model of "deep prevention" suggests that international law is gradually shifting from a predominantly reactive framework focused on crisis response toward a more anticipatory model of governance that seeks to address risks before they materialize into large-scale emergencies. In this context, the case of *Terra dei Fuochi* illustrates the severe human and environmental consequences that may arise when preventive obligations are not adequately implemented. The prolonged environmental contamination and its associated public health impacts demonstrate how failures in regulatory oversight, institutional coordination, and environmental governance can generate long-term risks that ultimately transcend local boundaries.

The COVID-19 pandemic, analyzed in the third chapter, provides an equally powerful illustration of both the relevance and the limitations of the current global governance framework. The pandemic revealed how rapidly localized health events can escalate into global crises in an interconnected world characterized by intense mobility, environmental pressures, and complex socio-economic interactions. On the one hand, the international response demonstrated unprecedented levels of scientific cooperation and information exchange, with researchers, public health institutions, and international organizations working together to understand the virus, develop vaccines, and coordinate response strategies. On the other hand, the crisis exposed significant structural weaknesses within international health governance. These weaknesses include fragmented surveillance systems, insufficient integration between human, animal, and environmental health sectors, and major disparities in states' capacities to detect, report, and respond to emerging health threats. Moreover, the unequal distribution of vaccines and other medical countermeasures highlighted persistent global inequalities and revealed the limitations of existing mechanisms for ensuring equitable access to essential health technologies. The persistence of geopolitical

tensions and competing national interests further complicated international cooperation, demonstrating the difficulties of achieving coordinated global responses during periods of crisis.

The adoption of the WHO Pandemic Agreement in 2025 represents an important attempt to address some of these systemic challenges and to strengthen the international legal architecture governing pandemic preparedness and response. By promoting enhanced international cooperation, reinforcing surveillance systems, and explicitly incorporating the One Health approach into strategies for pandemic prevention, the Agreement acknowledges the structural drivers of emerging infectious diseases and the need for more integrated governance frameworks. In particular, the treaty emphasizes the importance of early detection, coordinated risk assessment, and equitable access to medical countermeasures, while also encouraging the sharing of scientific data and technological resources. Nevertheless, significant challenges remain. The absence of robust enforcement mechanisms may limit the capacity of the agreement to ensure consistent implementation across states. Furthermore, persistent inequalities in technological capacity, public health infrastructure, and access to health products continue to pose major obstacles to effective global preparedness. Unresolved questions regarding pathogen sharing, intellectual property rights, and the fair distribution of benefits derived from genetic resources also illustrate the complex political and legal negotiations that accompany efforts to strengthen global health governance.

In light of these findings, the thesis argues that strengthening the legal dimension of the One Health approach requires the development of a more integrated and preventive model of global governance. Achieving this objective will require enhancing coherence between different international legal regimes that currently address environmental protection, biodiversity conservation, and public health through largely separate regulatory frameworks. It will also require reinforcing due diligence obligations related to environmental protection and public health, ensuring that states adopt adequate regulatory measures to prevent activities that may contribute to the emergence or spread of infectious diseases. Additional efforts should focus on improving international legal frameworks governing wildlife trade, ecosystem protection, and land-use practices, as these factors play a critical role in shaping the

ecological conditions that facilitate zoonotic spillover events. At the same time, strengthening global health security requires addressing persistent inequalities in access to health technologies, financial resources, and scientific capacity. Ensuring more equitable distribution of vaccines, diagnostics, and other medical countermeasures is essential for building resilient global response systems capable of protecting all populations. Equally important is the development of robust national legal frameworks capable of effectively implementing international commitments. International norms and agreements can only achieve their intended objectives if they are translated into domestic policies, regulatory systems, and institutional structures that support multisectoral coordination. Governments must therefore strengthen national governance mechanisms that facilitate collaboration between public health authorities, environmental agencies, veterinary services, and other relevant actors. Such integrated governance structures are essential for ensuring that the One Health approach is not merely a theoretical framework but a practical strategy guiding policy decisions and risk management processes. Ultimately, the One Health approach challenges traditional boundaries between sectors, disciplines, and legal regimes. Addressing the complex risks posed by emerging infectious diseases requires moving beyond fragmented governance toward a systemic legal architecture capable of anticipating and preventing health threats at their origins. This transformation involves not only strengthening international legal instruments but also fostering deeper cooperation between institutions, disciplines, and states. International law has begun to evolve in this direction. However, further legal innovation, stronger institutional coordination, and sustained political commitment will be necessary to transform the One Health paradigm into a fully operational framework capable of effectively preventing future global health crises, recognizing that *no one is safe until everyone is safe.*

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