

Analysis paper

One Health, Sustainable development and the Principle of Integration: legal synergies for effective implementation

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- Abstract

The One Health approach is increasingly recognised as a holistic solution to complex global health and ecological challenges. Legislation is of utmost relevance for its effective implementation, providing a mechanism to institutionalise intersectoral and interdisciplinary collaboration, clarify responsibilities, and promote sustainability. However, the legal nature of One Health remains underexplored.

This paper examines how the key underlying principles of One Health align with legal principles and concepts broadly recognised by legal literature and jurisprudence, including those articulated in the Rio Declaration and the International Law Association's New Delhi Declaration on principles of international law relating to sustainable development. Emphasis is placed on the principle of integration, a cornerstone of sustainable development that offers a pathway to operationalize One Health within legal frameworks.

By conceptualizing One Health as an extension and practical application of the principle of integration, this paper advances its characterisation as a legal concept, embedding it within broader principles of international law. One Health is positioned as a legal construct, providing a pathway for its implementation through law and affirming its role as an integral component of sustainable development.

I. Introduction

"One Health" is a multisectoral approach that seeks interdisciplinary solutions to complex health challenges (FAO et al., 2023). Embracing the interconnectedness of human, animal, plant, and environmental health, together with economic, social, and cultural factors, it aims to foster collaborative efforts across sectors. The approach was first formulated by the World Conservation Society (WCS) in 2004. Since then, it has been adopted and promoted by various intergovernmental organizations to encourage intersectoral and multidisciplinary collaboration. One Health emphasises health considerations at the human-animal-ecosystems nexus while also incorporating aspects related to the health of the environment and ecosystems (Laing et al., 2023). The focus on health and disease management differentiates this approach from other holistic frameworks such as

Ecohealth or Planetary Health (Ruiz de Castaneda et al., 2023), and it has gained political momentum for this approach following the Covid-19 pandemic (Mwatondo et al., 2023).

In addition to the WCS, the role of different international organizations has been crucial in advancing the concept of One Health and providing global guidance for its implementation. The Food and Agriculture Organization of the United Nations (FAO), the World Health Organization (WHO) and the World Organization for Animal Health (WOAH) have been working together on One Health for decades (FAO et al., 2010), formalising their collaboration in a joint Memorandum of Understanding on cooperation to combat health risks at the human-animal-ecosystems interface under a One Health approach of 2018 (FAO et al., 2022). This MoU was extended in May 2022 to incorporate the United Nations Environment Programme, forming the Quadripartite. Since then, the Quadripartite has published a “Quadripartite Joint Plan of Action 2022-2026 (OHJPA)” (FAO et al., 2022) and “A Guide to implementing the One Health JPA at national level” (FAO et al., 2023), among other documents, and has established an advisory One Health High Level Experts Panel (OHHLEP). The OHHLEP 2022 “One Health Theory of Change” (OHHLEP, 2022c) identifies governance, policy and legislation as part of the first of three pathways to implement the OHJPA. The challenge remains in determining how legislation can effectively support One Health implementation.

This paper examines One Health from a regulatory perspective, exploring the complexities of understanding One Health from a legal standpoint. It identifies synergies between the definition of One Health and established legal concepts and principles, with particular emphasis on the principles of international environmental law and sustainable development. Environmental law encompasses consolidated principles, some of which -such as the principle of integration across sectors and disciplines- share conceptual similarities with One Health. Likewise, sustainable development aims to be integrated into national policies and legislation, establishing obligations of “means” rather than prescribing concrete objectives. This paper attributes similar characteristics to One Health as a legal concept.

Rather than attempting to resolve the intricate question of One Health’s legal nature, this paper focuses on examining these conceptual parallels. By aligning One Health with these established legal constructs, the analysis contributes to the groundwork for its potential categorization as a legal

concept, while leaving this broader objective outside the paper's immediate scope, and provides directions to incorporating One Health into legal and regulatory documents.

With this objective, Section 2 analyses the definition of One Health, anticipating key questions related to its legal nature. Section 3 examines its intersection with sustainable development, and Section 4 explores the synergies between One Health and the principle of integration. Finally, Section 5 identifies parallels between the key underlying principles of One Health and other established principles of international environmental law and sustainable development.

II. The controversial legal nature of One Health

Legislation is crucial for One Health implementation. Well-crafted laws and regulations, supported by effective enforcement mechanisms, have the potential to sustain multisectoral and multidisciplinary collaboration even when the initial enthusiasm fades, ensuring long-term sustainability (FAO, 2020). By delineating clear roles and responsibilities for both public and private stakeholders, legislation establishes an accountability framework that is conducive to effective implementation.

However, when legal experts confront One Health, they inevitably question its essence, implications and legal ramifications of this approach. Questions arise regarding its legal nature, substantive content, associated obligations, and mechanisms for implementation and enforcement. This article argues that synergies and resemblances exist between One Health and established legal concepts and principles. Understanding these similarities can enhance comprehension of the One Health approach from a legal standpoint and facilitate its implementation, anchoring it in within existing legal concepts.

In December 2021, the One Health High-Level Expert Panel (OHHLEP) proposed a comprehensive definition of One Health, emphasising its multisectoral and multidisciplinary nature, while expanding the focus beyond infectious disease prevention (Häsler, 2023). Although multiple definitions of One Health have emerged over time (Abbas et al., 2022; Nzietchueng et al., 2023), OHHLEP's definition has gained significant recognition from intergovernmental organizations (FAO et al., 2021) and the scientific community (European Commission, 2024), playing a pivotal role in harmonising the various interpretations that have evolved since the concept's inception. This

definition, reproduced below for analysis, embodies the multifaceted nature of the approach and its emphasis on holistic integration:

One Health is an integrated, unifying approach that aims to sustainably balance and optimize the health of people, animals and ecosystems. It recognises the health of humans, domestic and wild animals, plants, and the wider environment (including ecosystems) are closely linked and inter-dependent.

The approach mobilises 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 (OHHLEP, 2022).

While the first part of the definition emphasises the pivotal role of integration, the second part underscores the significance of inclusive participation and whole-of-society approaches as an integrant element of One Health. Consequently, One Health emerges as a complex concept seeking to combine diverse sectors within a framework of participation and inclusivity, with a focus on health and ecosystems threats broadly understood and including wicked problems such as climate change.

Together with the definition, OHHLEP formulated five key underlying principles of One Health, which include:

1. equity between sectors and disciplines;
2. socio-political and multicultural parity (the doctrine that all people are equal and deserve equal rights and opportunities) and inclusion and engagement of communities and marginalized voices;
3. socioecological equilibrium that seeks a harmonious balance between human–animal–environment interaction and acknowledging the importance of biodiversity, access to sufficient natural space and resources, and the intrinsic value of all living things within the ecosystem;

4. stewardship and the responsibility of humans to change behaviour and adopt sustainable solutions that recognise the importance of animal welfare and the integrity of the whole ecosystem, thus securing the well-being of current and future generations; and
5. transdisciplinary and multisectoral collaboration, which includes all relevant disciplines, both modern and traditional forms of knowledge and a broad representative array of perspectives.

Notably, both the definition and key underlying principles of One Health are intentionally non-anthropocentric. During OHHLEP's second meeting (OHHLEP, 2021b) in July 2021, the panel debated whether the definition should be centred on human health, but ultimately chose to broaden it, advocating for equity across sectors and species. The complexity of this non-anthropocentric approach poses significant challenges for legislative implementation. Furthermore, the varying qualifications of these principles across OHHLEP's documents as "underlying" (OHHLEP, 2021b, 2022b, 2022c), "foundational" (OHHLEP, 2022c), "core" (OHHLEP, 2021) or "guiding" (OHHLEP, 2022, 2023), do little to clarify their intended nature and impact, suggesting that they were not conceptualised as "principles" in the legal sense of the term.

Principles occupy a foundational role in legal theory, producing legal effects and guiding both regulatory and judicial decision-making. Unlike rules, which prescribe specific commands or prohibitions, principles function as overarching normative guidelines that inform the creation, interpretation, and application of legal norms (Alexy, 2021). They address gaps in statutory frameworks, serve as interpretative tools and establish broader objectives for legal reasoning. While the relationship between "moral" and "legal" principles remains highly contested in legal literature (Dworkin, 1978; Jakab, 2016) there is widespread agreement that legal principles must adhere to specific legal methodologies and maintain the objectivity of legal science (Garcia de Enterría, 1961; Schmith, 1959). Key attributes of legal principles include their judicial recognition, and their ability to generate concrete and specific (applicable) legal effects (Esser, 1956; Seys, 2012).

When legal principles gain broad recognition and acceptance they may evolve into *general principles of law*. As Boulanger observed, general principles of law recurrently appear across jurisdictions and legal traditions "*separés par leur règles et par leur concepts, les différents droits positifs se rejoignent par leur principes, qui sont l'essentiel*" (separated by their rules and

concepts, the different systems of positive law converge through their principles, which are the essence) (Boulanger, 1950). In international law, general principles of law are explicitly acknowledged under Article 38 of the Statute of the International Court of Justice as a subsidiary source when accepted by a wide range of countries, which means they can be used as basis for judicial decisions and to guide law development and implementation.

While OHHLEP key underlying principles would not qualify as legal principles in this sense, their alignment and synergies with established legal concepts and principles - particularly sustainable development and the principle of integration—offers a pathway for embedding One Health within existing legal systems. The following sections explore this alignment, proposing a framework that situates One Health within the operational domain of the principle of integration. This approach seeks to enhance its practical and normative application across regulatory and governance structures.

III. One Health and Sustainable Development

Articulating synergistic and intricate concepts is not novel in international law. The definition of One Health refers to other holistic concepts of comparable complexity, such as sustainable development or climate change, which have been extensively regulated and incorporated into legal frameworks. This section will focus on the concept of sustainable development. The aim is not to equate these two concepts from a policy perspective, as there are synergies but also important differences. For example, while the three pillars of sustainable development represent conflicting values, the different pillars of One Health are interdependent, sharing common objectives with the primary challenge being their synergistic operationalization. Despite these differences, this section seeks to draw lessons from the regulation of sustainable development that can help in understanding One Health from a regulatory perspective.

Broadly consolidated in international law, the concept of sustainable development resulted from the need to reconcile development objectives with environmental sustainability. References to the importance of reconciling these objectives can be traced back to the 1972 Stockholm Conference (UN, 1972). The Brundtland Report in 1987 referred to it as development that “meets the needs of the present without compromising the ability of future generations to meet their own needs”

(WCED, 1987). Sustainable development gained prominence with the 1992 Rio Conference on Environment and Development (UNCED, 1992) (hereinafter Rio Declaration) and was further refined at the 2002 Johannesburg Conference (WSSD, 2002), which expanded its scope to incorporate a social dimension. Its inclusion in hundreds of conventions, including at least 30 of global scope -such as the Convention on Biological Diversity, The United Nations Convention to Combat Desertification, or the United Nations Framework Convention on Climate Change (UNFCCC)-, its endorsement by the World Trade Organization (WTO) and the International Court of Justice (ICJ) jurisprudence (WTO, 2001; ICJ, 1996, para.29, 1997, para.140) and its adoption by the international community -including international organizations, countries and other actors- underscore its significance in the contemporary discourse and its pivotal role in international law.

The concept and legal nature of sustainable development have been subject to prolonged debate (Barral, 2012), ranging from its characterisation as a distinct and novel area of law (Cordonier et al., 2011) to a rule of *ius cogens* (Schrijver, 2008). Bossleman (2008) considers sustainable development as essential to the principle of sustainability, imposing tangible obligations on nations to reconcile and harmonise conflicting interests. These must be adapted to each country and sector but should not lead to any deviation from the ecological core. Birnie and Boyle (Birni et al., 2002) consider sustainable development as a procedural principle, requiring cooperation among parties, while Lowe (1999) recognises it as a legal principle guiding judicial interpretation.

Without delving into the nuances of this discussion, we can affirm that sustainable development and its core principles have gained recognition in international law, undergoing thorough analysis in legal literature and incorporation into case law, thus solidifying its position in the international legal discourse. In this context, the analysis of sustainable development and its synergies with the One Health approach may provide valuable insights into understanding One Health from a regulatory perspective.

First, and foremost among these parallels, is their inherently multisectoral nature and shared aspiration to combine diverse domains. Both concepts emphasise the necessity of achieving a harmonious equilibrium across different objectives with an overarching focus on sustainability and the preservation of public goods. Similarly, One Health requires solutions that account for the interface between different objectives and disciplines, which, while inter-dependent, may yield

divergent outcomes if addressed in isolation. Sustainable development, as formulated in the Rio Declaration, strives to balance social, environmental and economic development, ensuring that this balance remains anchored in the principle of sustainability and the ecological foundation that underpins it (Bosselman, 2008). Similarly, One Health strives to promote sustainability and socioecological equilibrium by fostering multisectoral collaboration, aiming to develop integrated solutions that address interconnected challenges.

A second commonality lies in the emphasis on cooperation. The International Court of Justice in the Pulp Mills case on the river Uruguay affirmed, in relation to sustainable development, that “*it is by cooperating that States concerned can jointly manage the risks of damage to the environment*” (ICJ, 2010, p.14). Cooperation among stakeholders, including institutional cooperation, is also intrinsic to One Health as reflected in its definition and principle of transdisciplinary and multisectoral collaboration. Cooperation introduces a procedural obligation, compelling parties to engage, share resources, and collaboratively pursue mutually beneficial solutions.

Third, both concepts exhibit a broad scope and a perceived lack of precision and clarity. The nebulous nature of sustainable development has been criticized for hindering the identification of concrete substantive obligations (Baxter, 1980). Barral contends that this dynamic and “inherently evolutive” nature allows for continuous adaptation to diverse contexts and actors *ratione temporis, personae, materiae and loci* (Barral, 2012). This dynamism precludes the imposition of specific outcome-based obligations, fostering a framework of “obligations of means or best efforts”, wherein parties diligently strive toward desired outcomes without guaranteeing their attainment. This nuanced understanding accommodates the complexity and variability inherent in sustainable development and offers valuable insights for interpreting and applying One Health. Indeed, the One Health approach also possesses and requires an evolutionary content, adaptable to different situations and subjects, providing it with versatility that enables its application across various sectors.

Finally, from a policy perspective, One Health is closely intertwined with the objectives and principles of sustainable development and serves as a significant driver in achieving sustainable development goals (SDG).

The next sections explore commonalities between the key underlying principles of One Health and established legal principles of sustainable development and environmental law, with Section IV focusing specifically on the principle of integration. The intended purpose is to draw lessons from established legal principles applicable to One Health and its key underlying principles, facilitating the understanding of their potential legal implications. It also aims to present One Health as part of a broader international dynamic of integration that has received appropriate response from a legal perspective.

IV. One Health and the principle of integration

The principle of integration¹ is a fundamental component of sustainable development (ILA, 2006). It has been described as the need to ensure that environmental considerations are integrated into economic and other development plans, and that development needs are taken into account in applying environmental objectives (Sands, 2018). It fosters nature conservation, and social well-being through long-term approaches, requiring transparency and broad public participation in decision-making (UNEP, 1996). In this way, it embodies both a collaborative process and the outcome of such collaboration, imposing obligations related to both the means and the result (ILA, 2006).

Integration is of utmost importance for One Health, which reflects the interdependence among the health of humans, animals, plants and ecosystems, and promotes the consideration of distinct objectives which have traditionally been addressed in silos. In this regard, One Health mirrors the principle of integration by bridging different dimensions of health and well-being across humans, animals, plants and ecosystems, and can be seen as an extended form of this principle.

The principle of integration has been enshrined in numerous legal instruments of environmental law, such as the Stockholm Declaration, the Rio Declaration (principles 4, 11 and 25) and the Convention on Biological Diversity (CBD)². It is also reflected in health-related instruments such as the WHO Convention on Tobacco Control³, as well as in the jurisprudence of the International Court of Justice (ICJ, 1996, 1997), the WTO Appellate body (WTO, 2001; Gehring and Genest, 2017), or the International Tribunal for the Law of the Sea (ITLOS, 1999, 2002), among others⁴. Today, the principle of integration is widely acknowledged in both international environmental law and as a principle of sustainable development (Parejo et al., 2019). Scholars refer to this principle in

various ways and question the clarity of its legal content and effects (Sanz Larruga, 2018). Other scholars consider sustainable development as a *customary* rule (Rodrigo, 2012), which imposes legal obligations on international actors -such as the duty to prevent environmental damage - beyond their involvement in specific international agreements (PCA, May 24, 2005) (Rodrigo, 2012).

Legal literature offers valuable insights into incorporating the principle of integration through legislation, which can guide its application to One Health. The International Law Association, in its report on the principle of integration (ILA, 2006), distinguishes its potential application at three levels: systemic, institutional, and normative. **Systemic integration** focuses on achieving equitable implementation among the three pillars of sustainability – economic, environmental and social- to fulfil a unique function unattainable by the elements alone (ILA, 2006, footnote 13, page 5). As highlighted by this ILA report, integration is more than “bringing together the pillars” and means that “sustainable development must be achieved without, in any way, undermining any of the three pillars”.

Institutional integration⁵ emphasises the importance of mainstreaming environmental and social considerations into all levels of governance and decision-making. This includes fostering cooperation across institutions at both central and decentralised levels (inter-institutional integration) and within the internal policies, programmes⁶ and strategies⁷ of specific institutions (intra-institutional). It can also lead to the establishment of new institutions that focus on integrated objectives. Institutional integration is also reflected in the Draft International Covenant on Environment and Development proposed by IUCN, Article 13.2.(c), which affirms that the principle of integration requires States to ‘establish or strengthen institutional structures and procedures to fully incorporate environmental and developmental issues in all spheres of decision-making’ (IUCN, 2015). Intrinsic to institutional integration is participation for all relevant actors in decision making, as we can see in the Preamble of the Aarhus Convention (UNECE, 1998), which emphasises that public engagement is not only a firmly established human right but also a key component of sustainable development.

Normative integration seeks to reflect the interrelationships across various legal domains, such as environmental law, trade law, and human rights, promoting better connections and synergies

through law. Rather than advocating for the actual merging of different legal areas, normative integration proposes leveraging their differences to enhance synergies and ensure complementarity. This approach can be incorporated into international agreements (ILA, 2020), regional frameworks and domestic legislation, fostering cross-fertilization and introducing environmental and social considerations into traditionally isolated legal domains.

Several traits of the principle of integration could be applied *mutatis mutandis* to One Health. Scholars have highlighted the importance of the systemic approach for One Health (Häsler et al., 2023b), emphasising the significance of holistic understanding and participatory methods in addressing interrelationships and complex issues (Duboz et al., 2018). At the institutional level, the implementation of the One Health approach could be carried out through working groups, coordination mechanisms, or agreements between institutions, such as the Quadripartite itself. Different institutions could establish a coordination framework with a joint program of work or establish institutions that combine different sectors. Public participation in decision-making, socio-political equality, and the importance of interdisciplinary and multisectoral collaboration are essential elements for both sustainable development and the One Health approach.

From a normative perspective, incorporating One Health into law should not necessarily require merging different laws or developing consolidated One Health legal instruments. A One Health approach to legislation promotes that sector-specific legal instruments which have traditionally operated in silos refine their differences and introduce shared objectives and connection points to work in synergy across areas. This cross-fertilization across legal instruments under a One Health lens can apply at all levels of governance, from international law to regional, national and subnational regulation. Within each domain, sector-specific legislation should incorporate principles and elements that facilitate consideration of other topics, thereby fostering synergies and multidisciplinary collaboration. For instance, human health legislation should reflect the principles and objectives of environmental law and establish synergies with animal health, calling for multisectoral approaches. As a result, legislation can promote synergies across multiple domains by fostering normative integration at the level of institutions, decision making processes, and legal objectives.

V. Synergies between the key underlying principles of One Health and established legal principles

This section focuses on identifying synergies between the principles of One Health and established principles of sustainable development and international environmental law. It takes into consideration the key underlying principles of One Health as formulated by OHHLEP in 2021 (OHHLEP, 2022), rather than the Principles of Manhattan and Berlin, as the latter are not formulated as legal principles for interpretation. Nevertheless, the OHHLEP principles capture the essence of the earlier principles and offer a more contemporary and relevant framework for examining the legal dimensions of One Health. The analysis references the principles delineated by the International Law Association in the New Delhi Declaration on Principles of International Law Related to Sustainable Development (ILA, 2002) (hereinafter “ILA New Delhi Declaration”), alongside those articulated in the Rio Declaration, which are considered as established law principles (Seys, 2012; Rodrigo, 2015; Sands, 2018).

The established principles included in this section have been selected for their immediate applicability to One Health. The selection does not aim to be exhaustive, acknowledging that there might be many other principles of international and environmental law relevant to One Health. The goal is not to mention them all, but to anchor the One Health key underlying principles in established legal concepts.

The OHHLEP key underlying principle of **equity** emphasises fairness and justice in balancing the needs, contributions and responsibilities of all sectors, disciplines (e.g. human and veterinary medicine, microbiology, epidemiology, sociology, environmental and social sciences) and species (humans, animals, plants and the environment) relevant to One Health. This approach departs from the traditional legal principle of equity, which focuses exclusively on fairness among humans - rather than across species- in the enjoyment of public goods, such as natural resources or health services, as articulated in Principle 2 of the ILA New Delhi Declaration on equity and poverty eradication (ILA, 2002).

In the One Health context, equity transcends this anthropocentric perspective, advocating for an equitable balance that recognises the interconnected health and welfare of humans, animals and ecosystems. This paradigm shift challenges Western legal systems, which have historically

regulated animals and plants primarily to protect human interests, such as public health and food security, without acknowledging their intrinsic contributions to biodiversity and ecosystem health (Queenan et al., 2017). By contrast, certain indigenous legal systems uphold principles that recognise the environment and all living beings as potential subjects of rights. While this paper does not examine the regulation of non-human beings' subjective rights, it highlights how the One Health principle of *equity* provides a foundational lens for future research in this domain.

The principle of (human) **sociopolitical and cultural parity** emphasises the importance of protecting the rights of all individuals within a Human Rights-based framework (ILA, 2020), ensuring that Human Rights are incorporated in all legislation. This principle aligns with the ILA New Delhi Declaration principle 2 of equity and eradication of poverty (ILA, 2002), but also with the human right to non-discrimination enshrined in Article 1 of the United Nations Declaration of Human Rights and Article 26 of the International Covenant on Civil and Political Rights (ICCPR). Sociopolitical parity demands the inclusion and engagement of communities and marginalised voices in One Health initiatives (OHHLEP, 2022). It requires active involvement of all stakeholders in decision-making processes, ensuring that local communities, vulnerable populations, and Indigenous Peoples actively participate in research and decision-making, and have access to relevant information. This principle also aligns with Rio Declaration principle 10 on public participation and access to information and justice, further reinforced by the Aarhus Convention, which emphasises the right to hold and express opinions and access appropriate, comprehensible and timely information. Applied to sociopolitical parity among countries, this principle would recall the international environmental law principles of solidary, consultation, prior informed consent, and common but differentiated responsibilities in Rio Declaration principle 7 and the ILA New Delhi Declaration principle 3 of common but differentiated responsibilities.

The principle of **socioecological equilibrium** seeks to achieve a balance across all species and recognises the intrinsic value of all living things within the ecosystem (OHHLEP, 2022). Aligned with the duty of States to ensure the sustainable use of natural resources (ILA New Delhi Declaration principle 1), the implementation of this principle concurs with the principle of sustainability applied to the health of humans, animals and the environment, at both central and decentralised levels. It acknowledges the intrinsic value of animals and other living species, not as

private goods to be owned and used, but as sentient beings that possess their own dignity and are integral to a broader ecosystem that humans must preserve.

Incorporating the principles of *equity* and *socioecological equilibrium* into national legislation involves introducing legal objectives and administrative procedures that protect all species and recognise the intrinsic value of various sectors in decision-making, following the above-mentioned technique of normative integration. It also connects and extends the environmental principle of shared responsibility, ensuring that obligations resulting from environmental law are shared across multiple public and private actors (Sanz Larruga, 1999).

The One Health OHHLEP principle of **stewardship** underscores the imperative for humanity to rationally use common goods while recognising the value of all living things. This principle aligns with the principle of sustainability captured in the ILA Declaration Principle 1 as the duty of States to ensure the sustainable use of natural resources (ILA, 2002). It also accords with the principle of equity and the eradication of poverty from the ILA New Delhi Declaration principle 2, which asserts that equity must be inter and intra-generational, ensuring fair access to natural resources for all peoples within the current generation and for future generations to enjoy a fair share of the common patrimony. The balance between developmental and environmental needs, and the reduction of unsustainable consumption, is also reflected in Rio Declaration principles 3 – rights of present and future generations- and 8 -reduce and eliminate unsustainable production and consumption patterns-. Furthermore, it echoes the principles of biodiversity safeguarding, sustainable use, non-degradation, no transboundary harm, polluter pays, and with the principles of prevention and precaution (UNEP, 2018).

Implementing the principle of stewardship at the national level would require regulatory mechanisms that evaluate and prevent the mismanagement of natural resources, providing clear guidelines for sustainability and rational use. These mechanisms would include, among others, environmental and social impact assessments (ESIA) for proposed activities likely to have significant adverse impact on the environment, as stipulated in Rio Declaration principle 17 -EIAs-. Under a One Health lens, ESIA should also address the potential impact of an activity on human or animal health.

Closely connected to stewardship and sustainability, the principles of prevention and precaution commit States, international organizations, and civil society to avoid activities that may cause significant harm to human health, natural resources or ecosystems. The principle of prevention, enshrined in Rio Declaration principle 14, operates when there is scientific evidence of harm, compelling stakeholders to prevent such harm before it occurs (De Sadeleer, 2002).

The principle of precaution, recognised in Rio Declaration Principle 15 and ILA New Delhi Declaration principle 4, operates in the absence of scientific certainty, requiring stakeholders to anticipate and minimize potential damages⁸. Initially an environmental principle, its application to other sectors relevant to One Health, including human health and food safety, is widely accepted (Goldstein, 2001). The diversity of formulations in international law instruments complicates the quantification of the risk necessary for the principle to operate, but also highlights its flexibility (De Sadeleer, 2002). In multifaceted One Health interventions, risk assessments must consider complex criteria from multiple sectors, and science will not always have all the answers. In these situations, by virtue of the principle of precaution, the absence of scientific evidence cannot justify either action or inaction (Sanchez, 2021). Decisions must take science into consideration as an important factor, but in its absence, they must also account for other aspects, including society's long-term goals (Fiorino, 1990; Kriebler and Tickner, 2001). In this context, participation and transparency become crucial to justify and legitimize policy decisions. For these reasons, the principle of precaution is especially important for One Health and its application should be further studied.

Transdisciplinary and multisectoral collaboration calls for a problem-solving approach based on collaboration and exchange among relevant stakeholders, incorporating both modern and traditional forms of knowledge (Jahn et al., 2012; Bernstein, 2015). It advocates for breaking down silos, engaging non-scientific actors, and embracing a broad array of perspectives. Such collaboration is necessary for good governance, recognising that the complexity of current planetary crises demands an intersectoral and multidisciplinary approach that actively involves all relevant actors, including beneficiaries. As such, it aligns with the ILA New Delhi Declaration principles of good governance (Principle 6) and public participation (Principle 5). Public participation is recognised in Principle 10 of the Rio Declaration, which advocates for the participation of all concerned citizens in decision-making on environmental issues, and has been further consolidated in the Aarhus Convention on access to information, public participation in decision-making and access to justice. The Aarhus

Convention links environment and human rights, and recognises that sustainable development can be achieved only through the involvement of all stakeholders, thereby connecting government accountability and environmental protection.

Additionally, transdisciplinary and multisectoral collaboration introduces a dimension of cooperation that is core to sustainable development and captured in Rio Declaration principle 27 - cooperation among states and people to implement the Declaration-, coupled with the duties of notification and information sharing across countries recognised in Rio Declaration principles 18 - notification of natural disasters of emergencies- and 19 -notification of activities of environmental transboundary effect-. Implementing transdisciplinary and multisectoral collaboration at the national level requires administrative procedures that facilitate data and expertise exchange across multiple stakeholders. Legal frameworks can support multistakeholder bodies by providing accountability structures with specific and binding data-sharing and other responsibilities, and by contributing to their long-term sustainability. This is 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 and implementation (FAO et al., 2022).

The principles of **equity**, **socioecological equilibrium** and **collaboration** imply that actions in one sector must consider their potential impact on other sectors, promoting systems thinking as a foundational element of One Health (Laing et al., 2023). They advocate for moving away from traditional human-led and human-centred policies and regulatory frameworks, recognising the intrinsic value of all species and ecosystems. In this sense, they reflect the principle of integration, as described above (see also ILA New Delhi Declaration principle 7).

Finally, the implementation of the abovementioned One Health principles in national legislation would not only contribute to but also align with the principle of good governance in new ways beyond those previously discussed. The ILA New Delhi Declaration principle 6 of good governance commits States to, among other things, adopt democratic and transparent decision making and respect the principles of the Rio Declaration. The Quadripartite Guide to implementing the One Health Joint Plan of Action (OHJPA) identifies participation, accountability, and rule of law as core principles of good governance (FAO et al., 2023), along with equity and inclusion, which are essential for One Health implementation. Other elements of good governance require

entities to be consensus-oriented, effective and efficient, equitable and inclusive, combat corruption, and be responsive to the present and future needs of society (UNESCAP, 2009).

VI. Discussion

This article examines One Health from a legal perspective, suggesting pathways for further research into its legal nature, foundations, and strategies for implementation. Rather than providing definitive answers, it aims to stimulate interest among legal scholars and regulators regarding the concept of One Health and the fundamental role of law in creating an enabling framework for its realization. It also aims to engage non-legal professionals in understanding the critical role of legal science in fostering sustainable solutions at both the national and the international levels. The paper emphasises the benefits of integrating legal professionals into interdisciplinary research efforts, as law serves as the instrument through which societies establish their social contract, forming the basis for a shared future.

Despite its critical importance, the legal literature on One Health remains limited, primarily addressing pandemic prevention, antimicrobial resistance (AMR), and global health. A 2022 paper from the International Law Association on One Health identified three main challenges -zoonotic spill-over, antimicrobial resistance and laboratory accidents- largely centred on the human and animal health dimensions of One Health. Some literature also addresses animal welfare and rights in relation to One Health. This narrow scope has hindered the development of comprehensive regulatory strategies grounded in rigorous analysis. Consequently, the One Health community has yet to fully leverage legal science to facilitate its implementation across global, regional, and national levels.

This paper raises several unresolved questions, particularly regarding the legal nature of One Health. Aligning One Health's definition and its key underlying principles with sustainable development and established principles of environmental law presents an opportunity for broader legal recognition. However, this alignment requires further scrutiny to determine its practical implications and implementation challenges.

Understanding One Health as an extension of the *principle of integration* positions it as a potential *emerging legal principle*, applicable across diverse legal areas at both national and international

levels. For such operationalization to succeed, however, One Health's legal content must be sufficiently specific to generate actionable legal obligations (applicability), and be broadly accepted (Seys et al., 2012) (Esser, 1956). Based on OHHLEP's definition and key underlying principles, these obligations could include requirements for multisectoral and multidisciplinary collaboration, inclusive stakeholder participation, and a duty to protect living species for their intrinsic value rather than their utility to humans.

However, significant challenges persist. Despite growing recognition, the OHHLEP definition of One Health has not yet achieved broad consensus and remains under scrutiny. The absence of a universally accepted definition complicates the identification of its legal effects and the practical design of regulatory frameworks. Moreover, instruments explicitly recognising One Health as a principle remain rare. Notable exceptions include the annex to the EU Communication "The Future of Europe: Putting Vision into Concrete Action", which identifies One Health as "a horizontal and fundamental principle encompassing all EU policies" (European Commission, 2022), and the "United Nations System Common Approach Towards a Pollution-Free Planet" (UN-EMG, 2023), which lists One Health as one of its ten key guiding principles. These examples demonstrate the potential for One Health inclusion in international legal discourse as a principle but highlight the need for greater consolidation and harmonisation.

Despite these challenges, framing One Health as an extension of the principle of integration or an emerging legal principle offers significant promise. A general principle of One Health could provide a unifying framework for cross-sectoral collaboration and introduce flexible legal obligations tailored to the capacities and policy priorities of individual countries. Such obligations could evolve as "obligations of means or best results" following the example of the concept of "sustainable development", allowing for contextual adaptability. Although a thorough analysis of these aspects is beyond the scope of this paper, they represent critical areas for future research. Further exploration of the legal implications of implementing One Health as a legal principle, particularly its operationalization through international and national instruments, is essential to fully leverage its potential as a tool for addressing complex global challenges at the interface of health and the environment.

Additionally, further research is needed to identify key legal elements for incorporating a One Health approach into legislation. These should include actionable characteristics that facilitate integration into law while ensuring coherence across diverse legal domains. Specifically, such elements should address multisectoral collaboration, foster inclusive stakeholder participation, address the interconnectedness of human, animal, and environmental health, and embed shared values such as sustainability and equity.

One of the most pressing challenges of implementing One Health through legislation is achieving equity across species. This raises complex legal questions, including whether recognising subjective rights for non-human species is a viable or preferred solution. This paper argues that equity could be achieved by recognising the intrinsic value of all species, ensuring their protection and respect, independent of their utility to humans. It does not take a definitive stance on granting human-like rights to non-human species, as this solution may perpetuate a refined form of anthropocentrism.

Lastly, the article briefly discusses the importance of the precautionary principle in addressing uncertain risks at the One Health interface. Widely referenced in COVID-19-related case law, this principle holds significant relevance for One Health. Its operationalization, however, warrants further examination to ensure its practical application in addressing interconnected health challenges.

VII. Conclusion

Incorporating legal considerations into One Health programming and interventions is of utmost importance. Legislation provides the foundation for achieving long-term public policy objectives and establishing enforceable frameworks. Without legal mechanisms, institutional coordination and stakeholder engagement risk being driven by political or individual interests, lacking the necessary accountability and sustainability. However, for legislation to effectively support One Health implementation, it is crucial to understand its legal nature, foundational principles, and the mechanisms through which it can be operationalized in legislation.

By connecting established legal concepts and principles -such as sustainable development and the principle of integration - with the key underlying principles of One Health -equity, sociopolitical

parity, socioecological equilibrium, stewardship, transdisciplinary and multisectoral collaboration-, this paper outlines potential pathways for their legal categorization and implementation.

One Health reflects an ongoing trend toward integration, inherent in the international development agenda and reinforced by the COVID-19 pandemic. International organizations have played a crucial role in conceptualizing and advancing this approach as a multidisciplinary and multisectoral framework, emphasising the need for holistic and collaborative responses to global challenges at the nexus of human, animal, plant, and ecosystem health. In this context, One Health can operate as an extension of the principle of integration, promoting systemic, institutional, and normative cohesion through inclusive governance frameworks and adaptable legal instruments.

The principle of integration, widely recognised in international law, provides a compelling framework for exploring the normative potential of One Health. Similarly, synergies between the key underlying principles of One Health and established legal principles can facilitate their implementation through legislation. Among these principles, equity and socioecological equilibrium among all living species represent innovative contributions, challenging traditional anthropocentric views by emphasising humanity's interconnectedness with other species and recognising their intrinsic value beyond mere utility to humans. Integrating considerations for the health and welfare of other species into developmental decisions is not only a moral imperative but also an urgent necessity, given our shared planet and intricate connections.

The principle of stewardship aligns One Health with the principle of sustainability, while sociopolitical parity supports a human-rights-based approach, advocating for whole-of-government and whole-of-society strategies where participation is an essential element.

In conclusion, drawing upon the inherent complexity of One Health, both technically and legally, this paper advocates for a return to foundational legal principles to inform its effective implementation. By refining our understanding of how law can support and enhance One Health, we can better address the complex interconnections between the health of humans, animals, and ecosystems, contributing to a more sustainable and resilient future for all.

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- **Connections References (Please reference all the papers connected to this one, for example all methods papers, results papers and analysis papers.)**

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Notes

¹ We refer here to the principle of integration in the context of sustainable development (ILA Declaration principle 7), and not to the “principle of systemic integration of international law” in the Vienna Convention on the Law of Treaties article 31 (3)(c) which advocates for different sources of international law to be interpreted in an integrated manner to avoid fragmentation.

² Enunciated in Principle 13 of the 1972 Stockholm Declaration: “(...) States should adopt an integrated and coordinated approach to their development planning”. Integration is also included in the 1982 World Charter for Nature Principle 7, the Río Declaration Principles 4, 11 and 25. It is also enshrined in the Convention on Biological Diversity Articles 6 (b) and 10 (a), the 1994 UN Convention to Combat Desertification in Countries Experiencing Serious Drought Article 2.2.

Integration is also at the basis of the Agenda 2030 (see points 13 and 17 “Reflecting the integrated approach that we have decided on” and 18 “the 17 SDGs and 169 associated targets are integrated and indivisible” – also in point 55)

³Article 26.3: economically viable alternatives to tobacco production, including crop diversification should be addressed and supported in the context of nationally developed strategies of sustainable development.

⁴ The principle of integration has also been incorporated by the Interamerican Court of Human Rights (see, among others, Cases *Saramaka vs. Suriname* 28.11.2007, *Indigenous Community Yakye Axa vs. Paraguay*, 17 June 2005)

⁵ Institutional Integration corresponds also to Principle 7.2 of the ILA New Delhi Declaration: “[a]ll levels of governance – global, regional, national, sub-national and local – and all sectors of society should implement the integration principle, which is essential to the achievement of sustainable development”. ILA. Resolution 3/2002 Sustainable Development New Delhi Declaration of Principles of International Law Relating to Sustainable Development. Principle 7. Available at https://www.ila-hq.org/en_GB/documents/conference-resolution-english-new-delhi-2002-3. Article 13.2.(c) of the Draft International Covenant on Environment and Development states that the principle of integration requires States to ‘establish or strengthen institutional structures and procedures to fully integrate environmental and developmental issues in all spheres of decision-making.

⁶ Following the ILA Report, forms of programmatic integration could be the ODGs and the Agenda 2030, or the WTO Doha negotiations on trade and sustainable development. Page 11.

⁷ The ILA report suggests that institutional integration at the level of program and strategy can be monitored through environmental impact assessment (EIA) along with other forms of integration, such as cost-benefit analysis, environmental accounting, and public participation. See ILA Report 2006 Toronto. Page 9.

⁸While the Rio Declaration refers to “serious and irreversible damages” later Conventions and the jurisprudence have softened this requirement. See the 1992 Helsinki Convention on the Protection of the Marine Environment of the Baltic Sea and the Cartagena protocol. Other instruments, such as the Convention on Biological Diversity, refer to “a threat of significant reduction or loss of biological diversity”. The 2001 Stockholm Convention on Persistent Organic Pollutants refers to “significant adverse human health and/or environmental effects” (de Sadeleer, 2020)