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Ancestral Comprehensions for a Policy for the Future of the Earth: The Narrative of the South American Andes in the Face of the Global Climate Crisis

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I. INTRODUCTION

“The past is never dead. It's not even past.”¹ Thus, with this thought, the narrator William Faulkner reveals how past times, in truth, remain in force in the present. Perhaps such vision responds to a non-linear understanding of time or to what we call “conception of circular time” or “spiral thinking,” derived from our ancestral cosmovisions, which is at the base of those abstruse wisdoms that survive still in the collective memory of the traditional societies of the South American Andes.

Indeed, under the “principle of guardianship of the Earth,” over approximately fourteen thousand years, the ancestral civilizations of the mountains of Andean America have created and recreated systems of complex knowledge that are praxeology of deep ecology and reveal an intense comprehension of the interconnections, interdependencies, and necessary balances between the Earth, humanity, and the Cosmos. This knowledge—transmitted from generation to generation—constitutes complex systems that are manifested in sophisticated technologies, mechanisms of social organization, and an ethic of interrelation based on the naturalness of intergenerational and interspecies balances. These systems allow

1. WILLIAM FAULKNER, REQUIEM FOR A NUN 73 (1951).

for the generation of adaptive responses and solutions in high mountain ecosystems in which the only permanent thing is the high and tremendous climatic variability.² The material universe is seen as a dynamic network of interrelated events. None of the properties of any part of the network is critical; all are derived from the properties of the other parts and the total consistency of their interrelations determines the structure of the entire network.

However, on a global scale, the application of traditional knowledge systems has long been ignored in climate policymaking and, only very recently, have they become part of the discourse on the climate crisis.³ Since the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), comparisons between Indigenous and Western climate knowledge have been used as foundations to favor its integration into a participatory research process,⁴ considering that Indigenous and traditional peoples possess valuable lessons that are vital for managing global climate disorder.⁵

In this context, some key questions emerge: How can ancestral knowledge systems contribute to the design and implementation of planetary security policies in the face of the risks posed by global change, the transgression of planetary boundaries, and the global climate crisis? How can international law contribute to the preservation of ancestral knowledge systems as a tool to more efficiently face the planetary ecological crisis and safeguard the lives of present generations—as well as the possibilities for future

2. Erick Pajares Garay & Jaime Llosa Laraburre, *Relational Knowledge Systems and Their Impact on Management of Mountain Ecosystems: Approaches to Understanding the Motivations and Expectations of Traditional Farmers in the Maintenance of Biodiversity Zones in the Andes*, 22 MGMT. ENV'T QUALITY INT'L J. 213, 214, 216–17, 228 (2011).

3. See D. Green & G. Raygorodetsky, *Indigenous Knowledge of a Changing Climate*, 100 CLIMATIC CHANGE 239, 242 (2010).

4. See Gary W. Yohe et al., *Perspectives on Climate Change and Sustainability*, in CLIMATE CHANGE 2007: IMPACTS, ADAPTATION AND VULNERABILITY. CONTRIBUTION OF WORKING GROUP II TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 811, 833 (Martin L. Parry et al. eds., 2007).

5. Mirjam Macchi et al., *Indigenous and Traditional Peoples and Climate Change*, INT'L UNION FOR CONSERVATION OF NATURE [IUCN] 9 (Mar. 2008), <https://www2.ohchr.org/english/issues/climatechange/docs/IUCN.pdf> [<https://perma.cc/SK27-84SD>].

generations—in the face of risks and threats caused by the devastation of the biosphere?⁶

From a transdisciplinary perspective, we argue that those ethics contained in ancestral cosmovisions can powerfully contribute to the ecological literacy of human society, to the progressive recovery of the stability of the Earth system, and, consequently, to “planetary security.” On the other hand, it is necessary to point out that one of the foundational ideas of Western humanity is that there is—based on assumptions of reality, or for epistemic reasons—better knowledge than others. However, today it is debated how the planetary ecological crisis reveals the crisis of a civilization project that has been sustained on a reductionist and Cartesian model of thought.

Due to the aforementioned issues, international law and the international legal regime of climate change, by considering and integrating these valuable ancient comprehensions in the formulation of global climate policies—and in multilateral agreements on climate—influence the civilizational paradigm change, as they contribute to the generation of complex thought—and different knowledge—from a “dialogue of knowledge” that enables epistemic approaches between millennial knowledge systems and the best scientific knowledge.

II. A THEORETICAL FRAMEWORK

A. Planetary Ecological Crisis and Dialogue of Knowledge for Civilizational Change

This essay proposes an understanding of the “planetary ecological crisis,” starting from the complex perceptions⁷ of the

6. In their work ‘The Ecology of Law’, Fritjof Capra and Ugo Mattei argue that at the root of many of the environmental, economic, and social crises we face today is a legal system based on an obsolete worldview. Tracing the parallel history of law and science from antiquity to modern, Capra and Mattei explain how, by incorporating concepts from modern science, the law can become an integral part of bringing about a better planet, rather than facilitating its devastation. FRITJOF CAPRA & UGO MATTEI, *THE ECOLOGY OF LAW: TOWARD A LEGAL SYSTEM IN TUNE WITH NATURE AND COMMUNITY* 20 (2015).

7. James Gibson's ecological approach defends the theory that perception (or sensory experience) is a simple process; information is in the stimulus, without the need for subsequent internal mental processing. See JAMES J. GIBSON, *THE ECOLOGICAL APPROACH TO VISUAL PERCEPTION* 76 (Psych. Press, Classic ed. 2015).

ancestral wisdom inherited from the Andean civilization. We aim to unveil—in the midst of globalizing dynamics—a narrative of its own that provides statements for a civilizational change in the face of multiple and systemic crisis and that, at the same time, contributes to the construction of a local but also universal society, which transits towards the *unitas multiplex*, that is, towards unity supported by human diversity.⁹ This implies—from transcomplex epistemology—recognizing the relevance of the principle of universality, but assuming its deficit and linking it in complementarity with the local and the singular. When our culture approaches the knowledge of foreign cultures—and of past cultures—the human spirit will have more possibilities to develop its autonomy.¹⁰

The planetary emergence is revealed in the transgression of planetary boundaries, giving way to “global change,” a complex phenomenon characterized by accelerated and convergent dynamics that feed back and resize from the non-linear effects of the desertification, the loss of biodiversity stocks (agrobiodiversity), population growth at a primatological scale, and the climate crisis itself. Global change is therefore an expression of the crisis in the model of thought and construction of knowledge,¹¹ both essential foundations of the “global society,” to which the reflection of Albert

This approach is based on the assumption that the intellectual keys to perception as a survival mechanism are found in the natural laws underlying each organism; therefore, the organism only perceives what it can learn and what is necessary to survive. *Id.*

8. A “narrative,” according to MacIntyre, is a rational story reconstructed in search of truth. See Alasdair MacIntyre, *Epistemological Crises, Dramatic Narrative, and the Philosophy of Science*, 60 *THE MONIST* 453, 455 (1977).

9. See generally EDGAR MORIN ET AL., *EDUCAR EN LA ERA PLANETARIA [EDUCATE IN THE PLANETARY AGE]* 71 (2003).

10. EDGAR MORIN, *INTRODUCCIÓN A UNA POLÍTICA DEL HOMBRE [INTRODUCTION TO THE POLITICS OF MAN]* 138 (2012).

11. The word “crisis” comes from the Greek language, where we find exactly the same term (“*krinô*”), which means to separate, to choose, to cut, to decide, or to judge. Jet Roitman, *Crisis, POLITICAL CONCEPTS*, <http://www.politicalconcepts.org/issue1/crisis/> [<https://perma.cc/NNQ3-5TEJ>]; The Vocabularist, *Where Did the Word ‘Crisis’ Come From?*, BBC (Sept. 15, 2015), <https://www.bbc.com/news/blogs-magazine-monitor-34154767> [<https://perma.cc/X87P-332E>]. In principle, this word does not have a negative meaning: the crisis is the moment when routine has stopped serving as a guide and we need to choose one path and give up another. Etymologically at least, crisis is the complete opposite of accepting an inevitable destiny. The time of crisis is that of decision and intelligent change. The natural state of the world is dynamism, the change that varies its rhythm from multiple fluctuations and regulations that have a high component of chaos. The crisis is the natural state of things.

Einstein appears in response: “[n]o problem can be solved from the same level of consciousness that created it.”¹²

Now, when we talk about global change, we refer to the impact of human activity on the functioning of the biosphere;¹³ that is, to the ability to substantially alter the infrastructure that sustains life on Earth in all its forms. Consequently, we are facing a notable and growing deterioration of the biophysical base that guarantees the reproduction of human societies.

Desertification processes,¹⁴ loss of biodiversity, overpopulation, and climate change are factors causing global change.¹⁵ Each of these factors are planetary-scale phenomena that occur simultaneously, that converge, that are interrelated, that are multidimensional, and that generate non-linear effects of high uncertainty. The vast majority of the global scientific community today recognizes that climate change constitutes a planetary problem, the solution of which may represent the greatest collective challenge for humanity.¹⁶ It is essential to objectify the magnitude of the phenomenon, not only to anticipate trends or their effects, but, above all, to identify and question the causes that are at the base of the biosphere crisis.

12. Debbie Woodbury, *My No. 1 Tip for Solving Problems*, HUFFINGTON POST (May 2, 2013), http://www.huffingtonpost.com/debbie-woodbury/problem-solving-advice_b_3185536.html [<https://perma.cc/6K89-S4BR>].

13. CARLOS M. DUARTE ET AL., CAMBIO GLOBAL: IMPACTO DE LA ACTIVIDAD HUMANA SOBRE EL SISTEMA TIERRA [GLOBAL CHANGE: IMPACT OF HUMAN ACTIVITY ON THE SYSTEM] 43–70 (2006) (discussing the various impacts human activity has on climate change and earth systems).

14. According to an IPCC report, desertification is “land degradation in . . . drylands, resulting from many factors, including human activities and climatic variations. . . Desertification and climate change, both individually and in combination, will reduce the provision of dryland ecosystem services and lower ecosystem health, including losses in biodiversity.” Alisher Mirzabev, et al., *Desertification*, in CLIMATE CHANGE AND LAND: AN IPCC SPECIAL REPORT ON CLIMATE CHANGE, DESERTIFICATION, LAND DEGRADATION, SUSTAINABLE LAND MANAGEMENT, FOOD SECURITY, AND GREENHOUSE GAS FLUXES IN TERRESTRIAL ECOSYSTEMS 249, 251 (Priyadarshi R. Shukla et al. eds., 2019), <https://www.ipcc.ch/site/assets/uploads/2019/11/SRCCL-Full-Report-Compiled-191128.pdf> [<https://perma.cc/6MRW-VCPN>] [hereinafter CLIMATE CHANGE AND LAND].

15. See Almut Ameth et al., *Framing and Context*, in CLIMATE CHANGE AND LAND, *supra* note 14, at 79, 82, 84–85, 88–89.

16. See *Climate Science*, UNION OF CONCERNED SCIENTISTS, <https://www.ucsusa.org/climate/science> [<https://perma.cc/WY44-9UQW>].

The understanding of climate change implies phenomena that cross the traditional disciplinary boundaries, ranging from geosciences to climate anthropology. Climate management requires an interdisciplinary, transdisciplinary, and multidimensional vision, as it incorporates the subject, the group, the local territory, and the planet. As Herman E. Daly points out, the greater attention that climate change attracts today is laudable, being the predictions of complex climate models that are most used to face its impacts.¹⁷ However, it is pertinent to recall the observation of physicist John Wheeler: “We build the world by the questions we ask.”¹⁸ What kind of world do climate models build? Do they allow us to envision other possible worlds—other alternatives—in the face of global change? Is global change the result of the epistemic crisis of modernity?

Faced with these questions, the dialogue of knowledge emerges as a statement of alterity (I-you/you-us relationships) to rethink the disciplinary rigidities that dominate climate science. Above all, the ensuing dialogue reveals the resistance and resilience that continue to occur in other regions of the planet, such as the South American Andes, even though these ancient knowledge systems are not officially integrated into public climate management, nor are they adequately valued in the design of global climate policies. Since this part of the world is a region of high bio-culturality—featuring the Tropical Andes hotspot at the center of genetic and biological diversity, high cultural diversity,¹⁹ and fresh water sources²⁰—such a situation is not a minor issue, but rather constitutes a central aspect to make visible and strengthen other climate governance.

17. Herman E. Daly, *Cambio climático: ¿Cuál es la pregunta? [Climate Change: What is the Question?]*, GLOBALIZACIÓN (Dec. 27, 2007), <http://globalizacion.org/2007/12/cambio-climatico-cual-es-la-pregunta/> [<https://perma.cc/5BF7-BTXY>].

18. *Id.*

19. United Nations Env't Programme [UNEP], *Latin America and the Caribbean: Environmental Outlook*, at 22, 100, 103, UNEP Doc. DEW/1076/PA (2010) <https://wedocs.unep.org/handle/20.500.11822/8663?show=full> [<https://perma.cc/5VWG-3N4K>]. Latin America is home to a high rate of biodiversity, both in species and genetic variation, as well as in ecosystems. It is estimated that about 40% of the planet's higher plant species and 45% of reptilian species are specifically found in these ecosystems. *Id.* at 103.

20. Despite the fact that Latin America constitutes only 15% of the world's surface area and 8.4% of the world's population, it receives 29% of the precipitation and represents more than a third of the world's renewable water resources. *Id.* at 94, 107–08.

The societies that inhabit the South American Andes have been facing the consequences of the non-linear global phenomenon in their local territories, but at the same time they are highly resilient. Throughout 14,000 years of cultural construction, they have relied on advance readings on the possible behavior of the weather and climate to develop knowledge and technologies for the domestication of water, the breeding and maintenance of agrobiodiversity, and agro-astronomical observation.²¹ Each of these developments were made possible through an attentive look at the movements of the Sun, the Moon, the dark constellations (interstellar gas and dust) and stellar constellations (the Qollqa²² or the Pleiades, the Chakata or Andean Cross²³). These traditional knowledge systems for the management of high mountain ecosystems —supported by the cybernetic principle of “massive parallelism”²⁴—are manifested in the validity of socio-ecological resilience strategies, being essential to disperse the risk of aggressive ecoclimatic variability, in an environment in which the only permanent thing is uncertainty and constant change.

From the understanding of the complexity and the praxis of deep ecology²⁵ present in the centrality of the foundations of the ancestral cosmovisions²⁶ of the South American Andes, it is assumed that

21. Garay & Laraburre, *supra* note 2, at 215, 217.

22. This word of the Quechua indigenous language means “storehouse.” Mark Cartwright, *Inca Food and Culture*, ANCIENT HIST. ENCYCLOPEDIA (2015), <https://www.ancient.eu/article/792/inca-food--agriculture/> [<https://perma.cc/3FM3-YP3P>].

23. The word ‘Chakata’ or Andean Cross, has its origin in the Quechua indigenous language, in its variant of Cusco, the founding center of Inka society. See GOBIERNO REGIONAL CUSCO, DICCIONARIO QUECHUA-ESPAÑOL 42 (2d ed. 2005), <https://indigenasdelperu.files.wordpress.com/2015/09/diccionario-queswa-academia-mayor-cuzco.pdf> [<https://perma.cc/G5YH-797Y>].

24. Climate risk management is implemented using the laws of cybernetics, such as Ashby's Law: only the variety of responses of a system controls the variety of states of its physical environment. See John Naughton, *Ashby's Law of Requisite Variety*, EDGE, <https://www.edge.org/response-detail/27150> [<https://perma.cc/6T8V-YV4L>]; Yi Lu & Juiping Xu, *Cybernetic Paradigm Based Innovative Approaches Towards Coping with Climate Change*, 26 J. SYST. SCI. SYST. ENG'G 359, 360–61 (2017). See also FRITJOF CAPRA, *THE WEB OF LIFE: A NEW SCIENTIFIC UNDERSTANDING OF LIVING SYSTEMS* 49, 71 (Anchor Book 1996).

25. Deep ecology recognizes the fundamental interdependence between all phenomena and that, as individuals and as societies, we are all immersed in (and finally depend on) the cyclical processes of nature. CAPRA, *supra* note 24, at 6.

²⁶ According to the Kawsay Center for Orinary Cultures, “a cosmovision is the human elaboration that recovers the ways of seeing, feeling and perceiving the

everything is interconnected, that the entire phenomenology of the Cosmos manifests in energy, that nature is the regeneration center of life, and that it is possible to converse with all natural phenomena—and with all living beings—with respect and affection, about the passing of time.²⁷ Thus, the Earth, humanity and the Cosmos are re-linked, resizing themselves in a sacred space. As Mircea Eliade says, “the sacred always manifests itself as a reality of a wholly different order from ‘natural’ realities.”²⁸

It should be specified here, in a very superficial way, that complexity is that which is woven together, that which is interwoven together, that which cannot be divided and at the same time cannot be separated, thus configuring the paradox of the “one and the many.”²⁹ In a more profound way, Edgar Morin defines complexity as “the fabric of events, actions, interactions, feedback, determinations and hazards that constitute our phenomenal world.”³⁰

totality of reality, that is; human beings, the whole of nature and the Cosmos. All the cultures of the world have their particular worldview, therefore ours, located in this part of the planet, and on this continent, also have them.” EQUIPO DE TRABAJO KAWSAY, METODOLOGÍA PROPIA: EDUCACIÓN DIFERENTE [OWN METHODOLOGY, DIFFERENT EDUCATION] 14 (2005). Ulrich Köhler points out that the worldview of a people “synthesizes in a structured way its main concepts about the form and quality of the Universe, of its inhabitants, and of man's position within this system.” See Ulrich Köhler, *Cosmovisión Indígena e Interpretación Europea en Estudios Mesoamericanistas [Indigenous Worldview and European Interpretation in Mesoamerican Studies]*, in LA ANTROPOLOGÍA AMERICANISTA EN LA ACTUALIDAD: HOMENAJE A RAPHAEL GIRARD 583, 583 (1980).

27. In the Andean conception, time is not linear, irreversible or segmented; events do not occur in a cancellation or definitive manner. See Hanny G. Fernandez Colonel, *Concept of Time in the Andean Thought*, APULAYA CTR. FOR ANDEAN CULTURE, <https://www.apulaya.com/blog/espanol-concepto-del-tiempo-en-el-pensamiento-andino> [<https://perma.cc/4Q8C-2YYT>].

28. MIRCEA ELIADE, *THE SACRED AND THE PROFANE: THE NATURE OF RELIGION* 10 (Willard R. Trask trans., Harcourt Inc. 1959) (1987).

29. For an in-depth discussion on the ancient philosophical problems of “the one and the many”, see generally Yonghua Ge, *The One and the Many: A Revisiting of an Old Philosophical Question in the Light of Theologies of Creation and Participation*, 57 HEYTHROP J. 109 (2016).

30. EDGAR MORIN, INTRODUCCION AL PENSAMIENTO COMPLEJO [INTRODUCTION TO COMPLEX THOUGHT] 32 (Du Seuil ed., 1990). Complexity is a category to rethink our human condition, which presupposes a new relationship with knowledge, a reform of thought, education and also politics. A complex system is a set of interacting elements. When one of its components is modified in a system, all the others are affected, changing the whole. Any system can be part of another greater than itself, which is often called a supersystem. The environment is a complex system, and an

The “animism” of the Andean civilization is thus the comprehensive account of the complex, insofar as it assumes life as an “emergency,” that is, as an expression that “the whole is more than the sum of the parts.”³¹ These ancestral ethics—which propose a respectful and “sacred” vision of life on the Earth³²—were first approached by James Lovelock, with his Gaia hypothesis and further expounded on by ecologist Stephan Harding, with his book *Animate Earth: Science, Intuition and Gaia*, in which he proposes to recover a respectful relationship with the planet, as an organism full of life and purpose.³³

In this sense, it is essential to consider that ancestral wisdom—as another episteme—implies a different way of creating and recreating knowledge; a way that involves thought, feeling, intuition and sensory perception as equally valid forms of access to knowledge. From the rigidities of scientism, it is considered that ancient epistemes cannot create knowledge comparable to the technoscientific. Consequently, “normal science,” which some call the “cosmology of domination,” has tried to replace that older cosmology while validating traditional knowledge, innovations, practices and technologies through protocols that allow their systematization and integration into the gnosis of normal science.³⁴

ecosystem is a superorganism with an organizational complexity with multiple interactions and recursion.

31. Erick Pajares Garay, *Así en la Tierra como en el Cielo: Sabidurías ancestrales para re-crear los pasajes bioculturales y armonizar con el cambio climático en las montañas andinas [On Earth As Well As in Heaven: Ancestral Wisdoms to Re-Create Biocultural Passages and Harmonize with Climate Change in the Andean Mountains]*, in *CAMBIO CLIMÁTICO, CAMBIO CIVILIZATORIO: APROXIMACIONES TEÓRICAS* 87, 88, 93 (Manuel Guzmán Hennessey ed., 2012) (An “emergency” is a quality that arises, in functionalist terms, from the sum of the parts, but that can neither be reduced to the parts, nor be restricted or explained from any of them.).

32. Darrell Addison Posey, *Introduction: Culture and Nature – The Inextricable Link*, in *CULTURAL AND SPIRITUAL VALUES OF BIODIVERSITY* 1, 4–6 (Darrell Addison Posey ed., 1999).

33. Tim Radford, *James Lovelock at 100: The Gaia Saga Continues*, *NATURE* (June 25, 2019), <https://www.nature.com/articles/d41586-019-01969-y> [<https://perma.cc/SQ5B-TBC8>]; STEPHAN HARDING, *ANIMATE EARTH: SCIENCE, INTUITION AND GAIA* 251–53 (Green Books 2d ed. 2009).

34. *Indigenous Knowledges: Resistance and Advocacy*, in *INDIGENOUS KNOWLEDGES IN GLOBAL CONTEXTS: MULTIPLE READINGS OF OUR WORLD* 87 (George J. Sefa Dei ed., 2002).

However, ancestral knowledge takes on significance within the culture that sustains it.³⁵

Indeed, it is still intended to ignore the importance of traditional knowledge systems in the face of the need to reveal other alternative solutions to the biosphere crisis, ignoring that such a crisis reveals an eroded and exhausted model of thought, which being at the base of the model of civilization, it exposes it to collapse.³⁶ Vandana Shiva has therefore suggested the term “monocultures of the mind” to describe the exclusive characteristics of Western knowledge, and the authoritarian implementation of its episteme.³⁷

Today humanity subsists amidst the tensions of two inter-influencing levels: biosphere and technosphere, while the linear processes of the latter collide violently with the cyclical processes of the biosphere. The interaction between the natural and the social perspective has given rise to a model of a social ecosystem—the socio-sphere—that reflects a profound crisis. This explains why it is not sustainable for economic policies to subrogate climate policies,³⁸ and why it becomes essential to rethink a model of civilization that has yielded its chances of survival to transhumanism, which postulates that the human species is capable of overcoming its limitations—intellectual and physical—through technological control of their own

35. See George J. Sefa Dei et al., *Introduction*, in *INDIGENOUS KNOWLEDGES IN GLOBAL CONTEXTS: MULTIPLE READINGS OF OUR WORLD*, *supra* note 34, at 3, 4 (Traditional knowledge “cannot be dismissed as a mere localized phenomenon. Such knowledges extend across cultures, histories, and geographic spaces, as well as across time.”).

36. OLIVER QUIJANO VALENCIA, *DE SUEÑO A PESADILLA COLECTIVA: ELEMENTOS PARA UNA CRITICA POLITICO-CULTURAL DEL DESARROLLO [FROM DREAM TO COLLECTIVE NIGHTMARE: ELEMENTS FOR A POLITICAL-CULTURAL CRITIQUE OF DEVELOPMENT]* (2002) (invisibility of the “other” is expressed, in principle, in the “invention” of the New World, typical of European Renaissance imagery, which ignores the specificity of the American and Third World reality, and consequently, establishes its disappearance, denial and cover-up).

37. VANDANA SHIVA, *THE MONOCULTURES OF THE MIND: PERSPECTIVES ON BIODIVERSITY AND BIOTECHNOLOGY* 12, 50 (1993).

38. See HARDING, *supra* note 33, at 229, 230, 253. See also *id.* at 253, for a discussion of biocentric perspectives. Concern for climate change is anthropocentric; that is to say, it is interesting to control its perverse effects, especially for humanity. From biocentric perspectives, climate change would not be a problem, because even under very different biophysical conditions, the Earth would continue to exist. *Id.* at 253.

biological evolution.³⁹ The reinvention of society will then imply moving towards the definition of public policies for socio-ecosystems, recognizing that the built society, like all complex organisms, is vulnerable to decomposition and destruction, due to the laws of environmental thermodynamics.⁴⁰ Indeed, the second law of thermodynamics—the law of entropy—defines the compelling nature of resources and warns of the harmful effects of productive activities, effects that will complicate, and are already complicating, the survival of society on a human scale, since it establishes the intrinsic degradation of any process of transformation and expansion, the same that is irreversible (social entropy)⁴¹

The evidence of the crisis of self-organization of the planet presses for a debate full of critical thought⁴² and a responsible attitude towards the need to “deconstruct” the knowledge that has led us to the possibility of making our survival as a species on the Earth unfeasible, and to move towards different ways of thinking, that is, to the recognition of other epistemes and other gnosis. The reconfiguration of the way of experiencing the world implies a re-dimensioning of the sense of being of the human species; as a

39. Héctor Velázquez Fernández, *Transhumanismo, Libertad e Identidad Humana* [*Transhumanism: Freedom and Human Identity*], THÉMATA: REVISTA DE FILOSOFÍA, June 2009, at 577, 579 (Spain).

40. See ISIDORO MARTÍNEZ, ENVIRONMENTAL THERMODYNAMICS (2014), <http://imartinez.etsiae.upm.es/~isidoro/Env/Introduction%20to%20environmental%20thermodynamics.pdf> [<https://perma.cc/Y675-WWSV>]. The Austrian scientist, Ludwig Boltzmann, defined entropy, noting that it was “a measure of the disorder of a system.” The idea of applying thermodynamics to society came later, with the contributions of the sociologist Kenneth D. Bailey in 1990: “social entropy” is the sum of all chaotic states that occur in a given time at the social level. See LEONARDO TYRTANIA, EVOLUCIÓN Y SOCIEDAD: TERMODINÁMICA DE LA SUPERVIVENCIA PARA UNA SOCIEDAD A ESCALA HUMANA [EVOLUTION AND SOCIETY: THERMODYNAMICS OF SURVIVAL FOR A HUMAN SCALE SOCIETY] 40, 71 (Juan Pablos ed., 2009).

41. The Austrian scientist, Ludwig Boltzmann, defined entropy, noting that it was “a measure of the disorder of a system.” The idea of applying thermodynamics to society came later, with the contributions of the sociologist Kenneth D. Bailey in 1990: “social entropy” is the sum of all chaotic states that occur in a given time at the social level. For further information on this topic, see TYRTANIA, *supra* note 40.

42. *Aprender a Pensar*, EL EDUCADOR, Nov. 2008, at 4, 4–5, <https://es.calameo.com/read/0000963308a623f250cd6>. Critical thinking can look to the past or to the future, but it is never conjugated in the present tense. It lies in a horizon of the past when it calls into question the legitimacy of what is established. Instead, it is projected into the future when it proposes new ways of approaching reality. According to Linda Elder and Richard Paul, creators of the Foundation for Critical Thinking, this thought “implies a commitment to overcome the natural egocentricity and sociocentricity of the human being.” *Id.* at 5.

collective project, this in turn requires the reinvention of current global climate policies—which have so far failed—to give way to others that allow us to innovate, and that are formulated by establishing bridges between the best “objective science” and the “ancestral systems of knowledge.”⁴³ It is therefore necessary to rethink reality as a complex totality, that is, as a whole that is woven in common: everything is interrelated, everything is interdependent.⁴⁴ The perception of the living world as a network of relationships has turned “network thinking” into another of the fundamental characteristics of systems thinking.⁴⁵

In the current state of affairs, we have to learn to differentiate and distinguish, without having to separate. In this sense, the dialogue of knowledge presupposes the recognition of the existence of plural knowledge and gives the possibility to the scientific episteme to alternate with other forms of knowledge production. This will allow us to rebalance and reconnect (put back together) what was unbalanced and divided in the first modernity: the relations between science and social practices, and the interdependence of humanity and nature.

A dialogue of knowledge for climate governance also implies transcending the disciplinary and building transdisciplinary thinking. Michel Foucault has already argued extensively about the power of the exercise of disciplinary knowledge.⁴⁶ It can often become very difficult to be accepted by “experts” in one discipline or another when you try to link with it and do not proceed from it. Such knowledge-power-discipline relationships continue to hinder what cannot be postponed: a multi-, inter- and transdisciplinary dialogue in the face of the climate crisis.

On a planetary scale, climatic transformation is an identical phenomenon, producing similar impacts in different regions of the Earth, such as sea level rise, deglaciation, drastic changes in the rainfall regime (floods and droughts), and loss of biodiversity or soil erosion. Yet the problem is that it is interpreted culturally—and at a symbolic level—in very different ways: there is only one Earth, but

43. See CAPRA, *supra* note 24, at 40, 306–07.

44. *Id.* at 7.

45. *Id.* at 17, at 37–38.

46. Michel Foucault: *Key Concepts*, FOUCAULT NEWS, <https://michel-foucault.com/key-concepts/> [<https://perma.cc/N6G3-N2VN>]; *Power/Knowledge*, SOCIAL THEORY, <http://routledgesoc.com/category/profile-tags/powerknowledge>.

different climatic cultural worlds occur simultaneously. As Clark A. Miller points out,

“local knowledge” has become more than just the basis for competing knowledge claims; it is now also a tool for exercising voice in global politics. Demanding a space for “local knowledge” thus functions as a form of boundary work designed to give value to practices and ways of interpreting nature and society that differ from those introduced by the “forces of globalization.”⁴⁷

The United Nations Framework Convention on Climate Change (“UNFCCC”), in Article 3, Principle 1, refers to the common but differentiated responsibilities of the States Parties, in the face of the global phenomenon; in addition, Principle 4 prescribes that “[p]olicies and measures to protect the climate system against human-induced change should be appropriate for the specific conditions of each Party.”⁴⁸

Consequently, climate governance should not only be thought based on the greater or lesser responsibility of countries in the emission of greenhouse gases (“GHG”), but also considering the different ways of perceiving, knowing, understanding and managing climate change, which is of the greatest importance for a region with biocultural characteristics as pronounced as those present in the territories of the South American Andes.

B. Cultural Codes, Climate Change, and Education for Complexity

The first World Climate Conference, convened by the World Meteorological Organization (“WMO”), took place in 1979, so the trends and scale of the non-linear effects of climate change have been known for just over three decades. It is therefore obvious that neither the scientific evidence—although abundant—nor the supply of technologies to protect the climate, have made it possible to transform global policies and the behavior of citizens. Moreover, indifference and negligence have overcome public awareness and

47. Clark A. Miller, *Resisting Empire: Globalism, Relocalization, and the Politics of Knowledge*, in *EARTHLY POLITICS: LOCAL AND GLOBAL IN ENVIRONMENTAL GOVERNANCE* 81, 85 (Sheila Jasanoff & Marybeth Long Martello eds., 2004).

48. United Nations Framework Convention on Climate Change, art. 3, ¶¶ 1, 4, May 9, 1992, S. TREATY DOC NO. 102-38, 1771 U.N.T.S 107.

ethical questions regarding the causes of the planetary ecological crisis.

The cultural codes of societies—both at the level of industrialized countries, as well as those of emerging countries and the poor—resist changes in the consumption model of fossil matter and energy that would have had to take place some time ago, before the transformation of the planet's ecosystems. These codes require deep attention and analysis, which in turn implies a transdisciplinary and transversal understanding of the global phenomenon, assuming it not only as a “scientific fact”, but essentially as a “social fact.” In this regard, the problem of climate change is, to a great extent, seen as a social phenomenon with a clear anthropogenic origin; it requires modifying the civilizing model and its scale of values.⁴⁹

Unfortunately, the socio-cultural dimension of climate change is barely taken into account by global cooperation networks, and it is essential to move towards other understandings of policies. This move would achieve the articulation of a global climate governance that represents the diverse governance that emerges in the local territories and that is based on other cosmologies, other cosmovisions, and other epistemes. However, it will not be possible to achieve a paradigm shift to reverse the planetary emergency without an education that contributes to the transformation of behavior and unsustainable lifestyles.⁵⁰ Now, we need an education for complexity—a revolutionary education—that fosters dialogue between cultures, the convergence of epistemes, the will for alterity, and a re-linking of sensibilities to recover our multiple consciences: namely our anthropological, ecological, telluric, and cosmic consciousness.⁵¹

In this regard, Maturana and Varela contend that it is no longer acceptable for educators to ignore the educational implications of the

49. Isaac Torres Cruz, *El cambio climático es, ante todo, un tema social: Rafael Loyola [Climate Change Is, Above All, a Social Issue: Rafael Loyola]*, CRÓNICA (Aug. 16, 2015), <http://www.cronica.com.mx/notas/2015/915151.html> [https://perma.cc/9VVF-B59D].

50. Although in contrast to what we sustain in our analysis, for a debate that explores—from a strongly economic perspective—the role of culture in development contexts at a global level, see Mariano Grondona, *A Cultural Typology of Economic Development*, in *CULTURE MATTERS: HOW VALUES SHAPE HUMAN PROGRESS* 44, 46–47 (Lawrence E. Harrison & Samuel P. Huntington eds., 2001).

51. MORIN, *supra* note 10, at 156.

epistemic conception that integrates the concepts of intersubjectivity, certain organization, complexity, disorder, indeterminacy and non-linear dynamics, which characterize living systems.⁵² They argue that, because they are associated with cognitive science and allow a more challenging view of the morphogenesis of knowledge, a non-linear view of the dynamics of reality will show the existing plot between cognition and life.⁵³

Humanity today faces a situation of extreme urgency⁵⁴ that responds to our social model as a risk society, and which is the result of a utilitarian model of relationship with nature.⁵⁵ Consequently, as Francisco Varela points out, in a context of multiple and convergent crises, “the chance of surviving with dignity on this planet hinges on the acquisition of a new mind.”⁵⁶ In this perspective, critical environmental thinking emerges, fostering a critical reading of environmental reality that allows clarifying the ethical and ideological components implicit in the ecological crisis. It also establishes connections between the environment, knowledge systems and lifestyles. Meanwhile, socially critical environmental education describes “environmental education as a process of critical analysis of interrelated environmental, social and educational realities (. . . reflections of ideologies), in order to transform [them].”⁵⁷

Thus, the metamorphosis of civilization will not be achieved solely with political technology (technopolitics).⁵⁸ Rather, it requires

52. See CAPRA, *supra* note 24, at 158–61.

53. CAPRA, *supra* note 24, at 172. See also MARÍA CÁNIDA MORAES & SATURNINO DE LA TORRE, SENTIPENSAR SOB O OLHAR AUTOPOIÉTICO ESTRATÉGIAS PARA REENCANTAR A EDUCAÇÃO 42 (2d ed. 2018).

54. Federico Mayor Zaragoza, *La problemática de la sostenibilidad en un mundo globalizado [The Problem of Sustainability in a Globalized World]*, REVISTA DE EDUCACIÓN, Número Extraordinario 2009, at 25, 47–48 (Spain).

55. See ULRICH BECK, RISK SOCIETY: TOWARDS A NEW MODERNITY 79–80 (Mike Featherstone ed., Mark Ritter trans., Sage Publications 1992) (1986).

56. Peter Reason, *The Road is Your Footsteps*, RESURGENCE & ECOLOGIST Mar.–Apr. 2019, at 37, 37.

57. Lucie Sauvé, *Environmental Education Between Modernity and Postmodernity: Searching for an Integrating Educational Framework*, 4 CAN. J. ENV'T EDUC. 9, 14 (1999).

58. The massive organizational capacity mediated by the network is a pattern of political self-organization in the network society. See generally EUNATE SERRANO ET AL., TECHNOLITICS: THE POTENTIAL OF CONNECTED MULTITUDES. THE 15M NETWORK-SYSTEM AS A NEW PARADIGM OF DISTRIBUTED POLITICS (2013), <https://datanalysis15m.files.wordpress.com/2013/06/technopolitics-15m-summary.pdf> [<https://perma.cc/4SNH-MZZ4>].

the adoption of policies to educate from, and for, complexity as well as the ability to promote an “intercultural dialogue,” thereby opening up participation of individuals and groups from their own cosmovisions.⁵⁹ The basis for dialogue among cultures lies in mutual respect and appreciation (recognition), reducing inequality in the face of opportunities (equity), and having a voice in the public space (participation). But also—in the context of the planetary ecological crisis—intercultural dialogue should aspire to be the “dialogue of civilizations,” the same one that is essential to reach consensus that will lead to global solutions to problems on a planetary scale. Moving towards a planetary citizenship—and a planetary consciousness—implies a constant process of transformation, in which each participant in the “inter-civilizational dialogue” is not simply an object of transformation, but also participates as an active transformer.⁶⁰

III. ANOTHER EPISTEMOLOGY FOR CLIMATE GOVERNANCE

Proposing a look in relation to the world, and to the multiple and convergent crises that configure global change—from the cosmovision that survives in the South American Andes—requires a prior approach to the conceptual foundations that sustain complex thinking and traditional knowledge systems, which are at the base

59. See ERICK PAJARES GARAY & JAIME LLOSA LARRABURE, CAMBIO CLIMÁTICO Y RESILIENCIA EN LOS ANDES: ENUNCIAR UNA POLÍTICA EDUCATIVA PARA LA COMPLEJIDAD [CLIMATE CHANGE AND RESILIENCE IN THE ANDES: ENUNCIATING AN EDUCATIONAL POLICY FOR COMPLEXITY] 83 (Elena Castilla ed., 2010), <http://disde.minedu.gob.pe/bitstream/handle/20.500.12799/824/468.%20Cambio%20clim%C3%A1tico%20y%20resiliencia%20en%20los%20Andes.%20Enunciar%20una%20pol%C3%ADtica%20educativa%20para%20la%20complejidad.pdf?sequence=1&isAllowed=y> [https://perma.cc/4K32-CWJH].

60. From December 13 to 14, 1998, the seminar on Dialogue among Civilizations was held in Tehran, Iran, with the contributions of 110 communications and the participation of personalities from Germany, Italy, Egypt, Syria, Lebanon, Kenya, Japan, Canada, Malaysia and Russia. The central topics of discussion were a) the definition of civilizations, b) the bases for a dialogue between civilizations, c) religion, morality and spirituality, and d) peace and the future. Permanent Rep. of the Islamic Republic of Iran to the U.N., Letter dated Aug. 30, 1999 from the Permanent Representative of the Islamic Republic of Iran to the United Nations addressed to the Secretary-General, U.N. Doc. A/54290 (Sept. 1, 1999).

of the management of highly complex spaces such as mountain biocultural territories.⁶¹

A. The Principles of Systemic Thinking in Ancestral Wisdoms

Approaching the phenomena of the world from complexity implies internalizing three principles of an epistemic nature inherent in the way of perceiving the world: the systemic, the dialogical, and the hologrammatic.⁶² The systemic principle highlights the interactions among the entities that make up the phenomena of the world and allows us to understand them as networks formed by nodes that are linked.[FN] Each node is made up of an entity, made up of relationships and connections through which matter and energy circulate. Under this principle, the world is like a great multidimensional web in which continuous relationships occur among elements located on a variety of scales.

A system is a network that may be differentiated within its context. It can be further defined as a set of elements that maintain a relationship among them and that interact jointly with their environment.⁶³ Each element that makes up the system develops—individually—a repertoire of emergencies⁶⁴ that guarantee its continuity and at the same time present limitations in its behavior.⁶⁵ The system, as such, is both more and less than the sum of its parts. It is more because it can show emergencies that the separate parts cannot elaborate.⁶⁶ Less because its limits do not allow it to carry out each and every one of the emergencies that its components reveal.⁶⁷

61. See J. Marina Apgar, *Building and Supporting Resilient Biocultural Territories in the Face of Climate Change*, IPSI (Feb. 27, 2012), <https://satoyama-initiative.org/old/building-and-supporting-resilient-biocultural-territories-in-the-face-of-climate-change/> [<https://perma.cc/54Q9-BNZ3>].

62. Edgar Morin, *A New Way of Thinking*, UNESCO COURIER, Feb. 1996, at 10, 14.

63. LUDWIG VON BERTALANFFY, *TEORÍA GENERAL DE LOS SISTEMAS: FUNDAMENTOS, DESARROLLO, APLICACIONES* [GENERAL SYSTEM THEORY: FOUNDATIONS, DEVELOPMENT, APPLICATIONS] 38, 56 (Fondo de Cultura Económica 1986).

64. See *supra* note 31 and accompanying text, discussing how an “emergency” is a quality that arises, in functionalist terms, from the sum of the parts, but that can neither be reduced to the parts, nor be restricted or explained from any of them.

65. See VON BERTALANFFY, *supra* note 63, at 67.

66. See *id.* at 55.

67. *Id.*

The dialogic principle gives us the possibility of joining two principles or concepts that at first glance may seem opposed but are inseparable in the same reality.⁶⁸ The integration of adversative elements (complementary opposites) allows us to understand the complexity of systems. The dialogic principle shows us the entities within a “continuum” move permanently, where there is no equidistant point between extremes. For example, analyzing the individual from the dialogic perspective requires moving between nature and culture to discover their essence. The analysis requires deciphering between individuals and species in their natural dimension or between individuals and the collective in their social perspective: always axes where extremes—far from being excluded—mutually explain each other in a reciprocal and dynamic way.

From this point of view, the systems move in the dialogic closure/opening.⁶⁹ Closure because they maintain limits that allow them to be differentiated from the environment and therefore give them identity. Openness because every system is an open network that receives fluctuations from the environment that allow its continuity as a system. To guarantee continuity within the system, “organization” emerges.⁷⁰ This is understood as the set of underlying mechanisms that allow regulation in the face of fluctuations in the environment.⁷¹ It emerges as a dialogue between order and disorder that has, as a consequence, an “increase in the disorder of the environment” to guarantee the “internal order of the system.”⁷² In this way, we discover systems as procedural entities, in continuous dynamism to guarantee their continuity as such.

The hologrammatic principle establishes a relationship of inclusion between the whole and its parts or components.⁷³ From the hologrammatic principle, the whole is made up of parts and at the same time the whole is within each part.⁷⁴ Understanding living beings from this principle implies relating organism and cell; the organism is made up of cells, but at the same time each cell contains the entire individual in genetic information. From the social

68. Morin, *supra* note 62, at 14.

69. VON BERTALANFFY, *supra* note 63, at 39.

70. *See id.* at 46–49.

71. *Id.* at 47–48.

72. *Id.* at 39–41.

73. Morin, *supra* note 62, at 14.

74. *Id.*

perspective, the set of individuals makes up society and at the same time the whole society is in each individual in the form of language and culture.⁷⁵

The hologrammatic principle provides the concept of a fractal scale—of an inclusive and redundant nature—which highlights the internal interaction of the system.⁷⁶ It implies that each fluctuation that the system receives triggers a set of processes that link the various scales, incorporating retroactive and recursive transport mechanisms and causal relationships.⁷⁷ In this way, a continuous relationship is established between system and components that determines a continuous flow and a lot of uncertainty in the ultimate knowledge of the dynamics of a system. Thus, the objective of any approach to a world phenomenon is its targeting, without losing the relationship with the upper and lower scales, simplifying without isolating.

In conclusion, approaching natural and social phenomena, from complexity, consists of a change of vision whose fundamental axes are the discovery of relationships and procedural thinking.⁷⁸ Such relationships are present in the events of the world in a contextual way, in which various scales interact continuously and in a procedural thinking that gives relevance to the processes of change, thus confronting that scientific tradition that was only concerned with the states of things.⁷⁹ In view of the above, it should be noted here that modern science (classical scientific rationality) has the

75. *Id.*

76. See Benoit B. Mandelbrot, *Fractals and the Geometry of Nature*, in YEARBOOK OF SCIENCE AND THE FUTURE 168, 170–72 (Encyc. Britannica, Inc. 1981). The word “fractal” comes from the Latin *fractus*, which means fragmented or fractured, very appropriate for objects whose dimension is fractional. *Id.* at 172. Fractals are elements classified as semi-geometric (due to their irregularity they do not belong to traditional geometry) that have an essential structure that is repeated at different scales. *Id.* According to Mandelbrot, a fractal is a figure built, in some way, of parts similar to the whole. See *id.*

77. *Id.*

78. In procedural thinking, each structure is seen as the manifestation of the underlying processes. It is the ability to understand facts in terms of process, movement, and flow. See Javier Torró Biosca, *La Ecología de Sistemas Humanos en el Nuevo Paradigma [The Ecology of Human Systems in the New Paradigm]*, ECOLOGÍA DE SISTEMAS HUMANOS https://www.ecologiadesistemashumanos.com/ecosishum_nuevo_paradigma_torro.htm [<https://perma.cc/T5AX-HH5D>]; CAPRA, *supra* note 24, at 4–5, 33–34.

79. CAPRA, *supra* note 24, at 4–5, 33–34.

characteristic of preventing us from thinking in a complex way, that is to say, in a global and relational way.

B. Ancestral Knowledge as Relational Knowledge Systems

1. Characterization of Traditional Knowledge Systems

Many of the most biologically diverse areas on the planet are inhabited by Indigenous and traditional peoples, fostering what the Declaration of Belem calls an “inextricable link” between biological and cultural diversity.⁸⁰ Indeed, of the nine countries that together account for 60 percent of human languages, six of these “centers of cultural diversity” are also countries of “megadiversity” with exceptional numbers of unique plant and animal species.⁸¹

Knowledge valued in Indigenous and traditional societies is derived from multiple sources, including traditional teachings, empirical observations, and revelation. These categories overlap and interact with one another, being useful for examining the dynamics of ancient wisdom.

Leanne Simpson describes seven principles of indigenous cosmovisions.⁸² First of all, knowledge is holistic, cyclical, and depends on relationships and connections with living and non-living beings and entities; second, there are many truths, which depend on individual experiences; third, everything is alive; fourth, all things are equal. Fifth, the land is sacred; sixth, the relationship between people and the spiritual world is fundamental; and seventh, human beings are the least important thing in the world.⁸³

80. DECLARATION OF BELÉM (1988), <https://www.ethnobiology.net/what-we-do/core-programs/global-coalition-2/declaration-of-belem/> [https://perma.cc/SK8J-4DE4].

81. Posey, *supra* note 32, at 3 (citing ALAN T. DURNING, GUARDIANS OF THE LAND: INDIGENOUS PEOPLES AND THE HEALTH OF THE EARTH 112 (Ed Ayres ed., 1992)).

82. Michael Anthony Hart, *Indigenous Worldviews, Knowledge and Research: The Development of an Indigenous Research Paradigm*, J. INDIGENOUS VOICES IN SOCIAL WORK, Feb. 2010, at 1, 3 (citing Leanne Simpson, *Anishinaabe Ways of Knowing*, in ABORIGINAL HEALTH, IDENTITY AND RESOURCES 168, 168–85 (J. Oakes et al. eds., 2000)), https://scholarspace.manoa.hawaii.edu/bitstream/10125/15117/v1i1_04hart.pdf [https://perma.cc/QH3B-EUTZ].

83. *Id.*

Mahia Maurial defines Indigenous knowledge as “peoples’ cognitive and wise legacy as a result of their interaction with nature in a common territory.”⁸⁴ Joey de La Torre defines it as the knowledge established by indigenous peoples, their worldviews and the customs and traditions that govern them.⁸⁵ Castellano described the characteristics of indigenous knowledge as personal, oral, experiential, holistic, as well as through narrative or metaphorical language.⁸⁶ Maurial further identifies three characteristics of indigenous knowledge: local, holistic and oral.⁸⁷

Although such definitions are valuable in gaining a better understanding of traditional knowledge, the views of Marie Battiste and Sakej Henderson on the conceptualization of ancestral knowledge deserve particular attention.⁸⁸ These authors affirm that the attempt to define traditional knowledge is inappropriate, considering that such efforts are based on the “comparison of knowledge,” since there are no methodologies to carry out this type of contrast on different epistemes.⁸⁹ Battiste and Henderson have suggested that, instead of trying to define indigenous knowledge, it would be much more important to establish a process of understanding that other episteme (ancestral wisdom).⁹⁰ For these authors, comprehension requires that the researcher be open to accepting different realities, regardless of how the term “ancestral knowledge” is perceived or used.⁹¹

Various authors have emphasized that millennial cosmovisions are very different from the worldview of the dominant culture in

84. Mahia Maurial, *Indigenous Knowledge and Schooling: A Continuum Between Conflict and Dialogue*, in *WHAT IS INDIGENOUS KNOWLEDGE? VOICES FROM THE ACADEMY* 59, 62 (Ladislaus M. Semali & Joe L. Kincheloe, eds. 1999).

85. Hart, *supra* note 82, at 3 (citing Joey de La Torre, *In the Trenches: A Critical Look at the Isolation of American Indian Political Practices in the Nonempirical Social Science of Political Science*, in *INDIGENIZING THE ACADEMY: TRANSFORMING SCHOLARSHIP AND EMPOWERING COMMUNITIES* 174, 190 (Devon Abbott Mihesuah & Angela Cavender Wilson eds., 2004)).

86. *Id.* (citing Marlene Brant Castellano, *Updating Aboriginals Traditions of Knowledge*, in *INDIGENOUS KNOWLEDGES IN GLOBAL CONTEXTS, MULTIPLE READINGS OF OUR WORLD*, *supra* note 34, at 21, 25)).

87. Maurial, *supra* note 84, at 63.

88. Hart, *supra* note 82, at 4 (citing MARIE BATTISTE & JAMES YOUNGBLOOD HENDERSON, *PROTECTING INDIGENOUS KNOWLEDGE AND HERITAGE: A GLOBAL CHALLENGE* (2000)).

89. *Id.*

90. *Id.*

91. *Id.*

Western societies.⁹² Despite the differences that have emerged in different regions of the planet, and the need to sustain these types of differences, Gill has reported that many scholars do not dare to address broader concepts, such as that of “visions of the world,” much less to deepen the recognition of the validity of those ancestral understandings.⁹³ This marginalization—or invisibility of ancient cosmovisions—“has been and continues to be one of the major tools of colonization.”⁹⁴

2. Sources of Ancient Wisdom

Traditional knowledge has been transmitted—intergenerationally—in a quasi-invariable way. With slight differences from one country to another, it speaks of the creation of the world and the origins of Indigenous clans from the encounters between ancestors and spirits, in the form of animals—just as genealogies and ancestral relationships with the territory are recorded. Through historical accounts and messages of caution, which reinforce values and beliefs, the foundations are provided for in the construction of societies. This includes technologies—understood as cultural responses to environmental conditions—perfected through generations.

Empirical knowledge is acquired through careful observation. With reference to knowledge of ecosystems, James Waldram describes how knowledge is created through observations by community members over long periods of time. “This information processing forms a constant loop in which new information is interpreted in the context of existing information, and revisions to the state of knowledge concerning a particular phenomenon are made when necessary.”⁹⁵ Thus, empirical knowledge represents a

92. *Id.* (citing Little Bear, *Jagged Worldviews Collide*, in RECLAIMING INDIGENOUS VOICE AND VISION 77 (Marie Battiste ed., 2000); Eugene F. Pichette et al., *Cultural Identification of American Indians and It's [sic] Impact on Rehabilitation Services*, 65 J. REHABILITATION 3 (1999); Polly Walker, *Decolonizing Conflict Resolution: Addressing the Ontological Violence of Westernization*, 28 AM. INDIAN Q. 527 (2004)).

93. *Id.* (citing JERRY H. GILL, *NATIVE AMERICAN WORLDVIEWS: AN INTRODUCTION* (2002)).

94. Walker, *supra* note 92, at 531.

95. James B. Waldram, *Traditional Knowledge Systems: The Recognition of Indigenous History and Science*, 2 SASKATCHEWAN INDIAN FEDERATED COLL. J. 115, 124 (1997).

convergence of perspectives—from different points of view—that are accumulated over time, which is why we consider ancestral knowledge to be relational knowledge.⁹⁶

We must also emphasize that ancestral wisdom systems incorporate the “spiritual knowledge”⁹⁷ that emerges from their cosmocentric vision and its “animistic logic” that is mediated through rituality. Revealed knowledge—which is acquired through dreams, visions and intuitions—is assumed to be spiritual wisdom in its origin.⁹⁸

3. The “Socio-Ecological Resilience” in the Face of the Climate Crisis

Resilience is defined as the ability of a system to maintain its organizational structure and productivity, after a disturbance. Resilience has two dimensions: resistance to shocks and recovery. Ecological resilience is closely linked to social resilience, particularly in local groups or populations that depend directly on natural resources—and the environment—for their survival. Social resilience, defined as the ability of groups or communities to adapt to extreme elements (external shocks) that cause stress—be they social, political or environmental—goes hand in hand with ecological resilience.⁹⁹

In the concept of “socio-ecological resilience,” adaptive change refers to “socio-ecological interactions” and not to the management of social and ecological systems separately.¹⁰⁰ Socio-ecological

96. See Garay & Larrabure, *supra* note 2, at 217.

97. See U.N. University, *Land is Breathing: Respecting Nature in Altai*, YOUTUBE (Nov. 19, 2009), https://www.youtube.com/watch?v=AVCGnOZAsxQ&ab_channel=UNUniversity [<https://perma.cc/P6FY-FLHS>].

98. For an in-depth look at dharma as a religion and the environmental ethos, see PANKAJ JAIN, *DHARMA AND ECOLOGY OF HINDU COMMUNITIES: SUSTENANCE AND SUSTAINABILITY* (2011).

99. See, e.g. Emma Tompkins & Neil Adger, *Does Adaptive Management of Natural Resources Enhance Resilience to Climate Change?*, *ECOLOGY AND SOC'Y*, Dec. 2004, at 1, 4–5, 9, <https://www.ecologyandsociety.org/vol9/iss2/art10/print.pdf> [<https://perma.cc/66QV-AWR8>].

100. See Leonardo A. Ríos-Osorio et al., *Resiliencia socioecológica de los agroecosistemas: Más que una externalidad [Socio-ecological Resilience of Agroecosystems: More than an Externality]*, in *AGROECOLOGÍA Y RESILIENCIA SOCIOECOLÓGICA: ADAPTÁNDOSE AL CAMBIO CLIMÁTICO [AGROECOLOGY AND SOCIO-*

resilience may be increased in a variety of ways. For example, reducing social vulnerability through the extension and consolidation of social networks, self-organization, and collective action to cushion disturbances and the maintenance of local knowledge to manage the territory each help to increase resistance.¹⁰¹ Conversely, deinstitutionalization exacerbates the effects of climate change.

IV. COMPLEX KNOWLEDGE ABOUT THE TERRITORY AND CLIMATE IN ANDEAN AMERICA

This analysis is one of political ecology.¹⁰² It aims to provide elements to intuit other understandings of the world, other ethics of the climate, other possible epistemes to build another planetary governance, supported by a network of governance that are built from local territories, and from distant and different cosmovisions, yet still converge in the urgency of safeguarding our “common future.” Below we develop some concepts that, being part of the narrative of the South American Andes, transcend the local and contribute to the debate on a politics of civilization.

A. Sacred Space and Territory

The concept of sacred space (territory) underlies the essence of the traditional communities of the South American Andes and suggests a new perspective on territorial studies, in a scenario of global change. The sacred space has the effect of highlighting a territory from the surrounding cosmic environment and making it different.¹⁰³ These spaces are covered with signs, codes, and languages that indicate the sacredness of the place, the orientation, the forms, the positions, and the behaviors.¹⁰⁴ This reveals the

ECOLOGICAL RESILIENCE: ADAPTING TO CLIMATE CHANGE] 60, 61 (Clara Nicholls, et al. eds., 2013).

101. Tompkins & Adger, *supra* note 99 at 2.

102. Political ecology does not imply that ecology is political, but rather that politics makes ecology visible.

103. See ELIADE, *supra* note 28, at 10–12.

104. Gerardo Reichel-Dolmatoff, *Templos Kogi: introducción al simbolismo y a la astronomía del espacio sagrado [Kogi Temples: An Introduction to Sacred Space Symbolism and Astronomy]*, REVISTA COLOMBIANA DE ANTROPOLOGÍA, July–Dec. 1975, at 199, 209.

dynamics and communication that are maintained with other sacred spaces, which provide the necessary balance for the subsistence of individuals and the collective. This perspective of sacred space corresponds to the earthly reality, from which humans converse with “other worlds,” with telluric and cosmic forces, to maintain the balance of life on Earth.

The sacred symbolic territoriality of contemporary traditional societies has remained in the “collective memory”—through oral tradition—through myths that explain the original events and particularities of the history and cosmogony of the peoples that organize and delimit the natural, social, and spiritual world.¹⁰⁵ Sacred sites thus determine a social behavior and a system of relationships from which tradition is built and rebuilt.

It is necessary to understand the thinking of the traditional societies of the South American Andes in a systemic way, or as a unit, and not as parts that explain situations, but as continuous and coherent processes linked by ancestral wisdom, from which sacred space and territory are explained. Thus, the landscape becomes a complex reality, which requires a systemic outlook to assume it as a hinge that articulates the objective with the subjective, and the natural with the social and cultural.

In the South American Andes, landscapes are then transformed into biocultural spaces and represent the symbolic categorizations of certain territories. This finds support in the monistic,¹⁰⁶ ethical, mythical and mystical vision of the Cosmos, inherent in the civilizations of pre-Columbian record; different and distant from the analytical vision of western culture linked to modernity. Therefore, a rigorous understanding of Andean biocultural landscapes requires a hermeneutical reading of them. This forces them to be viewed as “texts” that must be decoded by resorting to a variety of resources such as description, analogy and metaphor, which mediate in the construction of complex dialogues with little homologated cultures. In this way, the territory becomes habitus. That is, it is transformed

105. See Erich Mauricio Córdoba Ponce, *Sitios sagrados y territorio wiwa*, UNIVERSITAS HUMANÍSTICA, Jan.–June 2006, at 275, 277, 284–85.

106. “Monism” refers to the philosophical positions that maintain that the Universe is constituted by a single arche, cause or primary substance. See *Monism*, STANFORD ENCYCLOPEDIA OF PHILOSOPHY, <https://plato.stanford.edu/entries/monism/> [<https://perma.cc/6ZDV-UACU>]. Thus, according to materialistic monism, everything is ultimately reduced to matter, while for spiritualists or idealists such a “unique principle” would be the spirit.

into in-corporate knowledge, made body, adhered to the deepest mental schemes, to the devices of pre-reflection of the “social unconscious,” with which the people guide most of their practices without the need to rationalize them, but adjusting them to a rational purpose.¹⁰⁷

In the ancestral cosmovisions of Andean America, the natural and cultural form have an indissoluble unity: the mountains possess spirit, indistinctly called apu,¹⁰⁸ wamani or awkillu in the Peruvian Andes, or machula, achachila or mallku in the Bolivian high plateau;¹⁰⁹ humans relate to the apus or mallkus throughout a deferred dialogue, mediated by the offerings; it is a world in which the stones have a soul, the spirits inhabit the springs and where rituality helps to restore balance and empathy with the Cosmos.¹¹⁰ In the South American Andes, the mountains represent high altitude worship and exert a great influence on human communities; they control weather phenomena and are considered the owners of animals and plants, both wild and domesticated.¹¹¹ Hence, different ceremonial rites have the purpose of giving offerings to these deities in order to propitiate and ensure the reproduction of animals, crops and, ultimately, the survival of human beings themselves.

Therefore, from the complex perceptions of the Andean traditional knowledge systems about territory, nature and the Cosmos, we can say that “[c]louds are not spheres, mountains are not cones, coasts are not circular, tree bark is not smooth and lightnings

107. PIERRE BOURDIEU, *THE RULES OF ART: GENESIS AND STRUCTURE OF THE LITERARY FIELD* 352 n.43 (Susan Emanuel trans., Stanford University Press 1996) (1992).

108. The Quechua word “apu” means big gentleman, superior judge, main curaca or king; and until the present time they represent the tutelary deities personified in the mountains, who regulate the meteorological phenomena and the life of the members of the communities. DIEGO GONZÁLEZ HOLGUÍN, *VOCABULARIO DE LA LENGUA GENERAL DE TODO EL PERU* 52 (digitized reprinted. Runasimipi Qespisqa Software 2007) (1608). The *apus* or *wamanis* are organized in a pyramidal hierarchy in which the deities are placed according to their importance. To each one of the deities correspond territories on which they exert their influence, corresponding to more extensive geographic areas to those deities located in the top of the hierarchy. FEDERICO GARCÍA & PILAR ROCA, *PACHAKUTEQ: UNA APROXIMACIÓN A LA COSMOVISIÓN ANDINA* 51 (2009).

109. Victoria Castro & Carlos Aldunate, *Sacred Mountains in the Highlands of the South-Central Andes*, 23 *MOUNTAIN RSCH. & DEV.* 73, 73 (2003).

110. Colin McEwan & Maarten Van de Guchte, *El tiempo ancestral y el espacio sagrado en el ritual estatal incaico*, in *THE ANCIENT AMERICAS: ART FROM SACRED LANDSCAPES* 359, 371 (Richard F. Townsend ed. 1992).

111. See Castro & Aldunate, *supra* note 109, at 73, 78.

do not travel in a straight line.”¹¹² This reflection proposes that we understand nature as a state of marvelous chaos: the geometry of nature is fractal—that is, irregular, unstable and repeats itself countless times and at different scale. This was grasped—from the notion of “circular time” or “evolutionary spiral thought”—by the ancestral cosmovisions of the South American Andes to promote a relationship of balance and equilibrium with the territory and the elements of the environment.¹¹³

Fractal thinking—together with chaos and catastrophe theory—are ways of interpreting and predicting different states of phenomena that establish changes as a result of instability, within non-linear dynamic systems.¹¹⁴ If an essential structure in nature is identified and the principles of fractal geometry are applied to decompose it, predictions can be made about how that structure will behave in the future—from the local to the global, or vice versa—thanks to the fact that fractals comply with the mathematical principle of self-similarity (they replicate themselves infinitely, at different scales).¹¹⁵ The so-called “God's fingerprint”¹¹⁶ allows us to explain very intricate processes and to make predictions of emerging phenomena within the environmental and climatic systems.

On this subject, it has been emphasized that,

112. Jack Challoner, *How Mandelbrot's Fractals Changed the World*, BBC NEWS (Oct. 18, 2010), [https://www.bbc.com/news/magazine-11564766#:~:text=Mandelbrot%20famously%20wrote%3A%20%22Clouds%20are,is%20something%20to%20be%20celebrated.,\[https://perma.cc/6APM-7S97\]](https://www.bbc.com/news/magazine-11564766#:~:text=Mandelbrot%20famously%20wrote%3A%20%22Clouds%20are,is%20something%20to%20be%20celebrated.,[https://perma.cc/6APM-7S97]).

113. The spiral thinking model is the thinking model of indigenous peoples. It is the alternative to the linear thinking model designed by European rationalism, and the positivist philosophy, causing the mental model existing in the western world for the last 400 years. Victor Gavilán Pinto, *El Modelo Mental de los Pueblos Indígenas*, 2 ESPACIO REGIONAL, no. 6, 2009, at 95, 96.

114. Alexander Martínez-Suárez & Jorge Eliécer Rivera-Franco. *Sistemas fractales como posibilidad para refundar/resignificar sistemas etnoeducativos en Colombia [Fractal Systems as a Possibility for the Reestablishment/Resignification of Ethno-educational Systems in Colombia]*, EDUCACIÓN Y HUMANISMO, Jan.–June 2020, at 1, 3.

115. Lee Dye, *Using 'God's Fingerprint' to ID an Image Problem*, L.A. TIMES (Dec. 14, 1998, 12:00 AM), <https://www.latimes.com/archives/la-xpm-1998-dec-14-fi-53860-story.html#:~:text=A%20fractal%20is%20a%20geometric,at%20any%20level%20of%20magnification.&text=The%20leaves%20to%20be,the%20%E2%80%9Cfingerprint%20of%20God.%E2%80%9D> [https://perma.cc/BTRV-KND8].

116. *Id.*

The amplification—by multiplication—of concerted actions of “sustainability at a small scale,” through “networks of social organization in the mountains of Andean America (community institutionality, social software),” favors “sustainability at a larger scale,” contributing to regulate the complex systems in the Andean territories, and strengthening the strategies of local resilience to manage more efficiently the adaptation to the effects of the global climate crisis.¹¹⁷

The spiral thinking—legacy from the past—is now valued by deep ecology and quantum physics. Normally the consideration of evolution is linear and hierarchical; that is, later developments are 'superior' to earlier ones. This vision is enrolled in a linear perception of time, typical of Western culture. In contrast, ancient civilizations assume a reality governed by cyclic time.

We consider it essential to highlight that time is a construction of the human mind, which generates a historical magnitude or a mythical dimension.¹¹⁸ The historian of religions Mircea Eliade, in his work *The Myth of the Eternal Return*, proposed the thesis that mythical thought tends to construct time as a circle, in such a way that each event is experienced as a return to patterns coined from the origins; on the contrary, historical thought constructs time as a line, as a one-way arrow, in which each event is experienced as a rupture, an innovation, or a change.¹¹⁹ Cyclical time “is provided by the Cosmos, with the circularity of its astronomical, meteorological and vegetative cycles. So the production of a cyclical time aims first

117. Erick Pajares et al., *Gestionando el cambio climático en los paisajes culturales andinos futuribles y futurables para la construcción de una política pública para la adaptación al fenómeno global en los Andes [Managing Climate Change in Future and Future Andean Cultural Landscapes for the Construction of a Public Policy for Adaptation to the Global Phenomenon in the Andes]*, in PERÚ: EL PROBLEMA AGRARIO EN DEBATE [PERU: THE AGRICULTURAL PROBLEM IN DEBATE] 614, 645 (Raúl H. Asensio et al. eds., 2012).

118. These considerations were made in response to the valuable comments and contributions on the concept of “circular time” reached by Smita Narula, Professor, Elisabeth Haub School of Law at Pace University, remarks at the conference between Pace University and Stockholm University on the Climate Crisis: Legal Safeguards for Justice and Security (Dec. 3, 2020) (recording available with Pace University Library).

119. See MIRCEA ELIADE, *COSMOS AND HISTORY: THE MYTH OF THE ETERNAL RETURN* (Willard R. Trask trans., Harper Torchbooks 1959) (1954).

to make the ordering of human things coincide with that of the Cosmos.”¹²⁰

For example, for the Kogi people (Santa Marta, Colombia), the Universe is made up of nine circular worlds or staggered lands, one on top of the other, which correspond to the nine months of the human gestation process.¹²¹ The universal Mother, the only possessor of the art of spinning and weaving, vertically nailed her immense spindle in the center of the Sierra Nevada of Santa Marta.¹²² A cotton thread detached from the spindle with which she traced a circle around it, delimiting the fifth black land where human beings live. Above it, the four lands that make up the upper cone, are of light, of the Sun and are good, but not as fertile as the one inhabited by people. The four lower worlds are opposite to those above, they are of darkness.¹²³

In Buddhist and Hindu thought, the logical principle of “non-contradiction” that prevails in Western thought does not operate either.¹²⁴ These cosmovisions reject the official chronology and fuse the historical level with the ontological level. The conception of time in these traditions is not linear but cyclical or circular. We observe, for example, a close relationship between quantum physics and Eastern mysticism in principles such as emptiness, indivisibility or the interconnection of all realities. In Tibetan Buddhism and Modern Physics, Vic Mansfield describes how the principle of emptiness or sunyata (the unreality, without identity, the uninhabited), the philosophical core of Tibetan Buddhism, is closely related to quantum non-locality and other foundational characteristics of the mechanics of subatomic physics.¹²⁵

120. See JAN ASSMANN, EGIPTO A LA LUZ DE UNA TEORÍA PLURALISTA DE LA CULTURA [EGYPT IN THE LIGHT OF A PLURALISTIC THEORY OF CULTURE] 6–7 (Ana Agud trans., 1995).

121. Reichel-Dolmatoff, *supra* note 104, at 204, 235 fig.1.

122. *Id.* at 205.

123. *Id.* at 206.

124. Aristotle, in his *Metaphysics*, presents the following formulation of the principle of non-contradiction: it is impossible that, at the same time and under the same relationship, the same attribute occurs and does not occur in the same subject. From this non-observance, a formal logical contradiction will arise. Eduardo Molina Cantó, *Principio de No-contradicción y Usos del Verbo Ser en Aristóteles*, ONOMÁZEIN, no. 7, 2002, at 259, 263, 26–67.

125. See VIC MANSFIELD, TIBETAN BUDDHISM AND MODERN PHYSICS: TOWARD A UNION OF LOVE AND KNOWLEDGE 63–95 (2008).

V. CONCLUSION

In light of current conditions on the planet and in human societies, we wonder how ancestral comprehensions—ancient wisdoms—can contribute to the global debate on climate governance and achieve a policy for the future of the Earth. From our Latin American narrative, we deliver the following initial contributions.

A. The Planetary Security Policies in the Context of Global Change, the Translocation of Critical Ecosystems and the Global Climate Crisis.

The crisis of the planetary boundaries demands the implementation of a “planetary security network.” According to The Millennium Project, among the fifteen global changes that humanity must face, the first and most decisive is related to sustainable development and climate change.¹²⁶ In this regard, the Stockholm Resilience Centre (Stockholm University) proposes nine planetary boundaries within which humanity can continue to develop and flourish for future generations. Four of the nine planetary boundaries have been transgressed as a result of human activity, and they are: climate change, loss of biosphere integrity, earth system change, altered biogeochemical cycles (phosphorus and nitrogen). Two of these limits—climate change and biosphere integrity—are what scientists call “core limits.” Significant alteration of either of these “core boundaries” would lead “the Earth System to a new state.”¹²⁷ However, global strategies to stop the double crisis of biodiversity loss and climate change are often formulated separately, although they are interdependent. Moreover, protecting the most biodiverse ecosystems could reduce the risk of deadly viruses passing from wildlife to humans. Further, the fifth Global Biodiversity Outlook (GBO-5) report—published by the Convention on Biological Diversity (CBD)—shows that humanity is at a crossroads regarding the legacy it intends to leave to future generations.¹²⁸

126. *Global Challenge 1*, THE MILLENNIUM PROJECT, <http://www.millennium-project.org/challenge-1/> [<https://perma.cc/8XE7-TK6E>].

127. Will Steffen et al, *Planetary Boundaries: Guiding Human Development on a Changing Planet*, 347 *SCIENCE* 736, 736 (2015).

128. CONVENTION ON BIOLOGICAL DIVERSITY, GLOBAL BIODIVERSITY OUTLOOK 5, at 8 (2020), <https://www.cbd.int/gbo/gbo5/publication/gbo-5-en.pdf> [<https://perma.cc/W7A2-9YYG>].

In the same way, it should be noted that there are Indigenous peoples in seventy-five of the 184 countries of the world, and some authors have pointed out that there is a great coincidence between the territories in which Indigenous communities live and the territories where the greatest biodiversity on the planet is found.¹²⁹ This is the case in many places in Africa, Latin America and Southeast Asia where the largest amount of tropical forest in the world is to be found. This correlation between the areas where Indigenous people live and biodiversity is found is in part due to the fact that this biodiversity is maintained, and even in some places created, by human intervention. The methods that these groups use for food production are, in many cases, those that maintain and even generate biodiversity. Some authors, such as Pretty and Smith, consider that the areas with the greatest biological diversity also correspond to the areas with the greatest cultural diversity.¹³⁰

The ancestral knowledge systems associated with the conservation of biological diversity and climate adaptation, still maintained integrally by Indigenous peoples, in interaction with the highest objective science, can have a fundamental impact on planetary security, through the recovery and maintenance of ecosystems of global relevance, and on global climate management. In fact, local knowledge focuses on the multiple use of diversity and evolves into new local knowledge through natural and human selection.¹³¹

B. The Dialogue of Knowledge to Cope with the Global Climate Crisis

Epistemological crises occur when thought patterns that support one's interpretation of the world are challenged, either because of their internal limitations and/or deficiencies or because

129. Víctor M. Toledo, *Indigenous Peoples and Biodiversity*, in ENCYCLOPEDIA OF BIODIVERSITY 269 (Simon Asher Levin ed., 2d ed. 2013). See e.g., GONZALO OVIEDO, TEODORA ZAMBUDIO & FLAVIA NOEJOVICH, CHALLENGES FOR THE MAINTENANCE OF TRADITIONAL BIODIVERSITY KNOWLEDGE IN LATIN AMERICA (2007).

130. Jules Pretty & David Smith, *Social Capital in Biodiversity Conservation and Management*, 18 CONSERVATION BIOLOGY 631, 632, 637 (2004).

131. Vandana Shiva, *El milagro de los problemas [The Miracle of Problems]*, CERES, no. 154, 1995, [http://www.nzdl.org/cgi-bin/library?e=d-00000-00---off-0aginfo-00-0---0-10-0---0---0direct-10---4-----0-11-11-en-50---20-about---00-0-1-00-0-0-11---0-0-&a=d&c=aginfo&cl=CL1.3&d=HASH01e44f0a5dbc8751f1a0eac5.3.4 \[https://perma.cc/6NN4-BJR2\]](http://www.nzdl.org/cgi-bin/library?e=d-00000-00---off-0aginfo-00-0---0-10-0---0---0direct-10---4-----0-11-11-en-50---20-about---00-0-1-00-0-0-11---0-0-&a=d&c=aginfo&cl=CL1.3&d=HASH01e44f0a5dbc8751f1a0eac5.3.4 [https://perma.cc/6NN4-BJR2]).

they are weakened in the face of the perceptions and understandings of other existing patterns. “Normal science” is in crisis today, since it is unable to find solutions to the serious planetary problems it has caused, while the global emergency proposes a critical debate in the form of an epistemic rupture. In order to make visible (or not continue to deny) other forms of thought and construction of knowledge, Fritjof Capra proposes the “interdisciplinary dialogues to explore new ideas and ways of thinking.”¹³²

We require a convergence of knowledge,¹³³ a dialogue of civilizations, a metamorphosis that elevates us to another project of humanity, one that transcends the paradigm of simplification/reduction to conquer the paradigm of complexity.¹³⁴ The episteme of the ancestral wisdoms is based on the principles of complexity, of deep ecology and of fractal logic, reconnecting in an empathic way the Earth, with humanity and the Cosmos. Thus, from the narrative inherent to the Andean cosmovision, fundamental elements are contributed to achieve a “policy of civilizational change” through the dialogue of knowledge, one oriented to expose the diverse ways of understanding the world. This dialogue –planned in terms of equivalence– should include a topic absent from global climate debates: the ethics of the model of civilization.

Given global change, it is essential to propose synergies, convergences and reinventions, recognizing the “partial commensurability” that exists between different interpretative paradigms or epistemes (objective science/traditional knowledge), and assuming that climate change does not mean for oneself what it can mean for others. Climate governance should be understood as a network of governance in which societies participate by expressing their cosmologies and cosmovisions.

132. CAPRA, *supra* note 24, at 53.

133. For a more in-depth discussion of the construction of transdisciplinary thinking, see NAT'L RSCH. COUNCIL, CONVERGENCE: FACILITATING TRANSDISCIPLINARY INTEGRATION OF LIFE SCIENCES, PHYSICAL SCIENCES, ENGINEERING, AND BEYOND (2014).

134. Erick Pajares G. & Carlos Loret de Mola, *Otras Políticas Climáticas. Ruptura de episteme y diálogo de saberes*, in PERÚ HOY: MÁS A LA DERECHA COMANDANTE 289, 297 (2014).

C. The Role of International Law in the Preservation of Ancestral Knowledge Systems in the Face of Climate Change

The United Nations Educational, Scientific and Cultural Organization (“UNESCO”) has long recognized that knowledge values and solutions from different backgrounds must be brought together to address global challenges. Flavia Schlegel, UNESCO Assistant Director-General for Natural Sciences, emphasized that “Indigenous peoples respond, innovate and adapt to this context of change, and their resilience is rooted in their ways of life and their social solidarity,” and that “[t]hey will find a path, whatever the hardships, thanks to their trust in their deeply rooted cultures, and the strength of their observations and knowledge, which are both ancestral and innovative.”¹³⁵

The Paris Agreement—adopted by the 21st Conference of States Parties to the United Nations Framework Convention on Climate Change (“UNFCCC-COP21”), on 12 December 2015—recognizes in its preamble the importance of the rights of Indigenous peoples, their role in addressing climate change, and intergenerational equity.¹³⁶ Precisely, Article 7 of the Agreement, which deals with adaptation, affirms the need for a participatory, transparent, gender-sensitive approach based on science and as appropriate, on Indigenous peoples' traditional knowledge and local knowledge systems.¹³⁷ This is a positive recognition, as is the promotion of the integration of science, technology and indigenous knowledge to provide solutions that help mitigate the impacts of the climate crisis. In the words of the United Nations Special Rapporteur on the Rights of Indigenous Peoples, Victoria Tauli-Corpuz, the challenge is how to put this decision into practice.¹³⁸

135. *Indigenous Knowledge Offers Innovative Solutions to Address Climate Change*, UNESCO (Nov. 7, 2016), http://www.unesco.org/new/en/natural-sciences/about-us/single-view/news/indigenous_peoples_we_must_work_together_to_address_climate/ [https://perma.cc/K7M2-VCBY].

136. See U.N. Framework Convention on Climate Change Conference of Parties, Twenty-First Session, Adoption of the Paris Agreement, U.N. Doc. FCCC/CP/2015/L.9/Rev.1 (Dec. 12, 2015) [hereinafter Paris Agreement].

137. *Id.* art. 7, ¶ 5.

138. Victoria Tauli-Corpuz, U.N. Special Rapporteur on the Rights of Indigenous Peoples, *Enhancing and Promoting Indigenous Peoples. Knowledge and Innovations for Climate Resilience and Sustainable Development* (Feb. 13, 2019),

Indeed, cooperation between ancestral knowledge systems and scientific research can generate new knowledge that will enable more effective action on climate change. There is a clear need to better understand the differences and similarities among the different knowledge systems to facilitate collaboration. Frequently, scientists and experts overlook the observations and contributions of Indigenous knowledge. In this perspective, the international debates around the proposal of a Global Pact for the Environment¹³⁹ should consider the incorporation of clear provisions on the integration of traditional knowledge systems in the design and implementation of global environmental policies.

D. The Ethical Contribution of Ancient Wisdom to International Law: The Principle of Guardianship of the Earth

The revealed problem demands to consider the need to contribute to the strengthening of the environmental justice and to advance in the formulation of biocentric policies and of intergenerational equity. To this, we enunciate the “principle of guardianship of the Earth,”¹⁴⁰ in order to irradiate—with a contribution supported by our Latin American narrative—the evolution of the international debates on the right to sustainability and intergenerational rights, considering that the principles can be invoked in national courts or tribunals and supranational instances

<http://unsr.vtaulicorpuz.org/?p=2686> [<https://perma.cc/FY5D-EW5S>]. See also DEBORAH DELGADO PUGLEY, LA PARTICIPACIÓN DE LOS PUEBLOS INDÍGENAS EN LA CONVENCION MARCO DE LAS NACIONES UNIDAS SOBRE EL CAMBIO CLIMÁTICO. DE ACTORES “TRADICIONALES” A ACTORES FRENTE AL ANTROPOCENO 22 (2019).

139. G.A. Res. 72/277, Towards a Global Compact for the Environment (May 10, 2018).

140. This conceptual construction has been formulated by the Biosphere Group – Think Tank on Sustainable Futures Research, starting from the understanding of the ethical foundations about life, present (before and now) in the ancestral cosmovisions of America. The previous step to the presentation of this approach has been the itinerant Meeting “Semillas de la América Profunda: Un diálogo intercultural por la Tierra y las Generaciones Futuras” (Cusco, Peru, February 27-28, 2018), which had as its initial objective to achieve an intense conversation and reflection with the wise men and women—as well as children—of the ancestral ayllus of Cusco, on the relevance of the intergenerational dialogue Child-Grandparent (QhepaWiñay-Yachaq), and thus to understand more profoundly the importance of the permanent exchange, particularly between the children and the wise elders, in the preservation of the ethics of our collective memory as a legacy for the generations to come.

(regional or international), in the development of litigation processes for the defense of environmental rights, and particularly through public interest actions (class action).¹⁴¹

From the theory of law, a principle can be understood as the pre-existence of a fundamental and social value, the apprehension of which by the international community generates the conviction of obligation.¹⁴² So a principle is a foundation, the basis of a guarantee, but it is not a guarantee.¹⁴³ Then, under the proposed premise, the conception contained in the principle of guardianship of the Earth starts from the foundation that humanity—in the light of the understanding of the co-evolutionary dynamics—is not the owner of the Earth, but the result of the interdependencies among all forms of life (co-evolutionary ethics). Mankind is not the “lord and master” of nature, as the French philosopher René Descartes proposed in the seventeenth century, but rather a conqueror through the development of technology and science.¹⁴⁴

The position of dominance of the human species over other forms of life, taken to the extreme of de-naturalization and the overflowing of planetary boundaries, requires humanity to assume its intergenerational responsibility as an essential value for achieving recognition of the rights of future generations. Guardianship, as a principle, involves receiving a legacy from the past, caring for it in the present, and ensuring its transfer to future generations. The difference—essentially a complementary one—between the proposal of the principle of guardianship of the Earth and the principle of intergenerational equity lies in the fact that the guardianship, with a disruptive intent, proposes the metamorphosis of the meaning of human action on the planet. The meaning of being does not lie,

141. See CARLOS A. VALLEFÍN, LA LEGITIMACIÓN EN LAS ACCIONES DE INTERÉS PÚBLICO 17–19 (2013).

142. Maria Angélica Benavides Casals & Jose Ignacio Nunez Leiva, *Los principios en el derecho internacional: ¿una fuente del derecho o una fuente de interrogantes?* [*Principles in International Law: A Source of Law or a Source of Questions?*], REVISTA DE DERECHO, Dec. 2017 at 31, 35–37 (Spain).

143. A principle is not a minor matter; it is one of the general formal sources of the international order. Statute of the International Court of Justice, art. 38, ¶ 3.

144. Thomas W. Merrill, *Masters and Possessors of Nature*, THE NEW ATLANTIS, Winter 2008, at 91, <https://www.thenewatlantis.com/publications/masters-and-possessors-of-nature> [<https://perma.cc/58CC-AKCY>] (“By going public with a science designed to make us ‘like masters and possessors of nature,’ Descartes inaugurates the politics of the Enlightenment.”); Souleymane Bachir Diagne, *We, the Servants and Tenants of Earth*, UNESCO COURIER, Apr.–June 2018, at 39, 39.

therefore, in the control or appropriation of nature, but in its temporary safeguarding so that the Earth—as a living system (Gaia)—is preserved for present and future generations. Guardianship implies a responsibility that transcends the right of ownership over the planet and the control or dominion over its various forms of life.

Such a principle proposes that we broaden human consciousness based on ethics (with ancient roots) that, at the current critical moment in the planet's history, converge powerfully: the ethics of interdependence, interspecies ethics, and intergenerational ethics. In addition, this principle would be supported by two others, which are fundamental for international environmental law: the principle of preventive action and the precautionary principle.¹⁴⁵

1. The Guardianship of the Earth in Ancient Wisdom

The “principle of guardianship of the Earth” seeks to contribute to the recovery of planetary consciousness and makes explicit our responsibilities to future generations (intergenerational responsibilities). In the understanding of our Latin American narrative, we have been able to reveal that various ancestral cultures of America have been guided by the “criterion of the seventh generation”: “keep in mind the repercussions of your actions up to

145. Aldo Servi, *El Derecho Ambiental Internacional [International Environmental Law]*, RELACIONES INTERNACIONALES, May–Dec. 1998, at 1, 8, 10 (Spain), <https://revistas.unlp.edu.ar/RRII-IRI/article/view/1785/1675> [<https://perma.cc/KK3K-DASN>]. Currently, the objectives of international environmental law are fundamentally preventative, but this posture is particularly ineffective due to its inability to effectively compensate for damages, many which are already largely irreparable. *Id.* at 8. The precautionary principle stresses the fact that societies can no longer rely on the lack of absolute scientific certainty to delay the adoption of effective measures, those that will prevent environmental degradation, based on cost. *Id.* at 10. That is, scientific ignorance should not be used as justification to pass on to future generations the decisions that must be made now to prevent eventual and inexorable damage to the environment. *Id.* See e.g., United Nations Educational Scientific and Cultural Organization [UNESCO] General Conference Res. 29 C/31, at 69–71 (Nov. 12, 1997) (example of precautionary principle to protect future generations); United Nations Educational Scientific and Cultural Organization [UNESCO] Res. 33 C/15, at 78 (Oct. 19, 2005) (example of precautionary principle to protect future generations from environmental impacts). See also *La Carta de la Tierra +15 Celebraciones y Otros Eventos en Mexico*, CARTA DE LA TIERRA (Oct. 29, 2010), <https://cartadelatierra.org/la-carta-de-la-tierra-15-celebraciones-y-otros-eventos-en-mexico/> [<https://perma.cc/YE82-RCX5>] (highlighting the importance of the Earth Charter to move towards a sustainable future by embracing challenges and forging new creative paths).

the seventh generation that will precede you, that is, meditate on the consequences up to the generation of the great-great-grandchildren of your great-grandchildren.”¹⁴⁶ Such a view is present, for example, in the Gayanashagowa or oral constitution of the Iroquois Indians of North America, as well as in the ethics of life that is immanent to ancient civilizations such as the Hopi, Maya, and Inka, among the most important.¹⁴⁷ While postmodern society maintains its conviction that material accumulation is the foundation of society's progress and that consumption leads to fulfillment, ancient cosmologies assumed that evolution and fulfillment were linked to moderation and measurement: life flows with respect for balance.¹⁴⁸

A traditional celebration that reveals the spirit of better with less is the potlach, practiced by Indigenous peoples of the Pacific coast of North America such as the Haida, Tlingit, and Kwakiutl.¹⁴⁹ Potlach means to give, and in this celebration, it is about giving and distributing as much as possible, to the point that the potlach can be understood as a competition in which the one who distributes more

146. Erick Pajares G., *Políticas biocéntricas y ética intergeneracional: El principio de guardianía de la Tierra [Biocentric Politics and Intergenerational Ethics: The Guardian Principle of the Earth]*, in PERÚ HOY: SIN PARADERO FINAL 323, 340 (2018).

147. *Id.* at 327, 340.

148. See Nadia Ahmad, Barry University, Remarks at the Conference between Pace University and Stockholm University on the Climate Crisis: Legal Safeguards for Justice and Security (Dec. 3, 2020) (recording available with Pace University Library) (comments on “Sumaq Kawsay” (Buen Vivir)). We consider it important to underline that, when we refer to “Sumaq Kawsay,” we are alluding to “life in balance,” or to the necessary balance between Earth, humanity and the Cosmos. An even deeper concept is the “*Kusi Sami Kawsay*” (transcendental existence) that comes from the *Nawpaq Pacha* (primordial time or time of the origins) whose foundations come to us thanks to the ancestral memory that is maintained through oral tradition. The old Andean sage Ciprian Phuturi Suni stressed that every human being has these three energies internally: Munay = love; Yachay = knowledge, and Ruway = action. These three energies converge in the *Kusy Sami Kawsay*. This concept proposes balance as the supreme principle of everything. CIPRIAN PHUTURI SUNI, TANTEO PUNTUN CHAYKUNA VALEN: LAS COSAS VALEN CUANDO ESTÁN EN SU PUNTO DE EQUILIBRIO (1997); NINA KINTI-MOSS & NEMATNI BALTAZAR MASAQUIZA CHANGO, KICHWA-ENGLISH-SPANISH DICTIONARY 78, 103, 176 (2d ed. 2018), <https://kuscholarworks.ku.edu/bitstream/handle/1808/25707/Kichwa%20Dictionary%202nd%20edition.pdf> [<https://perma.cc/S4MR-DP6M>]; *What is Munay?*, ISE, <http://www.internationalspiritualexperience.com/about-inca-shamanism/what-is-munay-love> [<https://perma.cc/L3VN-TDV7>]; “*Ruway*”, GLOSBE, <https://glosbe.com/quz/en/ruway> [<https://perma.cc/Y7CE-E3YY>]. See also JORGE LIRA, DICCIONARIO KKECHUWA – ESPAÑOL 38 (1982).

149. Pajares G., *supra* note 146, at 341.

and keeps less gains more prestige.¹⁵⁰ Unlike the equalitarian structure of most Indigenous societies, the Pacific Coast groups that practiced potlach were hierarchical societies where some individuals accumulated considerable wealth. The potlach then aimed to restore social balance and harmony to the world through acts of detachment by those who had accumulated too much.

In this context, a pending task is to achieve the comprehension of “circular time,” which in a non-linear conception integrates past, future and present—and how future is understood in the ancient wisdoms, and in the contemporary ancestry, of America. Thus, in order to manage the consequences of global change and its converging crises, it is vital to recover, from the philosophical and spiritual heritage of humanity, the invaluable lessons that will help us to fulfill the mission of preserving and perpetuating life in all its forms. In this regard, the Senegalese Souleymane Bachir Diagne, philosopher, mathematical logic historian and professor at Columbia University (New York), warns that human beings should not consider themselves the exclusive owners and masters of the Earth.¹⁵¹ Regarding the philosophy that links the spiritual and the ecological, let's relive the thought of the scholar Abu Bakr Ibn Tufay, who masterfully exposed in his philosophical novel that the full realization of humanity lies in acquiring an ecological conscience, since this allows it to understand its own evolutionary sense and the responsibility that it has to safeguard life on the planet.¹⁵²

While, in the Andean America, the wise Ciprián Phuturi Suni, of the Quechua ayllu¹⁵³ of Willoq, of the mountains of Ollantaytambo (Cusco, Peru) tells us: “From our grandparents we are the depositaries of those who spoke before, of the first generations, and for that reason we preserve their wisdom. If you do not understand that knowledge you could not understand those things either.”¹⁵⁴ The teaching is clear and intense: the guardian is

150. *Id.*

151. Diagne, *supra* note 144, at 39.

152. *Id.*

153. The *Quechua ayllu* is the social organization of pre-Hispanic origin in the Andean mountains. See, e.g., Alejandro Argumedo & Bernard Yun Loong Wong, *The Ayllu System of the Potato Park, Cusco, Peru*, SATOYAMA INITIATIVE (May 5, 2010), https://satoyama-initiative.org/case_studies/the-ayllu-system-of-the-potato-park-cusco-peru/ [https://perma.cc/DW7C-7APF].

154. Erick Pajares G. & Carlos Loret de Mola, *Clima, Guardianía de la Tierra y Equidad Intergeneracional: Nuestras Memorias del Futuro* [*Climate, Guardianship*

not the owner of knowledge; he is the messenger who—understanding the circularity of time—connects the future with the past through knowledge transmitted from generation to generation. This guardian has a temporal mission: the vigil of the Earth for posterity.¹⁵⁵

The crisis of civilization reveals us the crisis of science and pushes for an epistemic rupture to reach new knowledge—through the recognition of different cosmovisions—from the coevolutionary education. This would emerge as the “metamorphosis” of a culture in crisis, in which a part of it is destroyed and another is transformed.¹⁵⁶ This requires the elevation of human consciousness, for which we need to recover the abstruse wisdoms, assuming that “the key to our scientific future is hidden in our past.”¹⁵⁷

of the Earth and Intergenerational Equity: Our Memories of the Future, in PERÚ HOY: HACIA OTRO DESARROLLO 198, 212 (2015).

155. See Richard Wallsgrove, Professor, William S. Richardson School of Law, University of Hawai'i at Mānoa, Remarks at the Conference between Pace University and Stockholm University on the Climate Crisis: Legal Safeguards for Justice and Security (Dec. 3, 2020) (recording available with Pace University Library) (comments on guardianship and stewardship of the Earth). We consider essential to establish the approximations and differences between the concepts of guardianship and stewardship of the earth. The concept of guardianship is natural to Indigenous people as it implies responsibility. For most Westerners, a guardian is a mercenary that guards someone else's property or at best bordering with ecofascist conservation by the State. In many cases because of this, the concept is translated as “steward,” understood as a manager. This concept is closer, but a steward can be considered also as an employee. The understanding of guardianship by Indigenous people is very close to a custodian acting on deep belief and motivated by ethics, altruism, and consciousness of belonging and kinship with the Earth and the living beings inhabiting it. For further discussion of these concepts see Pajares G., *supra* note 146, at 337–42.

156. See Edgar Morin, *Elogio de la metamorphosis [In Praise of Metamorphosis]*, EL PAÍS (Jan. 17, 2010, 1:00 PM), https://elpais.com/diario/2010/01/17/opinion/1263682813_850215.html [https://perma.cc/J5JL-AP75] (applying the concept of metamorphosis, the process of self-reconstruction, to earth systems' responses to future crises).

157. DAN BROWN, *THE LOST SYMBOL* 57 (2009).