



Transcending the nature-society dichotomy: A dialogue between the Sumak Kawsay and the epistemology of complexity

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ARTICLE INFO

Keywords:

Sumak Kawsay

Nature

Society

Epistemology of Complexity

Epistemologies of the South

Ecological Economics

Ecuador

Political Ecology

ABSTRACT

This transdisciplinary research aims to propose one path, among multiple paths, to transcend the nature/society dichotomy in ecological economics, through an ecology of knowledge between *Sumak Kawsay*—an Andean indigenous cosmivision—and the epistemology of complexity. A qualitative methodology has been used, which includes a critical revision of scholarship on *Sumak Kawsay*, the definition of nature, complexity, complex systems, and the epistemology of complexity. This effort points to a critique of the conception of nature held by ‘traditional science’; one that has also resulted in the nature/society dichotomy as an epistemic basis within ecological economics. Thus, an epistemic convergence between *Sumak Kawsay* and the epistemology of complexity is advocated not only to disregard the nature/society dichotomy in ecological economics but also to include ancestral indigenous principles and values in knowledge production. In conclusion, such a dialogue between *Sumak Kawsay* and the epistemology of complexity could transcend the nature/society dichotomy within ecological economics by including notions like *Pacha Mama* and socio-ecological systems. It also has the potential to influence science production by considering principles from ancestral knowledge that points towards community, inclusion, horizontality, complexity, interculturality, and trans-disciplinarity.

1. Introduction

This article¹ discusses how the confluence between *Sumak Kawsay*—an ancestral Andean cosmivision—and the epistemology of complexity can enable us to rethink the relationship between nature and society within science in general, as the result of an ecology of knowledge, within ecological economics in particular. Thus, a critical revision of categories (e.g., nature, society, complexity, and the socio-ecological system) is offered in this work, supported by a dialectic methodology. Moreover, *Sumak Kawsay* is broadly analysed as a cosmivision that implies a philosophy, a worldview, a social organisation, and a set of socio-ecological relations with their related practices. Likewise, a brief description of the epistemology of complexity is offered.

It is worth mentioning that in this paper, *Sumak Kawsay* is

understood as a transgressing epistemology in the sense that in convergence with the epistemology of complexity, it enables the definition of alternative epistemic principles and relations for science; just as it allows indigenous communities to establish non-capitalist relations within capitalism. Such a suggestion already constitutes a real breakthrough, since traditional science has relegated, from its epistemic matrix, any other knowledge that does not conform with a traditional epistemic, discursive, systemic, methodologic, and even cognitive homogeneity (Rajão et al., 2014), thus configuring an ‘epistemicide’ (de Sousa Santos, 2010a). It does this by displacing and denying the systematicity, complexity, validity, and collective nature of ancestral and alternative knowledge.

Despite a systematic undervaluing of alternatives and diversities, traditional science has appropriated elements of ancestral knowledge as

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¹ This work emerges both from the doctoral thesis: Societal Metabolism, Sumak Kawsay and the territory: the case of Cuenca, Ecuador and from the project ‘Philosophy of education: reflections for transdisciplinary pedagogical training’, approved by calls for research from the National University of Education (UNAE) of Ecuador.

long as they are useful for accumulating capital and knowledge within capitalism and its dynamics (Cvijanović et al., 2010; Moulrier-Boutang and Emery, 2012; Naito, 2013). It has also deepened the epistemological separation between social and ecological systems. This disassociation has supported the exploitation and appropriation of nations, communities, and nature, by considering them as external and alien agents. Once nature and society are split up and seen as a dichotomy, they are assumed as objects to be exploited and appropriated without limits. Ancestral knowledge is also the subject of exploitation as they are considered to be alien elements that must be processed and assimilated by traditional science. The grounding argument of such a position is the conception of the subject as the active and predominant part of the epistemic relation, while nature is assigned a passive role. For many classic European philosophers it is this active position—implying physical and mental effort—that legitimises commodification of knowledge and nature; a perspective that has been placed as hegemonic with regard to all other forms of knowledge (Dussel, 2005).

Thus, it is within this epistemic discussion that our argument takes place. First, the *Sumak Kawsay* cosmivision is introduced by describing its emergence—including *Pacha Mama*—to emphasise that it offers an epistemic possibility to rethink the nature/society dichotomy in ecological economics. Second, the definition of nature by traditional science is criticised, since it is conceived as an object to be manipulated by following a unique method. We propose instead that nature is a social construction resulting from ecological and social processes: there is not a unique notion of nature once it is embodied by diverse social and power relations. Third, the epistemology of complexity is briefly explained by recalling the main features of both complexity and complex systems as critical elements of traditional science, although they resulted from that tradition. Fourth, we attempt to apply the epistemology of complexity to the concepts of nature and society to define them as complex systems that could converge into the notion of the socio-ecological system to overcome—from a traditional science perspective—the nature/society dichotomy. Fifth, based on the ecology of knowledge, the convergence between *Sumak Kawsay* and the epistemology of complexity is advocated, not only to disregard said dichotomy in ecological economics, but also to include ancestral indigenous principles and values in knowledge production that stress inclusion, horizontality, and democracy. In conclusion, the concept of the socio-ecological system, assumed by the epistemology of complexity, rejects this dichotomy in science. However, *Sumak Kawsay* (and its *Pacha Mama* cosmivision) contribute, through an ecology of knowledge, to modify the conception about nature and society, allowing a different way of producing science to emerge based on alternative values and principles such as community, horizontality, and trans-disciplinarity.

2. The principles of *Sumak Kawsay*

The *Sumak Kawsay* cosmivision is a complex topic since it can be delivered from a variety of perspectives. *Sumak Kawsay* is commonly confused with the *Buen Vivir* political construct. *Buen Vivir* is a legitimate interpretation of one specific Ecuadorian political group. To avoid confusion, this work will use the term '*Sumak Kawsay*', which is not only an ancestral cosmivision but is also a politically strategic concept (Hidalgo Capitán et al., 2014; Hidalgo, 2011; Hidalgo-Capitán and Cubillo-Guevara, 2014; Vanhulst, 2015; Vanhulst and Beling, 2014a, 2014b). Yet, *Sumak Kawsay* is not unique — several indigenous and alternative cosmivisions imply and claim a rupture with capitalism. However, what makes it particularly different (along with the Bolivian *Sumak Qamaña*) is that both have been included in their national constitutions. Furthermore, in addition to being an ancestral indigenous cosmivision, *Sumak Kawsay* is a political conception that has reached legislative and public policy dimensions. This is why we can claim that *Sumak Kawsay*, from its indigenous roots and political implications, offers an alternative to the dichotomy of nature/society.

Sumak Kawsay is a Kichwa term often translated as 'Good Life'.

However, it goes much further than a better way of living. *Sumak Kawsay* is a core element of the Ecuadorian Andean cosmivision, which is in turn born from ancestral practices of the Kichwa people (even before the emergence of capitalism at a world scale). Besides, unlike other cosmivisions that look for materialisation in daily life, *Sumak Kawsay* is conceptualised from the daily life of ancestral peoples (mainly from territories of present-day Ecuador but not limiting itself to them). Although it belongs to Andean cosmivision, *Sumak Kawsay* was systematised (during the 1990s) by the Kichwa Amazonian nation in Ecuador as a core principle for their territorial organisation in the context of struggling against the oil industry (Hidalgo, 2011). Hence, *Sumak Kawsay* is presented frequently as a brand-new concept—disregarding its long history—that far from being introduced as a pure category, is characterised by contradictions coming from indigenous peoples who intend to structure non-capitalist relations within a capital-ruled world. It unfolds cultural and socio-ecological relations and a way of 'being' that emerged in *Abya Yala*, even before its European conquest. Moreover, *Sumak Kawsay* contradicts the idea of progress and development by emphasising diversity and harmony (Boogaard and van Norren, 2022). These elements point towards an alternative understanding of nature and society (Kallis and Norgaard, 2010; Leff, 2004; Mayumi and Giampietro, 2006; Passalía and Peinado, 2021; Roy and Hanaček, 2023; Tetreault, 2021) and can also be found in some of the diverse conceptions that coexist within ecological economics and political ecology.

Sumak means fullness, the ideal, what is beautiful, what is good, and utmost realisation, whereas *Kawsay* means life: a dignified life in balance and harmony between human beings and between humans and *Pacha Mama*. *Sumak Kawsay* can then be understood as a wholesome life, but a life that is also dynamic (Kowii, 2011; Macas, 2010). Achieving this wholesome life is the task of the sage, and it represents the achievement of a level of total harmony with the community and the cosmos (Macas, 2010). Therefore, *Sumak Kawsay* means a full, wholesome life with humanity and with all other living beings (CONAIE, 2012). As Freire and Atawallpa. (2011) claims, a fundamental principle of Andean tradition is parity, better understood as 'complementary polarity': an element that enables one to think far beyond any classic Manichean dichotomy, such as that asserted by religion and philosophy. In this vein, there is no such contradictory opposition among humans and between society and nature. Instead, for *Sumak Kawsay*, there is harmony (the dynamic coexistence of multiple elements) and equilibrium (the balance between two opposed elements); a meeting point (*tinku*) between oppositions and polarities.

Furthermore, *Sumak Kawsay* requires a healthy ecological system (Hernández, 2009; Roa-Avendaño, 2009) in consonance with *Pacha Mama*—a key notion to challenge the nature-society dichotomy—which represents the integration of space and time in a single being, where life in community and the universe exist (Bautista, 2011). More than being an ancestral deity, *Pacha Mama* should be translated as 'All Mother' or 'Mother Universe' instead of reducing it to the patriarchal notions of 'Mother Earth' or 'nature' (Anzoátegui and Barba, 2016). This is not a casual understanding, since it implies, on the one hand, an 'epistemicide' (that can be translated as the destruction of the epistemic diversity) (de Sousa Santos, 2010a) by appropriating the Andean indigenous cosmivisions, while on the other hand it legitimates territorial depredation (Anzoátegui and Barba, 2016; de Sousa Santos, 2010a).

Kowii (2011) states that in order to comprehend *Sumak Kawsay*, we must first understand its semantics, which is constituted by eight principles (Fig. 1): 1. *Pakta Kawsay* (the balance of a person, family, and community as the core for any relationship in the sense of both external stability and emotional stability); 2. *Alli Kawsay* (harmony) and *Pakta Kawsay* (work) are the basis for harmony between a person, their family, and their community. These dimensions relate to the cosmos, and their flows are influenced by space and time. 3. Both *Pakta Kawsay* and *Alli Kawsay* motivate people to create and recreate their initiatives; this

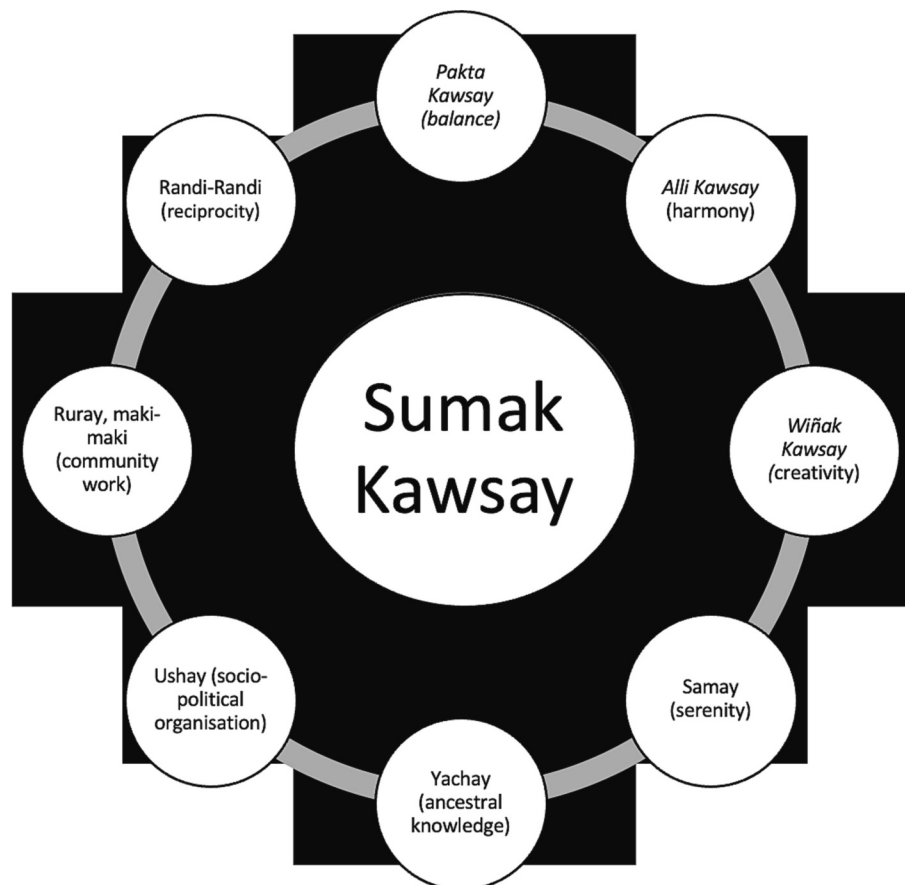


Fig. 1. The principles of *Sumak Kawsay*: as stated by Macas (2010) and Kowii (2011) are presented with the *chakana* (Andean cross) as a background.

convergence conduces *Wiñak Kawsay* (creativity). It is supported by *Tinkuy*, a dialectic process of a constant search for innovations and new elements through exploration and continuous confrontation of the cosmos. 4. *Samay* (serenity, which must be nurtured in every aspect of life, meaning that relationships will happen in peace and respect). The confluence of these four elements produces *Rumakay*, which means 'knowing to be', synthetising the realisation of human beings. The other four principles are related to communitarian living, since community is fundamental for this cosmovision (Macas, 2010): *Randi-Randi* (the reciprocity and the redistribution); *Ruray, maki-maki* (the work in the community); *Ushay* (the community as a social and political organisation), and *Yachay* (collective and ancestral knowledge).

It is worth recalling that this article aims to suggest that *Sumak Kawsay* offers the elements to rethink the relationship between nature and society in science, and in consequence, in the field of ecological economics. Such a claim follows the ideas of Spash (2012) who set up an essential epistemological discussion within ecological economics, enabling us to establish links between science, ecological economics (i. e., as a field and as a science), and *Sumak Kawsay*. Particularly, we rely on Spash's (2012) definition of epistemology as:

...the theoretical basis on which we create understanding of the world. This involves theories about the origin and limits of knowledge. It describes how we can form knowledge about the world and what is the meaning of truly knowing something. What comes prior to how we can know is the metaphysical (ontological) question of what exists, and so what are the primary entities of concern in any given field, and what are their most general features and relationships.

In this vein, once it constitutes an epistemology, *Sumak Kawsay* could contribute to the epistemic roots of ecological economics. It appears as a

pre- and post-developmental epistemology that involves a transition from colonisation to self-determination (de Sousa Santos, 2010a, 2010b). *Sumak Kawsay* shifts the traditional use of power with horizontal relationships and practices that are based on community and redistribution. In consequence, it confronts the infinite patterns of accumulation and development as these principles are not upheld by 'having', but rather by 'existing, being, feeling and doing' (Ramírez, 2010). This implies the possibility of overcoming the hegemonic perspectives of welfare, development, and nature, which have originated the current civilisation and ecological crisis (Gudynas, 2009). Besides, *Sumak Kawsay* is not a philosophical form of sustainable development; it does not affect the accumulation-devastation logic once it becomes a challenge and an alternative to development itself (Hidalgo-Capitán and Cubillo-Guevara, 2014; Vanhulst, 2015; Vanhulst and Beling, 2014a, 2014b). It entails deep implications in political philosophy; it is unthinkable for it to exist without freedom, and social and environmental justice (Acosta, 2011). It is, then, a 'way of being' that exists and that has been practised for millennia. Nonetheless, it does not correspond to an ethnic, but to a political identity; therein lies its potential. Thus, *Sumak Kawsay* constitutes a polylogical concept in which different types of epistemic logic converge into the same space and time (Ruano and Javier, 2017). When we can understand *Sumak Kawsay* as a living, non-linear epistemology, an alternative socio-ecological concept arises that is characterised by an ecocentric perspective, as opposed to an anthropocentric one.

Undoubtedly, the epistemological rupture of *Sumak Kawsay* overcomes the dichotomy of object/subject that relies on the nature-society relationship. This cosmovision responds to an Andean landscape-observer of a reality that is manifested in the *Pacha Mama*. Its complex character entails a transdisciplinary perspective that is also complex regarding the problematisation of socio-ecological relationships. As

such, concepts like ‘nature’ and ‘society’ are questioned by the humanist-communitarian methodology of *Pacha Mama* that integrates the ‘non-human’ (nature) into new relations that are complex and possess a non-reductionist focus on what is urban/rural or natural/artificial. These relations are mediated by a spirituality based on the principles of *Sumak Kawsay*, whose cultural matrixes understand nature and society from a complex standpoint in which there is no such dichotomy between them.

Finally, all these vindications are framed in the construction of *Sumak Kawsay* as an alternative to development since it disregards economic growth and progress as ultimate goals. Instead, it prioritises community within socio-ecological systems: about the life in community; to ancestors, past and future, all together at the same time (Larrea Maldonado, 2010). The logic of *Sumak Kawsay* has gone beyond the indigenous world (Hidalgo-Capitán and Cubillo-Guevara, 2014; Latorre and Malo Larrea, 2019; Radcliffe, 2012) and has become an epistemology in dispute. Such an indigenous cosmovision offers the opportunity to rethink the nature-society relationship within ecological economics; not by refashioning some concepts and principles, but by considering non-capitalist relationships by means of the *Sumak Kawsay* principles. According to several indigenous and social movements, the *Sumak Kawsay* realisation demands a deep socio-political transformation that goes far beyond the definition of welfare public policies because it entails a completely different *modus vivendi*, in harmony between nature and society. Thus, the potentiality of *Sumak Kawsay* lies in having enough epistemic and socio-political principles to tackle capital-centrality within the nature-society relationship.

3. The social construction of nature

The notion of ‘nature’ that this work is criticising is the one that was consolidated during so-called ‘modernity’, which settled on a nature-society relationship understood as a dichotomy, and gave way to early industrial capitalism (Deleuze et al., 2002; Gudynas, 2009; Harding, 2016). It was a historical moment, deeply influenced by the Enlightenment and its natural philosophy, which shaped a scientific paradigm where every part of nature is studied in an isolated way in the belief that the understanding of the different parts will generate an understanding of the whole (Leff, 2004; Morin, 2004; Munné, 2004). This configured what is called ‘traditional science’, understood as a rational systematic seeking of the truth by following a unique method based on observation and experimentation to formulate laws and theories (Hodson, 2008; Siegel, 1989).

Such an approach has homogenised both the ‘image of the natural’ and ‘what is natural’ as an object of study and/or exploitation. Thus, what has been called ‘nature’ has been fractured into parts (Guillibert and Monferrand, 2018; Hajer, 1997). Several scholars (Gandy, 2004; Guillibert and Monferrand, 2018; Kaïka, 2003; Leff, 2003, 2015) claimed that the current ecological collapse and crisis of civilisation are the consequence of perceiving nature as an external entity that can be dominated in the name of humanity’s welfare.

In this vein, the multiple ‘natures’ that exist are neglected, and the fact that people, species, and ecosystems have coevolved historically and interdependently is rejected (Latour, 1993; Norgaard, 1984; Odum, 1997; Swyngedouw, 2011a). According to Swyngedouw (2011a), the definition of nature is due to two modern scientific achievements: first, the rejection of the idea of nature as a cosmic and mythical being, and second, the objectivisation of nature from the subject that exploits it. Thus, nature has been presented as an abstract concept hidden behind a veil of apoliticality. This apoliticality is established using the wrongly called ‘epistemological’ miracle of Greek thought that intends to make nature yield to reason through a configuration of reality based on order and non-contradictions. This epistemic reduction implied denying nature as a chaotic, and contradictory reality (Munné, 2004) with an unpredictable character (Swyngedouw, 2011a).

Nature is a powerful notion that has been systematised, and

politicised (Guillibert and Monferrand, 2018; Whiteside, 2002). Nature can be described in several different ways, and the expressions that have been used to do so are linked to the exercise of power in societies (Swyngedouw, 2004; Whiteside, 2002). Thus, it is fundamental to explore different notions of nature to understand the economic, political, and cultural processes that rule the metabolisation of what is not human (Heynen, 2003). Our knowledge has been structured by very specific cultures and by different languages and experiences (Hajer, 1997; Rosen, 2000). The image of reality is created under different cultural and scientific paradigms, which in turn creates a different problematic of nature: the social construction of nature. Munné (2004, p. 27) states: ‘(...) between the image of reality and our knowledge of it there is constant feedback. This is especially sensible when it comes to human reality, allowing for the problem of theoretical pluralism in relation to the underlying images constructed by different theoretical frames’. Therefore, nature is not only a product of ecologic processes, but it is also strongly determined by social and cultural constructs, and it is modelled by power relations.

Finally, it is worth mentioning that *Sumak Kawsay* is not alien to such a notion of nature, since the socio-ecological processes that took place in what is called ‘nature’ are contained by *Pacha Mama* and understood by the *Sumak Kawsay* principles. Therefore, nature is not separated from the social processes; rather, it is conceived as a multidimensional entity instead of being a mere object of study.

4. Conceptualising complex systems

Complexity implies the acceptance of uncertainty (Funtowicz and Ravetz, 1994; Turnpenny et al., 2011) and its diverse dimensions (Mayumi and Giampietro, 2006). Complexity encourages us to distinguish and consider multidimensionality, and not to isolate and separate interdependent phenomena. This means that the conception of an ordered and static reality is shattered. In this sense, sciences are assumed as complex systems (Morin, 1992) that are distinguished by² chaos, nonlinearity, and dynamic harmony, among other ontological phenomena (Maldonado and Gómez Cruz, 2010; Munné, 1994, 1995, 2004).

Barret et al. (1997) define a complex system that is unified and composed of regulatory and interdependent components. The study of complex systems allows for the birth of an epistemology of complexity (Morin, 2004) that problematises the philosophical foundations of traditional science and its rigour because it introduces new ways of understanding ‘non-linear’ realities, as well as the principle of simple causes producing complex effects. Therefore, traditional science is being questioned as new forms of understanding non-linear ontological reality are introduced, in which different biophysical principles and complex phenomena coexist in an inter-systemic manner (Morin, 1999, 2004, 2006; Munné, 1994, 2004). Although complex systems and the epistemology of complexity have been configured within the development of traditional science, they enable an overcoming of the modern dialectic of nature and society, making epistemic and symbolic integration possible.

The General Theory of Systems was developed by Ludwig von Bertalanffy during the 1920s, establishing a milestone in the reconceptualisation of science. Despite this, the theory remains as a traditional theory guided by traditional science (Morin, 1999, 2004, 2006), for which the required qualitative leap towards an epistemology of complexity also implies a paradigm shift: the paradigm of chaotic systems (Morin, 1992). According to Morin (1992), the problem of conceiving a system within the positivist paradigm is that a holistic and

² It is worth saying that the General Theory of Systems and Chaos Theory share a dialogue regarding the laws of thermodynamics (especially about the Law of Entropy) questioning the foundations of modern epistemology and generating the need for a different epistemology: that of complexity.

homogenised vision is produced: the system is understood as an indissoluble whole, by denying its internal diversity and heterogeneity. A shift to a non-holistic, homogenised paradigm is essential to comprehend the complexity and self-organisation of systems and their relations (Munné, 2004).

In this vein, chaotic systems represent a different challenge for traditional science (Giampietro, 2003; Odum, 2007). Their study requires methods that (1) contextualise them in a hierarchy, evidencing the existing interrelations among the different levels, and (2) can understand them at a global level, showing their diverse, and heterogenic interrelations. Chaotic systems cannot and should not be conceived without considering the relations among their elements (Morin, 2004). Thus, 'complexity', 'uncertainty', and 'indeterminacy' are terms that have grown within current scientific fields, in opposition to traditional science.

Because of the diversity that exists in the structure of ontological reality, the epistemology of complexity is as plural as it is multidimensional. However, it is not a disciplinary classification that leads to new paradigms. Therefore, the acknowledgement of diversity and non-linearity leads to the affirmation that every problem has more than one solution, thus avoiding the determinism that characterises traditional science. In this context, the epistemology of complexity implies a new epistemological understanding of science (Morin, 2004). It has the potential to enable a dialogue between equal epistemes that are also complementary within a genuine philosophical dialectic. In such an ecology of knowledge, it is possible to assemble scientific theories together with ancestral indigenous knowledge, yet emphasise that their and cultural and spiritual manifestations cannot be instrumentalised (Rajão et al., 2014).

4.1. Societies and nature as complex systems

Several authors (Gandy, 2006; Harvey, 1997; Latour, 1993; Mies and Shiva, 1993; Swyngedouw, 2006) have discussed the idea of nature, all agreeing that the symbolic schism between nature and society is a crucial element in this debate. That is why we resort to the epistemology of complexity as an effort to represent the diversity of phenomena coming from nature and society, which are understood as complex, self-organised systems that can maintain their balance through the reproduction of a determined metabolic pattern (Giampietro et al., 2000; Mayumi et al., 1998). A complete renovation and a radical change in the representation of nature and society are thus required.

Although the idea of nature as a quasi-cosmic mythical being was erased by traditional science, ecology signified the emergence of new concepts that attributed living qualities to nature, such as 'ecosystem' and 'biosphere'. These concepts have revived nature as a self-regulating living being (Capra, 2002; Guilibert and Monferrand, 2018; Morin, 1995). Likewise, for Margulis, nature is an evolutive and autopoietic entity (Onori and Visconti, 2012) that is equivalent to what has been denominated as the 'ecological system' (Berkes and Folke, 1992). Thus, the ecological system can be understood as a complex, adaptative system (Levin, 1998; Morin, 1992, 1995; Munné, 1994) with properties such as non-linear relations between its components, and time and space heterogeneity (Allen, 1987; Allen and Hoekstra, 1990; Hoekstra et al., 1991; Levin, 1998; Zurlini et al., 2006). Therefore, nature and ecological systems become equivalent notions that overcome the traditional scientific idea that nature can only be deciphered through mathematics.

However, the category 'nature' answers to a romanticised anthropocentric vision, while the idea of an ecological system assumes the complexities of a natural system. Because of this, nature as an ecological system is described as a matrix that is formed by countless articulations that represent structure and dynamics, allowing them to renew themselves through time. These articulations—also called ecosystems—constitute an array or unique combination of elements both biotic and non-biotic, each of them with an individual history that makes them different from one another (Toledo, 2008).

On the other hand, human societies are also complex systems (Forrester, 1971; Luhmann, 1983) whose stability depends on inflows of low entropy matter and energy that maintain their functions and infrastructure (Giampietro et al., 2000). In societies, many of the characteristics of complexity can be found; for example, the distance to equilibrium and self-organisation. Human societies are systems that are constantly adapting to changing conditions and ever-changing limits, and because they are non-linear systems, they are chaotic (Faber et al., 1992; Munné, 1995, 2004; Ramos-Martin, 2003).

Reality is a continuum where matter, energy, and information flow freely, in and away from the ecological circuits towards different social circuits (Toledo, 2008). Thus, relations between social systems and ecological systems are coevolutive (Berkes and Folke, 1992; Norgaard, 1984, 1994). In this vein, an ecologic conceptualisation of what is social appears alongside a social conceptualisation of what is ecologic. This constitutes the socio-ecological system (Gallopín et al., 1989), which is much more than the simple conceptual integration of two entities that were separated.

Therefore, the socio-ecological system is a complex system in continuous evolution, implying that the social system and the ecological system must be considered as a single, complex, and adaptative system (Madrid et al., 2013; Pujantell-Albós, 2012). The evolution of living organisms is linked to the evolution of their environment, mutually adapting in a multidimensional and continuous coevolution process (Farina, 2010; Ghazoul and Sheil, 2010; Odum and Barrett, 2006). The acknowledgement of coevolution as an ontological phenomenon has deep philosophical implications (Ruano and Javier, 2016). In the context of the socio-ecological system, human societies are a hybrid, born from cultural and biophysical systems (Erb, 2012). In this way, what is human and what is non-human form hybrids that are constantly reproducing; blurring the lines between isolated entities such as nature and society (Latour, 1993; Swyngedouw, 2011b).

The notion of socio-ecological systems is assumed by the epistemology of complexity (Morin, 1995), which disregards the nature/society dichotomy and becomes a possible path for science to study the socio-ecological system. Therefore, the epistemology of complexity is understood as one of the most prominent advocates to support the overcoming of the nature/society dichotomy as a post-developmental alternative. Thus, we can affirm that *Pacha Mama* is not completely alien to the socio-ecological system framework; therefore, the epistemology of complexity is not a closed field for *Sumak Kawsay* and the diversity of ancestral knowledge.

5. *Sumak Kawsay* and the epistemology of complexity

Despite historical and geographical differences, the *Sumak Kawsay* and the epistemology of complexity present multiple confluences in terms of their philosophical and epistemological foundations. As mentioned above, both of them entail the overcoming of the nature/society dichotomy, or what Guilibert and Monferrand (2018) call 'substantial dualism'. Furthermore, they not only recognise the identity of systems but also their heterogeneity. In this context, and continuing with Guilibert and Monferrand's thinking (2018, p. 246), we believe that these two epistemologies are '...capable of accounting for the continuity as well as the discontinuity between nature and society'. Thus, they are ontologically capable of facing the roots of the ecological crisis.

Sumak Kawsay is built on symbolic, and epistemic horizontalities, which problematise the conditions and relations that allowed the multidimensional separation of social and ecological systems. Because of this, it is worth restating that the convergence of *Sumak Kawsay* and the epistemology of complexity is multidimensional because it problematises every socio-ecological sphere. Therefore, given that *Sumak Kawsay* is a dialoguing epistemology (Kowii, 2011), this proposal is possible, and in this way it is the baseline condition for the ecology of knowledge in which ancestral knowledge could contribute to the

construction of universal knowledge. The acknowledgement of knowledge diversity within science is necessary to configure a different epistemological horizon, in which *Sumak Kawsay*—or any indigenous knowledge—could converge with the epistemology of complexity in order to face the present-day ecological and social issues resulting from traditional science and capitalism, both of which are conceived as closed and completed. Besides, *Pacha Mama* represents the integration of socio-ecological systems by disregarding the epistemic, subject-centred relation that has characterised traditional science, because the convergence of *Sumak Kawsay* and the epistemology of complexity leaves the distinction between subject-object groundless once the idea of epistemic passivity is refused.

Sumak Kawsay is presented as an epistemological rupture (Bachelard and Jones, 2002) in the face of a traditional science that has so far been incapable of offering alternatives to the current ecological and scientific crisis. Diversity in the production of knowledge leads to a reorientation of the study of socio-ecological systems. In this way, *Sumak Kawsay* emerges as a philosophical alternative to monocultural thought. It is also an alternative epistemology that is diverse and is sustained on the geographical, natural, biological, cultural, and social potentialities of different regions that agree with their needs and priorities. The complexity, belonging to the socio-ecological system and scientific production, admits to the inclusion of diversity in the epistemic and cognitive matrix of science and knowledge. An epistemic dialogue has already happened in Ecuador due to several studies that have used social multicriteria evaluation (Munda, 2004, 2008), such as the works of Moscoso Lazo et al., 2006, Report, and Larrea Maldonado et al., 2011.

This proposal supports an understanding of *Sumak Kawsay* principles and *Pacha Mama* as practical and applicable concepts in science and research, and not only as ethnic notions restricted to cultural expressions. In the first place, it does this by effectively modifying the notions of nature and society as two antagonistic objects of study to be replaced by the socio-ecological system; a framework that does not stray from what *Pacha Mama* entails. Second, by including some of the *Sumak Kawsay* principles in research—for instance, those related to the community: *Randi-Randi*; *Ruray, maki-maki*; and *Yachay*—such an approach would not only overcome the nature/society dichotomy within science, but also its community values could bring more inclusive and democratic paths in the construction and re-creation of knowledge. These principles match with post-normal science (Funtowicz and Ravetz, 1994) and open science (Cribb and Hartomo, 2010; Open Science, 2023). The combination of *Sumak Kawsay*, the epistemology of complexity, post-normal science, and open science, could together bring a deep qualitative change in science and its understanding of knowledge.

Science and research must be opened up to other knowledge, especially those ancestral ones that can offer alternative and creative solutions to the present socio-ecological crisis. On the one hand, plurality in traditional science is not possible due to its epistemic character as it tends to ‘epistemicide’ (de Sousa Santos, 2010a). On the other hand, according to Spash (2012), ecological economics is a plural field. Within it is the possibility to find divergent epistemologies, such as traditional science and the epistemology of complexity. The epistemology of complexity, and *Sumak Kawsay*, are horizontal and democratic. Thus, traditional science can be in dialogue with them as equals within the plurality of ecological economics. In this vein, it is possible to tackle the lack of solid theoretical foundations for ecological economics, as Spash (2012) claims—at least with regard to what constitutes the notions of ‘nature’ and ‘society’—instead of being objects of study, they would be studied as complex and interrelated systems.

Once a dialogue with ancestral knowledge is possible (by demystifying their principles), the epistemic convergence with the epistemology of complexity can become trans-disciplinary by assuming them as practical principles to be exercised in science. However, new challenges emerge in the discussion and require further debate; for instance, the difficulties of applying said dialogue in practice and within the

institutional structure of science and research, beyond the mere starting point of a theoretical discussion.

6. Conclusions

The nature/society dichotomy has been a grounding aspect of capitalism and traditional science (Dussel, 1998; Gudynas, 2009; Quang, and Matthieu, and Tamia Vercoutère., 2013; Freire and Atawallpa., 2011); therefore, studying the universe out of that contradiction is essential to explore alternative paths to solve the present-day socio-ecological crisis.

Even though the epistemology of complexity was produced within traditional scientific development, it overcomes the nature-society dichotomy by assuming—within a complex systems framework—the concept of socio-ecological systems. *Sumak Kawsay*, as an ancestral epistemology, and a political notion, has evolved through understanding people and their territories as elements of *Pacha Mama*, thus bypassing the nature/society dichotomy. This work, then, suggests that by following the ecology of knowledge framework, the epistemology of complexity and the *Sumak Kawsay* can establish a dialogue between science and ancestral knowledge in order to rule out such a dichotomy in ecological economics. *Sumak Kawsay* and its principles could contribute to science by modifying the conception of the nature-society relationship to carry out diverse practices that consider the complex systems involved. This would allow a more inclusive, horizontal, complex, intercultural, and trans-disciplinary science to emerge.

Thus, *Sumak Kawsay* can address science through the epistemology of complexity, creating a real dialogue of knowledge, that is horizontal and democratic, and which can articulate the struggle against epistemicide (de Sousa Santos, 2010a). Affirming the diversity of knowledge and cognitive landscapes is indispensable for an internal transformation of the sciences through an epistemic opening towards methodological and technological pluralism (Harding, 2016). Despite the above-mentioned challenges, this dialogue can be operationally and methodologically reached by post-normal science (Funtowicz and Ravetz, 1994; Mayumi and Giampietro, 2006; Turmpenny et al., 2011) and open science (Cribb and Hartomo, 2010; Open Science, 2023; Spellman and Gilbert, 2017; Vicente-Saez and Martínez-Fuentes, 2018). Because of this, it is urgent to perform an archaeology of epistemes, inquire about ancestral knowledge, and create an eco-philosophy that can imagine other, more resilient, fair, democratic, sustainable, and regenerative worlds.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

No data was used for the research described in the article.

Acknowledgements

1. Secretaría Nacional de Educación Superior, Ciencia, Tecnología e Innovación del Ecuador (SENESCYT).
2. Universidad Nacional de Educación del Ecuador (UNAE).
3. Universitat de Girona
4. Natalia Cordero Cordero
5. Tomás Malo Cordero
6. Camilo Martínez Iglesias
7. Jesús Ramos Martín
8. Enrique Santos Jara
9. Javier Poveda

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