



## Relationships between ecological restoration and environmental education: a critical view from Enrique Leff's conceptual framework

### *Relações entre restauração ecológica e educação ambiental: uma visão crítica desde a estrutura conceitual de Enrique Leff*

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**ABSTRACT:** Ecological restoration (ER) arises from Leopold's environmental ethics in the 1930s. Since about 1970, the discipline was consolidated with exponential growth in social movements and environmental policies. Analysis of the current and future development of the ER is currently on international and national journals, networks, societies, and within environmental public policies. In this last case, to such a degree, it is considered to be one of the rights of nature in the Latin American Constitutions, such as in Ecuador, Bolivia, and in the United Nations priority plan between 2021-2030. However, ER is poorly addressed in the field of environmental education. In this scenario, we consider it appropriate to confront some theoretical frameworks of environmental thought with the meaning and practices of ecological restoration and environmental education. With this in mind, based on a literature review and an interview with Enrique Leff, we present a critical view of the ER around three topics: a) A synthesis of an environmental conceptual framework of Enrique Leff; b) the historical development of ecological restoration, c) the relationships between Leff's conceptual framework, ecological restoration, and environmental education. We conclude that ER has "plasticity" to be included in different rational frameworks. Finally, we propose three historical periods of the ER: the ecocentric period, the scientific-technological period, and a new growing humanistic, creative and critical period in which education plays a central role.

*Keywords:* dialogue of knowledge dialogue; ecocentrism; environmental rationality; environmental knowledge and restoration of ecosystems.

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**RESUMO:**

A restauração ecológica (RE) surge da ética ambiental de Leopold na década de 1930. Desde cerca de 1970, a disciplina consolidou-se com crescimento exponencial nos movimentos sociais e nas políticas ambientais. A análise do desenvolvimento atual e futuro da RE atualmente é feito nas revistas científicas, redes de restauração nacionais, sociedades internacionais, e também nas políticas públicas ambientais. Neste último caso, em tal grau, que “o direito da natureza” é considerado nas Constituições da América Latina, como no Equador, na Bolívia e no plano das Nações Unidas entre 2021-2030. No entanto, a RE é pouco abordada no campo da educação ambiental. Nesse cenário, consideramos apropriado confrontar alguns marcos teóricos do pensamento ambiental com o significado e as práticas de restauração ecológica e educação ambiental. A partir de uma revisão bibliográfica e de uma entrevista com Enrique Leff, apresentamos uma visão crítica da RE, em torno de três tópicos: a) Uma síntese da estrutura conceitual ambiental de Enrique Leff; b) o desenvolvimento histórico da restauração ecológica, c) as relações entre a estrutura conceitual de Leff, restauração ecológica e educação ambiental. Concluimos que a RE possui uma grande “plasticidade” e pode ser incluída em diferentes estruturas racionais. Finalmente, propomos três períodos da RE: a) O período ecocêntrico; b) O período científico-tecnológico; c) O crescente e novo período humanístico, criativo e crítico, em que a educação tem um papel principal.

*Palavras-chave:* diálogo de saberes; ecocentrismo; racionalidade ambiental; conhecimento ambiental; restauração de ecossistemas.

## 1. Introduction

Carol Crowe, a native Algonquin environmentalist from Canada, relates that she had to explain to one of her elders that she would have to travel to a conference which was about the meaning of sustainable development. The expression was unfamiliar to him, so she explained that it was about how to manage resources in such a way that future generations could still get the same ecosystem services that are provided today without undermining the land. He was silent for a moment. The idea was new to him. Then he asked her to take the following message to the conference:

This idea of sustainability seems to me to be the same old formula where people simply continue to take away from the earth. They just want to keep taking. You cannot just take, tell them, that among our people our concern is not what we can take from the earth, but what we can give (Kimmerer, 2011).

Ecological restoration is understood as to be “assisting in the recovery of ecosystems that have been damaged, degraded or destroyed” (SER, 2004), it can be seen as a way that humans exercise their responsibility to “give” to the earth. It is a discipline and practice where people try to recover damaged ecosystems by reintroducing missing plants and animals to promote a web of life based on an understanding of changing historical conditions, stopping invasive species, restoring soils, eliminating dangerous substances, and restoring natural processes such as periodic fires and floods (Higgs, 2003; Clewell & Aronson, 2013).

The rapid growth of the ER, in the last three decades, probably has to do with similar desires of the Algonquian people and restorationists, many of whom are peasants, native people, young people, and children, as well as volunteers and even researchers (Egan *et al.*, 2011). According to Jordan III (2003), ER covers not only scientific or technical knowledge but also, that of human spirituality,

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hope, and stands in contrast to the often explicitly expressed idea of an invariably negative and destructive role of human beings on natural landscapes. People around the world who practice ER do it with the intention of “giving” to nature, like the intention of the native Algonquin people. This is the original sense and “soul” of ER: a pedagogical opportunity to build new links with nature (Leopold, 1949). However, the panorama of motivations, intentions, and interests in ER is not homogeneous in the present, and some researchers, practitioners, and decision-makers affirm that for its expansion, need to be inserted in the national and international financial market not only at small but at large scales (Brancalion *et al.*, 2017; UN, 2020).

Reflecting on this issue from an educational perspective, we considered of interest the link between ER and the environmental thinking of Enrique Leff. His ideas such as environmental knowledge, environmental rationality, and dialogue of knowledge, are frequently cited as reference sources in the context of academic debate, educational practices, as well as in educative public policies in Latin American (García & Priotto, 2009; Brière & Parra, 2014; Molina & Novo, 2017, among others).

On these foundations, the objective of this essay was developed in three axes of analysis: a) The environmental Leff’s conceptual framework; b) The historical development of ecological restoration, and c) The relationships between Leff’s conceptual framework, ER, and environmental education.

We have enriched our perspective with quotes from an interview with Dr. Enrique Leff (Supplementary material). The dialogue with this sociologist and philosopher was made with no closed-ended questions but by continuing the conversation as it developed. It was held in Mexico City

in February 2020 and captured by voice recording and interviewer notes (Supplementary material).

## ***2. The environmental conceptual framework of Enrique Leff***

According to Leff (1998), environmental knowledge emerges at countercurrent to the modernity project and its technologization of life and the economization of nature. This knowledge “*opens to thinking about other methods of understanding outside of the traditional paradigms which are built around the logocentrism of science*” (Supplementary material).

Environmental knowledge sheds light on this domination which is strongly related to the instrumental management of nature, social, and economic resources, and opens up to new methods capable of integrating the contributions of different rationales, such as that of the indigenous peoples and peasants, among others, generating a more comprehensive analysis of a complex reality (Leff, 2004; Supplementary material). For this reason, this concept is “*a call, a welcome to a diversity of knowledge that has long been buried, to open up to new ways of thinking in the understanding of life and ways of intervening in life*” (Supplementary material). Environmental knowledge cannot be considered solely a simple knowledge re-reading as an interdisciplinary reflection as it goes beyond modern science and incorporates silenced or subjugated values and identities (Leff, 2004). The inclusion of traditional and indigenous people’s knowledge in the same hierarchy aspires to the emergence of new social meanings and political positions in the world (Leff, 2004).

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According to Leff, the environmental crisis inaugurates the search for new rationality, which he refers to as environmental rationality. It is said to be rational because it is thinkable (and includes that what has not yet been thought), and it is also environmental because it mobilizes knowledge for a sustainable future based on human behavior and people's knowledge (Leff, 2004). Environmental rationality, in that sense,

*seeks ways of understanding, ways of taking action, which generally goes against the flow of normal rationality and modernity; it is a starting point, as a keyword, and as the master key in understanding what we can do concerning the reconstructive task of the ecological and vital processes of the planet (Supplementary material).*

In agreement with some philosophical and sociological sources, for example, Frankfurt school and philosophers such as Horkheimer, Adorno, Habermas, among others (Galafassi, 2004), environmental rationality discusses the hegemony of the instrumental, or pragmatic rationality, that separates the human being from nature, and what's more, intends to submit and transform it into an object of domination, consumption, merchandise, and even war. The system of values and beliefs on which the dominant rationality is based is where the current social and productive order is nurtured and makes the future of the planet unsustainable (Leff, 2004).

The relationship "with the other," or "the otherness," is also central to Leff's conceptual framework, which is linked to the "dialogue of knowledge" (Leff, 2004; 2005). The dialogue of knowledge breaks the ice toward simplifying rationality and opens towards otherness. That is, to understand the

other, to negotiate, and reach agreements "with the other" without any established cultural barriers, or that of translating "the other" in terms of "the same." Here Enrique Leff uses the deconstruction category of the philosopher Jacques Derrida. Deconstruction can be interpreted from the "polysemy democracy" metaphor, which refers to the possible multiplicity of meanings, contradictions, and logical-discursive inequalities that are observed and make it possible to understand behind the words (Borges de Meneses, 2013). For this reason, the dialogue of knowledge is only possible within a politics of differences and plurality. From Leff's conceptual framework, the dialogue of knowledge encourages collective intelligence and the ability to solve critical problems such as scarcity of resources and ominous life conditions among the marginalized sectors of humanity.

The relationship of Leff's environmental framework with the ER deserves deep reflection. In Leff's words:

*Rather than forcing a tune through the metaphors that can be established between these concepts, phrases or terms, it is necessary to reflect on ways of thinking that go toward the reconstruction of a more sustainable process in the metabolism of the planet's life, so that they may converge, but they do not necessarily go in parallel to or in perfect harmony. First of all, the derivations and consequences of these concepts have to do with the rationality and intervention processes on nature (Supplementary material).*

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### 3. *The historical development of ecological restoration*

Efforts to restore damaged lands are probably as old as human culture, although the term began to be used frequently during the early 20<sup>th</sup> century, linked to forestry (Sarr *et al.*, 2004). However, Aldo Leopold's work in the 1930s to restore vegetation and wildlife in Wisconsin (USA) is often cited as the birth of ER (Jordan III *et al.*, 1987; Sarr *et al.*, 2004).

Leopold's plantations went beyond silvicultural issues because he devoted his work to an ecocentric (as opposed to anthropocentrism) and a philosophical perspective toward a new land ethic. According to him, restoration not only increases the ecological quality of degraded sites but also would form a privileged way to educate people to acquire an ethical attitude towards the earth and a better relationship with nature (Leopold, 1949; Leopold, 2004). Jordan & Lubick (2011) called this approach "ecocentric restoration" to distinguish it from other varieties of restoration that may be motivated by loyalties to other goals than the ecosystem itself. Jordan and Lubick place this ER period between the 1930s and the 1970s. In the mid-1970s, ER began to be conceptualized as a discipline that, through the use of ecological concepts integrated with technologies, could contribute to reversing the loss of habitats, biological diversity, and natural areas (Bradshaw & Chadwick, 1980). Bradshaw (1987) synthesized the interest and value of ER for the ecologists when he expressed that ER is the "acid test" of ecology.

However, on the first meeting in Oakland, California, in 1989, the Society for Ecological Restoration and Management (now the Society

for Ecological Restoration International, hence SER) registered several discussions on the goals of ER. In this event, some considered that the ER could become an excuse for industrial excess and a justification for further degrading activity: if we can repair the problem, why not keep business as usual? (Higgs, 2003).

Nevertheless, from the 1990s onward, restoration grows not only in its relationship with ecological theory and technologies but also as an "elixir" to solve socio-economic problems and to institute sustainable economic development (Brancalion *et al.*, 2017). The prime milestones in the history of the discipline and practice of restoration occurred in the year 1993 when the scientific journal *Restoration Ecology* was founded, and in the year 2004, when the "primers" of SER was created and translated into many languages (SER, 2004; Clewell & Aronson, 2013). After the dissemination of the general principles, ER expands exponentially throughout the world, and new scientific networks and societies are created, including a significant development in Latin America (Pérez *et al.*, 2018). A recent event of high significance is the United Nation's plan to dedicate a decade toward ecological restoration between 2021-2030 (UN, 2020).

In the executive summary of the United Nations declaration, it is stated that this decade could provide 1/3 of the necessary solutions for climate change and recovery of the loss of biodiversity. At the same time, it mentions that ER will provide economic returns: "based on data from a wide range of ecosystems, for every dollar spent on restoration, at least nine dollars of economic benefits can be expected" (UN, 2020). This last statement is in tune with positions that link the advancement of ER to an increase in investments and/or business profits,

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business attraction for economic corporations, creation of business contexts to favor markets, and offers economic profitability on different scales (Brancalion *et al.*, 2017).

Parallel to the growth in the business field of ecological restoration, many times presented in purely capitalistic term (see <https://www.wri.org/our-work/project/new-restoration-economy>), philosophical and cultural ideas are presented. William Jordan III continued to deepen Leopold's ideas (Jordan III, 2003; Jordan III & Lubick, 2011). New books emphasized political, social, and cultural aspects of restoration (Egan *et al.*, 2011, Clewell & Aronson, 2013; Ceccon & Pérez, 2017). ER is particularly assimilated in Latin America in the last decades by environmental movements that incorporate it as one of the rights of nature (Gudynas, 2014). This right is enshrined in the national constitutions of Ecuador and Bolivia (Gudynas, 2014; Martínez & Acosta, 2017). Even the critical, cultural, and sociological perspective of the restoration is not significant in the international debate, philosophical forces that face each other in the ER ring. It remains to ask how far the restorers can reflect and position themselves with any of them.

#### ***4. Relationships among Leff's conceptual framework, ecological restoration and environmental education***

Environmental education is currently debated between two main perspectives: one proposes to reform the current development model within the logic of the market, without altering the current economic model, while the other does so from a critical perspective, intending to provoke changes

in social, cultural, and economic models (Sauvé, 1999; Guimarães, 2013). This last and most current vision of the EE is formulated from epistemology or theory of knowledge that considers in Enrique Leff terms “ways of intervening in life” based on new rationality, more than new technologies (Leff, 1996; Leff, 2004).

We see many points of contact between Enrique Leff's thinking and ecological restoration in its ecocentric version. The ER, from the pedagogical and humanistic standpoint originally proposed by Aldo Leopold, considers that ecosystem recovery is inseparable from cultural and spiritual restoration and requires an attitude of gratitude and reciprocity to nature (giving to the earth), as it was also expressed by the Indigenous Environmental Network (Kimmerer, 2011). This ecocentric perspective offers an opportunity to reflect upon the profound changes in the paradigm. And this change in concordance with Leff's ideas is required to address and to shift the prevailing economic and political climate that is keeping our world and the biosphere on their current ominous trajectory (Ceccon & Pérez, 2017; Cross *et al.*, 2019; Ceccon *et al.*, 2020).

In the literature referring to education and restoration, there are projects oriented towards this transformation path of new relationships between society and nature, with the original pedagogical sense of Aldo Leopold. Some of them were developed with peasants of the Amazon rainforest (Garzón *et al.*, 2020), residents of urban peripheries of arid zones in the Argentine Patagonia (Pérez *et al.*, 2019), indigenous people of North American tribes (Kimmerer, 2011), urban citizens and municipal government in the USA (Andre, 2011), marginalized ethnic minorities and immigrants in Cape Florida in the USA and Toronto, Canada (Newman,

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2011; Westervelt, 2011); Canada (Newman, 2011; Westervelt, 2011); and with prison inmates in the river basins of Rio de Janeiro, Brazil (Marques de Abreu *et al.*, 2017). The concepts, procedures, and currents of environmental education used in the mentioned cases have even been systematized around the emerging field of work called *restoration-based education* (McCann, 2011; Pérez *et al.*, 2018; Garzón *et al.*, 2020).

In the above-mentioned approach, environmental conflicts, ecological history, popular knowledge, biophilic links (McKeon, 2011), participatory action research, and also various currents of environmental education with the preponderance of the bioregionalism are considered (McGuinis, 2005; Sauv , 2005; P rez *et al.*, 2018; Garz n *et al.*, 2020).

On the other hand, the same ecological restoration can be included in the current anthropocentric vision of nature, and it can be used as a justification for deepening the current economic neoliberal model (Cecon & P rez, 2017; Cecon *et al.*, 2020). Consistent with this view, a recent article expressed the concern by the impetus productivity-based of the UN declaration for the next decade or ER, without addressing the necessary changes in the anthropocentrism and unbridled neoliberalism of prevailing economic models causing degradation (Cross *et al.*, 2019).

The economic, anthropocentric, pragmatic conceptions of ER sets goals of restoration in terms of benefits in dollars to exclude it from Leff's conceptual framework (Supplementary material), and also exclude it from the critical EE objectives, such as proposed by several authors (Sauv , 2005; Guimar es, 2013).

Leff's conceptual framework reveals that restoration can be malleable, co-opted, forgeable,

or "too plastic" (Supplementary material). This was expressed as follows by Leff in the interview obtained for the discussion of this topic:

*(...) the concept of ER may be, or is presented as being too plastic perhaps too adaptable to be appropriated by the sustainable development strategies of the dominant rationality because it is precisely from that dominant paradigm that they intend to solve the problems of the environmental crisis (Supplementary material).*

*Either the concept of ecological restoration is being falsified, or those of us who are uncritically proposing it are being poorly served, believing that we are on the real path to solving the environmental crisis. Ecological restoration is easy to forge towards projects that are a way of capitalizing on nature. I cannot adopt the concept of restoration in this sense [...] is not giving back to nature its capacity of expression, but it is exposing it to be appropriated by the dominant economic system as has happened with so many other concepts, such as sustainability (Supplementary material).*

This is a typical phenomenon of the capitalistic use of promising human aspirations, recurrent in the dominant social model, as has been seen with the original revolutionary environmental movement later co-opted around the concept of sustainable development (Pierri, 2005).

However, hope remains among many restorationists. Although in the last three decades, the economic proposals implicitly fit into neoliberalism and have advanced exponentially in ER, the humanistic positions have persisted.

Therefore, with the increasing incorporation of ecological restoration into the educational field, we propose the restoration progress discussion in the context of an emergent *Humanistic, creative and critical ecological restoration* period oriented to the

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restoration of the relationship between society and nature. Although the newest ecological knowledge is fundamental from this perspective, returns to nourish in philosophical, sociological, and pedagogical dimensions. In this period, a central axis is the constant revision of the rational and sociopolitical bases on which ER is based (instrumental-pragmatic-economists vs. environmental).

Finally, we share an idea from Enrique Leff that helps us to think about the soul or final meaning of the ecological restoration from the humanistic, creative, and critical view: “*with science, we reach the limit of the objectivism of life, of things, of nature and a pathway that deviates from the search of the deeper understanding of the meaning of life, which is something we have to restore. Life far exceeds the objective knowledge of life*” (Supplementary material).

We emphasize that, to advance in a humanistic, creative, and critical ecological restoration, we should consider the following triad of interrelations: a) environmental philosophy and political ecology (b) the regional ecological history and knowledge of the territories: analysis of ancestral land uses, environmental conflicts, origins of degradation and social deterioration in the bioregions; and (c) education in the social and natural sciences that contribute to the teaching and significant learning (Garzon *et al.*, 2020).

We maintain that the education-restoration relationship will require even greater debate both because of the global interest in the subject and its growing impact on education systems in Latin America and worldwide.

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