Introduction: Linking Ecology and Ethics for an Interregional and Intercultural Earth Stewardship

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Chapter 1
Introduction: Linking Ecology and Ethics for an Interregional and Intercultural Earth Stewardship

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Abstract Earth Stewardship implies a paradigm shift in linking facts and values, multiple forms of ecological knowledge and practices, and broadening the mission of the ecological sciences. However, two core limitations need to be addressed: (i) geographical gaps in the coverage of long-term ecological and socio-ecological research (LTER, LTSER, and other long-term environmental research networks) across the planet; (ii) philosophical gaps in the epistemological, political, and ethical dimensions of LTSER. If the rates of anthropogenic damage to the biosphere are to be reduced, both research and its application on a planetary scale requires transdisciplinary as well as inter-hemispheric, and intercultural inputs. Also both scientific and traditional ecological knowledge are dynamic. The integration of biocultural diversity is not an integration of a collection of biological, physical, or cultural objects; it is the incorporation of dynamic, often conflictive, processes of intercultural dialogue, negotiation, and poetic creativity. These intercultural, interdisciplinary, inter-institutional, and international processes generate forms of ecosystem co-management, which constitute Earth stewardship. Three areas of discussion contribute to finding the way forward: (1) embracing the multiple forms of

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understanding and co-inhabiting the biosphere; (2) undertaking the transdisciplinary work of long-term socio-ecological research networks; and (3) integrating ethics and ecological sciences through environmental citizenship. Bringing these broad areas together will contribute to overcoming the geographical and philosophical gaps that limit effective Earth Stewardship.

Keywords Biocultural ethics • Ecological economics • Environmental justice • Intercultural • Long-term socio-ecological research (LTSER)

Earth Stewardship implies a paradigm shift that links facts and values, multiple forms of ecological knowledge and practices, and broadens the mission of the ecological sciences. To confront global environmental change it is necessary, but not sufficient, to conduct long-term socio-ecological research. It is also necessary to act. Earth stewardship calls ecologists to engage not only in the production of knowledge, but also in public discourse, as well as in decision making, education, and governance. As a means of engaging science and society in rapidly reducing the rates of anthropogenic damage to the biosphere, the Ecological Society of America launched the Earth Stewardship Initiative in 2009 (Power and Chapin 2009; Chapin et al. 2011a, b).[1] Since then, this call for action has been appealing not only to ecologists, but also to anthropologists, sociologists, engineers, economists, religion scholars, philosophers,

[1] Note that the ESA defines Earth Stewardship as a science. Chapin et al. (2011a, p. 89) define it as "science that facilitates the active shaping of trajectories of social-ecological change to enhance ecosystem resilience and human well-being." The concept has since evolved to be "a strategy to shape the trajectories of change…;" i.e., the application of sustainability science to problem solving (Chapin et al. in this volume [Chap. 12]). In this book we focus on it as a transdisciplinary science, embedded in social and cultural action. Within the ESA, Earth Stewardship has as antecedents the notions of ecosystem stewardship (Chapin et al. 2009) and planetary stewardship (Power and Chapin 2009), and beyond the ESA it is paralleled by the Planetary Stewardship Initiative developed internationally as part of the scientific planning for Future Earth (Steffen et al. 2011). See chapters by Callicott and by Chapin et al. in this volume [Chaps. 11, 12].

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conservation biologists, and other professionals, decision makers, and citizens interested in the combination of environmental, economic, and social sustainability.

This book contributes to advancing the Stewardship Initiative toward a planetary scale. What is happening today in the Amazon depends partly on environmental policies in North America, Asia, and other continents. What happens to the climate in North America, Asia, and other continents depends in part on the conservation of forests in the Amazon. Therefore, today, inter-hemispheric, intercultural, and transdisciplinary collaborations for Earth Stewardship are an imperative. The call for socio-environmental stewardship at a planetary scale faces, however, two core limitations that need to be addressed:

(i) geographical gaps in the coverage of long-term ecological and socio-ecological research (LTER and LTSER) across the planet;
(ii) philosophical gaps in the coverage of epistemological, political and ethical dimensions in LTSER (Rozzi et al. 2012).

Geographical gaps exist because more than 90 % of LTER or LTSER sites are located in the Northern Hemisphere. As Li et al. (Chap. 13) discuss in this volume, the International Long-Term Ecological Research network (ILTER) offers an ideal research, information, and infrastructural platform for the Earth Stewardship initiative; however, it presents a marked Northern Hemisphere bias, with more than 90 % of the ILTER publications generated by researchers from the Northern Hemisphere. Furthermore, within this hemisphere 89 % of ILTER publications are generated by researchers associated with LTER networks in temperate regions, and only 1 % are in equatorial regions. Consequently, the distribution of ILTER sites is more associated with political and economic resources than with the geographic distribution of biodiversity.

Regarding philosophical gaps, until now the social component considered in socio-ecological studies worldwide has been primarily economic (Rozzi et al. 2012).[2] Furthermore, as documented by Li et al. (Chap. 13), social research is still incipient in long-term socio-ecological research programs. For example, <0.5 % of ILTER publications are included in social sciences databases. Noticeably, however,

[2] ESA's Earth Stewardship call gives special "consideration to both ecological and socioeconomic" (Chapin et al. 2011a). Similarly, the European LTSER platform was designed "as a research infrastructure to support integrated socioeconomic and ecological research and monitoring of the long-term development of society–nature interaction within the context of global environmental change" (Haberl et al. 2009, p. 1798). These quotes show that socio-ecological is subsumed by "socio-economic" in foundational documents of Earth Stewardship and LTSER (see also Parr et al. 2002; Redman et al. 2004; Lui et al. 2007; Ohl et al. 2007). It is also striking that in socio-ecological research, the fields of philosophy, including ethics, are most often absent. For example, in a recent comprehensive review of the state of the art in long-term socio-ecological research in the US and Europe by Singh et al. (2013), philosophy is not included, and the word ethics is not used. The integration of socioeconomic research into the LTSER framework during the last decades represents a significant step forward for the inclusion of the human component in LTER (See Redman and Miller in this volume [Chap. 17]). Our book complements these approaches by incorporating philosophy and ethics as disciplines into the theory and practice of LTSER and Earth Stewardship.

>99 % of all ILTER publications in the arts and the humanities are generated by researchers working in the Southern Hemisphere. This volume calls attention to the opportunities for stronger partnership and complementarity in long-term socio-ecological research and stewardship initiatives across the planet. The southern regions can demonstrably add to the integration of social, ethical, and artistic dimensions to transdisciplinary socio-ecological research at ILTER and other networks, providing a broader intercultural and participatory foundation for Earth Stewardship.

This publication has its origin in the 14th Cary Conference held at the Cary Institute of Ecosystem Studies, Millbrook, New York, in 2011.[3] During the conference we acknowledged utmost the importance of global scale and interregional dialogue integrating ecology and ethics. As a follow up, we created the *Ecology and Ethics* book series with the publishing house Springer. This volume is the second in the series. It is conceived as a companion to the first one, *Linking Ecology and Ethics for a Changing World* (Rozzi et al. 2013), which placed greater emphasis on core concepts of ecological sciences and environmental philosophy. It was organized using conceptual frameworks provided by the notion of worldview and by a biocultural approach to environmental ethics.[4] This second volume places stronger emphasis on the practice of ecology and ethics. It was stimulated by the challenges and opportunities raised by the Earth Stewardship Initiative of the Ecological Society of America (ESA). Indeed, this book elaborates a conceptual framework at the planetary scale for continuing to build Earth Stewardship as part of the centennial celebration of the ESA.

More fully understanding and respecting biocultural diversity, with the multiple forms of land stewardship it implies, will allow us more effectively and justly to confront local and global socio-environmental challenges. Through dialogical processes and partnerships it will be possible to achieve novel forms of stewardship. Both scientific and traditional ecological knowledge are dynamic. The integration of biocultural diversity is not an integration of a collection of biological, physical, or cultural objects. Rather, it is the incorporation of dynamic, often conflicting, processes of intercultural dialogue, negotiation, and poetic creativity. These

[3] The 14th Cary Conference was jointly organized by three institutions: the Cary Institute of Ecosystem Studies (New York), the Institute of Ecology and Biodiversity (IEB-Chile), and the University of North Texas (UNT). The Cary Institute has a tradition of frontier research on ecosystem science and coupled human-nature systems. IEB is a leading Latin American research center that coordinates and supports the Long-Term Socio-Ecological Research network (LTSER-Chile) in southwestern South America. The UNT Department of Philosophy and Religion Studies and its Center for Environmental Philosophy represent a world-leading center for environmental ethics. With the joint coordination of the Sub-Antarctic Biocultural Conservation Program (www.chile.unt.edu), these three institutions are supporting this *Ecology and Ethics* book series (see Rozzi et al. 2013).

[4] The formal proposal of the biocultural ethic interrelates the habits and habitats with the identities and wellbeing of the co-inhabitants, human and other-than-human beings. Consequently, the conservation of habitats and access to them by communities of co-inhabitants becomes an ethical imperative. The biocultural ethic's proposal demands to incorporate this imperative into development policies as a matter of socio-environmental justice (see Rozzi 2013).

intercultural and interdisciplinary processes generate forms of co-management of ecosystems, which contribute to planetary stewardship.

Our ultimate goal is to contribute to dynamic, intercultural, and interregional approaches to planetary stewardship initiatives. We have organized the book into three parts. Part I presents contrasting forms of understanding and co-inhabiting the biosphere, forms that often remain outside of academia and prevailing government discourses. Part II examines the Earth Stewardship Initiative, relating it to transdisciplinary work conducted at ILTER sites and networks around the globe. Part III introduces environmental citizenship and participatory approaches, policy and conservation actions, religious belief systems and alliances, and exemplary lives of people who have made, and are making, a difference for practicing Earth stewardship. These approaches and initiatives place the value of life, human and other-than-human, above the value of capital, and have the capacity to implement Earth stewardship practices driven by that reoriented value hierarchy.

1.1 Part I: A Biocultural Approach to Earth Stewardship

Earth stewardship is a biocultural practice because it operates at the interface of biophysical and cultural domains. Different forms of stewardship have evolved from ancient, collective practices in Global Western, Southern, and Eastern societies. Ricardo Rozzi indicates that preserving the diversity of ways of understanding the natural world and of co-inhabiting with it is an essential aspect of the stewardship of both local places and the entire Earth. Part I examines multiple current forms of ecological knowledge and practices in various regions of the world—such as crab- and oyster-harvesting communities living on the Chesapeake Bay, the ancient agricultural tradition of *satoyama* that today molds the life of remnant rural communities in Japan, and lifeways of the Aymara and Quechua people in the high Andean Plateau that relate to the Earth as a living being and regard themselves as integrally connected to the forces of nature. In these living ecological worldviews and practices we can find vital elements to enrich our understanding of Earth stewardship today.

Focusing on local ecological knowledge in North America, Sharon Kingsland calls attention to the complex history of integrating ecological sciences and vernacular conservation practices. Based on a case study in Chesapeake Bay (eastern United States), Kingsland criticizes the split between two cultures: that of scientists and that of "watermen" whose livelihoods rely on harvesting of shellfish. The first culture is based on faith in theoretical models and logical arguments, while the second on knowledge grounded in everyday experience. The historical analysis of this case illustrates how this split was overcome through collaborative work that led to the establishment of co-management practices involving watermen, scientists, and policy makers. Kingsland remarks that scientists are now being challenged to overcome disciplinary constraints in order to be able to produce innovative responses to address the environmental, economic, and social challenges of the twenty-first century.

Scientists must interact with local communities in more respectful and open-minded ways in order to better assist and participate in Earth stewardship.

Hideaki Shibata presents an elegant example of how scientific and traditional ecological knowledge can complement each other. His overview of Japanese ecosystems and cultures introduces the experience of his country's Long-term Ecological Research network (JaLTER), which explores social-ecological interactions along with the more usual focus of LTER programs on biophysical patterns and processes. Shibata shows that traditional ecological knowledge continues to be important to the biogeochemistry of landscapes, and that environmental ethics and belief systems that respect nature can be guiding references for plans to develop a sustainable future. The example of JaLTER's incorporating traditional ecological knowledge in its core research mandate is a powerful one.

In Chinese philosophical traditions, as well as in everyday life, the aesthetic appreciation of nature is central. Shan Gao examines how aesthetic appreciation of nature is also aesthetic appreciation of *ch'i*, a core concept in Chinese philosophy that has no physical form, is invisible, and is always in an unceasing process of movement that produces and reproduces life. Both Shibata and Gao examine ways of understanding nature that include visible and invisible realities (the *kami* among Japan's Ainu population), and how such understanding shapes social-ecological relationships. Shibata affirms that "from ancient times, there has been an established traditional religion that fosters respect for diverse natural objects, including both visible and invisible entities, through a belief in nature deities that reside in various natural places such as mountains, forests, lakes, and oceans."

Visible and invisible realms of reality also play an essential role in Andean worldviews in South America. Based on his research on sacred sites, Fausto Sarmiento introduces the dynamic integration of the physical, the psychological, and the spiritual realms in the Quechua worldview. The triad of body, mind, and spirit is not exclusive to humans. As a member of an Aymara community and a feminist in Bolivia, Vicenta Mamani presents another Andean worldview. She shows how Aymara life is framed in rituals regarding the *Pachamama* or Mother (*mama*) Earth (*pacha*), based on a close and communicative relationship with nature. Humans and their social organizations, nature, and the spirits of humans, nature, and the divine, constitute an indissoluble unit. The Aymara worldview is based on male-female pairing because reciprocity, duality, and complementarity are fundamental concepts. Even personhood is not granted to the individual but to the couple in Aymara societies. Collective complementarity is the basis of labor relations and forms of collective labor continue to be an important dimension of community life and for respecting the *Pachamama* as a living being. Hard work, honesty and truthfulness, generosity and hospitality are Aymara values that reinforce collective labor practices. These values could acquire a broader cultural significance within the Earth Stewardship Initiative.

Also starting from the Aymara worldview, Roy May discusses the concept of Earth Stewardship. He highlights how this concept arises from peasant societies where the earth or land is fundamental to their well-being. Many ancient peasant traditions (including that of Adam and Eve), emphasize the earth as the substance of

human genesis and as the means that make life possible. Humanity is seen as being part of a network of interrelationships binding together the earth and the human, in such a way that a good and just life is facilitated, as conveyed by the Andean idea of *Pachamama*. In Aymara and other Andean societies, May highlights the multiple and important functions of llamas. Even the dung they produce is worthy of respect and care because it contributes to the cycle of life through enriched soil for cultivation. It is this integral respect for the animal that makes the llama a fitting metaphor for stewardship. Reading stewardship from the praxis of peasant societies such as the Aymara, provides a perspective that emphasizes mutuality, care and protection, and advocacy for the wellbeing of the Earth and its many forms of life.

The closing chapters of Part I address a core question. If there are so many forms of traditional ecological knowledge with associated traditions of ecologically sustainable practices, why do we face environmental crises in Asia, Latin America, and around the globe? The chapters by Ricardo Rozzi and by Laura Ogden and collaborators provide complementary answers. Rozzi combines the conceptual frameworks of the biocultural ethic and of liberation philosophy to argue that the core problem is axiological, that is, a matter of values. Today, the value of capital is ranked above the value of life. As Argentinean-Mexican philosopher Dussel (2003) has demonstrated, this scale of values is in disagreement with the theological and philosophical roots of Western civilization. Therefore, Rozzi argues that it is necessary to re-establish the right hierarchy of values; that is, to rank the value of life above the value of capital. This conclusion coincides with the perspective of influential US environmental philosophers, such as Holmes Rolston (1985) or Mark Sagoff (2008). As concisely stated by Poole et al. (2013, p. 356) in the closing chapter of the first book of this *Ecology and Ethics* series, "inverting the value hierarchy—i.e., treating economic value as the primary value as we usually do—is as incorrect as planting a tree with its roots in the air."

From the perspective of political ecology, Laura Ogden et al. argue that social-ecological changes associated with global assemblages—that is, globally extensive and multiform governance arrangements—disproportionately impact poorer nations and communities along the development continuum, or the "Global South," as well as others who depend largely on natural resources for subsistence. Complementarily, they show how transnational networks of grassroots organizations resist the negative social and environmental impacts of global assemblages, thus fostering social-ecological resilience. Thus, new community-based global assemblages have emerged as alternative governance mechanisms to counteract the hegemony of corporate, economic versions of the global order.

In summary, the biocultural approach undertaken in Part I suggests that to build a solid Earth Stewardship initiative, we need to identify more precisely the main agents responsible for socio-environmental problems at all scales, from local to global. They are not humanity in general, but specific agents—unequal power relationships, exclusionary institutional arrangements, inequitable and unjust economic strategies. Rozzi concludes that omitting this specification in the diagnosis of global environmental change would be a mistake as serious as a physician blaming microorganisms in general for a disease, rather than identifying the specific organisms

that are actually responsible for an infection. As Aldo Leopold (1949, p. 258) stated, "health is the capacity of the land for self-renewal. Conservation is our effort to understand and preserve this capacity." A biocultural approach to Earth stewardship helps to achieve a better diagnosis of specific threats and opportunities for conserving the health of the land and people.

1.2 Part II: Integrating Stewardship Across Disciplines and Scales

The chapters in Part I lay out a broad range of topics that form the threads of a stewardship tapestry. These threads are diverse, both conceptually and culturally, suggesting that the formulation of effective approaches to Earth Stewardship will vary with time, place, scale, and audience. It is unlikely that a single formula or strategy of stewardship will be universally effective, but rather that different conceptual threads of stewardship will vary in their importance depending on context. The chapters in Part II explore stewardship across scales, disciplines including the humanities and ecological sciences, and the timely relationship between stewardship and the Long-Term Socio-Ecological Research (LTER) networks.

Paradigm shifts, such as that implied by Earth Stewardship, often require examining the past in order to transform the present and project into the future. J. Baird Callicott traces the history of tension between ecological science and advocacy in the Ecological Society of America (ESA) from its birth nearly a century ago to the present. Callicott examines the work of the first president of the ESA, Victor Shelford. Today, we can learn from Shelford by understanding how he combined theory and practice in his proposal to create the Committee for the Preservation of Natural Conditions for Ecological Study in 1917. In today's terminology, Shelford developed a pioneer transdisciplinary approach by working closely with federal and state governmental agencies to implement "nature sanctuaries" as "research reserves" that were protected from impacts by people. However, as Callicott points out, in contrast to Shelford's early aim to preserve natural reserves free of human influence, stewardship efforts now recognize the importance of integrating humans as essential components of ecosystems.

Chapin et al. describe how renewed concern about human impacts on the biosphere led to the Earth Stewardship Initiative of the Ecological Society of America (ESA). This chapter, coauthored by current and past presidents of the ESA, discusses multiple approaches that were used to develop a platform for stewardship action, as illustrated in four case studies. Approaches included clarification of the stewardship concept through articles and a website, open discussion and elaboration of the stewardship concept at ESA's annual meetings, engagement of ESA members in activities organized by ESA sections, and outreach beyond ecology through collaborations and demonstration projects with academics and practitioners from other disciplines as well as with other groups in civil society.

The following chapters describe the application of diverse stewardship approaches in contrasting cultural contexts, drawing primarily on experiences from the

International Long-Term Ecological Research (ILTER) network. Maass and Equihua discuss the conceptual framework that has guided the ILTER in its stewardship efforts. They undertake a transdisciplinary research approach to understanding socio-ecosystems, representing an important epistemological shift from earlier LTER paradigms that focused on ecology, with people viewed as external influences rather than integral components of the system.

An initiative at a global scale presupposes information about the different regions of the planet. Ben Li and collaborators examine the cumulative publication output of the ILTER network—some 30,000 publications—to document striking gaps in terms of regions of the world where knowledge is produced and published, and the type of information that is included in ILTER research. This chapter provides a quantitative diagnosis of critical geographical and conceptual gaps in ILTER that an Earth Stewardship initiative should aim to fill. Ways to integrate ecological sciences and ethics should be found in order to solve intercultural and interdisciplinary conceptual gaps. To address these gaps, Jorge Aguirre describes field environmental philosophy (FEP), a methodological approach developed in Latin America that underscores the value of the integration of poetic work with scientific and philosophical research into education and conservation. Aguirre enriches the FEP methodology by incorporating hermeneutics—i.e., theory of text interpretation—with a dual purpose:

(i) to deconstruct a narrow economic-utilitarian rationality, which is not inherent to human nature but emerged in a particular historical and cultural context, and
(ii) to develop innovative practices of biocultural conservation that are informed scientifically and ethically, illustrated with examples from Mexico and Chile.

The arts and humanities also contribute to interdisciplinary research at sites of the US LTER network. Based on an extensive series of questionnaires, Lissy Goralnick et al. describe novel collaborations among ecologists, artists, writers, and philosophers to frame the stewardship discussion in a very different context, using multiple media to explore distinct ways to communicate concerns about Earth's future. They focus on empathy as a key element because empathy touches those scientists and students who have developed a commitment and sense of responsibility to stewardship. This focus coincides with one of the methodological elements highlighted by Aguirre regarding FEP, in resonance with the essay "Thinking like a Mountain," written by Aldo Leopold—another ESA president who articulated a stewardship ethic, as Callicott explains.

To achieve interdisciplinary work, Charles Redman and Thaddeus Miller emphasize the methodological importance of understanding the specific meanings of concepts used with contrasting connotations by different disciplines. They note that infrastructure has both technological and cultural implications. Within a new interdisciplinary framework, they propose that infrastructure should be considered in the context of three equally important domains: social, ecological, and technological/infrastructural systems (SETS).

Part II closes with two chapters that present case studies of interdisciplinary work in remote arid, rural Mediterranean, and urban ecosystems. Daniel Orenstein

and Elli Groner describe an LTER site on the border between Jordan and Israel that provides a venue for developing trust and collaborations in a politically contentious region of the world. They describe discussions about what kind of knowledge is important to local stakeholders. In some cases, experts can clarify which management actions should receive highest priority and which require either more research to fill knowledge gaps or greater dialogue to overcome gaps in values between locals and scientists. For example, the aesthetic value of landscapes often is more relevant to citizens and decision makers than to scientists. Orenstein and Groner propose a social-based research approach to ecosystem services within the LTSER platform that provides a framework for integrating the values and opinions of local communities into the local research and policy agenda. This social-based approach to ecosystem services assessment—which has proven to be a catalyst for constructive, community-level engagement—could be further applied within the Earth Stewardship initiative. Olga Barbosa and Paula Villagra highlight the relevance of combining bottom-up with top-down approaches. Capacity-building in local communities is as important as building relationships with regional and national government institutions and private business organizations.

In summary, Part II explores the integration of historical and cultural analyses, philosophical methodologies, and long-term socio-ecological research platforms, with practices that are essential for creating a stronger stewardship commitment that is conceptually grounded in diverse realities, and is relevant to addressing the practical issues faced by today's global and local societies. Effective approaches depend deeply on cultural context, requiring interdisciplinary exploration, study, partnership, and infrastructural implementation throughout the world.

1.3 Part III: Integrating Ecology and Ethics as a Foundation for Earth Stewardship Action

This final part introduces concepts, ongoing initiatives, and future perspectives for stewardship actions. Earth stewardship, as much citizenship, entails rights and responsibilities. Eugene Hargrove introduces the concept of Earth citizenship as a metaphor for an ecological governance of the planet as its capacity to support human life is pushed to the limits. Following Mark Sagoff, he contrasts the notions of *citizen* and *consumer.* Furthermore, Hargrove argues that stewardship has a religious connotation, whereas citizenship is religiously neutral, and therefore can be widely accepted across the many cultures of the world. Peter Taylor emphasizes the importance of engagement and participation of people, cultivating collaborators, transversality, and fostering curiosity for dynamic environmental planning and management. Engagement and participation of people also is central to the approach to protected areas taken by the International Union for Conservation of Nature (ICUN). Ernesto Enkerlin and collaborators introduce the "Promise of Sydney," the focus of the 2014 World Parks Congress in Australia, to emphasize that protected areas can be an effective strategy to put Earth stewardship into action. They argue that protected

areas not only are necessary for conservation aims, but they also contribute critically to human well-being and social justice in the Anthropocene.

Flavio Berchez and collaborators support ICUN's argument with experiences in South American Marine Protected Areas (MPA), where MPAs are essential for protecting biodiversity, informing policy making, managing coastal fisheries, and supporting ecological education and scientific tourism programs.[5] Berchez et al. indicate that to achieve these goals in MPAs it is imperative to include not only scientists, but also policy makers, teachers, and importantly, graduate students, a point that coincides with the perspective that Chapin et al. have for the ESA Earth Stewardship Initiative. However, socio-ecological problems are complex. Based on their experience in political sciences and global climate change in Brazil, Eduardo Viola and Larissa Basso underscore this complexity, and identify plutocratic regimes as a central problem: "economic sectors have excessive influence over governmental decision-making and the political system." A governance and ethical shift toward a low carbon economy and consciousness is required.

To achieve a change in global consciousness, religions are playing a major role. Uruguayan theologian Guillermo Kerber explains the Climate Initiative of the World Council of Churches, which brings together most of the Christian communities in more than 110 countries. Additionally, the Climate Initiative is an inter-faith effort including Buddhism, Hinduism, Judaism, and Islam. Kerber explains that the concept of Earth stewardship is at the core of religious messages.[6] These affirm that humans are not owners of the Earth, but rather care-takers of the Earth. This idea is shared by groups of Christians, Jews, and Muslims, who have come together to address the challenges of Global Climate Change. The role of religions in Earth Stewardship is further introduced by US theologian Mary Evelyn Tucker. She identifies six core values that are widely shared by religious traditions: *reverence*, *respect*, *restraint*, *redistribution*, *responsibility*, and *renewal*. These values were adopted by the Earth Charter initiative of the United Nations, matching them with six corresponding components for human-Earth flourishing: *cosmological context*, *ecological integrity*, *social equity*, *economic justice*, *democracy*, and *non-violence and peace*.

Dorothy Stang (1931–2005), a US Roman Catholic religious who in 1966 went to the Amazon, is portrayed by Roy May within a tradition of the Latin American

[5] The South American Marine Protected Areas framework is similar to the one developed in the US National Marine Protected Areas (MPAs) Center of the National Oceanic and Atmospheric Administration (NOOA) created in 2001. NOOA's MPA Center defines marine stewardship as "careful and responsible management to ensure goals and objectives are being achieved for the benefit of current and future generations." The MPA Center focuses its objectives on enhancing MPA stewardship by strengthening capacity for planning, management and evaluation. (http://marineprotectedareas.noaa.gov/sciencestewardship/)

[6] Since the recognition of the environmental crisis in the 1960s, Earth Stewardship has been a primary metaphor among Christian churches that have been concerned with sustainability and the wellbeing of life in the planet (see Ball et al. 1992; Northcott 1996; Hessel and Ruether 2000). A majority of Christian theologians, as well as lay thinkers have been supportive of a stewardship environmental ethic (see Berry 1981; Attfield 1983; Callicott 1994; Rasmussen 1996; Petrie 2000). However, some criticize the concept of stewardship as being anthropocentric and hierarchic (see Palmer 1992).

Church of non-violent and peaceful defense of social justice, and in recent years also environmental justice. This Latin American tradition began as early as the sixteenth century, with Bartolome de las Casas—a Dominican who undertook the role of "Protector of the Indians" in the Maya territories of southern Mexico and Central America. Today, this tradition of defending the culture and wellbeing of indigenous and other local communities has acquired a relevant role in Latin America and worldwide through liberation theology. Theological texts associated with Earth Stewardship concepts are grounded in peasant communities and indigenous cultures. Advocacy for the human rights of Brazilian peasants and indigenous people, and the fight to preserve the Amazon rainforest, were undertaken by one of the most important environmental leaders in South American history, Chico Mendes (1944–1985). Fábio Valenti Possamai and Fernando da Rocha portray the life and work Francisco "Chico" Alves Mendes Filho—a rubber tapper who became a grassroots union organizer—in counterpoint to Jose Lutzenberger (1926–2002)—a German-Brazilian agronomist, politician, and environmentalist who was appointed Minister for the Environment in Brazil in the early 1990s. Both made endurable contributions to the concept and implementation of sustainable extractive reserves in Amazonia.

The biographies of Stang, Mendes, and Lutzenberger are important for understanding the difficulties of implementing an Earth-stewardship environmental ethic. The first two were murdered for defending the poor and the Earth, while the latter was criticized harshly and finally marginalized by the Brazilian political establishment. Their lives teach us much about stewardship and what it may cost to practice it. They also teach us about the importance of transdisciplinary and international alliances. Frank Golley (1930–2006), an ecologist who served as president of the International Association of Ecology, the International Society of Tropical Ecology, and the Ecological Society of America (ESA), pioneered academic international networking, and recognized the great value of learning from other cultures and of involving different kinds of people in ecological research. Alan Covich, also a former president of the ESA, describes how Golley reached out far beyond the confines of his Georgia-based university. His academic interest integrated ecological sciences and environmental ethics; as a scientist his stewardship praxis was broad and deep. If we want to understand what stewardship means, we should review the lives of these and other people. They show us that Earth Stewardship is not only what we think and write about the Earth, but, foremost, what we do, individually and collectively, on behalf the Earth's creatures, its biocultural diversity, and its climate. They also reveal the essential role played by international collaborations and exchanges, by building institutional platforms, and by complementing disciplines and life experiences.

Earth Stewardship requires personal commitment and involvement. It is to do science and philosophy committed personally to the well-being of all the Earth's co-inhabitants—human and other-than-human—and to the biogeochemical processes that make life, as we know it and cherish it, possible on what Holmes Rolston calls "the home planet."[7] The lives of Golley, Stang, Mendes, and Lutzenberger

[7] See Rolston (2013).

make this evident. Personal commitment takes us beyond theory and puts us into practice, into actively practicing Earth Stewardship. It is a stimulating perspective because the viewpoint from personal involvement, commitment, and experience will shape not only the science, but the very philosophy of Earth Stewardship. Praxis integrates theory and practice, and in so doing transforms both. And both are needed. In this sense Earth Stewardship is praxis.

1.4 Concluding Remarks

Latent throughout this book is the importance of praxis, that is, the way people actively relate in and to the natural world. Research and ideas are necessary but not sufficient. Earth stewardship is not only an idea, but a way of co-inhabiting in the world.

Core ideas for Earth stewardship emerge from praxis, a praxis that is ancient and contemporary, collective and individual.

Ethical values, citizenship traditions, metaphors and poetic creativity, contemporary and traditional vernacular ecological knowledge, political ecology, institutional networks, local communities, and exemplary lives complement the scientific perspectives of the Earth Stewardship initiative.

The hybridization of disciplines and traditions will stimulate and strengthen a paradigm shift that fosters dynamic, intercultural, and interregional approaches to Earth Stewardship. The integration of ecology and ethics into Earth Stewardship inaugurates a new transdisciplinary stage of long-term socio-ecological research at a global scale, and a biocultural approach that includes all beings with whom humans co-inhabit the biosphere.

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