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Edited by Helen Kopnina and Eleanor Shoreman-Ouimet

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HISTORY AND SCOPE OF ENVIRONMENTAL ANTHROPOLOGY

Eduardo Brondízio, Ryan T. Adams, and Stefano Fiorini

Introduction

Environmental Anthropology is the general designation for the anthropological investigation of human–environment relationships. This area of research consists of a wide range of interests at various levels of analysis ranging from adaptation and resource management to environmental values and religion; from cognition and perception to global climate change; from conservation initiatives and their impacts upon populations to urban environments; from human rights and social justice to international agreements, and the list goes on. This rainbow of foci is the product of discussion, debate, and interdisciplinary cross-fertilization over the last 100 years, in the course of which paradigms have risen and fallen while the social, economic, and cultural context has shifted with respect to both the practice of anthropology and the nature of human–environment relationships.

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The aim of this chapter is to introduce and propose a historical chronology of the development of Environmental Anthropology. We start with a brief discussion about the evolution of terminology as applied to Environmental Anthropology and fields of specialization within it. We then highlight how different specialties developed – one dominated by an ecosystem-oriented approach, one by a political-economy-oriented approach, one by a historical-landscape approach, and another by a symbolic-oriented approach. We then discuss how these approaches developed with different degrees of overlap into the various specialties that comprise contemporary Environmental Anthropology. In doing so, we overview the history of Cultural Ecology, Ecological Anthropology, Political Ecology, Symbolic Ecology, Historical Ecology, and Ethnobiology.[1] We conclude by reflecting on the continuous challenge to overcome intellectual differences among these specialties, moving the discipline towards a new synthesis commensurable with the complexity of human–environment interactions in a world of accelerated and interconnected changes.

Historical view of Environmental Anthropology

As mentioned above, what we call Environmental Anthropology today is a product of research and cross-fertilization taking place since the beginning of the twentieth century (Figure 2.1). During this period, the nature of questions and problems has changed,

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specialized disciplinary communities have emerged, and with that new theoretical and methodological toolkits (Vaccaro *et al.* 2010). Environmental Anthropology as a term only gained popularity during the 1990s, providing a more inclusive umbrella to a diverse community of anthropologists at a time when heated and often unproductive debates dominated the field. Initially used in the United States, the term has since gained international usage. It is often used as a broader term when compared to Ecological Anthropology, although the latter is sometimes used as a proxy for Environmental Anthropology (Kottak 1999). In Europe, the term Anthropology of Nature continues to be used as a general designation for anthropological works on environmental issues. In the same way that Environmental Anthropology has served as an umbrella within Anthropology, Human Ecology has served this role for a larger interdisciplinary community, and it is still widely used to designate areas of research and also academic programmes, including some in Anthropology (Sponsel 2004). Similarly, Cultural Ecology is sometimes used in Anthropology as a general reference to human–environment studies and is a term some authors have suggested should not be abandoned (Netting 1968; Sutton and Anderson 2004).[2] Recognizing the ambiguities among these terms, this chapter unfolds the storyline of Environmental Anthropology. As Figure 2.1 indicates, we take as our starting point the formative period of the field within US Anthropology in the early twentieth century. Debates and theoretical-methodological developments during this period led to the evolution of Cultural Ecology in the 1950s. Subsequently, adding to the trends already recognized by Benjamin Orlove (1980) – i.e. ecosystem-oriented approach (neo-functionalist[3]) and political-economy-oriented approach (Marxian) – we introduce trends

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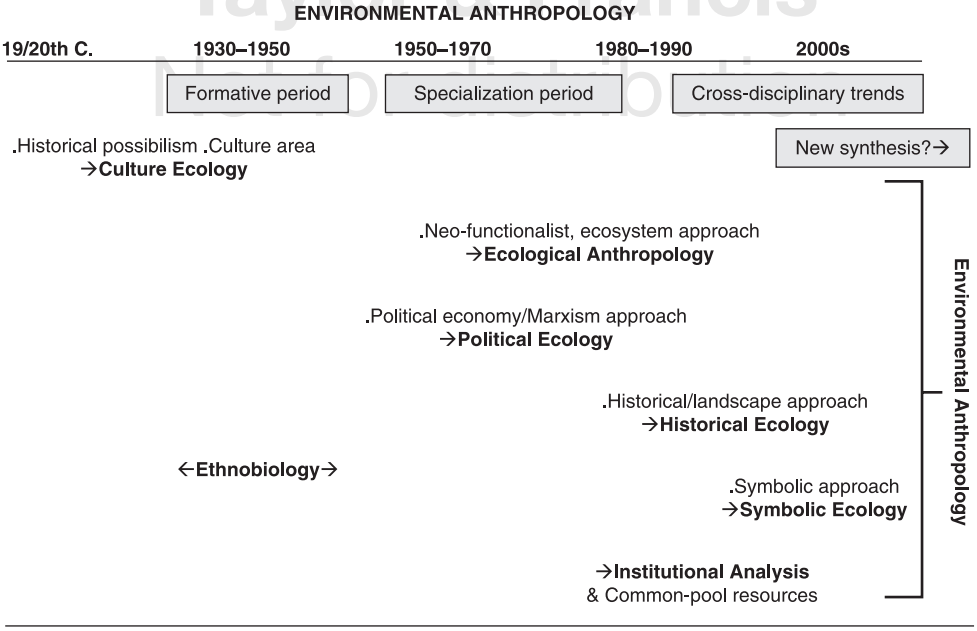

Figure 2.1 Historical timeline summarizing human–environment research in Anthropology and the emergence of Environmental Anthropology. As a term, Environmental Anthropology appears during the 1990s.

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that emphasize historical-landscape, symbolic-cosmological, ethnobiological, and institutional approaches.

Orlove identified intersections between the 1960s and the 1980s for a growing research community of anthropologists interested in human–environment research and those working within other disciplines on research that shared common methodologies or theoretical concerns, including Geography, Sociology, Ecology, Political Science, and so forth. From these intersections, Ecological Anthropology and Political Ecology emerged as research fields in their own rights. During the late 1980s, Symbolic Ecology and Historical Ecology appeared, bringing complementary perspectives to an expanding set of research questions and problems related to human–environmental issues. The former emphasized interpretive symbolic approaches and cosmological analysis, while the latter emphasized deeper timeframes and landscape-level analysis. Since the 1950s, however, Ethnobiology and related fields have evolved somewhat independently from anthropological debates related to the fields above. The same is true, albeit later (1980s) for the interdisciplinary field of Institutional Analysis and common-pool resources, which although independent, are increasingly important within Environmental Anthropology. In proposing this organization, however, we recognize the limitations of our interpretation to account for the development of fields such as Primate Ecology, Human Behavioural and Evolutionary Ecology, Spiritual Ecology, the Ecology of Conflict, and several others not covered here.

Cultural Ecology

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The field of Cultural Ecology is formally defined by Julian Steward's seminal book *Theory of Culture Change* (1955), although the term dates to his 1938 *Basin Plateau Aboriginal Sociopolitical Groups*. The history of the field, however, is rooted in debates dating back to the formative period of anthropology. Emerging as a discipline, the anthropology that nurtured Cultural Ecology was characterized by theoretical discussions among proponents of 'cultural evolutionism' in Europe and 'historical possibilism' in the United States. Cultural factors were deemed to determine the possibilities of human action in the latter approach. The works of US anthropologists Franz Boas (e.g. 1911) and Alfred Kroeber (e.g. 1939), including the analysis of cultural elements, traits, and the delineation of 'cultural areas' as organizing cultural-environmental units became the basis from which Cultural Ecology developed. The Boasian 'cultural possibilism' approach was, in part, a reaction against earlier evolutionary approaches (Morgan 1965 [1877]) and environmental determinism (Ratzel 1896), which postulated that the physical environment was conducive to, or limiting of, the development of culture and socio-political complexity. An emphasis on environmental determinism rendered the environment as a structuring and static constraint to humans' livelihood. In contrast, the 'culture area' was a cultural unit defined in relation to a biome (or environmental compartment) and described by a set of cultural and social elements associated with the material culture and forms of livelihood of different groups.

The collection of cultural characteristics observed and described by anthropologists allowed for comparisons of different cultural areas. This approach was furthered by Kroeber's work, *Cultural and Natural Areas of Native North America* (1939), and Steward's efforts with the *Handbook of South American Indians* (1939–1946). Among the elements needed for cross-cultural comparisons and applied to describe cultural groups and the landscapes of different parts of the Americas were habitat characteristics and population densities. This approach provided a rich collection of comparative ethnographic records on indigenous populations throughout the continent. Historical particularism and the 'culture area' approach stressed history and diffusion as forces of change (Harris 1968).

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This emphasis on culture areas was later advanced and challenged by two new evolutionary approaches: the unilinear evolution model of Leslie White and the multilinear evolution of Julian Steward (Nash 2014). White saw energy use and technology as the mechanism of cultural evolution (Bernard 2000); in this, change afforded increased ability to harness energy (White 1943, 1949). White's concern with energy re-emerged later in Ecological Anthropology in the attention that the 'ecosystem approach' paid to energy flow in ecosystems and caloric intake among indigenous groups and peasants. Steward's approach, avoiding both the extremes of Boasian historical particularism and White's unilinear evolutionism, provided the basis for much of what developed later in human–environment studies in Anthropology.

Steward focused his attention on cultural adaptation to the environment, identifying both functional, synchronic formulations of observed cultural features, and diachronic regularities in the ways people organize themselves, adapt to their environment, and use technology (Murphy 1981; Sponsel 1997; Kern 2003). The priority was to understand how localized forms of social organization relate to resource utilization processes (Moran 1990). He conceptualized a 'culture core' consisting of social and cultural features with more direct functional interrelationships with the local environment. He also recognized that these localized forms of social organization and adaptation are part of and influenced by higher levels of sociocultural integration (Steward 1955). For Steward, a multilinear framework rather than the unilinear evolutionary frameworks of his predecessors and contemporaries was better suited to the understanding of social and cultural change. A multilinear framework also allowed, more explicitly than Boasian cultural relativism and historical particularism, for understanding parallels of form and function in social-cultural change. Empirical at its core, Steward's Cultural Ecology focused on "conditions determining phenomena of limited occurrence" stressing that no cultural phenomenon is universal. This approach was intended to foster scientific investigations, hypothesis testing, and comparative analysis of cultural phenomena. Steward's Cultural Ecology has influenced a wide array of research questions and applications, contributing to generations of scholars examining human–environment interactions.

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Ecological Anthropology

Ecological Anthropology emerges during the mid-1960s (Vayda and Rappaport 1968), built upon Steward's Cultural Ecology, White's energy model, and the rise of the ecosystem approach. Moving away from the strong attention paid to culture, Ecological Anthropology includes a stronger engagement with ecosystem ecology and systems analysis with more meaningful attention to human communities functioning as a 'population' within a biophysical environment. The focus on ecosystem and population allowed Ecological Anthropology to open a dialogue with the biological sciences and systems theory based on shared terms and concepts, including the use of niche, ecosystem, natural disasters, adaptation, primary production, limiting factors, and energy and information flows in the works of many anthropologists.

Concepts related to ecosystem functioning became more widely adopted thanks to the work of Clifford Geertz, John Bennett, and Roy Rappaport along with Gregory Bateson. In particular, Bateson's influential collection of papers, *Steps to an Ecology of Mind* (1972), borrowed concepts from the scientific study of ecosystems, cybernetics, and general system theory, and were widely read, helping to establish the ecosystem concept in anthropology. In Geertz's (1963) *Agricultural Involution*, the ecosystem concept provided an organizing

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structure to analyze the role of historical and political factors to explain forms of agricultural change in different parts of Indonesia. Bennett's *Northern Plainsmen* (1969) drew the attention to the importance of regional studies and emphasized the role of socio-political and institutional adaptation, a theme he developed further in his classic *The Ecological Transition* (2005 [1976]), planting the seeds of what later became Historical Ecology. Along with the elements articulated in a seminal article by Vayda and Rappaport (1968), Rappaport's *Pigs for the Ancestors* (1968) marked (definitively and somewhat controversially) the assimilation of the ecosystem approach into Anthropology, and the full emergence of Ecological Anthropology. Rappaport achieved this by showing how a local population maintained homeostatic equilibrium with the environment through a ritual system that facilitated control of the pig population.

The criticism levelled at Rappaport and others for assuming conditions of homeostasis, equilibrium, and stability along with their strong bioenergetic emphasis characterized this period of the history of environmental studies in Anthropology. In Anthropology, critics focused on the misuse of equilibrium and carrying capacity assumptions and the limitations of the anthropological application of the ecosystem concept (Orlove 1980; Ellen 1982). Because this approach adopted scaled-down models based on a macro-level understanding of ecosystem functions that portrayed the ecosystem more as a biological unit decontextualized from social and political units rather than as a dynamic structure of relationships, it was limited in its ability to account for simultaneous cultural and environmental change.

Donald Hardesty's discussion of the ecosystem concept in *Ecological Anthropology* (1977), Emilio Moran's in *Human Adaptability* (see editions 1979, 2007), and Roy Ellen's in *Environment, Subsistence, and System* (1982) represented solid efforts among anthropologists to demonstrate the epistemological value of the application of ecosystem analysis in Ecological Anthropology and address the concerns noted above. Moran's and Ellen's views, in particular, reflected a general consensus that many of the tools provided by the ecosystem approach had tremendous utility despite the potential problems. They proposed separating ecosystem analysis from homeostatic models, and criticized energy flow models and ahistorical ecological analyses. The potential of an ecosystem approach without theoretical reductionism and which positioned anthropology within a wider interdisciplinary research agenda was still strong (Ellen 1982; Moran 1990; Rappaport 1990; Wilk 1991; Bates and Lees 1997). Examples of these criticisms and revision of the concept in anthropology can be followed in *The Ecosystem Approach in Anthropology* (Moran 1984, 1990).

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Following this revision, the emergence of a wider research agenda on the human dimensions of global environmental change led Anthropology, Geography, Ecology, and other fields to work together on new methodologies. The availability of new tools, such as satellite remote sensing, Geographic Information Systems (GIS), and modelling environments (e.g. agent-based modelling) resulted in new opportunities to integrate temporal and spatial scales (Brondízio and Van Holt 2014). Ethnographic approaches and survey instruments were combined with tools for spatial and temporal analysis to interpret changing local, regional, and global environments (Behrens 1994; Moran and Brondízio 2001; Castro *et al.* 2002). This made it possible to aggregate site-specific data, incorporate these data into a larger set of data from other scales, and observe the dynamics of ecological variables on multiple scales.

Ecological Anthropology has expanded considerably during the last three decades drawing from all sub-fields of anthropology (Sponsel 2004). As Biersack's "new ecologies" (1999) put it, the field has evolved (and matured), including a greater concern with symbolism and stronger emphasis on the historical, political, and economic contexts; bringing together interest in environmental values and religion, cultural construction of the environment

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(space and place), globalization and consumerism, tourism, gender and ethnicity, and human rights, as well as the human dimensions of global environmental change. Several research approaches illustrate these developments and their applications to different problems; for example, to the study of market impact on indigenous populations (Godoy *et al*. 2005), tropical deforestation and land use (Sponsel and Headland 1996; Nyerges and Green 2000; Brondízio 2006; Moran 2006), and climate anthropology (Nelson and Finan 2000; Orlove *et al*. 2000; Galvin *et al*. 2001; Magistro *et al*. 2001), among others. As Ecological Anthropology moved away from an overly deterministic and localized framework, political and historical approaches began to emerge in order to accurately frame explanations of the trajectories and outcomes of human–environment interactions.

Political Ecology

Interest in connecting local human–environment processes to the wider political economy paved the way for the emergence of Political Ecology, a term popularized by Wolf (1972). These linkages, however, started to be explored much earlier, for instance as part of the ambitious research programme led by Steward, *The People of Puerto Rico* project, or as part of the above cited work of Geertz in Indonesia. *The People of Puerto Rico* project, in particular, contributed to the expansion of research foci in space and time, as represented, for instance, in the works of Steward's students Eric Wolf and Sidney Mintz (among others) originating from the project. The project was an attempt to understand the cultural ecology of complex societies by building on the framework that was developed and tested on small-scale social groups. Wolf (1999: 44) described the shortcomings of the Cultural Ecology in *The People of Puerto Rico* (Steward 1956) as follows: "I would say that what Steward was primarily interested in was the social relations of work, to the considerable neglect of what Marxists call the social relations of production." This change in perspective called for understanding use of resources in terms of the complex economic and social dynamics resulting from historical processes and global interconnections (see e.g. Wolf 1966, 1982; Cole and Wolf 1974; Mintz 1985).

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Political Ecology tends to offer explanations in terms of the competing alliances of actors and accompanying structures as causes of the problems in environmental conditions and social justice (Little 1999). This approach has proven very flexible by adding political and institutional investigations to ecological studies in various contexts, but especially situations in which environmentalist interventions are prominent. Researchers sought to play down the role of ecological constraints to human adaptation over the primacy of political or economic forces in affecting the environment or changes in production systems. However, as some critics have pointed out (Vayda and Walters 1999), in many cases, this approach has led to a fairly typical storyline of capitalist forces usurping control of local resources, which leads to a decline in environmental quality and local prosperity.

Greenberg and Park (1994) in their introductory article for the first issue of the *Journal of Political Ecology*[4] perceived the roots of Political Ecology to lie in the Cultural Ecology of Julian Steward in combination with broader scholarship related to ecosystem ecology and political economy, in particular dependency theory and world systems theory. Nora Haenn (1997) has described how in actual practice, Political Ecology approaches tended to follow the powerful core to determine the actions of the weak periphery as delineated in Immanuel Wallerstein's (1974) World Systems Theory. In one of the seminal Political Ecology studies, Schmink and Wood showed how competing social actors (such as 'The Military', 'Colonists', 'Miners' and 'The Kayapó') battled over the control of resources in Southern Pará, Brazil.

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Their analysis was a careful examination of the multidimensional bases of power – physical, economic, political, ideological – and the strategies adopted by participants in specific conflicts constructed upon these bases of power.

> [T]he constitutive aspect of social process stresses the idea that both peasants and ranchers, in negotiating the contests that involved them and in the process of mobilizing the various sources of power at their disposal, continually reconstructed their respective interests, amending their strategies, bonds, and alliances accordingly.
>
> *(Schmink and Wood 1992: 17)*

Political Ecology and Institutional Analysis share some common interests and problems, but have evolved somewhat distinctively in their theoretical focus and methodological approach to examining those interests. While Political Ecology examines political explanations for behaviours that have an impact on the environment, Institutional Analysis is fundamentally concerned with factors affecting collective action, such as those related to the management of common-pool resources (Agrawal 2003; Acheson 2006). The field of Institutional Analysis emerged in reaction to an oversimplification of common-pool resources in an extremely influential paper by Hardin published in 1968 in the journal *Science*, entitled 'The tragedy of the commons'. Hardin (1968) claimed that the unsustainable exploitation of natural resources and environmental services, caused by an increase in population and maximization of per capita consumption in the absence of rules of use, could be controlled only through privatization or centralized government (Ostrom *et al.* 1999; Dietz *et al.* 2003).

Institutional analysis of empirical case studies based on ethnographic work carried out by anthropologists soon uncovered the existence of a variety of successful institutional arrangements for the management of natural resources (McCay and Acheson 1987; Ostrom 1990). This analysis not only revealed that humans were not inherently destructive of their environment or required to be subjected to external control, but able to engender forms of collective action to successfully manage common and public goods (see Ostrom 1990). Attention to common-pool resources occurred parallel to and in connection with the rise of indigenous and local social movements for the reclamation of access to resources. Building upon the now classic work of political scientist Elinor Ostrom and the Bloomington School of Political Economy (Ostrom 1990; Acheson 2011), this field has developed with a rare combination of theoretical concern (e.g. collective action, game theory) and applied contributions (Poteete *et al.* 2010). Several recent examples illustrate the productive engagement of anthropology with institutional research; for example, around conservation conflicts (Petursson and Vedeld 2015), fisheries and markets (Acheson 2003; McCay *et al.* 2014), co-management systems (Castro and McGraph 2003), and commodity markets (Tucker 2008), among others.

Vayda and Walters (1999) took the field of Political Ecology to task for being biased in favour of political explanations even when that was not the primary cause of an ecological event. They suggested that ecological events be given the central position in an analysis and that the true causes should then be pursued through progressive contextualization, a position Vayda had previously espoused (1983). Interestingly, some political ecologists now cite this article as presenting ecological causation as part of an expanding string of factors to be addressed in Political Ecology studies (Vasquez-Leon and Liverman 2004). This flexibility and receptivity to critiques perhaps originated from frustration with the bitter materialist/post-modernist debates that took place during most of the 1990s in the United States. As a consequence, the field of Political Ecology seemed to expand its areas and factors of investigation rather than engaging in contrasting debates with new approaches (Biersack and

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Greenberg 2006). Several new perspectives have emerged to broaden the scope of Political Ecology (Robbins 2012) to include cultured environmental perceptions (as described in Bryant 1998), local agency (Peluso 1991; Haenn 2002), emotions and beliefs (Anderson 1996), gender (Gezon 2002), discourse (Escobar 1996, 1999; Adger *et al.* 2001), event analysis (Penna-Firme 2012), and feminist perspectives (Rocheleau *et al.* 1997).[5] The intellectual challenge for Political Ecology is whether concern with the ecological context, political economy, social justice, and global environmental change can all be contained under a single rubric.

Symbolic Ecology and Environmentalism

In different ways, Strathern (1981), Ingold (1986, 2000), Descola (1994 [1986], 2013), Descola and Pálsson (1996), Latour (1993), Ellen and Fukui (1996) and Scoones (1999), among others, critiqued the materialistic thinking of Ecological Anthropology and Political Ecology, and cautioned against Ethnobiology's reproduction of Western concepts and taxonomies of nature, and the absence of ideational power relations in Institutional Analysis. Their critiques called attention to the social construction of the environment, for some as grounded in colonialist frameworks for science and Western perspectives on the environment. In contesting the culture/nature dichotomy, they called attention to alternative interpretations and ontologies of the environment. These debates have affected, albeit differently, each of the fields listed here. As suggested above, European Anthropology – as represented by Strathern, Ingold, Descola, Pálsson, Latour, Ellen, and Scoones, among others – played a central and fundamental role in the process, but this movement eventually found fertile ground in the United States as well (e.g. Biersack 1999).

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The re-conceptualization of Symbolic Ecology (Descola and Pálsson 1996) from its earlier traditions in Anthropology (for instance in Rappaport's *Pigs for the Ancestors*, 1968) occurred during a period of renewed interest and conceptual innovation in the study of human–environmental relationships. This period is marked by both a relativist concern with situated knowledge and contextualized cosmologies and a comparativist concern with forms of cognition and interactions with the environment (Descola 1996). Furthermore, as Philippe Descola puts it (1996: 18), "Rethinking the nature-society interface means rethinking Ecological Anthropology, in particular its notion of the relation between person and environment." The broader outcomes of these discussions, however, are aimed at developing a brand of Anthropology that refutes culture/nature and other dichotomist divides (Latour 1993; Descola and Pálsson 1996).

Revisiting the culture/nature dichotomy and its implications for a comparative understanding of human–environment relationships set the stage for rethinking Ecological Anthropology at a time when the discipline as a whole was engaged in debates about postmodernism. Thus, it provided a timely and influential contribution to the development of a more inclusive Environmental Anthropology such as we describe in this chapter. In many ways, it offered a nexus to disparate perspectives of human–environment analyses: materialist perspectives on the one side, Symbolic Anthropology and structuralism on the other. Both approaches, but Descola's model in particular, lead to provocative interpretations of the conservation movement and anticipated some key issues for the study of Environmentalism, as discussed below. As Descola puts it:

> Fetishing nature as a transcendental object, the control of which would be displaced from predatory capitalism to the rational management of modern ecological science,

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> the conservationist movement, far from questioning the foundation of Western cosmology, tends rather to perpetuate the ontological dualism typical of modern ideology.
>
> *(Descola 1996: 97)*

Another important contribution to this debate during the 1990s was the volume organized by Ellen and Fukui (1996), bringing together perspectives from Cognitive Anthropology and Ecological Anthropology, Biology, and general Ethnology. As Moran did in the 1980s (1990 [1984]) with a revision of the ecosystem concept, Ellen and Fukui (1996: 1) proposed a revision of "the concept of nature as an analytical device, and the way it features in anthropological explanation". They recognized that beyond accepting and understanding the cultural construction of nature, once a concept is deconstructed, the problem of how to move forward remains. As Ellen's comprehensive introduction puts it, "the real challenge is to examine the implications of such epistemological relativity for the objective practices of scientists of all kinds, and for those who attempt to build on these to implement change in the lives of people outside Academy" (1996: 1–2). Ellen recognizes that the culture/nature dichotomy is deeply embedded in anthropological history and that the disciplinary wars around the topic ended up reinforcing this dichotomy, saying (1996: 18): "Every social anthropologist who asserts that there is no need to take heed of biological explanation is re-asserting the nature-culture opposition, even if the terms are not used."

Ellen's concern is about the process of overcoming these divides rather than reinforcing them. He cites Robert Norgaard in noting that "it is always a synergy of the utilitarian and the aesthetics, the pragmatics and the symbolic, and knowledge of it can never be independent of relations with it" (Norgaard 1987: 118, cited in Ellen 1996: 12). In other words, and here he draws on Stephen Gould (1991), dichotomies may serve as an analytical framework where oppositions complement each other and as such can be useful or misleading, rather than true or false.

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During this period, synergistically related to these developments in ontology and Cognitive Anthropology and connected to Political Ecology, one sees a rise in anthropological studies of environmentalism. Kay Milton (1996) suggested that a focus on how culture shapes the social structure of human environmental values might lead to a better understanding of human–environment interaction. In particular, she calls for revealing how environmental values underlie decisions about the physical and economic organization of human activity and conservation efforts.

> It is not simply technology that determines the human impact on the environment, but a combination of technology with economic values, ethical standards, political ideologies, religious conventions, practical knowledge, the assumptions on which all these things are based and the activities that are generated by them.
>
> *(Milton 1996: 6)*

Others have taken this general approach to analyzing the social context of environmentalism, such as Walsh's ecotourism ethnography of local perceptions of Western models of environmentalism in Madagascar (Walsh 2005) and Harper's (2005) study of the environmental movement in Hungary. On a larger scale, Kempton *et al.* (1995) studied the ways that cultural models of nature lead to different perceptions of environmental problems in the United States. They combined survey and ethnographic approaches to examine broad patterns of environmental values and to understand current environmental problems.

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The intersection between environmentalism and indigenous/rural social movements has impacted research and policies in numerous ways during the past two decades. Anthropologists such as Charles Hale (2002, 2006) relate these interactions to a process they call 'neoliberal multiculturalism' (see also Brockington *et al.* 2008). Whether a result of global political dynamics, as these authors put it, or a convergence of historically independent regional social change, the 1990s witnessed the global boom in conservation areas, indigenous reserves, and the spread of eco-cultural tourism based on the value of indigeneity and traditionality bestowed on different places and groups. These issues are well represented in the review articles by West *et al.* (2006) and Dove (2006), focusing on people and parks and indigenous knowledge, respectively, as akin to globalization, both of which are related to the construction, popularization, and political appropriation of concepts such as biodiversity, traditionality, and sustainability. Elsewhere scholars have expanded on Foucault's concept of 'governmentality' (1991) to conceptualize 'environmentality' (Agrawal 2005), as when analyzing and criticizing the use of market-based conservation practices (Fletcher 2010; Buscher *et al.* 2012; Haenn *et al.* 2014; Adams 2015).

Productive new lines are emerging between Political and Symbolic Ecology as scholars examine interactions between practices associated with a Political Economy approach, with an examination of value systems, cultural constructions of meaning, and shifting narratives of development. For instance, Jeffrey Hoelle (2011, 2015) blends a political-economic analysis with a study of the cultural constructions of 'rainforest cowboy' identities to understand the growth and impact of cattle ranching on deforestation rates in Acre, Brazil.

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Historical Ecology

The inclusion of historical perspectives in Ecological Anthropology started in the 1970s and 1980s (Bennett 1976; Netting 1981) and provided opportunities for intra-disciplinary and interdisciplinary exchanges, alongside an engagement with contemporary debates about resource management and global change (Crumley 1994; Balée 2006)[6] In the early 1970s, Netting's study of a village in the Swiss Alps provided a long-term historical population record in a bounded geographic area (1981). These data and research conditions allowed for an accurate and diachronic linkage of population and landscape variables to test for the existence of long-term homeostatic equilibrium, as well as a connection between institutional arrangements and property systems interactions with biophysical conditions across landscapes. Although not always recognized as such, *Balancing on an Alp* (1981) represented a precursor to what was later called Historical Ecology – the historical analysis of the relationship between population and environment through the focus on landscapes (Crumley 1994; Headland 1997; Balée 1998, 2006).

In the edited volume, *Historical Ecology*, Crumley (1994) and the contributing authors intended to develop a "multiscalar temporal and spatial frame, with an explicit focus on the role of human cognition in the human-environment dialectic" (Crumley 1994: 5). The goal was to be obtained through the integration of documents, ethnographies, historical records, archaeological records, remote sensing and GIS. Historical Ecology emerged as a distinct "research program" focusing on deeper timeframes with the landscape as the organizing principle and unit of analysis. The landscape is seen as the material manifestation of the human–environment dialectical relationship (Crumley 1994; see also Winterhalder 1994).

The initial phases of this trend were supported by William Balée's work in the Amazon. He debunked a long-standing environmentally deterministic position in the debate about human–environment relations in the region with a well-constructed argument about the

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anthropogenic history of Amazonian forests and its biodiversity (Balée 1989). His definition of Historical Ecology has some contrasts with that used in the Crumley volume, in that it is more centred on humans than on landscapes, and on human action in historical sequences: "historical, not evolutionary, events are responsible for the principal changes in relationships between human societies and their immediate environments" (Balée 1998: 13). This view of Historical Ecology takes Balée close to the Boasians' and Goldenweiser's views of humans as makers of their own environment (Moran 2007). Balée's (1994, 2006) perspective takes the impact of human action and history on the environment as underwriting the landscape concept, and as such, finds synchrony with developments in Ethnobiology, Political Ecology, and Symbolic Ecology.

Balée and Crumley both agree, however, that 'landscape' can help to bridge the gap between social and life sciences concerned with human–environment interactions (Balée 1998). Landscape approaches have allowed researchers to examine important aspects of human–environment interaction by looking at the relationship between the environment and the way people draw meaning from it. In *The Anthropology of Landscape*, Hirsch and O'Hanlon (1995) suggested that the concept of landscape might be useful in understanding how cultural processes shaped the ways that people related to socially constructed images of spaces with internally constructed and localized representations of places. For instance, in the Brazilian Amazon, as new landscapes related to the large-scale production of soybeans replace a mosaic of ranches and small-scale farms, the experience and representation of the new landscape, mediated with technology, creates social conditions that may reduce the sensitivity of landowners to local environmental changes (Adams 2008). The act of 'placemaking' was seen as a way in which spaces were rendered as meaningful through material and non-material experiences, such as perception and narration (Gow 1995; Hirsch and O'Hanlon 1995; Schama 1995), not unlike the concept of 'dwelling' and 'skills' proposed by Tim Ingold to discuss the social construction of landscapes (2000).

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In addition to landscape, deeper timeframes have helped to define Historical Ecology. As Charles Redman (1999: xiii) suggests, "I see the contemporary political and economic situation as being the end product of thousands of years of a slowly changing, fundamentally similar set of human-environmental interactions." This point resonates with the prehistoric work in Kirch and Hunt's edited volume (1997). William Denevan's article 'The pristine myth – the landscape of the Americas in 1492' illustrates that human populations everywhere have manipulated their environments with diverse outcomes, and that an unmanaged environment is not necessarily synonymous with ecological health (Denevan 1992; Redman 1999).

The research within Environmental History carried out by Alfred Crosby (1986) and William Cronon (1983) explored the importance of changing landscapes (for example, the changing context of weeds and diseases) as primers of European expansion and social change. Environmental History has also continued to receive the renewed attention of anthropologists, as illustrated in the work of Alf Hornborg *et al.* (2007). Their work, *Rethinking Environmental History: World-system History and Global Environmental Change*, explores the rich theoretical territory at the intersection of Environmental History and Political Economy. Historical ecological frameworks with a focus on population (e.g. Viazzo 1989) have also represented fertile ground for contributing to biocultural approaches to the study of ethnic groups, providing, for example, a critical outlook to population units adopted in bio-anthropological investigations (Fiorini *et al.* 2007).

The methodological integration found in the Historical Ecology trend contributes to the ability of Environmental Anthropology to address holistically the study of human societies,

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cultures, and environments, including the analysis of current land-use change (Brondízio 2006). The macroscopic conceptual frame to our understanding of human–environment relationships adds essential historical depth to observed changes in those relationships and the multi-layered systems of meaning and value that can underlie the human relationships with specific landscapes.

Ethnobiology and related fields

Ethnobiology has been an intrinsic part of many of the paradigms discussed above for the last half century. While already practised in some way at least since the 1920s, Ethnobiology evolved particularly since the 1950s by combining the analysis of language structure, lexicon, perception and conception (cognitive environment) with the analysis of resource management (behavioural environment) (e.g. Frake 1962). Ethnobiology and related fields developed relatively independently from, but nonetheless closely associated with, Cultural Ecology (Conklin 1954; Johnson 1974). For instance, Harold Conklin's studies of the ethnoecology of shifting cultivators (1961) provided much of the basis for studies on agricultural production systems.

The earliest root to Ethnobiology comes from Ethnobotany, which encompassed the study of people–plant relationships. The term was utilized to describe the use of plants (largely in an archaeological context) by indigenous people at the end of the nineteenth century and was already an active field during the first half of the twentieth century (see Ford 1978; Schultes and Von Reis 1995). The confluence and overlap of terminology (ethnobiology, ethnoecology, ethnobotany, ethnozoology, etc.) continues to the present day. For this reason, and unless specified, we have selected Ethnobiology as a general term to represent this field.

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During the 1960s, controversies and criticism emerged relating to the insufficiency of links between the cognitive domain and behaviour in ethnobiological data; that is, how people behave in relationship to what they say (Burling 1964). However, with the development of more complex methods, both in terms of systematic observations and linguistic analysis (Frake 1962; Sturtevant 1964), Ethnobiology became an important method for those practising Cultural Ecology.

At this point, it is useful to distinguish three complementary trends that developed in the field: universalism, particularism, and applied Ethnobiology (see also Ellen 2006 who uses a different terminology). During the 1960s, while most of the field continued in a particularist tradition concerned with assessment of knowledge systems, resource management, and material culture of specific groups and environments, some started to focus attention on the study of generalized systems of cognition and classificatory universals (Berlin *et al.* 1968). In the late 1960s and 1970s, important work in folk systematics and taxonomies contributed to understanding the general principles of cognitive models and folk classification relative to formal biological taxonomies (Berlin *et al.* 1973; Berlin *et al.* 1966, 1974; Johnson 1971, 1972), setting the stage for ethnoecology beyond descriptions of folk classification systems in its explanation of cognitive patterns of biological classification and behavioural practices.

Applied Ethnobiology emerges during the 1980s and 1990s with a focus on various aspects of resource management systems and economic development, particularly contesting and proposing alternatives to development (Posey *et al.* 1984; Posey and Overal 1990; Escobar 1998) and calling attention to issues of intellectual property rights (Posey 1990; Brush and Stabinsky 1997), cultural memory and biodiversity conservation (Nazarea 2006). Building upon a long-term research programme, the seminal work of Brent Berlin – *Ethnobiological*

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Classification (1992) – provided a generalizable conceptual framework for the field by presenting a formal interpretation of classification principles in traditional societies parallel to scientific taxonomic principles (Hunn 2007).

Ethnobiology and related fields were concerned with contributing to new alternatives for resource management (e.g. alternatives to deforestation) and informing debates about agricultural development issues (e.g. local production systems), with anthropologists contributing to studies of biodiversity and agrodiversity (Orlove and Brush 1996; Nazarea 1998; Maffi 2001). The abundance of work in the tropics created a new framework and environmental discourse for indigenous communities to propose a sustainable development perspective to those engaged in debates about resource management and to advocate for the potential benefits in opening new markets for non-timber forest products (Balick 1987; Denevan and Padoch 1987; Posey *et al*. 1984; Prance *et al*. 1984; Bennett 1992). Following on Conklin's tradition, this line of work has been important within the agricultural intensification debate (Boserup 1965) and the analysis of agricultural cycle, thus providing a new appreciation for the productivity of indigenous and local production systems (Brondízio and Siqueira 1997).

As illustrated by Balée's *Footprints in the Forest* (1994), Ethnobiology and related fields have fulfilled an important role by bridging environmental approaches within and beyond anthropology and have provided many conceptual and methodological tools essential to Ecological Anthropology in general, and Historical Ecology in particular. Ethnobiology gave additional tools to Historical Ecology to move beyond the culture/nature dichotomy and adaptationist approaches. It has helped to overcome the deterministic role of the environment in cultural ecology models by presenting a more active role for human understanding and transformation of the environment.

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The valorization of indigenous and local knowledge emphasized through Ethnobiology, as well as the way anthropologists became ethically and practically engaged as advocates, contributed to the establishment of an alliance between indigenous-rights advocates, indigenous communities, and the environmental movement around issues of deforestation and resource depletion (Posey *et al*. 1984, Conklin and Graham 1995; Dove 2006). This process facilitated a convergence between indigenous and peasant social movements fighting for land rights, and the environmental movement confronting development policies. Increasingly, however, local knowledge became idealized and romanticized. An expectation developed among some activists that indigenous and peasant people would behave in ways seen as environmentally responsible by environmentalists, as though they were disconnected from political and economic forces (Tsing 1999). This revival of the 'noble savage' image (Dove 2006; Hames 2007) and the formal designation of 'traditional populations' (Hanazaki *et al*. 2007) as a quasi-ethnic category (e.g. Brazil) served important political roles in pursuit of the peasant and indigenous communities' goals (e.g. land demarcation and rights to access resources), but it came at a cost of [mis]representation (Dove 2006).

During the 1990s and 2000s, the economic potential for bio-prospecting (sampling plant pharmaceutical compounds based on local practices of use) created a dilemma and led to criticism of Ethnobiology. Ethnobiologists (and anthropologists in general) often mediated the interaction of governments, communities, and pharmaceutical companies, despite the lack of cultural and legal frameworks for access to benefits and an equitable distribution of profits for local communities (Brush and Stabinsky 1997). The field became politically and legally sensitive due to pressures from social movements, the popular spread of the idea of 'bio-piracy', and legislation imposed to control access to local knowledge and biological resources, even though those within the ethnobiological research community were generally quite concerned about ensuring ethical research practices (e.g. Posey and Overal 1990). The

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over-emphasis on the value of knowledge and the perception that biological resources are 'property' have contributed to an increase in competition for resource ownership, commodification of ethnicity, and monetarization within and between indigenous groups (Comaroff and Comaroff 2008). These experiences echo an earlier pattern we illustrated in regard to anthropological studies of environmentalism. Despite these concerns, Ethnobiology continues to evolve, with new areas of research addressing contemporary issues, including research among urbanized and industrialized populations (Viladrich 2006), a growing attention to cultural change, cognition, and cultural consensus analysis (Reyes-Garcia *et al.* 2003; Ross *et al.* 2003), inter-generational change and transmission of knowledge (Zarger and Stepp 2004), cultural memory (Nazarea 2006), globalization and markets (Brondízio 2008), and agrodiversity and social networks (Emperaire and Peroni 2007), among others.

Concluding remarks

The predominant inductive approach of Anthropology has represented a continuous challenge to the rise of dominating theoretical frameworks. Thus, whenever a paradigm emerged to facilitate the explanation of a certain relationship, the potential for new interpretations could arise in contestation (for example, the shifts following Steward's Puerto Rico Project, or the challenge that political-historical factors provided to the ecosystem approach). Hence, tensions at the theoretical level arise regularly in relation to findings from empirical case studies. Environmental Anthropology, as an overarching term widely used today has arisen as a conceptual category above tensions between theoretical frameworks, and is indicative of a more inclusive field of study for diverse perspectives on human–environment interaction as well as various types of engagement with environmental and societal problems.

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Environmental Anthropology has been shaped by debates about the relative balance of environmental, cultural, political, and historical factors in providing meaningful explanations to human–environment interaction without resorting to determinism. As a consequence, it has served to reconcile contrasting perspectives and accommodate diverse specialties within the discipline. On the other hand, it continues to face the challenge of integrating these approaches into a new synthesis able to provide a useful understanding of the growing complexity of human–environment interactions within an ever-changing world, thereby contributing to our understanding of alternative models of socio-economic development and environmental sustainability more broadly. The challenge ahead for environmental anthropologists is to continue to be inclusive and reflexive in order to contribute and learn from a broad and growing community interested in understanding the relationship between people and the environment. At the same time, the field must reunite its rich array of specialties into cohesive frameworks able to productively position Anthropology within the broader discussions of human–environment interactions and global change today and in the future.

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Notes

1 In presenting these fields, we recognize that all of them extend and include wider interdisciplinary communities spanning many disciplines. Their inclusion as part of this review recognizes their roots and/or history within Anthropology and their current critical mass of scholarship in the discipline.

2 Cultural Ecology and Political Ecology are very active fields, particularly in Geography. Illustrative of the cross-fertilization between Anthropology and Geography, the Association of American Geographers offers an annual award in Cultural Ecology named after anthropologist Robert Netting.

3 Using Benjamin Orlove's definition of the term (1980: 240): "The term neo-functionalism is used because the followers of this approach see the social organization and culture of specific populations as functional adaptations which permit the populations to exploit their environments successfully without exceeding their carrying capacity."

4 While the *Journal of Political Ecology* is commonly referred to as the first academic publication dedicated to the field, an earlier and still active journal of similar name (*Revista Ecología Política*) has been published in Spain since 1991 (www.ecologiapolitica.info/ep/anteriores.htm).

5 Latour (2004) took issue with the culture/nature dichotomy perspective perpetuated in Political Ecology and argued for a Political Ecology closer to a philosophy of science and politics, although his use of the term Political Ecology seems to differ from that presented here (2004: 8).

6 William Balée (foreword of the 1998 volume *Advances in Historical Ecology*) refers to Carol Crumley's genealogy of the term, beginning with anthropologist Edward S. Deevey (University of Florida) in 1976 and later (1980) in an interdisciplinary collection entitled *Historical Ecology: Essays on Environmental and Social Change* organized by historian Lester J. Bilsky.

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