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Political ecology

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Political ecology is a critical research field within anthropology and related disciplines that examines how and why economic structures and power relations drive environmental change in an increasingly interconnected world. Initially it was most well-known for investigating the practices and impacts of large-scale resource development projects in subsistence-oriented communities in the Global South. Over time, political ecology has expanded its research trajectory to include analyses of environmental politics and socio-ecological degradation in urban, industrialised settings as well. This entry outlines the historical development of political ecology in order to understand the bases for its common theoretical assumptions, research themes, methodological approaches, and sources of critique. In doing so, it provides particular insight into the important ways that anthropologists have influenced, and been influenced by, political ecology. Though individual research interests and emphases have expanded since the early days of political ecology, the field continues to provide a valuable means for tracing the broader structural forces of socio-ecological change to a thorough understanding of the impacts and responses to that change at the local level. Yet, as an inherently interdisciplinary field, the challenge for political ecology continues to revolve around properly integrating its various disciplinary interests and influences into a consistent framework capable of analysing political, cultural, and ecological matters with sufficient rigor. Political ecologists' on-going efforts to meet this challenge have never been more important than they are today, as the world increasingly struggles with interrelated issues such as global climate change, industrial pollution, resource degradation, economic dispossession, and changing patterns of environmental health.

Introduction

Political ecology is a critical research field within anthropology, geography, and related disciplines that has become well known for its analyses of how and why structural forces, such as capitalist economic processes and power relations, drive environmental change in an increasingly interconnected world (see Biersack & Greenberg 2006; Blaikie & Brookfield 1987; Paulson & Gezon 2005; Peet *et al.* 2011; Perrault *et al.* 2015; Robbins 2019). Emerging in the context of global neoliberalisation in the 1970s and 1980s, political ecology emphasised the key role of outside forces like international development and economic modernisation schemes in the restructuring of local lives and environments in the Global South. As such, the field has often been associated with interdisciplinary studies of environmental change and livelihood loss in the context of transnational mining, logging, agricultural conversion, and nature conservation projects in developing countries. Political Ecology tends to foreground the role of capitalist markets and state forces in such processes of local dispossession and environmental disruption. Hence, it provides an important counter to earlier Malthusian arguments that centred the blame for environmental degradation and food insecurity on growing human populations outstripping the sustainable use of resources (e.g. Ehrlich 1968; Hardin 1968). Since the 1970s, the research trajectory of political ecology has evolved from its initial focus

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on rural lives and landscapes, to include concerns with issues of environmental politics and socio-ecological relationships in urban, industrialised settings as well. In all these contexts, political ecologists have commonly asked: whose use of, claims to, and/or perceptions of the environment prevail, and why? (Karlsson 2015: 350). Thereby, they attempt to understand the central relationships between environmental degradation and social marginalization, the causes of environmental conflicts over changing patterns of access to and control of resources, and the fundamental connections between place, identity, and social movements (Robbins 2019).

This entry traces the historical development of political ecology in order to understand the bases for its common theoretical assumptions, research themes, methodological approaches, and sources of critique. In doing so, it provides particular insight into the important ways that anthropologists have influenced, and been influenced by, political ecology. Though research interests and emphases have expanded since the early days of political ecology, the field continues to provide a valuable means for tracing the broader structural forces of socio-ecological change to a thorough understanding of the impacts and responses to that change at the local level. Yet, as an inherently interdisciplinary field, the challenge for political ecology continues to revolve around properly integrating its various disciplinary interests and influences into a consistent framework capable of analysing matters of both the political and the ecological with sufficient rigor (Paulson *et al.* 2003; Walker 2005; Bridge *et al.* 2015). On-going scholarly efforts to meet this challenge have never been more important than they are today, as the world increasingly struggles with interrelated issues such as global climate change, industrial pollution, resource degradation, economic dispossession, and changing patterns of environmental health.

Historical antecedents to political ecology

Many scholars locate the foundation of both environmental anthropology and political ecology in the research of Julian Steward (Gezon & Paulson 2005; Jacka 2015; Robbins 2004). From the 1920s through the 1950s, Steward worked within the subfields of cultural anthropology and archaeology, developing a research framework that he called ‘cultural ecology’. Cultural ecology sought to explain human social organisation as a functional adaptation to local environments and requisite subsistence practices (e.g. Steward 1937, 1955). For example, Steward argued that in the context of the harsh environment of the American Southwest, regular bouts of food and water shortage had forced smaller bands of Desert Cahuilla hunter-gatherers to separate from larger groups in order to find necessary resources (1937). Over time, some of these divisions became stable and ceremonially important. Such data formed the basis for Steward’s assertion that the human relationship to the environment was more important and more logical in structuring cultural patterns of kinship descent and residence than diffusion of these patterns from other, independent societies (1937).

Accordingly, Steward argued ‘those features which are most closely related to subsistence activities and

economic arrangements' constitute the 'culture core' of any particular society (1955: 37). It was this culture core that combined with the contingencies of historical circumstance to structure the largely symbolic 'secondary features' of a culture like ideology and religion. In this way, cultural ecologists argued that human interaction with nature through different forms of subsistence labour provided a directing influence on the social order (Robbins 2004: 30). Overall, like the work of geographer Carl Sauer (1965), Steward's assertion that cultural groups should be studied as forces that both shape, and are shaped by, their environment represented a significant theoretical contribution for the environmental social sciences. Likewise, the effort to understand adaptation toward functional stability within bounded groups would remain a key theoretical conviction for years to come (see Walker 2005; Watts 2015).

Cultural ecology was also significant because it reflected the growing influence of Marxist thought within anthropology, which would subsequently become more elaborated in the work of political ecologists. Steward's 'culture core' was roughly analogous to the Marxist idea of the 'material base', and his 'secondary features' approximated the Marxist concept of an 'ideological superstructure'. Like Steward (1955), Karl Marx (see also Foster 2000) had previously argued that human labour processes were key to understanding the relationship between nature and culture:

> Labour is, in the first place, a process in which both man [sic] and nature participate, and in which man of his own accord starts, regulates, and controls the material re-actions between himself and nature. He opposes himself to nature as one of her [sic] own forces, setting in motion arms and legs, head and hands, the natural forces of his body, in order to appropriate nature's productions in a form adapted to his own wants. By thus acting on the external world and changing it, he at the same time changes his own nature (1889: 156-7).

Marxist theory influenced cultural ecology's materialist emphasis in the examination of human-ecological systems. However, cultural ecologists tended not to expand these insights to analyse the ways in which broader social and economic relationships between human groups might influence environmental and economic change. Cultural ecology's emphasis remained on subsistence as a creative process of local cultural adaptation and evolution (see Orlove 1980; Walker 2005; Watts 2015). Within anthropology, individual cultures continued to be viewed as largely homogenous and relatively bounded entities, in a way that precluded sustained investigation of intergroup relationships and patterns of change. Therefore, cultural ecology and related predecessors of political ecology eventually faltered on their inability to account for and understand human-ecological change in a complex, global economy (Robbins 2004). Future research would also emphasise the need to provide more holistic accounts of the symbolic and material dimensions of human-ecological relationships. Even so, much of this work continued to pay insufficient attention to the broader, structural relationships of political economic influence that were becoming increasingly important at the time – particularly within developing economies (Bridge *et al.* 2015). Anthropology, overall, had not yet developed a sophisticated means for accounting for the types of social

interactions that were often on display in processes of political transformation and transnational development.

From cultures to ecosystems

One important anthropological research effort that aimed to better integrate the symbolic and material aspects of the human relationship to the environment was a body of work developed by Roy Rappaport, which came to be known as 'new ecology' (1967, 1968, 1971, 1984). Rappaport's early work among the Tsembaga Maring, a group of horticulturists living in Highlands Papua New Guinea, was more interdisciplinary than previous efforts within environmental anthropology. It was strongly influenced by ideas from ecology, biology, nutritional science, and systems theory[iii] (Biersack 1999; Dove 2006; Kottak 1999). Over time, this penchant for borrowing from other disciplines would provide a key basis for the development of political ecology as a whole (Walker 2005). Rappaport was inspired by emerging work in ecology (e.g. Odum 1969) to use new units of analysis in his anthropological research. Against Stewardian cultural ecology that took cultures as the proper unit of analysis, Rappaport's 'new ecology' would focus on populations in the ecological sense, as one of the many components within a bounded, interdependent system of energy transfer and nutrient cycling (Biersack 1999: 5). Rappaport argued that this approach allowed him to analyse numerous human, plant, and non-human animal populations as commensurable units within the same research framework (Rappaport 1990). Human populations, like populations of plants and animals, were just material sub-components of a larger regional ecosystem. Culture was the symbolic tool that allowed these human populations to adapt to that ecosystem (Rappaport 1990). The key to understanding the overall functioning of such an ecosystem was to properly examine the structures and relationships between its various material and symbolic sub-components (Rappaport 1968; also Biersack 2006).

Accordingly, one of the most influential and lasting contributions of Rappaport's work was his argument that ritual could serve a principal role in the regulation of human-ecological systems (Biersack 2006; Jacka 2015). Specifically, Rappaport acknowledged (1967, 1968, 1984) that the Tsembaga Maring viewed their 'kaiko' pig killing ritual as a way to maintain social relationships of reciprocity with ancestral spirits and allies who had previously assisted them in times of war. However, he argued that the ultimate function of the ritual was to maintain the sustainability of the regional ecosystem by regulating population sizes of humans and pigs, conserving wild game, mitigating warfare, and regularly redistributing agricultural lands and other goods between human groups.

In many ways, the interdisciplinary influences that inspired Rappaport to make this argument about the functional role of ritual simultaneously constituted the greatest strength and the greatest weakness of his work (Biersack 2006; Jacka 2015; Watts 2015). These influences allowed him to introduce a more explicitly

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ecological framework, methodology, and focus within environmental anthropology. However, they also opened Rappaport to critiques of overcorrection. In the years following the publication of Rappaport's (1968; republished in 1984) book *Pigs for the ancestors*, he was charged with accusations of 'vulgar materialism' (Friedman 1974) and 'ecology fetishism' (Sahlins 1976). Critics suggested that his analysis of cultures as functional tools of human populations within bounded, self-regulated ecosystems may have blinded him to alternative explanations (Rappaport 1984; also Biersack 1999; Kottak 1999). Rappaport, like Steward, was also critiqued for paying insufficient attention to the broader historical and political economic relationships that were also influencing human-ecological processes among the Tsembaga Maring at the time (Rappaport 1984; also Biersack 2006). His critics held that environmental anthropology was focused 'too narrowly on the local to the exclusion of the dynamics of colonialism and the encroachment of a global capitalist economy' (Paulson *et al.* 2003: 207). Indeed, such increased attention to structural inequalities and the possibilities and processes of maladaptation that such inequalities necessitated was one of the defining features of the rise of political ecology (see Walker 2005; Watts 2015). Heavily influenced by Marxist theory and critical development studies, political ecology would come to emphasise the role of political economy as a force of socio-ecological change in an increasingly neoliberal world (Greenberg & Park 1994). The historical significance of colonialism, continuing reduction of global trade barriers, and the impact of broad, free-market economic restructurings of social and environmental policies within developing countries, could no longer be downplayed.

Political ecology comes of age: expanding the scales of analysis

The anthropologist Eric Wolf (1972) is generally recognised as the first scholar to coin the term 'political ecology', having done so in an article about the dynamics of land and resource ownership in the Swiss Alps. As Lisa Gezon and Susan Paulson note, it makes sense that a former student of Julian Steward's would go on to 'develop a powerful analytic framework linking ecological with political-economic phenomena across diverse scales of action and analysis' (2005: 8). Significantly, Wolf argues:

> Capitalism progresses through the employment of jural rules of ownership to strip the laborer of his means of production and to deny him access to the product of his labor. The local rules of ownership and inheritance are thus not simply norms for the allocation of rights and obligations among a given population, but mechanisms which mediate between the pressures emanating from larger society and the exigencies of the local ecosystem (1972: 202).

Yet, it may be more appropriate to argue that Wolf suggested this powerful analytic framework without fully developing it or specifically defining what it might become. The term 'political ecology' only appears in the title of Wolf's 1972 article, and not within the body of the text. Wolf's subsequent work in books, such as *Europe and the people without history* (1982), however, proved to be a seminal force in highlighting the significance of global capitalist processes to local human cultures and environments. In it,

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he illustrated how historical processes of European colonisation and expansion into the Global South in pursuit of valuable raw materials had resulted in the creation of a world economic system that impacted even the most remote people and places (Karlsson 2015). Along with the efforts of other anthropologists like Sidney Mintz (1985), William Roseberry (1983), and June Nash (1993), such work emphasised the importance of intergroup connections within the overall structure of a world economy tied together by the pursuit of valuable, limited resources. These insights would become central theoretical tenets within the mature 'structural political ecology' of the 1980s, which solidified around studies of socioeconomic 'modernization' efforts in supposedly underdeveloped countries (Walker 2005). Within structural political ecology:

> [q]uestions about the social relations of [economic] production and about access and control over resources – the basic toolkit of political economy – were applied in efforts to understand forms of environmental disturbance and degradation and to develop models for environmental rehabilitation, conservation, and environmentally sustainable alternatives (Paulson *et al*. 2003: 206).

This first generation of political ecology was heavily influenced by the Marxist principles of dependency theory/world system theory (Frank 1989; Wallerstein 1974). Here, critical development scholars like Andre Gunder Frank and Immanuel Wallerstein argued that underdevelopment did not actually represent an earlier stage in a country's evolution towards high consumer capitalism and representative democracy, but rather a continuing process that was in fact required by the contradictions inherent in the modern capitalist world system. Underdeveloped regions were essential to the maintenance of global capitalism because they served as 'sources of cheap or strategic raw materials, markets for manufactured goods, outlets for excess capital, and/or places where super-profits could be derived from super-exploitation of poorly paid workers' (Edelman & Haugerud 2005: 11). Developing countries, therefore, were integrated into this world economy as 'satellites', performing limited and/or unsustainable economic activities for the developed, 'metropole' countries (Frank 1989). It was this role within the world economy that kept these satellites underdeveloped, as they were structurally dependent upon foreign capital and external markets for economic viability (Frank 1989).

The implication for political ecology was that 'the local was subordinated to a global system of power relations and must be understood entirely with respect to that subjection, in terms of what is commonly referred to as capitalist penetration and its effects' (Biersack 2006: 9). Such studies often focused on the effects of colonialism and development policies in the Global South. They centred on the ways in which unequal power relations created conflicts in access to, and control of, land and resources in times of intense economic change (e.g. Blaikie 1985; Little *et al*. 1987; Peluso 1992). Works such as Piers Blaikie and Harold Brookfield's (1987) edited volume *Land degradation and society*, linked the marginalisation of farmers, shifting cultivators, and hunter-gatherers to state enclosures of commons resources for the purposes of market production. Such research highlighted how Indigenous and other politically marginal

groups tended to be disproportionately disadvantaged by the large-scale environmental changes often associated with capitalist development processes. In these contexts, it no longer made sense to conceive of local cultures and environments as bounded, or humans' relationship with nature as intrinsically adaptive. Environmental degradation was a problem grounded in social inequalities among and between groups (Harvey 1974). As the anthropologist Michael Dove would learn from his long-term studies among Indonesian shifting cultivators:

> [t]he nature of the relationship between forest degradation and underdevelopment of forest peoples is the reverse of that which is commonly claimed: forests are not degraded because forest peoples are impoverished; rather, forest peoples are impoverished by the degradation of their forests and other resources by external forces (1993: 21).

Political ecology, therefore, would strive to productively combine insights and methods from the social and environmental sciences to show how environmental degradation was 'both a result of and a cause of social marginalization' (Blaikie & Brookfield 1987: 23).

To better explain the specific processes and outcomes of such environmental change, Blaikie and Brookfield (1987), recommended a regionally focused methodology that would connect multiple scales of analysis. They argued that political ecologists should start their research by studying local-level land users and their relation with the land, before branching out to examine their relationships with each other and groups within the wider society. Eventually, the last links in this chain of analysis required integrating an understanding of how state policies and global economic processes were affecting local environmental conditions and resource use practices (Blaikie & Brookfield 1987: 1-37). Along with historical contextualisation, this commitment to connecting the local, regional, and global scales of analysis has become one of the key methodological principles of political ecology that ties it together as a field (Neumann 1992). Significantly, this methodological improvement also separates political ecology from earlier traditions within environmental anthropology (Biersack & Greenberg 2006; Gezon & Paulson 2005).

In the 1990s, however, this initial form of structural political ecology would be critiqued for the ways in which it conceptualised global capitalism, the state, and related multinational development processes as relatively unchecked forces that seemed to have intentionality (e.g. Moore 1993). Thinking of capitalism as a monolithic structure bore a striking resemblance to earlier anthropological models of culture as fundamentally homogenous, coherent, and purposeful. As such, it was suggested that many early political ecologists had not truly been following all the methodological principles outlined by Blaikie and Brookfield (1987). They had not given sufficient weight to the local level of analysis, potentially ignoring the fact that local groups were made up of individuals with often-divergent beliefs and interests regarding processes of economic development and accompanying socio-ecological change. Such change was not only initiated from the outside. Local people could also change their environments and economies through their own

actions and political struggles (Bryant 1998; Moore 1993, 2005; Li 2007, 2014). For example, as Michael Dove illustrates, generations of Bornean shifting cultivators have willingly engaged in commercial rubber production as an effective means to strengthen their customary land claims while simultaneously supplementing and maintaining their subsistence livelihoods (2011). Such practices demonstrate the ways in which capitalism and the state are not all-powerful structures. Global market forces are often subject to both resistance and facilitation from local actors who try to engage with them according to their own values and agendas (Tsing 2005).

Critiques and changing directions within political ecology

In 1993, the anthropologist Donald Moore echoed the critiques of other scholars when he argued for the need to move beyond the 'structural legacy' of early political ecology. As Moore noted, early political ecology too often relied upon a rather uncomplicated opposition between seemingly virtuous local land users and vicious states and corporations (also Bernstein 1990). Yet, real life is much more complicated. In Moore's (1993) article about a state-administered peasant resettlement scheme along the border of a Zimbabwean national park, we see the importance of paying closer attention to the possibilities of local agency in daily struggles over resource control. These struggles took place within and between groups of farmers, pastoralists, tourists, agricultural extension agents, national park staff, and rural development administrators all vying for control over their own particular vision of the border zone. Accordingly, Moore (1993, 2005) argues that local resource users and state governments are always made up of a complexity of different divisions and individuals that often do not share the same goals and values. Such complexities contradict earlier theoretical models within political ecology.

Work such as Moore's inspired a second phase of 'poststructuralist political ecology', which emerged in the 1990s. Poststructuralist political ecology tried to move political analysis beyond the determinisms of Marxist-inspired dependency and world system theory, while also recognising that multiple voices and interpretations exist in situations of environmental and economic change. This second phase of political ecology integrated a broader range of theoretical influence, such as: household studies (Berry 1989; Netting 1993); feminist and gender studies (see Agarwal 1992; Harcourt & Nelson 2015; Merchant 1980; Rocheleau *et al.* 1996); studies of race, environmental justice, and social movements (Escobar 2008; Harvey 1996; Martinez-Alier 2002; Moore *et al.* 2003; Peet & Watts 2004; Sawyer 2004; West 2016); and postructuralism and discourse theory (Escobar 1999; Li 2007; Moore 2005; Tsing 2005; West 2006). Together, they brought greater attention and analytical precision to the different ways in which environmental change and conflicts over that change were experienced according to variables such as gender, race, ethnicity, age, ability, sexuality, and/or socioeconomic status. For example, in a key article about gender and resource tenure, Dianne Rocheleau and David Edmunds (1997) argued that development schemes designed to promote formal titling and privatisation of land could have the unfortunate effect of

increasing power differentials between men and women in many parts of Africa. These practices often removed women's previous customary claims to use-rights on communally owned lands, as formal land titling invested greater powers of exclusion and decision-making in men, who were much more likely to gain such titles. Accordingly, Rocheleau and Edmunds suggested that policymakers should not simply make a better effort to 'bring women in' to these titling schemes. Instead, they should start such development processes by understanding and working within previously existing cultural models of overlapping land and resource tenure rights.

Yet, in the late 1990s, this continuing movement toward a more sophisticated conceptualisation and analysis of all things political prompted a different critique of the field. In an article entitled 'Against political ecology', anthropologist Andrew Vayda and geographer Bradley Walters (1999) criticised political ecology for what they saw as its unexamined, *apriori* focus upon issues of politics and power. This focus, they argued, prevented political ecologists from engaging in sustained ecological analysis that might explain how environmental phenomena and processes of socio-ecological change actually worked. Unlike the earlier environmental anthropology traditions of Steward and Rappaport, political ecology was now suffering from a dearth of ecology. Here, the environment had essentially become a stage where political struggles over resource control took place, but in-depth ecological analysis of the environmental impacts of such struggles was often not provided (Zimmerer & Bassett 2003). While the extent of Vayda and Walter's (1999) criticism may result from a somewhat selective reading of an increasingly expansive field (Robbins 2004; Walker 2005), the effort to achieve an appropriate balance between the concerns of political economy, cultural analysis, and ecological science remains an important issue that political ecologists are still contending with today. The challenge for political ecologists is to continue improving their methods of analysing the processes and effects of socio-ecological change across a variety of scales and actors. Determining ways to productively apply such methods and findings to alleviate our current socio-ecological problems like global climate change and resource depletion has never been more important.

The future for political ecology in a rapidly changing world

In 2020, the world finds itself confronted with cumulative social and ecological challenges of a degree that many of us have not seen before in our lifetimes. The 'Anthropocene' has become an academic buzzword for emphasising the fact we are now living in a geological time period in which humans are the absolute dominant force shaping the Earth's ecological processes (Chua & Fair 2019; Ogden *et al*. 2013; Moore 2016). Generations of increasing fossil fuel use, industrial development, population growth, and related processes of pollution and resource degradation have led to broad scale ecological and climatic changes that are no longer easy to deny. As Will Steffen and colleagues (2007: 614) note, '[t]he Earth is rapidly moving into a less biologically diverse, less forested, much warmer, and probably wetter and stormier state'. The implication is that we are approaching a global ecological tipping point from which we may

never recover. Accordingly, recent years have seen anthropologists cover an expansive list of topics related to this issue, such as: the rising frequency and toll of environmental disasters like hurricanes, droughts, forest fires, and industrial pollution (Oliver-Smith & Hoffman 1999; Jones & Murphy 2009); the impact of polar ice cap melt and climate change among Artic societies (Crate 2009; Cruikshank 2007); and rising sea levels and the mounting likelihood of environmental refugees being forced to leave small islands and coastal regions (Lazrus 2012; Rudiak-Gould 2013). Entire ecosystems and cultural ways of life are increasingly threatened with rapid and full-scale transformation. And yet, such challenges of the Anthropocene are far from the only challenges the world is facing right now.

The current COVID-19 pandemic has also thrown into stark relief the many key relationships between environment, economy, and a broadly defined public health. An entire global economy based upon the extraction of the surplus value embodied in natural resources and the exploitation of individual wage labour has quickly been thrown into recession by the necessity of social distancing. Similarly, the socioeconomic distinctions between mostly low-paid 'essential' workers and often well-paid 'non-essential' workers have highlighted the magnitude of economic inequality, social marginalisation, and despondency that the world has been experiencing for decades. Such issues are taking place within a global political context of rising nationalism, authoritarianism, and general social conflict about the responsibilities of states and the rights of social minorities within them. The many potential complications associated with these issues highlight the importance of the holistic and interdisciplinary perspective that anthropologists and political ecologists have long tried to bring to their analyses of the complex relationships between culture, nature, and economy.

The question for political ecology as a field is what is the best way to help moving forward? How might political ecologists work to ensure that often-abstract theory and impersonal scientific data becomes more relevant to state policymakers and the people with whom we work? Some anthropologists have suggested that we need to do more work in and with the state and corporate institutions that are so directly responsible for the direction of our futures (Fiske 2009; Rajak 2014; Welker 2014). Others argue that we need to pay much closer attention to the work of Indigenous scholars, and local frameworks of environmental explanation (e.g. Kirsch 2006; Smith 1999; Tallbear 2014; Whyte 2018). Still others have suggested that political ecology and medical anthropology would both benefit from a greater correspondence between the two fields (Baer 1996; King 2010), particularly during a global pandemic that has highlighted the social nature of illness in political and economic circumstances that restrict many peoples' access to medical care. Such a collaboration might also gain key insights from the work of disaster anthropologists on social patterns of vulnerability and resilience (Hoffman & Oliver-Smith 2002). The second phase of political ecology has already done the important work of opening the field to such multi-faceted collaborations. There is a place and a need for all of these efforts right now. The key for political ecology seems to be to continue working, collaborating, and improving its mechanisms of socioecological

analysis and intervention accordingly – so that we might come to recognize more sustainable and equitable pathways for living together in the future (Rappaport 1993).

References

Agarwal, B. 1992. The gender and environment debate: lessons from India. *Feminist Studies* **18**(1), 119-58.

Baer, H.A. 1996. Toward a political ecology of health in medical anthropology. *Medical Anthropology Quarterly* **10**(4), 451-4.

Bernstein, H. 1990. Taking the part of peasants? In *The food question: profits versus people?* (eds) H. Bernstein, B. Crow, M. Mackintosh & C. Martin, 69-79. London: Earthscan.

Berry, S. 1989. Social institutions and access to resources. *Africa* **59**, 41-55.

Biersack, A. 1999. Introduction: from the "new ecology" to the new ecologies. *American Anthropologist* **101**(1), 5-18.

−−−−− 2006. Reimagining political ecology: culture/power/history/nature. In *Reimagining political ecology* (eds) A. Biersack & J.B. Greenberg, 3-42. Durham, N.C.: Duke University Press.

−−−−− & J.B. Greenberg (eds) 2006. *Reimagining political ecology*. Durham, N.C.: Duke University Press.

Blaikie, P. 1985. *The political economy of soil erosion in developing countries*. London: Longman.

−−−−− & H. Brookfield 1987. *Land degradation and society*. London: Methuen.

Bridge, G., J. McCarthy & T. Perrault (eds) 2015. Editor's introduction. In *The Routledge handbook of political ecology* (eds) G. Bridge, T. Perreault & J. McCarthy, 3-18. New York: Routledge.

Bryant, R.L. 1998. Power, knowledge, and political ecology in the third world: a review. *Progress in Physical Geography* **22**(1), 79-94.

Chua, L. & H. Fair 2019. Anthropocene. In *Cambridge Encyclopedia of Anthropology* (ed.) F. Stein, University of Cambridge (available on-line: https://www.anthroencyclopedia.com/entry/anthropocene).

Crate, S. 2008. Gone the bull of winter: grappling with cultural implications of and anthropology's role(s) in global climate change. *Current Anthropology* **49**(4), 569-95.

Cruikshank, J. 2007. *Do glaciers listen? Local knowledge, colonial encounters, and social imagination*. Vancouver: University of British Columbia Press.

Dove, M. 1993. A revisionist view of tropical deforestation and development. *Environmental Conservation*

20(1), 17-24.

−−−−− 2006. Equilibrium theory and interdisciplinary borrowing: a comparison of old and new ecological anthropologies. In *Reimagining political ecology* (eds) A. Biersack & J.B. Greenberg, 43-69. Durham, N.C.: Duke University Press.

−−−−− 2011. *The banana tree at the gate: a history of marginal peoples and global markets in Borneo.* New Haven: Yale University Press.

Edelman, M. & A. Haugerud 2005. Introduction: the anthropology of development and globalization. In *The anthropology of development and globalization: from classical political economy to contemporary neoliberalism* (eds) M. Edelman & A. Haugerud, 1-74. Malden, Mass.: Blackwell Publishing.

Ehrlich, P.R. 1968. *The population bomb*. New York: Ballantine Books.

Escobar, A. 1999. After nature: steps to an antiessentialist political ecology. *Current Anthropology* **40**(1), 1-28.

−−−−− 2008. *Territories of difference: place, movements, life, redes*. Durham, N.C.: Duke University Press.

Fiske, S.J. 2009. Global change policymaking from inside the Beltway: engaging anthropology. In *Anthropology and climate change: from encounters to actions* (ed.) S. Crate & M. Nuttall, 277-91. Walnut Creek, Calif.: Left Coast Press.

Foster, J.B. 2000. *Marx's ecology: materialism and nature*. New York: Monthly Review Press.

Frank, A.G. 1989. The development of underdevelopment. *Monthly Review* **41**(2), 37-43.

Friedman, J. 1974. Marxism, structuralism, and vulgar materialism. *Man* **9**(3), 444-69.

Gezon, L.L. & S. Paulson 2005. Place, power, difference: multiscale research at the dawn of the twenty-first century. In *Political ecology across spaces, scales, and social groups* (eds) S. Paulson & L.L. Gezon, 1-16. New Brunswick, N.J.: Rutgers University Press.

Greenberg, J.B. & T.K. Park 1994. Political ecology. *Journal of Political Ecology* **1**, 1-12.

Harcourt, W. & E. Nelson (eds) 2015. *Practicing feminist political ecologies: moving beyond the 'green economy'*. Chicago: University Press.

Hardin, G. 1968. The tragedy of the commons. *Science* **162**, 1243-8.

Harvey, D. 1974. Population, resources, and the ideology of science. *Economic Geography* **50** (3), 256-77.

 ISSN 2398-516X

−−−−− 1996. *Justice, nature, and the geography of difference*. Oxford: Blackwell Publishers.

Hoffman, S. & A. Oliver-Smith (eds) 2002. *Catastrophe and culture: the anthropology of disaster*. Santa Fe: School of American Research.

Jacka, J. 2015. *Alchemy in the rainforest: politics, ecology, and resilience in a New Guinea mining area*. Durham, N.C.: Duke University Press.

Jones, E.C. & A. Murphy (eds) 2009. *The political economy of hazards and disasters*. Lanham, Md.: Altamira Press.

Karlsson, B. 2015. Political ecology: anthropological perspectives. In *International encyclopedia of the social and behavioral sciences* (ed.) J.D. Wright, 350-5. Oxford: Elsevier.

King, B. 2010. Political ecologies of health. *Progress in Human Geography* **34**(1), 38-55.

Kirsch, S. 2006. *Reverse anthropology: indigenous analysis of social and environmental relations in New Guinea*. Palo Alto: Stanford University Press.

Kottak, C.P. 1999. The new ecological anthropology. *American Anthropologist* **101**(1), 23-35.

Li, T.M. 2007. *The will to improve: governmentality, development, and the practice of politics*. Durham, N.C.: Duke University Press.

−−−−− 2014. *Land's end: capitalist relations on an indigenous frontier*. Durham, N.C.: Duke University Press.

Little, P.D. M.M. Horowitz & A. Endre Nyerges (eds) 1987. *Lands at risk in the third world: local-level perspectives*. Boulder: Westview Press.

Martinez-Alier, J. 2002. *Environmentalism of the poor: a study of ecological conflicts and valuation*. Northampton, Mass.: Edward Elgar.

Marx, K. 1889. *Capital: a critical analysis of capitalist production*. New York: Appleton and Company.

Merchant, C. 1980. *The death of nature: women, ecology, and the scientific revolution*. New York: Harper and Row.

Mintz, S. 1985. *Sweetness and power: the place of sugar in modern history*. New York: Viking.

Moore, A. 2016. Anthropocene anthropology: reconceptualizing contemporary global change. *Journal of the Royal Anthropological Institute* **22**(1), 27-46.

Moore, D.S. 1993. Contesting terrain in Zimbabwe's eastern highlands: political ecology, ethnography, and

peasant resource struggles. *Economic Geography* **69**(4), 380-401.

−−−−− 2005. *Suffering for territory: race, place, and power in Zimbabwe*. Durham, N.C.: Duke University Press.

−−−−−, J. Kosek & A. Pandian (eds) 2003. *Race, nature, and the politics of difference*. Durham, N.C.: Duke University Press.

Nash, J. 1993. *We eat the mines and the mines eat us: dependency and exploitation in Bolivian tin mines*. New York: Columbia University Press.

Netting, R.M. 1993. *Smallholders, householders: farm families and the ecology of intensive, sustainable agriculture*. Palo Alto: Stanford University Press.

Neumann, R. 1992. Political ecology of wildlife conservation in the Mt. Meru Area of Northeast Tanzania. *Land Degradation and Rehabilitation* **3**, 85-98.

Odum, E. 1969. The strategy of ecosystem development. *Science* **164**(3877), 262-70.

Ogden, L., N. Heynen, U. Oslender, P. West, K.-A. Kassam & P Robbins (eds) 2013. Global assemblages, resilience, and earth stewardship in the anthropocene. *Frontiers in Ecology and the Environment* **11**(7), 341-7.

Oliver-Smith, A. & S. Hoffman (eds) 1999. *The angry earth: disaster in anthropological perspective.* New York: Routledge.

Orlove, B. 1980. Ecological anthropology. *Annual Review of Anthropology* **9**, 235-73.

Paulson, S., L.L. Gezon & M. Watts 2003. Locating the political in political ecology: an introduction. *Human Organization* **62**(3), 205-17.

−−−−− & L.L. Gezon (eds) 2005. *Political ecology across spaces, scales, and social groups.* New Brunswick, N.J.: Rutgers University Press.

Peet, R., P. Robbins & M. Watts (eds) 2011. *Global political ecology*. New York: Routledge.

−−−−− & M. Watts (eds) 2004. *Liberation ecologies: environment, development, social movements*. London: Routledge.

Peluso, N.L. 1992. *Rich forests, poor people: resource control and resistance in Java.* Berkeley: University of California Press.

Perreault, T., G. Bridge & J. McCarthy (eds) 2015. *The Routledge handbook of political ecology*. New York:

Routledge.

Rappaport, R. 1967. Ritual regulation of environmental relations among a New Guinea people. *Ethnology* **6**, 17-30.

−−−−− 1968. *Pigs for the ancestors: ritual in the ecology of a New Guinea people*. New Haven: Yale University Press.

−−−−− 1971. The flow of energy in an agricultural society. *Scientific American* **25**, 116-132.

−−−−− 1984. *Pigs for the ancestors: ritual in the ecology of a New Guinea people*. Long Grove, IL: Waveland Press.

−−−−− 1990. Ecosystems, populations, and people. In *The ecosystem approach in anthropology: from concept to practice* (ed.) E. Moran, 41-72. Ann Arbor: University of Michigan Press.

−−−−− 1993. Distinguished lecture in general anthropology: the anthropology of trouble. *American Anthropologist* **95**(2), 295-303.

Robbins, P. 2004. *Political ecology: a critical introduction*. Malden, Mass.: Blackwell Publishing.

−−−−− 2019. *Political ecology: a critical introduction*. 3rd ed. Hoboken, N.J.: Wiley Blackwell.

Rocheleau, D., B. Thomas-Slayter & E. Wangari (eds) 1996. *Feminist political ecology: global issues and local experiences*. New York: Routledge.

Rocheleau, D. & D. Edmunds 1997. Women, men and trees: gender, power and property in forest and agrarian landscapes. *World Developmen*t **25**(8), 1351-71.

Roseberry, W. 1983. *Coffee and capitalism in the Venezuelan Andes*. Austin: University of Texas Press.

Rudiak-Gould, Peter. 2013. *Climate change and tradition in a small island state*: *the rising tide*. New York: Routledge.

Sahlins, M. 1976. *Culture and practical reason*. Chicago: University Press.

Sauer, C. 1965. The morphology of landscape. In *Land and life: a selection from the writings of Carl Ortwin Sauer* (ed.) J. Leighly, 315-50. Berkeley: University of California Press.

Sawyer, S. 2004. *Crude chronicles: indigenous politics, multinational oil, and neoliberalism in Ecuador.* Durham, N.C.: Duke University Press.

Smith, L.T. 1999. *Decolonizing methodologies: research and indigenous peoples*. Dunedin: University of Otago Press.

Steffen, W., P.J. Crutzen & J.R. McNeill 2007. The anthropocene: are humans now overwhelming the great forces of nature? *Ambio* **36**(8), 614-21.

Steward, J. 1937. Ecological aspects of southwestern society. *Anthropos* **32**, 87-104.

––––– 1955. The concept and method of cultural ecology. In *Theory of culture change* (ed.) J. Steward, 30-42. Urbana: University of Illinois Press.

Tallbear, K. 2014. Standing with and speaking as faith: a feminist-indigenous approach to inquiry. *Journal of Research Practice* **10**(2), Article N17 (available on-line: http://jrp.icaap.org/index.php/jrp/article/view/405/407.) Accessed 31 August 2020.

Tsing, A. 2005. *Friction: an ethnography of global connection*. Princeton: University Press.

Vayda, A.P. & B.B. Walters 1999. Against political ecology. *Human Ecology* **27**(1), 167-79.

Walker, P.A. 2005. Political ecology: where is the ecology? *Progress in Human Geography* **29** (1), 73-82.

Wallerstein, I. 1974. The rise and future demise of the world capitalist system: concepts for comparative analysis. *Comparative Studies in Society and History* **16**(4), 387-415.

Watts, M. 2015. Now and then: the origins of political ecology and the rebirth of adaptation as a form of thought. In *The Routledge handbook of political ecology* (eds) G. Bridge, J. McCarthy & T. Perrault, 19-50. New York: Routledge.

West, P. 2006. *Conservation is our government now: the politics of ecology in Papua New Guinea.* Durham, N.C.: Duke University Press.

––––– 2016. *Dispossession and the environment: rhetoric and inequality in Papua New Guinea.* New York: Columbia University Press.

Whyte, K.P. 2018. Indigenous science (fiction) for the Anthropocene: ancestral dystopias and fantasies of climate change crises. *Environmental Planning E: Nature and Space* **1**(1-2), 224-42.

Wolf, E. 1972. Ownership and political ecology. *Anthropology Quarterly* **45**, 201-5.

––––– 1982. *Europe and the people without history.* Berkeley: University of California Press.

Zimmerer, K.S. & T.J. Bassett (eds) 2003. *Political ecology: an integrative approach to geography and environment-development studies.* New York: The Guilford Press.

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[1] Systems theory is an approach to studying social life and environmental interaction that assumes that integrated systems exist, which consist of human and non-human elements. It tends to explain human actions, beliefs, and their interactions with the non-human environment by showing how all elements of the system function interdependently to preserve a stable whole.

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