

How is contemporary biology used for ideological purposes?

Introduction

The ways in which biological science has been co-opted into political, ethical, philosophical and religious programmes has been well-documented in recent years¹. Critical examination of the use of biological concepts in ideological rhetorics and discourses has flourished, with a particular focus on the use of evolutionary theory and genetics². In this paper I hope to contribute to this project by analysing a particularly potent ideological use of biology which is central to one of the most cherished causes of our age: environmentalism. I will be looking at political forms of environmentalism, where 'political' is understood in the broad sense of governmental and non-governmental policy-making. I focus on ecology, a branch of biology which is decisive for environmentalism.

There are two principal reasons for my choice of environmentalism. First, recognising that environmentalism involves an ideological use of biology demonstrates the point that ideological use of biology is not *per se* unacceptable. Like all science, biology is always put to work in the service of some values or other and itself expresses certain values, such as the value of its subject, Life. In this essay I argue that biological data are not only employed according to a framework of goods that is not itself positivistically derivable, but that such a framework is implicit in biological understanding from the

¹See eg. Höhle, V, and Illies, C (2005) eds., *Darwinism and Philosophy*, University of Notre Dame Press; Ruse, M (2009) eds., *Philosophy After Darwin: Classic and Contemporary Readings*, Princeton University Press; Dickens, P (2000), *Social Darwinism: Linking Evolutionary Thought to Social Theory*, Buckingham: Open University Press; Holloway, C (2006), *The Right Darwin?: Evolution, Religion and the Future of Democracy*, Dallas: Spence Publishing Company; Cunningham, C (2010), *Darwin's Pious Idea: Why the Ultra-Darwinists and Creationists Both Get It Wrong*, Grand Rapids: Eerdmans.

²See eg. Beurton, P, Falk, R, and Rheinberger, H, eds. (2000), *The Concept of the Gene in Development and Evolution: Historical and Epistemological Perspectives*, Cambridge University Press; Anhart, L (2005), *Darwinian Conservatism*, Exeter: Imprint; Shanahan, T (2004), *The Evolution of Darwinism: Selection, Adaptation, and Progress in Evolutionary Biology*, Cambridge University Press.

beginning³. There has been a tendency in the biological-scientific community to regard this observation of the value-laden nature of biological thought and practice as impugning biology's 'objectivity'⁴. Revealing biology's use in, and absorption of, the environmental agenda, will help biologists and others to recognise that for biology to serve such agendas is not itself objectionable. In this way, such an examination could contribute to the overcoming of the scientific positivism which still abounds in scientific self-perception⁵. A critical examination of the ideologies of environmental science could assist in a rehabilitation of the moral, and even the metaphysical, within biological discourse, a rehabilitation compatible with its jealously guarded methodological naturalism⁶. 'Ideological' would not then be a dirty word which implies a corruption of biology's integrity as a science, but would indicate that biology necessarily involves evaluative judgements which precede and inform biological practice and underpin the possibility of biological knowledge. This does not undermine biology's authority. Rather, by rejecting reductionist accounts of the moral and the ethical, it secures biology's dignity as a discipline which seeks the true and the good in and through its engagement with life⁷. Regardless of whether one accepts this expansion of scientific horizons, frank recognition of the already 'ideological', i.e. value-laden, character of biology by those who produce and use biological knowledge would stimulate a broader public conversation about the role of biology as a servant of the common good.

³Forsyth is right to complain that positivism, as a critical term, is often used simplistically (Forsyth, T (2003), *Critical Political Ecology: The Politics of Environmental Science*, Oxford: Routledge, p.54). To be clear, I mean positivism here as a general label for forms of scientific epistemology which hold that the scientific method is the supremely authoritative mode of access to the truth about the world, and which by implication suggests that only the empirically measurable is real. See Egan, K (1997), *The Educated Mind: How Cognitive Tools Shape Our Understanding*, University of Chicago Press, pp. 115-6.

⁴Eg. Merton, R (1973), 'The normative structure of science.' in Merton, R, *The Sociology of Science*, edited by Storer, N, University of Chicago Press, pp. 267-278; also Levitt, N (1999), *Prometheus Bedeviled: Science and the Contradictions of Contemporary Culture*, Rutgers University Press.

⁵Cf. John Paul II (1998). *Fides et Ratio*. London: CTS, article 88.

⁶See Hanby, M (2013), *No God, No Science: Theology, Cosmology, Biology*, Oxford: Wiley-Blackwell, pp. 9-48.

⁷Scientists should seek 'a *sapiential* horizon' in which 'scientific and technological achievements are wedded to... philosophical and ethical values'. John Paul II (1998). *Fides et Ratio*. London: CTS, article 106.

Second, it is only if the ideological elements in the political use of biology are identified as ideological, i.e. as not settleable exclusively by reference to empirical data, that political decision-making, which depends on biological knowledge, can occur in a genuinely democratic way. Where the natural environment is concerned the production, interpretation and application of biological data will always be central. Because scientific judgements concerning the environment are of such urgent significance to all, it is particularly important that ideological elements in this area should be observed, admitted, and judged so that they are not smuggled in as 'neutral', and therefore indisputable, science⁸. Where judgements are claimed as being 'merely' empirical, i.e. scientifically measurable, they are placed by implication within the remit of scientists alone, beyond public scrutiny or criticism. For this reason, 'empiricising' these judgements is already a political action, in the sense that it is a move for decision-making power; it places such judgements and decisions within the exclusive gift of scientific experts⁹. This disenfranchises those whom the judgements will affect and makes it impossible for non-scientists to exercise their political freedoms, which include the right to contribute in various ways to the discernment of what is of value to all¹⁰. The health of natural systems and environments is a matter of decisive significance for every human being and for all future generations, whatever their geographic or sociopolitical location; environmental good is a central aspect of the common good¹¹. Public awareness of ideology in biology and its political use is necessary for subsidiarity, which is the extension and devolution of decision-making power to all those whom a

⁸Jasanoff, S (1990), *The Fifth Branch: Science Advisers as Policymakers*, Cambridge University Press, p. 229.

⁹See Lash, S, Szerszynski, B, and Wynne, B (1996) eds., *Risk, Environment and Modernity*, London: Sage, especially Wynne, 'May the sheep safely graze?', pp. 44-83.

¹⁰See Mason, M (1999), *Environmental Democracy*, London: Earthscan, but note that Mason does not recognise the way in which notions of what is 'ecologically rational' themselves embody ideological elements.

¹¹The notion of 'the common good' is most thoroughly articulated by Catholic Social Teaching, where the environment is conceived both as an object of the common good, politically understood, and as a common good in itself. See Pontifical Council for Justice and Peace (2005), *Compendium of the Social Doctrine of the Catholic Church*, Washington DC: USCCB Publishing, pp. 197-212.

decision affects¹². Decisions which are within the political remit of all should be made by all, and not by a scientific elite, which means that determinative ideologies need to be made as explicit as possible. This requires an examination not only of the political use of ecology, but also of tacit political ideologies within ecology itself¹³. The environmental common good can only be accomplished through the ideological employment of biological knowledge and methods, which involves both the use of biology in the cause of shared values, and the shaping of biological practice and understanding by those goods.

This essay makes two connected arguments: that politics makes use of ecology, and that politics is embedded in ecology (in ways that are not intrinsically objectionable). It may seem obvious to start with the political uses of ecology, but I begin instead with an examination of the way in which ecology itself contains ideologies which operate in a political way. The purpose of starting with ecology's own ideologies is to show that political use of ecology is not an imposition of a foreign and non-neutral agenda on neutral fact-based science. Rather, modern ecology has been ideologically formed by environmentalist and political concerns. I also look at the way ecological concepts contain normative presumptions about nature which are inherently metaphysical. My key examples in this first section are conceptualisations of ecological units, such as the ecosystem, which embody assumptions about nature which are ideologically informed. This leads to the second argument, that ecology is used in political ways that may not be fully justified by the ecological science itself. My key examples here are deforestation and desertification as standard conceptualisations of environmental problems that are widely used by governmental and non-governmental agencies in framing environmental degradation. I also consider political uses of ecological concepts

¹²Ibid., pp. 81-3

¹³Cf. Forsyth, T (2003), *Critical Political Ecology: The Politics of Environmental Science*, Oxford: Routledge, pp. 231-265.

and models, particularly the equilibrium model. These uses not only carry over ecology's own value-laden conceptualizations of the environment, but also complicate them with political concerns, such as the critique of industrialist capitalism, or influential societal conceptions of pristine nature.

I argue that these analyses do not undermine either the environmentalist agenda or the authority of ecology. It is only because of the frameworks of goods and values which govern both politics and ecology that they are trustworthy. Problems arise only if the operative goods and values are unadmitted and therefore un-scrutinised. The constructed character of our recognition of truths and goods does not count against them but, rather, indicates the need for a non-representationalist, non-dualist epistemology of science, and an overcoming of the associated picture of the world as an inert and passive object of the disembodied human mind. These arguments appear conceptually separate, but the case of ecology and environmentalism shows with particular clarity how science and ideology are co-constructed, and so the politics *inside* science cannot really be divided from the politics *outside* science.

The political nature of ecology

Ecology, environmentalism and politics have been interwoven throughout the history of modern ecology, and political agendas have been key in shaping ecology's contemporary identity. During the 1960s in particular, "[e]cology was seen as both the study of [environmental] impacts, but also the new philosophical approach of looking at people-environment interactions as a whole"¹⁴. The Nature Conservancy¹⁵ grew out of the Ecological Society of America (ESA), and the history of these two bodies indicates the entwined

¹⁴*Ibid.*, p. 4.

¹⁵The Nature Conservancy is today the largest non-profit organisation by assets and revenue in the Americas. The political and financial power of the Nature Conservancy has become an object of media attention and criticism. See e.g. Ottoway, D, and Stephens, J (2003), 'Nonprofit Land Bank Amasses Billions.' In *The Washington Post*, Sunday 4th May 2003, <http://www.washingtonpost.com/wpdyn/content/article/2007/06/26/A R2007062600803.html>, accessed 28th November 2013.

character of political movements for conservation and environmental protection with ecology¹⁶. From its inception in 1915, the ESA was marked by disagreements about whether the society should have strictly 'scientific' or political goals; should it seek only to extend our knowledge of the natural world, or also pursue its preservation?¹⁷ In 1946, the group favouring the latter course founded 'The Ecologists' Union', a name seemingly designating only a group unified by a common object of study, which existed for the explicit aim of saving natural areas from destruction by combining science with political lobbying. This body soon opened its membership to non-scientists and a few years later became 'The Nature Conservancy'¹⁸.

In their public self-descriptions, the Nature Conservancy and the ESA provide typical examples of the use of ecology in environmental rhetoric. The ESA exists to promote 'the responsible application of ecological data and principles to the solution of environmental problems'¹⁹. This description, taken at face value, obscures the ideological relationship between ecology and environmentalism in two ways. First, it masks the criteria by which 'problems' are identified - identification of environmental problems requires there to be standards against which ecological 'normal' (i.e. non-problematic) is measured. Second, the description obscures the way in which ecological principles contain question-begging elements which are inherently open-ended, and which themselves depend on certain theoretical questions that inform, as well as being informed by, empirical considerations, such as the question of what counts as a species, an ecosystem, an organism, etc., and what criteria should be used to determine appropriate categories for ecological description.

The Nature Conservancy's self-description presents the combination of ecology and conservationism as an obvious partnership: 'The Nature

¹⁶Auerbach, S (1972), 'Ecology, Ecologists and the ESA.' *Ecology* 53, 205-207.

¹⁷Smith, S (2009), 'The historical roots of the Nature Conservancy in the Northwest Indiana/Chicagoland Region: From Science to Preservation.', *The South Shore Journal* 3, 1-10.

¹⁸Ibid., pp. 2-3.

¹⁹www.esa.org/esa/, accessed 20th November 2013.

Conservancy is the leading conservation organization working around the world to protect ecologically important lands and waters for nature and people²⁰. 'Ecology' and 'conservation' are presented as intrinsically linked notions. The complex relationship of values, such as worthiness to be preserved, from (perceived) facts, such as the interconnectedness of life revealed through ecology, is glossed over. Furthermore, the notion of 'nature' is invoked in a thoroughly ideological way, firstly by being placed contrastively with 'people', and secondly by being considered as a unitary subject which can be the recipient of moral action. The stated mission of the Nature Conservancy is 'to conserve the lands and waters on which all life depends'²¹. This formula indicates the way in which the language of ecology merges seamlessly into conservationism and environmentalism. The dependency of 'all life' on lands and waters is an insight derived from ecology, through its analysis of the interdependence of biotic and abiotic factors, and the significance of ecosystems considered as wholes rather than species or organisms considered as individuals. This interdependency is here invoked as the logic of 'conservation' in such a way that ecological understanding appears as having an obvious moral outcome. Most interestingly, the mission statement contains the tacit presumption that 'life', which is the moral centre of the formula, has an inherent, self-justifying and self-evident value.

In these self-descriptions the relationship between scientific knowledge and practice and moral and political agendas is unclear. The ambiguity of the concept of nature, the disunity in ecology about fundamental ecological frameworks, the metaphysical baggage surrounding the notion of environmental norms, and the considerable moral freight of 'life', is unmentioned. In this way such self-descriptions suggest the existence in environmentalism and conservationism of meta-narratives or myths which employ scientific concepts and disciplines in the service of particular meanings.

²⁰<http://www.nature.org/>, accessed 18th November 2013.

²¹<http://www.nature.org/about-us/vision-mission/index.htm>, accessed 23rd November 2013.

Certain values are already implicit in ecological concepts and assumptions, such as the existence of 'nature', the self-evidence of 'environmental problems' in relation to obvious norms, and the inherently self-justifying value of 'life'. The impression can be given, through the use of what appears to be 'hard science', that the narrative is uncontested; that it is, in fact, not a narrative.

These considerations indicate the utility of a broadly social constructivist understanding of science in approaching ecology, an understanding in which a strict fact-value distinction is repudiated (but noting, ahead of my argument below, that this does not have to entail relativism). The public understanding of science, which includes to a large degree the understanding of scientists themselves²², remains captive to a picture in which 'pure science', decides on the 'facts', and then political and/or philosophical methods settle the values which determine the *use* of those facts²³. This understanding of fact-based knowledge versus value-based use buys into a naive understanding of the relationship of knowledge and interpretation, which has been challenged in by philosophers of sciences such as Thomas Kuhn²⁴ and, more radically, by Paul Feyerabend²⁵. 'Facts' are only identifiable in the context of frameworks by which we distinguish the meaningful from the meaningless, and through which alone the notion of meaning becomes available in the first place²⁶. These frameworks are enabling conditions of our empirical discoveries, allowing us to distinguish information from mere sensory noise. This understanding of scientific epistemology can be traced to the hermeneutics of Hans-Georg

²²See eg. Baarschers, W (1996), *Eco-facts and Eco-fiction: Understanding the Environmental Debate*, London: Routledge; also Collingridge, D, and Reeve, C (1986), *Science Speaks to Power: the Role of Experts in Policy Making*, London: Pinter. But the word 'fact' of course means 'made', as in Vico's dictum *verum esse ipsum factum*.

²³See eg. Collingridge, D, and Reeve, C (1986), *Science Speaks to Power: the Role of Experts in Policy Making*, London: Pinter; Price, D (1965), *The Scientific Estate*, Harvard University Press.

²⁴Kuhn, T (1962), *The Structure of Scientific Revolutions*, University of Chicago Press.

²⁵Feyerabend, P (2010), *Against Method: 4th Edition*. New York: Verso Books.

²⁶See Morton, M (1991), 'Verum est factum: Critical Realism and the Discourse of Autonomy.', *The German Quarterly* 64, 149-165; also Vico, G (2002), 'Vico: The First New Science' in *Cambridge Texts in the History of Political Thought*, ed. Pompa, L, Cambridge University Press.

Gadamer who observed the central role of prejudice (in the sense of prior judgements) in every act of understanding²⁷. Bruno Latour's study of laboratory work applied this insight to science by demonstrating the symmetry between science and society and the constructed character of scientific objects²⁸. If the meanings upheld in environmentalist narratives are culturally and socially constructed, and these meanings themselves feed back into the practice and governing concepts of the science, then what counts as science and scientific knowledge in environmentalist discourse reflects tacit beliefs about environmental values.

Applying this approach to ecology highlights the role of ideological elements in ecology's foundational concepts. Ecology's distinctiveness as a discipline comes from its assumption that environment matters to an organism and organisms matter to an environment, and that together they form a coherent whole which can be understood as a distinct entity. Ecology is thus shaped by conceptualisations of nature²⁹. The term 'ecology' was coined by Ernst Haeckel with explicit reference to an 'economy' of nature, a metaphor which suggests a unitary and balanced system and which Haeckel employed to support the cause of Darwinism,³⁰ which itself owed a considerable debt to metaphors and models drawn from political economy³¹. Ecology's traditional emphasis on a balanced and coherent whole is in itself an ideological move, in that it partially reverses the victory of the nominalist reduction of the knowable world to innumerable analysable parts, a model in which knowledge comes about through fragmentation and exhaustive focus on isolated particulars³². The

²⁷Gadamer, H-G (2013), *Truth and Method*, London: Bloomsbury.

²⁸Latour, B, and Woolgar, S (1989), *Laboratory Life: The Social Construction of Scientific Facts*, Princeton University Press; Latour, B (1987), *We Have Never Been Modern*, Trans. Catherine Porter, Harvard University Press.

²⁹See eg. Graham, M, and Dayton, P (2002), 'On the Evolution of Ecological Ideas: Paradigms and Scientific Progress.' *Ecology* 83, 1481-1489.

³⁰Stauffer, R (1957), 'Haeckel, Darwin and Ecology.', *Quarterly Review of Biology* 32, 138-144.

³¹Schweber, S (1980), 'Darwin and the Political Economists: Divergence of Character.' *Journal of the History of Biology* 13, 195-289.

³²Cf. Funkenstein, A (1986), *Theology and the Scientific Imagination*, Princeton University Press, p. 57.

term 'ecosystem', for example, expresses the holism and contextual character of ecological understanding, which places organisms in their biological contexts and focuses on networks of organic relationships as a prerequisite of scientific understanding³³. Systems ecology takes this concept to new levels by homing in on "the structure and function of levels of organisation beyond that of the individual and the species"³⁴. The identification of such wholes in nature, with the implied location of the human observer 'above and outside', makes ecology inherently metaphysical, in presupposing that we are able to form total conceptualisations of natural systems. This is apparent, for example, in one of American ecology's foundational studies, 'The Lake As Microcosm'³⁵. The lake and its inhabitants can be viewed as a whole from 'above' and 'outside', conceptually and physically. Even constructions of ecology that deliberately resist metaphysical readings, such as that of Deleuze and Guattari, paradoxically underline the ideological character of ecology by admitting its implication of certain conceptualisations of nature as normative³⁶.

The vigorous contemporary debate in ecology surrounding a 'balance-of-nature' versus a 'flux-of-nature' model demonstrates the continuing centrality to the discipline of operative metaphors which contain normative implications about the nature of nature³⁷. The 'equilibrium' or balance-of-nature model, which is linked to the idea of systemic, economic wholes in nature, produces a particularly influential set of notions about environmental norms. It conceives

³³Tansley, G (1935), 'The use and abuse of vegetational concepts and terms.', *Ecology* 16, 284-307.

³⁴Odum, E (1964), 'The new ecology.', *Bioscience* 14, 14-16.

³⁵Schneider, D (2000), 'Local knowledge, environmental politics, and the founding of ecology in the United States. Stephen Forbes and "The Lake As Microcosm" (1887)', *Isis* 91, 681-705.

³⁶Deleuze and Guattari suggest that ecological thinking instantiates a particular conceptualisation of space which resists the Newtonian univocalisation of space by considering organisms and communities as biogeographically determinate and specific. Maskit, J (2008), 'Something Wild? Deleuze and Guattari, Wilderness, and Purity.' in Nelson, M, and Callicott, J, eds., *The Wilderness Debate Rages On: Continuing the Great New Wilderness Debate*, University of Georgia Press, pp. 461-484.

³⁷Eg. Pickett, S, and Ostfeld, R (1995), 'The shifting paradigm in ecology' in Knight, R, and Bates, S, eds., *A New Century for Natural Resources Management*, Washington DC: Island Press, pp. 261-278; McIntosh, RP (1998), 'The myth of community as organism.', *Perspectives in Biology and Medicine* 41, 426-438.

'nature' as a self-regulating, harmonious and stable system which intrinsically tends towards balance unless disturbed. This understanding of nature is very persistent in the public sphere, despite increasing contestation in the ecological community,³⁸ and has been influential in the environmentalist and conservationist movements, since it views environmental change as problematic in itself³⁹. The influence exercised by this idea is an example of the political significance of seemingly neutral definitions of ecological objects, such as biosphere, biome, biota and ecosystem. A normative conception of nature is transmitted in the positing of coherent, stable ecological entities which function as the objects of political action, scientific knowledge and management.

In this way, ecology is productive of and dependent on meta-claims about the character of the natural world which contain tacit norms and hence, by implication, goods. This is far from being a merely theoretical matter, nor is it an issue which only affects scientists, as the environmental goods implicit in ecological concepts influence policy-making. Notions of what constitute an environmental 'problem' depend on ecological perceptions of what constitutes an environmental good, and the ability to identify and formulate environmental problems is critical to environmental policy-making, and decisive in the shaping of concrete solutions and responses. The discourse which supplies criteria for the identification of values is thus critical. Central in this discourse, and determinative of environmental policy, is the definition of ecological units⁴⁰. Notions of 'biosphere' and 'ecosystem' express normative conceptualisations of nature, presuming a given wholeness and interdependence in the natural world which then forms a standard by which environmental values are measured. The UN's adoption of 'Biosphere Reserves' as a central conservation category, which has been widely implemented, is an example of the political power exercised by

³⁸Kricher, J (2009), *The Balance of Nature: Ecology's Enduring Myth*, Princeton University Press.

³⁹See eg. Gorz, A (1983), *Ecology as Politics*, London: Pluto.

⁴⁰Forsyth, T (2003), *Critical Political Ecology: The Politics of Environmental Science*, Oxford: Routledge, p. 65.

normative ecological concepts⁴¹. Similarly, the term 'ecosystem' occupies a central role in environmental policy and planning, such as in the influential Millennium Ecosystem Assessment, a document produced specifically for policy-makers which employs 'ecosystems' as the central environmental category⁴². In this way, uses of ecology are always ideological because they absorb the science's own conceptualisation of its object of study. In ecology this conceptualisation is weighted towards holistic, systemic and relational understandings of natural environments⁴³.

The use of ecology in politics

This brings us to the second argument concerning the political uses of ecology. As well as ideologies embedded in ecology itself, there are values and priorities arising from cultural, social and political contexts which influence the use and authority of ecological concepts. One obvious example is the increasingly central role of 'ecosystem services', used most notably in the Millennium Ecosystem Assessment, in identifying and measuring environmental degradation. This approach correlates human and environmental health, bringing them together into a new form of environmental assessment in which ecosystems' capacity to sustain human communities is a measure of environmental wellbeing⁴⁴.

The extent to which social and political needs, perceptions and values determine the formulation of environmental 'problems' is especially apparent in the case of two forms of environmental change which have become iconic in environmentalist discourse: desertification and deforestation. Forsyth argues

⁴¹<http://www.unesco.org/new/en/natural-sciences/environment/ecological-sciences/biosphere-reserves/>, accessed 25th November 2013.

⁴²World Resources Institute (2005), *Ecosystems and Human Wellbeing: Synthesis: A Report on the Millennium Ecosystem Assessment*, Washington, DC: Island Press, especially v-ix.

⁴³There is, however, a move toward a new mechanistic reductionism in ecology; T. Schoener, 'Mechanistic Approaches to Ecology: A New Reductionism?' in D. Keller and F. Golley, *The Philosophy of Ecology: From Science to Synthesis*, Athens: University of Georgia Press, pp. 181-193.

⁴⁴*Ibid.*, pp. 1-24.

that these terms have persisted through the influence of political forces which use ecology without being responsive to it⁴⁵. Desertification and deforestation have become synonymous with environmental degradation. But in themselves they are just labels indicating biophysical changes, which are likely to be valued and interpreted differently by different communities. Leach and Mearns coined the term 'environmental orthodoxies' to describe conceptualizations of environmental degradation which persist despite the accumulation of evidence against them⁴⁶. Such orthodoxies determine the framing of deforestation and desertification as both degrading and anthropogenic, and also control the explanations for these changes. These perceptions and explanations become deeply ingrained in both popular and scientific understanding of the environment. But, Forsyth argues, they are inadequate as framings of environmental problems because they mask both the biophysical complexities of the causes of environmental change and also the social and cultural factors which cause these changes to be valued differently by different communities⁴⁷.

For example, the orthodoxy concerning desertification is that increasing populations and associated intensive agriculture in areas of low rainfall irreversibly extends desert areas, causing famine, drought, and soil erosion. But other evidence suggests multiple causal factors behind desertification, of which intensive farming may be a minor and insignificant one. Many studies have argued against the thesis of expanding deserts and have challenged the perception of anthropogenic origin for desertifying land⁴⁸: "very little land has been irreversibly desertified as a result of man's [sic] activities"⁴⁹. Popular

⁴⁵Forsyth, T (2003), *Critical Political Ecology: The Politics of Environmental Science*, Oxford: Routledge.

⁴⁶Leach, G, and Mearns, R (1996) eds., *The Lie of the Land: Challenging Received Wisdom on the African Environment*, Oxford: James Currey.

⁴⁷Forsyth, T (2003), *Critical Political Ecology: The Politics of Environmental Science*, Oxford: Routledge, pp. 1-51.

⁴⁸Eg. Warren, A, and Agnew, C (1988), *An Assessment of Desertification and Land Degradation in Arid and Semi-Arid Areas*, London: IIED and University College; Correll, E (1999), 'The Negotiable Desert: Expert Knowledge in the Negotiations of the Convention to Combat Desertification'. *Linköping Studies in Arts and Science*, no. 191. Sweden: Linköping University, Department of Water and Environmental Studies.

⁴⁹Dregne, H (1985), 'Aridity and Land Degradation.', *Environment* 27(8), 28-33.

perceptions of the way in which communities on the margins of desertified areas use land and water are often skewed towards viewing local actors as irresponsible and ignorant⁵⁰. However, recent studies suggest that people in drylands employ more sensitive and adaptive responses in minimising impacts of drought and developing efficient dryland agriculture. Some practices of dryland communities may even reverse degradation of land and vegetation⁵¹. This, combined with increased understanding of the complexity of biophysical causes of desertification, particularly natural fluctuations in dryland rainfall and its effect on vegetation growth and sand movement, suggest that the common perception of desertification is poorly founded⁵². Some have even called for the term 'desertification' to be rejected, criticising the United Nations Environment Programme (UNEP) for perpetuating the 'institutional myth' of the ever-increasing, anthropogenic and degrading character of desertification: "It has been the source of publicity that has had little reliable scientific foundation"⁵³.

Similar considerations apply, in Forsyth's survey of the literature, to deforestation. There is an 'orthodox' popular understanding that forests universally increase rainfall, decrease soil erosion, and harbour the highest levels of biodiversity, and hence that deforestation always represents an environmental degradation. Reforestation is then perceived as a panacea for a wide variety of environmental ills⁵⁴. But a wide range of scientific literature challenges these perceptions⁵⁵. Our understanding of historic rates of change and disturbance in forests indicates that contemporary rates of deforestation

⁵⁰Forsyth, T (2003), *Critical Political Ecology: The Politics of Environmental Science*, Oxford: Routledge, pp. 27-28.

⁵¹Ibid., p. 28; see also Anderson, D (1984), 'Depression, Dust Bowl, demography and drought: the colonial state and soil conservation in East Africa during the 1930s', *African Affairs* 83, p. 332.

⁵²Thomas, D, and Middleton, N (1994), *Desertification: Exploding the Myth*, Chichester: Wiley.

⁵³Ibid., pp. 160-161.

⁵⁴Brown, L (2001), *Eco-economy: Building an Economy for the Earth*, London: Earthscan and Earth Policy Institute.

⁵⁵Forsyth, T (2003), *Critical Political Ecology: The Politics of Environmental Science*, Oxford: Routledge, pp. 34-35.

are not unprecedented; historic rates of change may have been quite high⁵⁶. In Papua New Guinea, for example, recent research suggests that as much as 90% of indigenous forest was previously cleared by fire⁵⁷. The age of forest biomes has often been overestimated, as many rainforest areas were cool and dry at the end of the Pleistocene era⁵⁸. The link between deforestation and biodiversity loss may have been overstated, as has the proportionally greater biodiversity-sustaining power of forests over other ecosystems⁵⁹. Some types of forest disturbance may even increase biodiversity, such as skilful uses of shifting cultivation,⁶⁰ and certain sorts of deforestation may enhance the forest ecosystem⁶¹. Correlations between deforestation and soil erosion are often insufficiently evidence-based, or over-reliant on particular measurement methods⁶². Calculated rates of deforestation have been shown have very wide error margins; for example, total forest loss in the last century in six West African countries may be 9.5-10.5 million hectares, rather less than estimates of some NGOs such as that of the World Conservation Monitoring Centre of 46.8 million hectares⁶³. Similarly, calculated Himalayan deforestation estimates have differed by a factor of 67⁶⁴.

⁵⁶Eg. Whitmore, T (1984), *Tropical Rain Forests of the Far East: 2nd Edition*, Oxford, Clarendon Press.

⁵⁷Crapper, P (1962), 'Land Requirements for the Papua New Guinea Population', Melbourne: CSIRO Land Research Series no. 1.

⁵⁸Whitmore, T (1984), *Tropical Rain Forests of the Far East: 2nd Edition*, Oxford, Clarendon Press.

⁵⁹Eg. Wu, J, and Loucks, O (1996), 'From balance of nature to hierarchical patch dynamics: a paradigm shift in ecology.', *The Quarterly Review of Biology* 70(4), 439-466.

⁶⁰Fox, J, Truong, D, Rambo, A, Tuyen, N, Cuc, T, and Leisz, S (2000), 'Shifting cultivation: a new old paradigm for managing tropical forests.' *BioScience* 50, 521-528; Schmidt-Vogt, D (1998), 'Defining degradation: the impacts of swidden on forests in northern Thailand.', *Mountain Research and Development* 18(2), 135-149.

⁶¹Eg. Fairhead, J, and Leach, M (1996), *Misreading the African Landscape: Society and Ecology in a Forest-Savanna Mosaic*, Cambridge University Press.

⁶²Hamilton, L, and Pearce, A (1988), 'Soil and water impacts of deforestation' in Ives, J, and Pitt, D, eds., *Deforestation: Social Dynamics in Watershed and Mountain Ecosystems*, London: Routledge, pp. 75-98.

⁶³Eg. Fairhead, J, and Leach, M (1998), *Reframing Deforestation: Global Analysis and Local Realities: Studies in West Africa*, London: Routledge. See also Cline-Cole, R and Madge, C, eds. (2000), *Contesting Forestry in West Africa*, Aldershot: Ashgate.

⁶⁴Thomson, M, Warburton, M, and Hatley, T (1986), *Uncertainty on a Himalayan Scale: An Institutional Theory of Environmental Perception and a Strategic Framework for the Sustainable Development of the Himalayas*, London: Ethnographica, Milton Ash Publications.

This evidence does not mean that all concerns about desertification and deforestation are misplaced. Rather, it suggests that the common narratives need to be complexified. Both desertification and deforestation have been central in public perception of environmental degradation and continue to be used by governmental and non-governmental agents in simplistic and morally loaded ways. There is a need to examine how and why “powerful organisations and campaigners adopt conceptualizations of environmental degradation despite the growing evidence of the inadequacy of such concepts”⁶⁵. Environmentalist rhetoric framing these changes as degrading and anthropogenic often uses emotive description and quasi-apocalyptic images. Desertification, for example, has been described as “an aggressive cancer, consuming more and more earth”;⁶⁶ deforestation as “the greatest single setback to life's abundance and diversity since the first flickering of life four billion years ago”⁶⁷. Often aesthetic factors are brought in to support moral and scientific concerns about environmental degradation. Anti-deforestation campaigns, for example, often make use of images of majestic forest giants, burning wastelands and brutal logging machinery. Aesthetic judgements about healthy or balanced landscapes have informed ecological research and interpretation of ecological data in crucial ways: “[v]iews about ‘balance’ in landscapes, and the science of ecology, co-evolved to be mutually supportive”⁶⁸.

One ideological underpinning of contemporary environmental orthodoxies in Forsyth's treatment is the I=PAT equation, which has been widely used since the 1970s as a basis for understanding the causes of environmental

⁶⁵Forsyth, T (2003), *Critical Political Ecology: The Politics of Environmental Science*, Oxford: Routledge, p. 66.

⁶⁶Eg. Katyal, J, and Vlek, P (2000), *Desertification - Concept, Causes and Amelioration*, Bonn: Zentrum für Entwicklungsforschung, Universität Bonn, p. 7.

⁶⁷Myers, N (1984), *The Primary Source: Tropical Forests and Our Future*, New York: Norton.

⁶⁸Forsyth, T (2003), *Critical Political Ecology: The Politics of Environmental Science*, Oxford: Routledge, p. 67.

degradation⁶⁹. I stands for Impact, P for Population, A for Affluence and T for technology. According to the I=PAT formula, population, poverty and associated technological capacities or limitations are the drivers of environmental degradation. This understanding of the causes and character of environmental degradation is linked to environmentalism's emergence as a populist critique of capitalist-industrialist exploitation of the natural world, and the instrumental rationality which justified it⁷⁰. It also shares a common ideological foundation with Malthusian economics, the Limits of Growth argument, and 'the tragedy of the commons' model, according to which unrestricted access to resources by all would cause of environmental collapse⁷¹. In combination with the ecological balance-of-nature model, this means that uses of the environment which cause environmental change is always regarded as environmentally negative and perceived as anthropogenic degradation.

The balance-of-nature model is driven not just by biological findings but by social and philosophical conceptions of 'pure nature', where what is 'properly' natural is pristine, undisturbed and unchanging wilderness⁷². The practical effect of this conception is that all human impacts on the environment are perceived as negative and damaging, and the objective of conservation is the purely reactive one of preserving 'uncontaminated nature'⁷³. This treatment of wilderness, associated with the American conservationist tradition, has become a hotly contested topic in environmental philosophy and ethics, with some scholars rejecting the notion of wilderness as a distorting ideology which

⁶⁹Ehrlich, P, and Holdren, J (1974), 'The impact of population growth.' *Science* 171, 1212-1217.

⁷⁰Forsyth, T (2003), *Critical Political Ecology: The Politics of Environmental Science*, Oxford: Routledge, p. 6

⁷¹*Ibid.*, p. 44.

⁷²Eg. Foreman, D (1998), 'Wilderness Areas For Real' in Callicott, J, and Nelson, M, eds., *The Great New Wilderness Debate*, University of Georgia Press, pp. 395-407, and Denevan, W in the same, pp. 414-442; see also in this collection foundational texts of the wilderness myth from John Muir (pp. 48-62), Ralph Waldo Emerson (pp. 29-30) and Henry David Thoreau (pp. 31-47).

⁷³Forsyth, T (2003), *Critical Political Ecology: The Politics of Environmental Science*, Oxford: Routledge, p. 67.

propagates a human-nature dualism⁷⁴. Through the National Park system as it developed in the US, this understanding of environmental change and human activity has been exported to many other conservationist cultures around the world. Such a dualism produces environmentalist and conservationist discourse which is weighted towards preservation of 'pristine' natural areas, and against models of 'sustainable use' in which human impacts on nature are not viewed as degrading *per se*⁷⁵.

The historic association between capitalist socio-economics and environmentalism, combined with a discourse which assumes an equilibrium model of pristine self-regulating nature, is suggestive of a demographic pattern: ecological environmentalism arises among those who live in industrial and highly urbanised societies, and who do not have to make a living directly from the land⁷⁶. This demographic makes direct use of nature primarily in recreational contexts, rather than for survival. Their narrative of what 'nature' is may have as much or more to do with perceptions of social change and lost harmonies as with ecologically measurable degradation of environments⁷⁷. Ecological language and concepts are used to support this narrative, just as these ideas of nature contribute to ecological understanding and practice: " 'nature' is as important to ecological thought as 'tradition' is to conservation"⁷⁸, where 'nature' is an ideologically loaded concept which requires as a defining necessity the exclusion of human activity and impact⁷⁹. "Using ecology,

⁷⁴Cronon, W (1998), 'The trouble with wilderness: or, getting back to the wrong nature.' in Callicott, J, and Nelson, M, eds., *The Great New Wilderness Debate*, University of Georgia Press, pp. 471-499; also Cronon, W (1996), 'The trouble with wilderness: a response.' *Environmental History* 1, 47-55.

⁷⁵Callicott, J (1998), 'The Wilderness Idea Revisited: The Sustainable Development Alternative.', in Callicott, J, and Nelson, M, eds., *The Great New Wilderness Debate*, University of Georgia Press, pp. 337-365.

⁷⁶See eg. Nash, R (1973), *Wilderness and the American Mind*, Yale University Press, and Woodgate, G, and Redclift, M (1994), 'Sociology and the environment: discordant discourse?' in Redclift, M and Benton, T, eds., *Social Theory and Global Environment*, London: Routledge, pp. 51-66.

⁷⁷Forsyth, T (2003), *Critical Political Ecology: The Politics of Environmental Science*, Oxford: Routledge.

⁷⁸Woodgate, G, and Redclift, M (1994), 'Sociology and the environment: discordant discourse?' in Redclift, M and Benton, T, eds., *Social Theory and Global Environment*, London: Routledge, pp. 51-66.

⁷⁹*Ibid.*, p. 204.

conservationists have diagnosed the pathologies of nature and prescribed remedies to make it regain its rightful form"; ecological concepts "were absorbed uncritically by conservationists"⁸⁰. The notion of equilibrium in nature is one such concept: "Many abuses that have stemmed from conservation policies are rooted in the belief, held by policymakers, politicians, scientists, and administrators, of a balance or equilibrium-tending stability of nature"⁸¹.

These ideological elements in ecological and environmental discourse can be detrimental in when applied to the developing world, in which 'exploiting' nature is essential for survival. When Western environmentalism exerts political authority, whether governmental or non-governmental, in the Global South, there can be severe consequences for those who live off the land (or the water). The I=PAT equation, combined with equilibrium ecological models of harmonious nature in which all changes are bad changes, overlooks the varied ways in which such communities are likely to interpret environmental change. What appears as degradation to Western eyes may not appear so to the communities whose livelihoods depend on natural resources in their immediate vicinity. Powerful vested interests of governmental and non-governmental environmental lobbies are often insensitive to this, fuelled by environmental orthodoxies which are wedded to a singularly inflexible model of environmental value. Fairhead and Leach describe one such situation in Kissidougou, New Guinea, where "the degradation discourse" has had "instrumental effects on many aspects of Kissidougou's life"⁸². The list of ills resulting is worth quoting in full, as it shows the concrete consequences of the ideologies we have been discussing. Those propagating the degradation discourse have

⁸⁰Adams, W (1997), 'Rationalization and conservation: ecology and the management of nature in the United Kingdom.', *Transactions of the Institute of British Geographers* NS 22, 277-291, pp. 284-285.

⁸¹Zimmerer, K (2000), 'The reworking of conservation geographies: nonequilibrium landscape and nature-society hybrids.' *Annals of the Association of American Geographers* 90(2), 356-369.

⁸²Fairhead, J, and Leach, M (1996), *Misreading the African Landscape: Society and Ecology in a Forest-Savanna Mosaic*, Cambridge University Press, p. 295.

“impoverished people through taxes and fines, reduced people's ability to benefit from their resources, and diverted funds from more pressing needs. They have accused people of wanton destruction, criminalised many of their everyday activities, denied the technical validity of their ecological knowledge and research into developing it, denied value and credibility to their cultural forms, expressions, and basis of morality, and at times even decried people's consciousness and intelligence. The discourse has been instrumental in accentuating a gulf in perspectives between urban and rural; in undermining the credibility of outside experts in villager's eyes; in provoking mutual disdain between villages and authority, and in imposing on the farmer images of social malaise and incapacity to respond to modernity.”⁸³

Conclusion

This fate of Kissidougou underlines the political importance of understanding ecologically-based ideologies in environmentalism and exposing them to view for analysis and debate; “We need to see the evolution of environmental facts and knowledge as part of the political debate, rather than as a pre-prepared basis from which to start environmental debate”⁸⁴. There is no “pre-defined unequivocal [environmental] problem”; rather there is “a complex and continuous struggle over the definition and the meaning of the environmental problem itself”⁸⁵. The definition of the environmental problem, and resulting identification of ecological, political and practical solutions, depends on a responsible ecology which is prepared to have its basic conceptualisations challenged and to frequently revisit its fundamental ideas, including its political and ideological suppositions. The increasing influence within ecology of a ‘flux-of-nature’ model, which is challenging traditional equilibrium understandings of natural systems, is helpful and important in this regard. This changing paradigm will

⁸³Ibid.

⁸⁴Forsyth, T (2003), *Critical Political Ecology: The Politics of Environmental Science*, Oxford: Routledge, p. 1.

⁸⁵Ibid., p. 16.

have important impacts on perceptions of what counts as 'natural', and may make a significant difference to environmentalism⁸⁶. But there is still a need for ecologists to be more aware of the value-laden character of the discipline and recognise the ways in which this plays out in practice, whether scientific or political.

At this stage, two objections to the foregoing discussion must be noted and countered. The first is the charge that recognising the narrative character of science represents an assault on the very possibility of objective scientific knowledge. The second is that the sort of questioning of ecological concepts and environmentalist discourse I have engaged in is a form of 'brownlash'. Brownlash describes environmental research agendas that actually undermine environmental concern and activism, and is associated with the financial sponsorship of large companies who support research which takes advantage of an academic forum to fuel skepticism of the environmental agenda⁸⁷.

In the first instance, recognising that science is co-constructed by ideology and formed by value-laden narratives does not need to result in scientific relativism unless a positivistic model of scientific knowledge is insisted upon. Science only appears anti-scientific, and results in anti-realism, if it weds itself to a naïve foundationalism, to representationalist epistemology and to Cartesian dualism. The constructed nature of knowledge does not make that knowledge untrue⁸⁸. At the most basic level, any science depends on the recognition of the goodness and desirability of truth, which is not an empirically derivable *datum*, but an un-derivable prerequisite for any empirical investigation. The un-derivability of the goodness of truth gives the lie to the claim that scientific knowledge should reject all but the empirically testable. Only in frameworks of

⁸⁶Simus, J (2009), *Disturbing Nature's Beauty: Environmental Aesthetics in a New Ecological Paradigm*, Denton, Texas: University of Northern Texas Digital Library. <http://digital.library.unt.edu/ark:/67531/meta dc11008/>, accessed 30th November 2013.

⁸⁷See Ehrlich, P, and Ehrlich, A (1996), *A Betrayal of Science and Reason: How Anti-Environmental Rhetoric Threatens Our Future*, Washington DC: Island Books; Morris, J (1995), *The Political Economy of Land Degradation: Pressure Groups, Foreign Aid and the Myth of Man-Made Deserts*, London: Institute of Economic Affairs; Stott, P (1999), *Tropical Rain Forest: a Political Economy of Hegemonic Mythmaking*, London: Institute of Economic Affairs.

⁸⁸Milbank, J (2006), *Theology and Social Theory: Beyond Secular Reason: 2nd Edition*, Oxford: Wiley-Blackwell. See especially Preface to the Second Edition.

recognised goods, where truth is the pre-eminent good, can basic scientific notions of relevancy and accuracy have any purchase. Environmental sciences are also informed by the recognition of the good of life. The use of ecology in environmentalism and of environmentalism in ecology makes this particularly evident. It is only by starting from the (empirically unjustifiable) position that life itself is a good that there can be an 'environmental science'.

The second charge is understandable but false. Vigorously debating the values and impacts of ecological and environmental orthodoxies is taking environmental concern as seriously as possible; it matters too much to be in the control of one group of scientific experts, politicians, or lobbyists, or one geographical region or social group. Sceptical enquiry into environmental and ecological discourse is intended to improve the accuracy and relevancy of biophysical accounts of causes and effects and of their social and political significance. Challenging the conceptualisation of environmental 'problems', and recognising the institutional influences on such conceptualisations, promotes "a more sophisticated analysis of environmental degradation" which is better placed to conceive and apply concrete solutions⁸⁹. Presenting certain environmental explanations as non-negotiable truths stifles this process. Political uses of ecology that are unresponsive to unexpected research findings which contradict established patterns, and ecological thinking that is insufficiently alert to the influences on and influence of its own fundamental concepts, need to be questioned. This is anything but 'brownlash', in the sense that it recognises that genuine progress can be made in attaining accuracy and relevancy⁹⁰.

It will be noticed, however, that these responses to criticism imply a certain tension. The framework of goods that science depends on, and the environmental good which is presumed in my defence of a critical approach to environmental and ecological

⁸⁹Forsyth, T (2003), *Critical Political Ecology: The Politics of Environmental Science*, Oxford: Routledge, p. 275.

⁹⁰For the critical process of scrutinising ideologies at both the scientific and the political levels, the natural sciences need not just social sciences but also the humanities. Philosophy, history, aesthetic disciplines such as literature, and even theology, can provide an invaluable perspective on the scientific project and its political uses. See MacIntyre, A (2009), *God, Philosophy, Universities: A Selective History of the Catholic Philosophical Tradition*, Plymouth: Sheed & Ward.

discourse, must in some sense be held accountable to the same critique of constructivism. It is extremely important for ecological and environmentalist discourse to be supported by an ontology which recognises the primacy of the good in and through our constructions of it. This ontology will not oppose 'objective/given' and 'subjective/constructed'. Such a dualism separates the 'good' from the 'true' and guarantees that scientific understanding will always be in denial of its own ideologies, and those it is called to serve, such as the good of life. Rather it will be an ontology which expresses the reciprocity of mind and world, and which itself supplies the rationale for the reverent esteem of life on which ecology and environmentalism depend⁹¹. This ontology can and should be explored by biology itself, showing the ontology inherent in biological understanding. In this way biology will always be on the side of the common good.

⁹¹See eg. Jonas, H (2001), *The Phenomenon of Life: Notes Towards a Philosophical Biology*, Northwestern University Press; Hanby, M (2013), 'Creation's Gift to the Sciences.' Centre for Theology and Philosophy, http://theologyphilosophycentre.co.uk/papers/Hanby_SavingTheAppearances.pdf, accessed 3rd August 2013; Hanby, M (2013), *No God, No Science: Theology, Cosmology, Biology*, Oxford: Wiley-Blackwell; Cunningham, C (2008), 'Trying My Very Best To Believe Darwin, Or, the Supernaturalistic Fallacy: From Is To Nought.' in Candler, P, and Cunningham, C, eds., *Belief and Metaphysics*, London: SCM, pp. 100-140.