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Critical realism and political ecology

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Why a realist political ecology?

Much discussion of critical realism and environmental issues has focused on philosophical debates concerning the dichotomies of nature/ society, people/ animals, or women/ men (e.g. Benton, this volume; Jackson, 1997). Yet in addition, critical realist arguments are also relevant to debates concerning environmental degradation and the management of ecological resources. The aim of critical realist research on environmental degradation is to highlight how scientific explanations of environmental change provide only partial insights into complex biophysical processes, and that existing models of explanation reflect the agendas of the societies that created them. Such explanations are problematic as they may only address certain aspects of biophysical change. Moreover, they may not represent the interests of social groups not included in the science process, particularly in developing countries.

Academic work focusing on the interface between politics and environmental degradation has often been labeled 'political ecology' (e.g. Blaikie, 1985).[1] Yet some recent writings on political ecology raise important questions from the perspective of critical realism. On one hand, there is a body of work that focuses on the environmental activism associated with struggles over resources and the formation of the state (e.g. Bryant and Bailey, 1997). Such work presents a valuable analysis of grassroots resistance and non-governmental organizations as counter points to repressive state policies and industrial activity. But this work may also be criticized for uncritically accepting existing definitions of environmental degradation derived from positivistic natural science without acknowledging how such terms are constructed. Indeed, much recent research within developing countries has indicated that many processes commonly thought to be degrading, such as soil erosion and deforestation, may not always threaten livelihoods or present long-term damage to ecosystems as sometimes thought.

[1] Similar terms are 'social ecology' and 'cultural ecology', which seek to assess the interface between societies and environmental change, often through locally based anthropological studies.

On the other hand, an alternative approach to political ecology engages directly with the constructed nature of environment, and the role of discourse and political action in establishing accepted definitions of environment. Peet and Watts (1996:37) write:

> 'The environment is an active construction of the imagination, and the discourse themselves assume regional forms that are, as it were, theoretically organized by natural contexts. In other words, there is not an imaginary made in some 'separate' social realm, but an environmental imaginary, or rather whole complexes of imaginaries with which people think, discuss, and contend threats to their livelihoods'.

Yet critical realists might criticize this statement for repeating the epistemic fallacy, or the belief that local discourses and knowledge might provide accurate insights of a biophysical reality that operates independently of human experience. Avoiding environmental problems might also require identifying biophysical prospects of resources that may exist uniformly across space.

An alternative body of work seeks to integrate political awareness of environmental conflicts with a realist understanding of environmental change. The key aspect of this type of work is that it incorporates the construction of biophysical science into the political analysis of environment. Such work may be considered critically realist because it seeks to understand ecological change through epistemological skepticism but ontological realism to underlying biophysical processes.[2] An alternative phrasing is the belief that biophysical reality is 'externally real' to human experience, because all knowledge, we have of such reality is partial and socially constructed. This kind of work may claim to be genuine 'political ecology' because it assesses the political construction of what is considered to be ecological. In this sense, (critically) realist political ecology builds on advances in science and technology studies (STS) by seeking to indicate how supposedly apolitical scientific laws in fact reflect historic political and social relations (e.g. Latour, 1993). Yet unlike STS, realist political ecology does not just seek to illustrate how such boundaries are constructed, but also to reconstruct new and more effective science for environmental policy that is both biophysically more accurate than existing conceptions, and socially more just. As this chapter argues, this ambition does not imply a belief in naïve realism – or the idea that environmental change can be understood in any final and complete way – but that existing scientific constructions of environmental degradation can be made more beneficial, and less potentially damaging, to people previously unrepresented in the science process.

What kind of environmental realism?

[2] Indeed, Hannah (1999) suggests 'skeptical realism' may be a more fitting name than 'critical realism' on account of the focus on individuals and science as knowing subjects, rather than on social ontological structures.

The aim of a realist political ecology is to understand the political ramifications of environmental degradation, but in a way that acknowledges the social and political construction of definitions of degradation. But does this mean identifying more accurate (and hence more realist) models of environmental explanation, or simply presenting alternative conceptions of environmental change arising from social groups previously unrepresented in science?

The usual problem discovered by researchers of environmental change in developing countries is that existing – or orthodox – conceptions of environmental degradation simply do not work. There are many examples of such 'environmental orthodoxies', including topics such as desertification, deforestation, and soil erosion (see also Leach and Mearns, 1996). Perhaps the best example of an environmental orthodoxy is the so-called Himalayan Environmental Degradation theory, which arose during the 1970s to claim that increasing population pressures in Nepal were leading to a vicious circle of deforestation, landslides, and further deforestation. Research conducted during the 1980s revealed that there were actually numerous and diverse measurements of environmental change in the Himalayas for which crisis was only one of many potential scenarios. Indeed, anthropological work revealed some hill farmers even triggered landslides themselves because they increased agricultural productivity (Thompson *et al*, 1986). It is now appreciated that so-called environmental 'degradation' is in fact a complex blend of biophysical processes – resulting from high rates of tectonic uplift, rainfall, vegetation growth, etc. – and the vulnerability and perceptions of social groups that may be divided on lines of gender, class, age, wealth etc. Worryingly, the existence of fixed beliefs about degradation – such as in environmental orthodoxies – can make things worse for both policymakers and local inhabitants because they simplify the biophysical processes that lead to environmental change, and because they overlook the social and political factors that create vulnerability to change. Indeed, some policy recommendations resulting from environmental orthodoxies such as enforced reforestation can have marginal impacts on long-term biophysical processes, plus enhance social vulnerability.

[Table 1 here]

The emergence of orthodox explanations for environmental problems can be traced to a combination of historic scientific practice based on the search for positivist and universal laws, and the experience and agendas of the societies that created the science (see also Latour and Woolgar, 1986). For example, the so-called 'Universal Soil Loss Equation' in the USA was constructed in response to serious soil erosion problems during the 'dustbowl' of the 1930s, and was built using erosion testing strips in the southwest of the country. Later applications in developing countries where rainfall, soil formation, and land-use practices are all different have revealed that the equation is far from 'universal', yet many development agencies and modelers still refer to the equation as a standard for indicating erosion.

In addition, there has been too little attention to the institutional factors that lead to the identification of certain environmental changes as 'degradation'. For many urban and industrial societies, trees are associated with natural beauty and wilderness. Yet for small farmers trees can produce food, firewood and building materials, or take up land needed for agriculture. 'Deforestation' therefore presents a variety of impacts for different social groups, including some benefits. The construction of deforestation as degrading is therefore a hybrid blend of physical impacts, social framings and values that reflect the perspectives of more powerful groups. But locally based research of environmental management among small farmers can question, or indeed falsify, the scientific basis of more powerful discourses. Does this represent a case of 'stratification and emergence' of environmental reality as argued by Bhaskar, or simply the illustration of an alternative hybrid construction of environment? In fact it is both.

Social perceptions of biophysically real environmental processes can be approached in a variety of ways from debates within realism. Perhaps most fundamentally, environmental processes such as water and sediment flows, vegetation growth, and desiccation of soil can be separated from the meanings attributed to them by different social groups (although acknowledging that the identification of such processes in the first place implies some social framing). Using Searle's (1985) terminology, such processes represent 'brute facts' – or entities about which there is little debate concerning their existence – but the identification of the processes as 'degradation; implies the translation of brute facts to 'institutional facts' – or those entities to which different social groups ascribe different functions. In certain occasions, environmental change composing of 'brute' biophysical processes may indicate degradation for one group, but be unproblematic or indeed good for another. As Blaikie and Brookfield (1987:4) wrote, 'one farmer's erosion is another's agricultural fertility'.

This kind of argument may also be expressed through reference to semantic realism (e.g. Tennant, 1997). Under semantic realism, truth statements can only be made through the construction of 'sentences' rather than 'words' from the perspective of the speaker. According to Russell (1940:245):

> 'On what may be called the realist view of truth, there are 'facts', and there are sentences related to these facts in ways which make the sentences true or false, quite independently of any way of deciding the alternative. The difficulty is to define the relation which constitutes truth if this view is adopted.'

In the context of environmental degradation, the individual 'words' are biophysical processes, which are arranged into sentence-based truth statements by whoever sees the processes as threatening to intended land uses.

It may therefore be argued that the political analysis of environmental degradation does not simply concern identifying winners and losers of struggles involving existing definitions of degradation, but instead the political struggle in environmental discourse to establish the truth conditions for identifying biophysical

processes as degrading. In essence this means advancing beyond identifying environmental degradation as defined by laws defined by universal positivist hypotheses or propositions, but acknowledging the social and institutional factors that both frame and experience externally real biophysical processes. Aronson *et al* (1994) describe this process as a gradual transition from approaching realism as the verisimilitude of discourses (relying on propositional truth) to the verisimilitude of models (pictoral truth). They write (1994:6-7):

> 'ontological atomism is replaced by global-ontological relationalism… scientific discourses is seen through the eyes of the metaphor.'

Such new political struggles involves empowering social groups and environmental perspectives not previously represented in science, and in subjecting existing explanations of environmental change to critical scrutiny. This approach implies some scientific progress through falsifying existing explanations in certain circumstances. Yet it also means political intervention in environmental discourse to create new spaces for local discursively identified environmental science to operate.

Example: hybrid science

An increasing body of research within environment and development illustrates techniques to rebuild environmental explanations on realist grounds (see Batterbury *et al*, 1997; Forsyth, 1998). Writing within science and technology studies, Bruno Latour (1993) has identified the concept of 'hybridity' to indicate the complex blending of social and biophysical factors within current concepts of nature and society, and the futility of attempting to 'purify' such concepts into separate natural and social components. So-called 'hybrid science' however, attempts to disentangle elements of biophysical change from social framings in environmental change by integrating aspects of physical and social science. The aim of hybrid science is not to uncover biophysical change in a final and complete realist manner, but to reveal how far hegemonic discourses of degradation may actually match the experience of people within specific localities.

Examples:

- *Deforestation in the West African forest-savanna transitional zone*

Research by Fairhead and Leach (1996) has demonstrated how orthodox explanations of deforestation in western Africa have reflected the false assumptions of scientists and policymakers rather than historic evidence from local inhabitants. In the forest-savanna transition zone in Guinea, the Kissi and Kuranko people have often been blamed for deforestation that has occurred during the last 200 years. Officials claim, for instance, that some 800 patches of forestland in Kissidougou province represent relics of a larger forest area that once covered this entire area

However, research into historical land-cover patterns and local forestry practices suggests that the Kissi and Kuranko actually created these patches on relatively treeless savannas through a painstaking process of altering fire and soil conditions. One of the farmers' key strategies was to promote the growth of 'silk-cotton' trees and other fast-growing species that increase forest area, provide wood, reduce the risk of fire, and (in the past) protected the villages from attack. Indeed, research indicates that some 71 percent of the 38 villages surveyed were founded in areas of savanna and encouraged forest growth around them.

The research methodology employed in this research involved a hybrid mix of quantified science, including the use of satellite imagery and transect surveys of vegetation, and qualitative analysis focusing chiefly on oral histories complied from interviews and discussions with villagers. One key element of research was to identify a local environmental history, and to compare this with official accounts of change. The result was to challenge some of the long-standing assumptions of environmental degradation dating from colonial times, and to demonstrate that the local people were in fact increasing rather than decreasing forest area.

- *Soil erosion in the highlands of Thailand*

Research by Forsyth (1996) has similarly questioned long-standing assumptions about environmental degradation in mountainous zones. According to Himalayan Environmental Degradation Theory discussed above, population increase within traditional upland agrarian communities will lead to the cultivation of steeper and steeper slopes. As a result, it is assumed that soil erosion will increase, leading to further pressure to cultivate steep slopes, and also produce downstream impacts on water supply and sedimentation. Policymakers have often argued that the solution to this problem is to restrict upland agriculture, and even relocate villages from the highlands to the lowlands.

An analysis of historic land use patterns in one village in Chiang Rai province, northern Thailand, revealed that the local Mien shifting cultivators had actually avoided using the steepest slopes in their locality. Farmers appreciated that cultivation on steep slopes caused erosion, and hence tended to use slopes of less steep incline more frequently. As a result, less erosion was caused, but agricultural fertility declined rapidly because of insufficient fallow periods. Furthermore, associated research of local geomorphological processes indicated that the area was dissected by deep gullies associated with granite land in similar areas of the tropics. These gullies predated agriculture, and were likely to be more effective conduits for lowland sedimentation than agricultural fields. It was therefore likely that much lowland sedimentation from the highlands was the result of naturally occurring rather than agricultural practices.

This study employed hybrid techniques by combining participatory discussions and observation of farmers, with quantified mapping of historic land use from aerial photographs using a geographical information system (GIS). The information from the GIS provided insights into the nature of gullying, and the extent that farming had encroached on steep slopes. The combination of these techniques enabled the analysis to

challenge some of the existing orthodox assumptions about the relationship of upland agriculture to environmental degradation in the region. It also indicated that local agricultural productivity was more likely to be affected by exhaustion of soil nutrients by overcultivation, rather than the removal of nutrients by erosion.

In both of these examples, the adoption of hybrid science techniques allowed the investigation of so-called 'hybrid' concepts of environmental degradation involving aspects of biophysical change and human experience. The studies form part of a realist political ecology because they have identified part of the political basis upon which environmental change has been constructed, and also undertaken steps to reconstruct science to acknowledge the role of local people. This technique is not realist in an ultimate sense of revealing how environment changes without any framing or relevance to human societies. But it does allow some scientific progress because it questions, and even falsifies the existing dominant discourses of environmental degradation. Yet rather than simply replacing one universal version of environmental truth with another, the studies indicate that the perceptions and actions of local people can create alternative versions of environmental truth that can be borne out by investigative science (see also Harré, 1993). The implication is that environmental explanation needs to incorporate the views and experiences of people living in supposedly degraded zones in order to be both biophysically accurate and socially relevant.

Conclusion: reconstructing environmental science

In common with many other areas of postmodern debate, recent studies of environmental problems and policy have focused on the ways in which environment or nature have been constructed, and the potential plurality of conceptions and priorities for policy. Perhaps most influential have been studies within science and technology studies, which have stressed how many commonly used concepts of 'nature' are in fact 'hybrid' blends of social perceptions and biophysical experiences (see Latour, 1993). This work has empowered political discourse by providing insights into how historic actors and societies have defined the boundaries between nature and society. But at the same time, there has been a disempowering effect on realist scientific explanation and prediction that may be needed for addressing current environmental problems that affect vulnerable populations.

As an alternative, this chapter has argued for a realist political ecology that aims to recognize constructions of science, yet also build new scientific explanations to address local development more effectively than existing environmental explanations. In effect, this is to empower one constructed version of reality over another by changing the focus of environmental policy (or 'problem closure') towards objectives

addressing the needs of developing or poor communities. But it is also a realist argument because it involves recognizing the inaccuracies of pre-existing 'institutional facts' about environmental change that are currently accepted as universal and unchallenged in mainstream environmental debate. In this way, realist political ecology does not uncover the 'reality' of biophysical environmental processes in any absolute or final way, but instead aims to progress science from one constructed set of explanations to others that are socially and practically more relevant in local contexts.

Institutionally, realist political ecology presents a variety of problems and challenges. Most importantly, building new scientific explanations based on the values and experiences of local groups does not imply that either local values or science can operate at larger time and space scales (although they might). Similarly, local experience and knowledge may not always prepare people against new environmental hazards such as industrial pollution in areas undergoing industrialization, at least in the short term. There is consequently a need for effective forms of governance that can accommodate local constructions of environmental change on one hand, yet also communicate forms of environmental protection on the other. For example, some policy advisors in Southeast Asia have urged the prohibition of burning by shifting cultivators because of the potential impacts on climate change and forest fires. Alternative, realist responses might argue for reframing climate change policy to reduce industrial emissions in developed countries rather than penalizing small farmers, plus the recognition of the role of limited fires in establishing high biodiversity. However, such arguments need not preclude the establishment of forest reserve areas for both the protection of 'wild' biodiversity and the sequestration of carbon dioxide if they can be achieved practically and with the approval of local inhabitants.

The key objective of realist political ecology is to address the current lack of attention as to how far 'scientific' explanations of environmental change which are currently accepted as factual actually reflect the experiences and values of powerful groups in history. Figure 1 indicates a preliminary and simple classification of environmental problems using the terminology of Searle (1985) which attempts this elucidation. In this diagram, environmental 'brute facts' (or biophysical properties) are divided locally or globally according to their universality over space. The 'institutional facts' (or definitions of degradation) are controlled by discursive practices. For example, both ozone depletion and climate change are commonly defined as 'global' problems yet their impacts (and causes) vary locally. This chapter has argued that too many orthodox environmental explanations have confused category 4 (discursively constructed global problems) with category 2 (universal biophysical facts), and paid insufficient attention to category 3 (discursively constructed local problems). Alternatively, some postmodern approaches to environmental degradation (for example, Peet and Watts, 1996) have urged the adoption of category 3 without also acknowledging the influence of categories 1 and 2. The aim of realist political ecology is to increase awareness of how proposed explanations of environmental degradation may fall into each category, with

the ambition of increasing local determination of environmental policy, and to avoid the potentially damaging impacts of policies based on assumed universal laws of nature.

[Figure 1 here]

This is not to argue that environmental science can be absolutely realist, or that so-called 'brute facts' are free from social framing. Instead it is to acknowledge the need to avoid the damaging social and biophysical impacts of environmental policy that does not take into account the needs and experiences of people not previously represented in science. Latour (1993:142) wrote:

> 'We want the meticulous sorting of quasi-objects to become possible – no longer unofficially and under the table, but officially and in broad daylight. In this desire to bring to light, to incorporate into language, to make public, we continue to identify with the intuition of the Enlightenment.'

Realist political ecology provides the means to integrate social constructivist approaches to environment with realism debates in order to make environmental science more relevant.

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Figure 1: Preliminary classification of environmental brute and institutional facts

	Local	Global
Brute facts	1	2
Institutional facts	3	4

1 = local 'brute' facts or physical properties *(eg. aridity, tectonic uplift)*
2 = universal 'brute' facts or physical properties *(eg. freezing points, toxicity)*
3 = local discursively constructed environmental problems or adaptations *(eg. shifting cultivation, pastoralism)*
4 = global discursively constructed environmental problems *(eg. deforestation, climate change)*