SCIENCE ACROSS CULTURES:
THE HISTORY OF NON-WESTERN SCIENCE

Nature Across Cultures

Views of Nature and the Environment in Non-Western Cultures

Edited by
Helaine Selin

Springer-Science+Business Media, B.V.

NATURE ACROSS CULTURES

Views of Nature and the Environment in Non-Western Cultures

Editor

HELAINE SELIN

Hampshire College, Amherst, Massachusetts, USA

Advisory Editor

ARNE KALLAND

University of Oslo, Oslo, Norway

SPRINGER-SCIENCE+BUSINESS MEDIA, B.V.

Library of Congress Cataloging-in-Publication Data

Nature across cultures : views of nature and the environment in non-western cultures /
Helaine Selin, editor; Arne Kalland, advisory editor.
p. cm. – (Science across cultures ; v. 4)
Includes bibliographical references and index.
ISBN 978-90-481-6271-0 ISBN 978-94-017-0149-5 (eBook)
DOI 10.1007/978-94-017-0149-5
1. Human ecology–Cross cultural studies. 2. Philosophy of nature–Cross-cultural studies. 3. Indigenous peoples. 4. Nature–Effect of human beings on. 5. Environmental protection. I. Selin, Helaine, 1946- II. Kalland, Arne. III. Series.

ISBN 978-90-481-6271-0

Printed on acid-free paper

MICHAEL R. DOVE, MARINA T. CAMPOS, ANDREW SALVADOR MATHEWS,
LAURA J. MEITZNER YODER, ANNE RADEMACHER, SUK BAE RHEE
AND DANIEL SOMERS SMITH

THE GLOBAL MOBILIZATION OF ENVIRONMENTAL CONCEPTS: RE-THINKING THE WESTERN/NON-WESTERN DIVIDE

It is increasingly evident that the process of globalization is a more complex and conflicted one than has been thought to be the case. Former iconographic images of "one world" have come to be suspect (Ingold, 1993; Sachs, 1992), and predictions of the coming "global village" have receded in the face of increasingly prominent divisions between developed and under-developed countries, North and South, Western and non-Western (Huntington, 1996).[1] The first challenge of global governance, as the debate over global warming has demonstrated, is not to coordinate solutions to global environmental problems, but to agree on a definition of the problem in the first place (Dove, 1994). An apparent irony of the globalization process is that at the same time as it erases some barriers and boundaries it constructs and crosses others. The simultaneous construction and destruction of boundaries is evident in the new and unorthodox alliances and oppositions that global mechanisms like the World Trade Organization have fomented.

One prominent fault line running through these new global alliances and oppositions is that between the developed industrialized nations and the less-developed industrializing ones. Western and non-Western stances in these debates are often easily differentiated. This differentiation maps onto a more general distinction that has developed over the past generation between Western and non-Western systems of resource use and environmental knowledge. Through the 1960s and 1970s, Western scientists privileged their own views of the environment, perceived few alternatives, and assumed that their views would eventually hold sway over the world as a "global science". Then, in part because of the increasingly obvious unsustainability of certain of the resource-use systems underpinned by Western science, non-Western systems of environmental knowledge and practice began to receive some recognition. Previously pervasive deprecation of non-Western systems of resource use has been replaced in many quarters by valorization of these same systems. This reappraisal is a

H. Selin (ed.), Nature Across Cultures: Views of Nature and the Environment in Non-Western Cultures, 19–46.

useful correction to the previously uniform approbation and disapprobation of Western and non-Western systems, respectively, in international circles. However, the perceived underlying division between the two is actually quite problematic (Agrawal, 1995; Dove, 2000).[2]

There is a critical literature on the social construction of global environmental problems (e.g., Lohmann, 1993; Taylor and Buttel, 1992). Recent contributions to this literature focus on the sociology of knowledge involved, in particular the way that environmental knowledge is transported and transformed, and in particular between Western and non-Western societies (e.g., Brosius, 1997; Dove, 1998; Gupta, 1998; Rangan, 1992; Tsing, 2000; Zerner, 1996). Most relevant to critiquing the validity of the division between Western and non-Western systems is recent research on the global circulation of environmental concepts. "Circulation" is actually an inadequate and misleading term to describe this process, because of what it implies for the agency of the concepts themselves as opposed to the people who hold and mold them. Environmental concepts do not travel independently from one place to another and impose themselves on agency-less people. Rather, the concepts of one part of the global community get appropriated, transformed, and contested by specific local actors when they move to another part, for which reason the term "deployment" or perhaps "mobilization" of ideas might be preferred to circulation (Tsing, 1999b, 2000). Transformation of concepts is made both possible by this movement and also necessary: concepts become powerful in a new setting only if they can be integrated into it, at the same time as a part of their power derives from continued identification with their prior setting. It is the non-fixity of the transported concept that allows it to draw on (as well as dispute) sources of authority in both its place of origin and its new setting.[3] The non-fixity of the transported concept is also a key to forging global coalitions: Tsing (2000) maintains that the key to successful global coalitions is the *mis*-translation of ideas. The movement of ideas is powerful, in part, because of this very reinterpretation and hybridization.

The process of the global mobilization of environmental knowledge is the subject of this chapter. The chapter is built around a number of different case studies, focusing on three themes. The first involves the valorization and villainization of resources users; the second focuses on the complexity of Western environmental discourses and how this affects their deployment in both Western and non-Western countries. The third theme concentrates on the historic processes by which Western and non-Western environmental concepts become hybridized.

HEROES AND VILLAINS IN THE TROPICAL FORESTS

In recent years, a problematic linkage has emerged between western environmentalists and politically marginal forest dependent communities in the tropics. Since the 1980s, some Western environmentalists concerned with conserving or sustainably managing tropical ecosystems have championed their cause in part through romanticized representations of forest-dwellers as "ecologically

noble savages" or primitive environmentalists (Ellen, 1986; Redford, 1990; Brosius, 1997; Conklin, 1997). These representations exoticize forest-dwellers as timeless, egalitarian, wise, and natural stewards of the environment (Poffenberger and McGean, 1993; Lynch and Talbott, 1995). Some anthropological work criticizes these representations of forest-dependent communities, revealing their dubious authenticity, the Western environmentalist agendas that motivate them, and the political-economic consequences when one group of forest-dwellers rather than another captures the interest of western environmentalists (Brosius, 1997; Conklin, 1997; Li, 1999). Other scholarship has taken a different tack, examining not only the process of fashioning these representations, but also the benefits they provide to local people (Tsing, 1999; Li, 2000). [Editor's note: see Dudgeon and Berkes' paper on Traditional Ecological Knowledge and Roy Ellen on the Construction of Biological Knowledge in this volume.]

Primitive conservationists in Borneo

The first example comes from the work of the Center for International Forestry Research (CIFOR), which is developing forest co-management programs with Dayak communities and other stakeholders in East Kalimantan.[4] By investigating the possibilities of forest co-management, CIFOR has opened up new rhetorical space for Dayak to contest dominant state resource discourses and to represent their own resource rights and uses better. As Li (1999a: 24) explains,

> Instead of a dialogue between the state and its critics, a mirror effect simply inverts the categories (wise swiddener/destructive swiddener, valuable traditions/backward traditions) leaving the categories themselves essentialized and fundamentally unchanged. In between these opposing camps, uplanders must invent especially creative strategies in order to defend their livelihoods and advance their own agendas, attempting to turn both state and 'green' discourse to their own ends.

One example of these "creative strategies" was demonstrated during a two-week research workshop, which was attended by (among others) three local Dayaks. Each of the individuals represented a different ethnic group – Kenyah, Merap and Punan. All three men were well-respected individuals in their communities and had extensive contact with researchers. During the workshop, all three emphasized both the cohesion among the ethnic groups and their efforts to protect forest resources. For example, they explained that when they find *gaharu* (*Aquilaria* spp.), they attempt to extract the part of the tree that is infected, leaving the rest of the tree standing in hopes that it will recover.[5] This account contradicts previous descriptions by other Dayak of the *gaharu* harvesting process, in which the entire tree is felled. Further, these three Dayak men consistently spoke of the harmonious cooperation among their respective ethnic groups, presenting a picture of village social dynamics which dramatically differs from both the stories told previously by other villagers and personal observations during fieldwork in their villages.[6] This fieldwork revealed not only a lack of cohesion among the different ethnic groups, but also an explicit inter-group discourse of inferiority and aggression.

The key to understanding these contradictions lies in the shift in socio-political context between village and research station. At the research station – which represented a shift to the formal and public – these Dayak men were engaged in an event of formal documentation, the results of which were to be used by the international research organization. It was a "field of attraction". As Tsing (1999a: 162) explains, for rural minority leaders to flourish today as tribal elders, a representational strategy with political force is required: "a field of attraction must be created to nurture and maintain the relationship between the rural community and its [environmentalist and green development] experts ... that keeps experts coming back."

Another example of Dayak appropriation of Western environmentalist discourse involves the fashioning of resource rights claims in romanticized terms. In 1991, a number of Punan in this same part of East Kalimantan formed a foundation to serve as the official voice for Punan living throughout the province.[7] A document entitled "The Mission and Vision of the Community of Traditional Punan Dayak", written by the Punan Chief Customary Leader, exemplifies the use of metaphors of nature and ancient customary law that appeal to Western environmentalist fantasies of forest dwellers:

> The words of our Mission and Vision ... are as strong as ironwood and as hard as iron stone. The wisdom of customary law for the Punan community ... is not merely a theory or concept like the products of laws, presidential decrees and government regulations that ... have caused losses in the rights of customary communities. Anybody ... who does not respect the existence of custom means that he or she is not the creation of God, who said humans must live and have children and grandchildren just like the grass and wood that is above the earth, guard and be responsible for the protection of nature in the whole world.[8]

Even in less formal contexts, Punan in this region now invoke images of themselves that fit well with environmentalists' notions of the indigenous naturalist. For example, Punan who have worked closely with researchers (including ethnobotanists) and environmental and social justice NGOs may say, "The forest is to us as milk is to a baby", which is a completely non-traditional image.[9] Also, they frequently mention – without prompting – the abundance of medicinal plants in the area and their knowledge of them. This echoes Brosius' (1997: 62) account of Penan in Sarawak who had worked with environmental NGOs: "One of the more interesting consequences of the environmentalist rhetoric of medicinal plants is that this rhetoric has itself suffused back to the Penan and been adopted by them as their own." In contrast, Punan in East Kalimantan who have had little contact with Western researchers or with self-representation for outside audiences rarely articulate livelihood practices or beliefs in these terms (cf. Brosius, 1997). Nor do the non-Punan Kenyah and Merap deploy rhetoric that so closely matches Western environmentalist discourse.[10]

This analysis illustrates the ways in which forest dependent communities deploy western environmentalists' representations of them as points of political leverage. Its purpose is *not* to assess the degree of authenticity of these representations; rather it is to contribute to the understanding of identity formation

and change through the articulation between forest dependent communities and Western environmentalists (see Tsing, 1999a; Li, 2000).

Migrant farmers on the Amazonian frontier

The principal Western perceptions and images of the tropical forest have undergone a paradigmatic change over the past generation, with "Green Hell" being replaced by "threatened and fragile Eden" and a view of "primitive and backwards" forest dwellers being replaced by a view of "wise bearers of ancient cultures" (Slater, 2000). The new images are often in contradiction, however, and this contradiction dominates current debates about tropical forest conservation. The idea of human presence being compatible with forest conservation is still the subject of a fierce debate. On the one hand, many tropical ecologists assume that forest people, who are characteristically portrayed as poor and hungry and with little organizational capacity (Alcorn, 1995), are the despoilers of forest resources, and thus they argue for the conservation of "pristine" examples of tropical forests in the form of parks and biological reserves (Redford and Sanderson, 2000; Terborgh, 1999). On the other hand, other natural and social scientists argue that forest people not only contribute to forest conservation but also actually enhance the biological diversity of forests and, as "natural conservationists" (Alcorn, 1995; Colchester, 2000), are potentially powerful political allies for conservationists (Balée, 1989; Alcorn, 1993, 1995; Schwartzman, Moreira and Nepstad, 2000). This debate over "parks versus people" has dominated discussions of tropical forest conservation in the Amazon and, in so doing, it has obscured other, equally important debates, notably one about differences between indigenous and non-indigenous peoples, in particular small migrant farmers. [Editor's note: See Balée on Amazonia in this volume.]

Commencing in the 1970s, both the indigenous tribal peoples and the long-settled rubber tappers of the Amazon have gained recognition as "natural conservationists" (Conklin and Graham, 1995). The high-profile nature of the struggles for land rights by these "green" actors has tended, however, to obscure the fate of many of the other people in the region, including the far more numerous small migrant farmers. In sharp contrast to the "green" image of indigenous forest peoples, small migrant farmers in the Amazon have always been viewed as the "villains" of the forest, and they have been virtually ignored by researchers and officials as potential allies in forest conservation. There are two reasons that migrant farmers have rarely been thought of as potential allies in forest conservation. First, they are not "native" and so are not thought to have any knowledge about the appropriate use and management of the forest. Second, the logic behind their existing use of the forest has been neither adequately nor sympathetically examined.

The small migrant farmers (locally known as *colonos*) who populate the Amazonian frontier hail from southern and northeastern Brazil and are a heterogeneous group (Moran, 1981). Their migration to the frontier represents a response to a variety of political and economic forces, including land availabil-

ity, financial incentives through government programs, massive road building, economic opportunities, and economic failure in their place of origin (Hecht and Cockburn, 1989; Schmink and Wood, 1992; Hall, 1997). They have played an important symbolic role at the frontier for the Brazilian government, which has been able to successfully characterize them as the villains of Amazonian deforestation. By blaming the migrants for the ecologically disastrous consequences of its own development programs, the government has been able to deflect most blame from itself and the equally culpable private sector.

In the Brazilian Amazon, given the limitations of infertile soils, the high availability of cheap land, and the scarcity of capital and labor, the most rational way to practice agriculture is typically by using the forest as a source of nutrients, released through fire in extensive systems of swidden cultivation (Boserup, 1965; Nepstad *et al*., 1999). The hypothetical benefits from conserving forests are often outweighed by the need to open the land and so establish a tenurial claim upon it (Brondízio *et al*., 2002). In the absence of incentives and infrastructure to encourage sustainable land use, poor *colonos* are under heavy pressure to continue to mine the natural resource base rather than make long-term investments in it (Pichón, 1996). Agriculture intensification and a shift toward fixed-field production systems begin to make economic sense only in older frontier areas, where there is greater access to both markets and technology, and the scarcity of land and rising land prices make swidden agriculture as well as cattle raising less viable (Toniolo, 1996). In these areas, colonists who arrived not even two decades earlier have begun to experiment with natural forest management and agroforestry, partially reconstructing the tropical forest in their own farm plots. These non-indigenous farmers have started to develop their own systems of environmental knowledge, drawing on their background, culture and society, as well as their own experiences at the frontier and on knowledge acquired from other groups there (Moran, 1981; Hall, 1997). At the same time, these older migrants have started to organize themselves to fight for political legitimacy and recognition for their resource-use systems.

Two recent grassroots initiatives show the increasingly proactive stance being taken by migrants. One, developed in association with the Catholic Church, is the *Movimento pelo Desenvolvimento da Transamazônica e do Xingu* or MPDTX (Movement for Development on the Transamazon and Xingu Regions), which is an umbrella institution for forty different local organizations including rural unions, farmers' cooperatives, teachers' and health workers' organizations, and movements of women, youths, and blacks (Hall, 1997). The MPDTX's first major initiative, taken in concert with a number of other grassroots institutions, was to propose a development program in which government and farmers organizations, acting as partners, would try to reconcile the twin objectives of environmental conservation and smallholder agricultural production. The proposed program consists of plans to: (1) reorganize land tenure throughout the region; (2) disseminate sustainable agro-ecological technologies; and (3) establish major new conservation areas in the region. The second notable grassroots initiative by migrants involves a proposal to reformulate the government agricultural credit line known as *FNO Pro-Ambiente* (FNO Pro-

Environment). This new environmental credit line would provide incentives for sustainable production systems and extractive activities by compensating farmers for the expenses that they incur to protect natural watercourses, shift to permanent forms of agricultural production, and re-establish forest on cleared land that is not suitable for agriculture (Pereira and Faleiro, 2000).

These grassroots initiatives reflect the political astuteness of the migrants in trying to assume the newly powerful role of environmental steward. More broadly, they reflect the migrants' concern to be represented as neither the villains nor victims of development in the region but to structure for themselves their own, more active role in development. These and similar actions by the *colonos* are forcing observers not just within Brazil but around the globe to reassess preconceptions of the resource-use practices and policies of migrants and frontier farmers.

WESTERN DISCOURSES OF RESTORATION AND CONSERVATION

The circulation of global environmental discourses, which often originate in Western ideological and institutional contexts, has been widely scrutinized for its impact on non-Western politics (Rangan, 1992; Baviskar, 1996; Dove, 1998; Gupta, 1998). Through attention to transformations, recontextualizations (Dove, 1998), or hybridizations (Gupta, 1998) at local levels, such studies demonstrate the complexity of local appropriations of global environmental rhetoric. Less studied to date is how such appropriations are affected by the diversity of rhetoric contained within the Western or global category.

Ecological restoration in Kathmandu

Western environmental discourses contain dramatically divergent formulations of "ecology" that can be called upon by a variety of differently positioned actors. Rhetoric traceable to Western institutional production can be found not only among those with power to frame ecological issues locally, but also among those who might contest this framing. In exploring the diversity of rhetorical tools circulating in non-Western nations, we are led to think less monolithically about Western environmental rhetoric as well: it, too, contains a diverse assemblage of tactical and strategic tools that might be employed on behalf of a variety of environmental ideas.

This can be seen in Kathmandu, Nepal, which over the last decade has become one of South Asia's fastest-growing cities.[11] One of the urban environmental issues featured in contemporary political discourse is the plight of the urban reaches of the Bagmati and Bishnumati Rivers, which converge in the city. The rivers are perceived as suffering severe ecological degradation, characterized by extremely poor water quality, serious morphological changes, and, some argue, loss of the cultural and religious values traditionally attributed to the rivers. Comprehensive policy and development studies identify the main causes of river pollution inside the urban area as the discharge of untreated sewage and widespread dumping of solid waste into the rivers and on their banks. Excessive sand mining in river beds and banks, which supplies mortar

and cement materials to the city's construction industry, is blamed for significant morphological change and severely channelized flow patterns (see IUCN, 1994).

In addition, most discussions identify human encroachment on the banks, floodplains, and riverbeds exposed by falling water levels as a significant factor in the degradation process. Urban growth in Kathmandu has catalyzed the rapid spread of development over a large area and increased population density throughout the city. For new migrants from Nepal's countryside as well as for poorer city residents, participation in the current land and housing markets is impossible. As a result, many new migrants as well as long-term Kathmandu residents have joined the swelling numbers of *sukumbaasi* (squatter) settlements along the rivers.[12] In 1991, these settlements were estimated to be growing by 12 percent annually, a rate twice that of the city itself (HMG/ADB, 1991). By 2000, the growth rate had slowed, but a significant portion of the urban riparian corridor is lined with semi-permanent structures and settlers asserting their right to the land they occupy.[13] The actual ecological impact of these riparian communities, particularly in contrast to an entire city whose effluents discharge directly into the rivers, is widely contested. State development planners routinely incorporate human encroachment into their degradation models, however, on the assumption that restoration might necessitate the forced removal of existing riparian sukumbaasi settlements.

Recognizing the serious threats posed by state representations of degradation and restoration, advocates of housing rights for riparian sukumbaasis try to counter claims that settlers are an obstacle to restoration through a counter-narrative with clear ties to Western ecological rhetoric. By emphasizing international development concepts such as "healthy cities" and "sustainable human settlements", phrases with origins in the United Nations Habitat Agenda,[14] they offer a narrative that inserts socioeconomic concerns into ideas about the ecology of the rivers and the city itself. By expanding the connotations of habitat to include both non-human and human populations, housing advocates frame environmental improvement in terms of housing rights, settlement quality, and improved public health, education, and sanitation services. Although they may not directly contest the main features of the official state narrative of river degradation, housing advocates use their notion of ecology to argue for precisely the opposite of the fate for riparian settlements called for in the official restoration scenario: *upgrading* squatter settlements, rather than *removing* them, is understood through a "sustainable human habitat" rubric as the key to realizing an ecologically healthy riverscape. A particular conceptualization of ecology, then, expressed through references to globally-circulating rhetoric, aids advocates in claiming a "natural", ecological place for people otherwise marginalized by a dominant urban environmental discourse.

The housing advocates' rhetorical strategies can be traced to the United Nations-sponsored *Future Cities World Habitat Day Conference* (FCWHD), held in Kathmandu in 1997. Throughout the session, environmental terms like "habitat" and "greening" were invoked, but never did these invocations imply a threat to sukumbaasis on the urban riverscape. Rather than blaming the

squatters for river pollution, for example, insufficient urban infrastructure was criticized. Rather than being seen as the disproportionate cause of river degradation, sukumbaasis were discussed as the disproportionate sufferers of its consequences. The effects of urban pollution and degradation were regarded as immediate and serious threats to the sukumbaasis (personal communication, Manandhar, 1997 and Pradhan, 1997), the city residents most proximate to the rivers, rather than the other way around. By drawing on the UN rhetoric of "sustainable human habitat", ecology was expanded to include contemporary human rights and urban infrastructural development objectives. By repeatedly invoking a "healthy cities" model, conference presenters emphasized an urban ecology in which a healthy environment is assessed through its capacity to provide food, clothing, and shelter to its human inhabitants.

The prevalence of a Habitat Agenda framing of urban ecology was reinforced in field interviews, in which housing advocates resisted any discussion of the negative effects riparian settlements may have on the ecological integrity of the rivers. Proximity to the degraded resource seemed to implicate settlers in the degradation process, they agreed, but they added that in ecological terms sukumbaasis could play only a minor role. This is most obvious in the case of sewage, for example, which key documents identify as the single most important element in the degradation of the river sysem. Since Kathmandu lacks a comprehensive, functional sewage treatment system, effluent inputs originate throughout the city, implicating legal and illegal urban inhabitants alike. Housing advocates further asserted that since sukumbaasis consume relatively fewer goods than more wealthy urban inhabitants, their per capita contribution of chemical inputs and other by-products of industrial production to the river system is probably also relatively small (Pradhan, personal communication, 1997).

At the local level, many sukumbaasi communities were in fact actively engaged with river monitoring, performing tasks that constitute efforts at river quality improvement. This directly contradicts representations of sukumbaasi knowledge, attitudes, and practices included in official characterizations of river pollution (Rademacher, 1998: 46–63). Planting vegetation on the riverbanks was a common practice, ironically, since riparian re-vegetation is a goal of the state development narrative. Settlers described patrolling their settlements to prevent illegal riverside dumping, practiced widely at the time by the municipalities, and suggested that they should have more authority to watch for, and halt, solid waste dumping on riverbanks. This framing of urban ecology not only downplayed any deleterious effects the settlements might have, it constructed sukumbaasis as in many ways more ecological than their legal neighbors.

The construction of the "Northern Forest" in New England and New York

It is instructive to examine not only how the diversity of rhetorics in Western environmental discourses is utilized in non-Western nations, but also how it is utilized in the West itself. Most of the discussion regarding environmental

relations between East and West assumes a divide between the two, which is attributed to endogenous environmental and socio-cultural characteristics. Yet the rhetoric used to promote conservation and development interventions in many domestic United States contexts, drawing heavily as it does on essentialized images of ruralism and wilderness, greatly resembles that often employed in non-Western nations. To a considerable degree, both narratives draw on an overarching discourse that objectifies natural environments and associated peoples as fundamentally "other". Exploring the discursive similarities between domestic environmentalism and East-West debates can shed light on the common roots of both and help reveal ubiquitous but problematic conceptual frameworks.

An example can be found in the Northern Forest of New England and New York, a socially constructed "region" that became a focus of conservation in the late 1980s (Klyza and Trombulak, 1994; Dobbs and Ober, 1995; Northern Forest Lands Council, 1994). A poster distributed in 1998 by a coalition of environmental organizations suggests its essence. A photograph, looking down on the sunrise from a mountain top, shows clouds dappled with shadows and shades of pink, an expanse of unbroken forest, and a remote pond tucked among the folds of a massive, fog-shrouded ridge. The poster invites us to "Explore the Northern Forest," which is identified on a map as a green mantle draped across the top of Maine, New Hampshire, Vermont and New York. We are told to "experience the landscape, the culture and the heritage of … the largest and last continuous wild forest east of the Mississippi River," with its high mountains, "pristine lakes and rivers", and "remote wetlands". There are people here, too, who are said to have "grown up hunting, fishing, trapping, and walking in the woods …" Although we are told that some now work in business or manufacturing, we are also told that they are "proud of their heritage, and a way of life so different than in the urban areas around them." Finally, we learn that there are problems here, like development of lakeshores, reduced recreational access, and loss of jobs in the forest industry. It is said to be "up to us" to save the Northern Forest, to "leave, for our children and grandchildren, a healthy forest and strong communities that can continue to support a way of life that has existed for generations."

Although this is a simplistic image, it draws on central themes that appear regularly in environmentalist literature. Of particular importance is the fundamental otherness of the Northern Forest, which constructs a symbolic and experiential opposite of the everyday and the mundane as the basic consumable resource of tourism (Urry, 1990). The Northern Forest is depicted as immense, wild, natural, and strikingly beautiful. It is represented as a contiguous, cohesive region that stands in opposition to the surrounding urban and suburban landscape so often lamented as artificial, confining, predictable, and unattractive. It is a place we can retreat to, where we can escape the stresses of modern life and explore new places and possibilities. Although people are included in this vision, they, too, are very different from "us". One gets a sense that the people here are frozen in time, or at least drastically slowed down. They hearken back to an idealized, imagined past and fit seamlessly into the natural

landscape. And all of this is rare and endangered; it is something that must be saved.

These images have great appeal because they connect to popular narratives of the frontier as a land of new possibilities, of sublime nature as a means of transcending modernity, and of the fusion of both in the contemporary emphasis on wilderness as both recreational and spiritual retreat (Cronon, 1995; cf. Slotkin, 1973; Callicot and Nelson, 1998). These ideas are, however, highly problematic. Far from being isolated in time and space, for example, this northern border country has been tightly bound to surrounding urban centers for more than two centuries through social, cultural, and economic ties, including a pervasive influence of absentee ownership of land and capital (Luloff and Nord, 1993). Nor do the Northern Forest's boundaries fit neatly with biophysical or social indicators. The Appalachian Mountains and associated forest types bend southward through the length of New Hampshire and Vermont, while Lake Champlain and extensive farmland in northwestern Vermont create a sharp break between its eastern and western sections. On large corporate holdings within the Northern Forest, intensive forest practices and a dense network of logging roads have caused dramatic ecological changes. And communities that lie on either side of the region's borders may have more in common with one another than communities that lie within the region but are separated by state lines (especially by the border between New York and New England).

Moreover, life in these communities has changed markedly in the past several decades. There has been mechanization and job loss in the forest industry and a consequent increasing dependence on tourism, government, and the service industry. With improved transportation have come the growth of regional commercial centers, decreased rural isolation, and a loss of community cohesion and local economic activity. There has been a pronounced shift of political authority from local to state and federal governments (Bryan, 1974, 1981; Hays, 1987). Demographic changes include a long history of out-migration of youth and more recent in-migration of people seeking the amenities of a rural lifestyle. Finally, the very concept of an interstate region called the Northern Forest did not exist until 1988, when the sale of large tracts of industrial forest land in each of the four states drew the attention of both government and environmental groups. Only then was the region named and institutionalized for the purposes of policy studies and political advocacy (Reidel, 1994).

In the short space of a dozen years, the Northern Forest has become incorporated into the environmentalist lexicon and is now seen by many as a very real entity. The successful circulation of images that are so easily questioned suggests that they are not so much "mistaken" as ordered and power-laden constructions of knowledge (Ferguson, 1990). While there are, indeed, significant commonalities across many parts of the Northern Forest – mountains, infertile soils, low population density, recreational tourism centers, large private landholdings and industrial forestry – its status as a "region" was hardly inevitable. Rather, its construction has been undertaken largely by non-local organizations utilizing deep-seated popular conceptions of rurality and wilderness – conceptions

that infuse the operations and goals of those organizations and appeal to their constituencies.

The construction of the Northern Forest has been neither seamless nor static, however. The environmental community has been the principal driver behind the Northern Forest concept since 1994, when a government initiative to promote the concept ended. As a strategic response to resistance to environmental initiatives among local residents, the environmental community has elevated local people to a central place in this imagined landscape. But even as some local concerns such as jobs and property rights have been added to the environmentalist agenda, others – including questions of absentee land ownership and loss of local political control – have been sidestepped. These latter concerns are missing, thus, from recent proposals for creating "healthy communities", which focus on ecotourism and, increasingly, heritage tourism.

For urban constituencies, the Northern Forest is principally a place to visit, to explore interesting natures and cultures. In the end, extra-local desires to assist Northern Forest communities are inseparable from the perceived function of those same communities as places for non-residents to enjoy through tourism, a process that by its very nature moves rural communities away from more traditional forms and towards more commodifiable, consumable ones. There may be benefits for local residents, but the Northern Forest remains in many ways a place to be controlled, utilized, and conserved by non-residents.

This example illustrates how marginal societies and environments in developed countries may be defined and objectified in the same ways as their counterparts in less-developed countries. This comparison can help alert us to the nature of conceptual lenses that, by accentuating the differences between East and West, obscure fundamental similarities between the two having to do with the relationships between economic core and periphery (O'Connor, 1989; Wallerstein, 1983).

HYBRID SYSTEMS OF KNOWLEDGE

A prominent feature of global environmentalism since the 1970s has been the discourse of indigenous environmentalism, in which indigenous peoples are portrayed as protecting nature due to their cosmology. In this same discourse, Western science is often posed as a polar opposite to indigenous knowledge, objectifying nature in order to manipulate it. Whereas this represented a necessary corrective to a century and more of virtual denial by the West of the existence of indigenous knowledge in non-Western regions, it nonetheless represents a simplistic understanding of scientific knowledge, and of the relationship between practice and theory (see Pickering, 1992). Studies of Western science have shown that practices may have local, rather than over-arching justifications (Fujimura, 1992), with some practices appealing to one theory and some to another, so that the same scientist may draw on conflicting theories in a patchwork of knowledge. Seen from this point of view there is no necessary opposition between Western and non-Western science, which may be combined in similarly patchy and eclectic ways (Agrawal, 1995); practices and ideas from

both Western and non-Western traditions may be used by people who do not appeal to a unified theory and who feel no tension between them. (Similarly, different people within a community may have different ideas depending on their experiences and interests.)

A hybrid forestry system in the Sierra Juarez

The hybridity of knowledge systems is well illustrated by the forestry practices of the Zapotec communities of the Sierra Juarez of Oaxaca, Mexico. These communities have been widely praised for their sustainable forest management (Bray, 1991). The Mexican Forest Service has promoted them as outstanding examples of good forest management, awarding prizes to several of the most successful (Ramos, 2000). In some cases the communities of the Sierra Juarez have been able to use management ideas from modern forest science to bolster community solidarity and to protect their forests. To what can these successes be ascribed? Is it, as advocates of indigenous knowledge might suggest, due to an ethic of forest protection, based on their traditional agro-ecological knowledge? Tyrtania (1992), among others, has documented the impressive complexity of traditional resource-use systems among the Sierra Zapotec. And indeed throughout Mexico, as elsewhere, scholars and politicians in recent years have credited indigenous peoples with extensive ecological knowledge and the use of sophisticated techniques of forest management (Gomez-Pompa, Salvador Flores, and Sosa, 1987). To credit the Zapotec forestry successes to strictly local knowledge would represent a denial of history, however.

In the community of Ixtlán in the Sierra Juarez, research revealed that forestry practices had been learned by the community members who previously worked with outside logging companies, which also brought them into contact with forest service regulations and policies. The practices and theories thus acquired largely contradict traditional agricultural practices, but community members do not see this as problematic. They have largely accepted the view of Mexican scientific forestry that fire is destructive, although in traditional Zapotec swidden agriculture (*milpa*) fire was an important tool and was also used to encourage pasture growth for cattle and sheep.[15]

In the 1930s the Mexican forest service initiated a policy of active fire suppression that was influenced by contemporary U.S. forest service policies (Anonymous, 1930a; Anonymous, 1930b; Gutierrez, 1930; Mares, 1932; Simonian, 1995). The forest service imposed upon communities the duty to form fire-fighting brigades and to suppress fires. The degree to which the communities complied is unclear, but they did learn to employ accusations of fire setting to involve the forest service in their boundary disputes with neighboring communities (Various, 1942, 1945). Commercial logging began in the forests of Ixtlán in 1948. An outside company employed *comuneros* – villagers with property rights – as loggers, providing them with cash income and an alternative to subsistence cultivation. Preliminary evidence from research in the forests of Ixtlán shows a dramatic decline in fire frequency after approximately 1945, which is probably due to Ixtlecos' realization that the forest could

be a valuable source of livelihoods and to their gradual abandonment of swidden agriculture. From 1956 onwards, the view that fire was destructive was further strengthened by the actions of the forest concessionaire FAPATUX, which built fire towers and organized fire brigades. In 1982, the community took responsibility for managing its own forests, largely continuing the fire management practices it had inherited from FAPATUX. During research in Ixtlán in 2000, community members involved in logging repeatedly described fire fighting as being a shared obligation and said that their willingness to fight fires set them apart from neighboring communities whom they described as lazy or contentious. In Ixtlán, traditional uses of fire for agriculture have become increasingly restricted, and comuneros describe fire as a destructive agent, let loose by malicious, stupid, or careless people, principally from neighboring communities. Willingness to fight fires is also a pre-requisite for working for the community logging company.

The policy of fire suppression has dissenters within the community; many citizens in Ixtlán are not comuneros, do not benefit from logging, and would be interested in continuing to farm, using fire. One non-comunero critiqued the community's stand against clearing and burning new swiddens, pointing out that pine trees came up spontaneously on old swidden fields. In fact, almost everyone in the community is aware that pines naturally regenerate both on old forest fire sites and the sites of former swiddens. Older comuneros can point to old swiddens that are now covered in forest and will even acknowledge that pine trees often came back after fires, but they continue to affirm the necessity of fire suppression and reforestation.

Successful forest protection in Ixtlán is based not only on the impact of modern scientific ideas about the forest but also on the community's success in incorporating forestry science into community management structures and practices. Not all communities have been so successful. Key factors in determining the community's ability to incorporate forest science are their political and bureaucratic skills, their political organization, and their tradition of local autonomy (Fox, 1995). The key factor is the ability to both engage with state programs and to hold the state at arms' length. The present-day community structures that provide this ability are the result of a profound re-ordering of community life during the colonial and post-colonial periods (Chance, 1998; Wolf, 1957; Wolf, 1986) and so are not in any simple sense "non-Western", although they contain elements of pre-colonial political traditions.

Critical factors in contemporary forestry protection in Ixtlán de Juarez are its large area of forest (19,000 ha) and its relatively small population (2,100). Its large territory reflects the continuing power of the community of Ixtlán within the Sierra Juarez, building upon its successful maneuvering during the political struggles of nineteenth and twentieth century Mexico. Ixtlán was a military supporter of presidents Benito Juarez and Porfirio Díaz and later of the ultimate winners of the Mexican revolution (Garner, 1988). In the nineteenth century Ixtlán was one of the few communities to successfully petition to have its boundaries surveyed, and it has since been able to retain much of its large land holdings in spite of attempts by sub-communities to break away.

More recently, Ixtlán has been selected as the location for a new secondary school and government offices, thereby creating a large pool of comuneros who are trained in forestry and accounting and affording them continued opportunities to learn how to manipulate government bureaucracies. At the same time, the community has been able to hold unwanted government services at a distance; a recent government land-titling project was only allowed to survey the external boundaries of the community, with internal boundaries being regarded as community business. This was justified not by appeals to cosmology or to a sacred bond with the land but by firm statements that the land is "ours" and that outsiders have no business with it.

In Ixtlán, comuneros have been able to incorporate modern forest science into community forest management through a mixture of pragmatism and political guile. They do not appear to hold a unified non-Western cosmology or science, proffering instead local explanations of specific practices and blending modern scientific forestry with traditional agricultural practices. However, there is also considerable difference of opinion within the community, reflecting the different interests and experiences of community members. These differences notwithstanding, and in spite of negative impacts from logging in the past, the community of Ixtlán has been able to combine modern forest management with its own traditional political organization to protect the forests of the Sierra Juarez.

Non-Western uses of mapping technology

Another way that non-Western systems of environmental knowledge become hybridized is through the adoption of Western methodologies for representing that knowledge. Although adopted methods today include writing, film, and public relations/outreach among others, one of the earliest, and still most important, is mapping. Both descriptive and normative, maps summarize the priorities of a state or of a society. They reflect what is of immediate importance to the makers and users of the product, including political boundaries, natural features, local resources, social structure, or cosmology (Scott, 1998; Thongchai, 1994; Peluso, 1995; Brody, 1982; Mundy, 1996). This political dimension notwithstanding, part of the power of maps in the modern era has derived from their self-representation as neutral and objective tools, typically employed by the West. This has given rise over the past decade or so to a critique and a counter-mapping movement among critical scholars and activists in many nations.

Historically, authorities have used mapmaking as a tool for gathering information, establishing borders, and projecting the administrative or development plans for a given area (Anderson, 1983; Kain and Baigent, 1992). Before the colonial era, indigenous maps were prevalent in some regions but very sparse in others. In Asia, China, Vietnam, and Burma have rich cartographic traditions, whereas there is virtually no record of pre-colonial maps for Cambodia, Laos, and insular Southeast Asia (Schwartzberg, 1994). Where local mapping traditions exist, local conceptions of space and territory can be revealed by

analyses of these maps (Lewis, 1998; Harley and Woodward, 1994). Thus, Mundy (1996) examines how indigenous American maps reflected social relations and local cosmology, while Spanish cartography reflected the colonizers' aims in urban administration and in gaining information about local topography. Similarly, Thongchai (1994) describes the evolution of Thai cartography from traditional, centrally-focused representations of religious significance to more modern topographical and political depictions that defined outer frontiers in relation to the neighboring colonized regions.

With the spread of colonialism and the concomitant European effort to extend control over land, population, and production in Southeast Asia, maps took on a central importance for new rulers, with increased attention to detail and frequent revisions (Henley, 1995). Colonial use of mapping shifted from the early exploration of territory to efforts increasingly focused on delineation of the boundaries of administrative units (Thongchai, 1994). There were notable differences among the colonial powers in their attitudes toward traditional land claims and uses, and these differences are reflected in both mapped representations and in colonial land regulations (Furnivall, 1956). Toward the end of the colonial era, mapping also played a crucial role in shaping national and regional identities (Anderson, 1996; Thongchai, 1994; Henley, 1995).

Mapping in colonial Southeast Asia was largely an administrative project to facilitate control over human and natural resources. Modern states, and some conservation organizations as well, still use maps to limit local residents' land claims by defining such use as "encroachment" in conservation areas or in areas designated for some other form of development (Eghenter, 2000). For example, representing forests used by swidden cultivators as "empty" on official maps is a strategic move which ignores people's presence and denies the legitimacy of their land use, thereby bolstering the case for alternative claims (Li, 1996). The incidence of mapping increased in Indonesia during the 1990s, supported by state, corporate, and conservation initiatives, with parks and sites of state interventions being the subjects of particular attention (Momberg *et al*., 1996).

However, local people also have begun to employ the Western technology of boundary mapping to communicate their resource claims in a medium acceptable to modern national authorities (Tsing, 1999a). Long an instrument of state control used to overwrite local land customs, mapping is now used to represent community land claims and to document local uses of forests and other resources (Peluso, 1995). Increasingly, non-Western actors are challenging Western scientific discourses of mapping as a state-directed activity which produces authoritative documents, with many mapmakers now defining their goals as the promotion of community interests (Sirait *et al*., 1994). Community-level mapping uses participatory methodologies to reverse the flow of information from externally produced to locally informed maps, thereby challenging the authoritative claims of state maps.[16]

The development and popularization of computerized, digitized mapping technologies has created new opportunities and challenges in mapping. Historical data and satellite images can now be combined to analyze questions

such as the causes of forest fires in Indonesia (Harwell, 2000; Rabindran, 2000) and the origin of forest islands in the African savanna (Fairhead and Leach, 1996). A challenge to the new methods of mapping is to reflect the dynamic nature of traditional land claims and use alongside other land designations (Fox, 1998). Otherwise, modern mapping in non-Western nations may, like some colonial maps, only serve to freeze and simplify what are otherwise mutable and layered boundaries and types of land use. Other concerns include the implications of fixing ethnicity to defined spaces (Li, 2000) and the difficulty of accurately representing complex local land classifications (Tsing, 1999a).

A case study from an interior valley in the central Bird's Head region of Papua, Indonesia illustrates the shifting purposes and multiple actors involved in mapping today. This region is inhabited by tribal clans who practice swidden agriculture alongside hunting and gathering in the forest. In 1999 the most topographically accurate maps available were Dutch maps from 1957, which were based on 1944 aerial photographs taken by the United States military. Villagers report that the Dutch used these maps in their regional planning for forestry development and plywood production in the valley, although this endeavor stalled during the 1960s due to local resistance to the plans and the imminent incorporation of Western New Guinea into Indonesia. Subsequent maps drew on the information in the Dutch maps with varying degrees of precision, but to this day many official Indonesian maps of the region inaccurately reflect the human settlements in the area, placing (e.g.) eastern villages in the west and southern villages in the north. In the 1990s, the planned construction of a road from the coast through the area refocused state attention on economic and social development planning in the valley. A review of the maps in use in different government departments showed the region variously categorized as protected area, slated for forestry development, a potential site for transmigration, or destined for conversion to agro-industry. Villagers, in partnership with a local legal aid society and the agriculture faculty of the provincial university, Cenderawasih, undertook a valley-wide mapping effort in the late 1990s to convey their forest resource use practices and understanding of traditional clan boundaries to Indonesian government officials. They used the 1957 Dutch topographical maps as a reference, supplemented by participatory mapping techniques, with plans to combine all of the data gathered using geographic information systems.

The political importance of maps has shifted somewhat as East-West colonial struggles for resources have been superseded by more complex power relations and struggles. Non-Western communities have taken up the Western concept of mapping and transformed it into a tool with the potential to challenge official views by presenting alternative views of resources and territories. In the arena of conservation of tropical forests and marine reserves, maps continue to play an important role in shaping Western awareness of and involvement in non-Western territories. Mapping is transformed, and transformative, as it is conducted with different actors, using different technologies, in different political environments.

The exoticization of swidden agriculture

A powerful symbol of Western views of non-Western environments is swidden agriculture, also known less accurately as "shifting cultivation" or more deprecatingly as "slash-and-burn agriculture". During the final quarter of the twentieth century, the image of a poor farmer standing in a swidden full of charred tree trunks became ubiquitous in Western representations of non-Western environmental degradation, especially tropical deforestation. This image explicitly stands for the alleged pressure of poverty on the environment; more implicitly, it stands for the purportedly short-term, irrational and destructive use of natural resources by non-Western farmers. This is a singular exception to the earlier-noted, popular and positive re-evaluation of the lifestyles of tropical forest peoples. The profoundly negative loading of this image is reflected in the role that the term "slash-and-burn" has come to play in Western language. Use of the term is largely confined to semantic domains where the required connotation is of ruthless and merciless behavior, recent examples of which included the corporate downsizings and government budget cutting by the Republican party in the United States in the 1980s and 1990s.

Most scholars abjure the use of the term "slash-and-burn agriculture" (or "shifting cultivation"), preferring instead to use the term "swidden agriculture". This is based on an archaic variant of old-English "swithen", meaning to singe, which was resurrected because no contemporary term was sufficiently neutral to be used or even rehabilitated.[17] Swithen/swidden was so archaic and indeed unknown as to have no prior connotations.

Over one-half century of sympathetic, systematic ethnographic research has shown, and continues to show, a picture of swidden agriculture quite unlike its popular representation in the contemporary Western world. Whereas the systems of agriculture most familiar to the contemporary West mine the soil, swidden agriculture does not. In tropical forests, the nutrient stores that can be exploited by agriculture lie mostly not in the soil but in the biomass atop it, and it is this that swiddens exploit. This is reflected in the term for swidden cultivation among Ibanic-speaking Dayak in Borneo, *bumai hutan* ("farming the forest").[18] The nutrients in the biomass are extracted through burning, which breaks down the biomass into a nutrient-rich ash that cultigens can easily access. Dayak in Borneo say that the burn is the most important single determinant of a good harvest; and burning the forest in the wet tropics is, popular misconceptions notwithstanding, far from easy.[19] Moreover, the burn is but a single moment in a long cycle that is otherwise devoted to encouraging natural processes of afforestation and maintaining a semi-natural forest cover on the land.

The reliance in swidden agriculture on natural forest dynamics to restore fertility after each cropping cycle conserves the use of both human and non-human sources of energy (Kleinman, Pimentel, and Bryant, 1995: 247–248). In fact, reliance on the dynamics of the forest gives swidden agriculture one of the greatest returns to labor (as opposed to land) known in agriculture. Dove (1985: 6) calculated that the return to labor in swiddens is 1–3 times as great

as that of irrigated rice terraces, whereas Ruthenberg (1976) calculated it as 3–4 times as great.[20] Proof of the economic and ecological sustainability of swidden agriculture lies in its sheer persistence. Recent estimates suggest that it is practiced on 30% of the world's arable soils (Bandy, Garrity and Sanchez, 1993: 2) and supports as many as one billion people – 22 percent of the population of the developing world in tropical and subtropical zones (Thrupp, Hecht, and Browder, 1997: 1–4). [Editor's note: See J.L. Kohen's discussion on burning in his article on Australian Aboriginal people in this volume.]

When Western scientists and government officials penned accounts of swidden agriculture in the tropics in the nineteenth and early twentieth centuries, they typically noted how alien it appeared to their eyes and how much of a mental contortion they had to go through in order to understand it. This perceived alienness rests, however, on a curious forgetting of Western agricultural history, in particular the role of swiddens in Western Europe and North America. Thus, in the mid-sixteenth century the founder of modern Sweden, King Gustav I, is recorded urging his subjects to put less of their energies into resistance to the state and more into making swiddens in the forest (Weimarck, 1968). Similarly, in the Ardennes in France, swidden cultivation not only persisted into the twentieth century but was actually a more profitable occupation than paid labor in industry until early in that century (Sigaut, 1979: 685). And a swidden system based on a melding of Scots-Irish and Native American practices developed in the uplands of the southern United States, where it dominated through the nineteenth century and has persisted to the present day (Otto and Anderson, 1982). This recency and prevalence of swidden agriculture in the West is not reflected in either the scholarly or policy literatures, however. The paucity of attention is so marked that Sigaut (1979: 679) has asked, "What has anthropology [among other fields] missed by ignoring the European case …?"

The most obvious reason for this historical erasure is the critical attitude of the modern state and its representatives toward swidden cultivation. Carl Linnaeus encountered an early example of this during his Scanian Travels in Southern Sweden in 1749 (from Weimarck, 1968: 40).[21] Linnaeus observed and commented favorably on the then-ubiquitous practice of swidden cultivation in this region, the Swedish term for which translates as "burn beating". He wrote "If the inhabitants … were not allowed to have burn-beating, they would want for bread and be left with an empty stomach looking at a sterile waste" (Weimarck, 1968: 56). Burn beating was used in a system of crop rotation and land fallowing that produced first turnips, then rye, then hay, and then finally pasture (Weimarck, 1968: 52). The sponsor of Linnaeus' expedition, High Commissioner Baron Carl Harleman, did not appreciate Linnaeus' findings, however. He wrote "[Linnaeus] not only had not condemned burn-beating, so pernicious for the country, but even contrary to his own better judgment justified and sanctioned the undertaking" (Weimarck, 1968: 40). Linnaeus had to knuckle under to this criticism and substituted in the final draft of his report "harmless notes on manure" in place of his discussion of burn-beating (Weimarck, 1968: 40). The tenacity of this official anti-swidden discourse is

reflected two and one-half centuries later in Kleinman, Pimentel, and Bryant's (1995: 235) puzzled remark on the "[continued] inability of domestic and international development agencies to consider slash-and-burn agriculture as a sound food production system."

The antipathy of the modern state to swidden agriculture is based, in part, on its "illegibility". Intensive, fixed-field, infrastructure-heavy agriculture tends to be favored by states because its product is visible, concentrated, and susceptible to state extraction, and its people are tied by capital investment to their fields. States tend not to favor swidden agriculture because, in contrast, its product is far less extractable and, in the absence of capital investment, its people are far more capable of evasion and flight. As Scott (1998: 282) writes, swidden is an "illegible form of agriculture", comprising "fugitive" fields and cultivators, and constituting "potentially seditious space." The state antipathy toward swidden agriculture is underpinned by the historic shift in Western economic development to a valorization of capital investment and returns to it versus returns to labor. Whereas the logic of intensive agriculture focuses on conserving land, the logic of swidden systems focuses on conserving and valuing human labor. The modern state's criticism of swidden agriculture is thus, in reality, a question not of agro-ecological development but of political-economic self-interest.[22]

The current antipathy of Western states toward swidden agriculture must be interpreted in light of the West's own swidden history. The erasure of this history and the rise of a critical, anti-swidden discourse appear to have occurred in the developed Western nations precisely as the practice of swidden was waning there and becoming concentrated in and identified with the less-developed non-Western nations. This coincidence suggests that Western deprecation of swidden agriculture is not so much a function of its geographic, historic, and technological distance as it is part of a political effort to *make* it distant. This socially constructed alienness enables Western nations to adopt a critical, self-empowering view of natural resource use in developing, non-Western nations. As recent scholarship suggests, any discourse of "under-development" privileges the part of the world that wields it and de-privileges the part that is characterized by it (Escobar, 1995; Ferguson, 1990).

* * *

We have endeavored here to take a new look at the "mobilization" of environmental concepts between Western and non-Western nations. One of our principal conclusions is that the purported divide between Western environmental science and non-Western systems of environmental knowledge, although continually represented as an important boundary marker heavy with symbolic meaning, is problematic. The two systems are historically inter-mingled. And there is also inter-mingling within each system. Neither is monolithic; both encompass multiple, diverse, and sometimes conflicting paradigms. The division between East and West or South and North, when discussing environmental knowledge and practice, is thus an essentialist fallacy. The linkages are more

compelling than the divide. The boundary between East and West is more meaningful as a metaphor than as a geographic fact.

The linkages between East and West, and the mingling of different systems of knowledge, have implications for our views of the static versus dynamic qualities of knowledge. In most of the cases that we have discussed, mobilization of knowledge involves its transformation. Indeed, such transformation seems to characterize the mobilization of knowledge between East and West. This, in turn, has implications for power relations. The transformation of environmental knowledge seems to be inherently a political act, which is in keeping with the fact that all deployments of knowledge or mobilizations of concepts that we have examined have had winners and losers. The data presented here do not support a view of environmental knowledge as politically neutral.

Finally, we must acknowledge an epistemological difficulty inherent to this (and any similar) critique: namely, we have not been able to critique the conceptual divide between Western and non-Western systems of environmental knowledge without using this concept ourselves, in seeming contravention of our own critique. Derrida sees this paradox as one that is inherent in language and criticism, which he characterizes as "the problem of the status of a discourse which borrows from a heritage the resources necessary for the deconstruction of the heritage itself" (Derrida, 1978: 282). This paradox (and the point of Derrida's work is that it *is* a paradox) raises a number of analogous and additional questions about the sociology of knowledge, which are relevant to the subject of our chapter. To what extent, for example, do policy-makers and practitioners continue to use concepts like the divide between Western and non-Western environmental knowledge, long after scholars have abandoned them? Or, and bearing more directly on our subject, to what extent do non-Western scholars continue to use concepts (like this division) after Western scholars have critiqued them?[23] These dimensions of the life cycle of conceptual constructs are little studied as yet. More broadly, why is the distinction between Western and non-Western being reified precisely at the point in history when it seems to be losing whatever empirical validity it may ever have had? Of more specific relevance to this chapter, why have environmental relations and knowledge emerged as key dimensions of this distinction? Why, thus, are both Western and non-Western actors using the environment as a focal point for reiterating the myth of themselves in contradistinction to one another?[24]

NOTES

[1] Of these sets of related terms, we will for convenience and clarity use "Western versus non-Western", although we could equally well have used any of the others.

[2] Said (1978) laid the groundwork for much of this critique with his analysis of the origins of Orientalism in the West.

[3] An analogous process takes place in the movement of concepts from one scientific discipline to another (Dove, 2001).

[4] Dayak – an umbrella term for the indigenous, upland people of Borneo – are often located within the rubric of primitive environmentalists by conservation and community-based natural resource practitioners (see for example Poffenberger and McGean, 1993). Following King (1993), the term

Dayak here is used to include both swidden argiculturalists and the Punan, the traditionally nomadic people of Borneo.

[5] *Gaharu* is the resinous heartwood that results from a fungal infection (*Cytosphaera mangifera*) in some species of *Aquilaria*. The resulting aromatic heartwood is exported and used in perfumes and incense.

[6] Compare with Baviskar's (1996, 1997) commentary on down-playing of ethnic violence by researchers.

[7] The Punan foundation is supported by an indigenous rights/human rights NGOs based in the provincial capital.

[8] "*Bagaimanapun harus penekanan yang datang dari luar untuk melumpuhkan komunitas adat dapat bendung melalui setrategi Misi dan Visi penguatan Adat yang selama ini berjalan dan menjadi keharifan pandangan hidup masyarakat Dayak Punan dengan ibarat kata Misi dan Visi kita bagaikan tegaknya tunggal Ulin dan sekerasnya Lugem. Keharifan hukum adat bagi kehidupan masyarakat Dayak Punan, memang terbentuk dan berada didalam diri masing-masing insan manusia sejak semula, bukan tiori atau konsep semata sepertinya produk undang-undang, kapres dan peraturan pemerintah yang selama ini merugikan hak-hak masyarakat adat. Siapapun didunia ini yang tidak mengakui keberadaan Adat berarti dia bukan ciptaan Tuhan yang berkata Hai manusia hidup dan beranak cuculah kamu seperti rumput dan kayu di atas bumi ini jaga dan peliharalah pelestarian alam semesta ini, dengan baik dan manusia yang menghujat keberadaan adat adalah manusia yang kehilangan keseimbangan Moral*" (Lembaga Adat Punan Besar Dayak Punan KalTim, 1999).

[9] Western bio-physical researchers, participating in what Brosius (1997: 66) terms the "hall of mirrors of representation", often explicitly seek out Punan as field assistants because of their reputed indigenous, ethnobotanical knowledge.

[10] If they employ any metaphor at all to describe the meaning of the forest to them, it is apt to be the non-green metaphor of a "bank".

[11] According to the World Resources Institute (1996), the urban growth rate in the cities of the Kathmandu Valley was 7.1% over the period 1990–95, a figure considerably higher than the UNFPA's (1995) estimate of 6.5%. The WRI study estimates that by 2025 the percent of Nepal's population residing in urban areas will increase to 34% from the present 14%.

[12] *Sukumbaasi* is most commonly translated as "landless squatter", but this is a controversial translation, especially in Kathmandu. The landholding status of many occupants of urban *sukumbaasi* communities is publicly disputed, with government officials and others doubting the authenticity of some *sukumbaasis*' claims of landlessness. There are many stories of people who live in so-called *sukumbaassi* areas while renting out their city homes or flats and capitalizing on the city's skyrocketing housing market.

[13] In the fall of 1997, the total number of settlements characterized as *sukumbaasi* in Kathmandu was 54. Half of these were riparian – situated on the banks of the Bishnumati, Bagmati, or one of their larger urban tributaries. Of the total population of *sukumbaasi*s in the Kathmandu Valley in 1996 – close to 9000 – 69% lived in riparian zones and about two-thirds of those occupied settlements on the banks of the Bishnumati or Bagmati Rivers (Tanaka, 1997).

[14] The United Nations Habitat Agenda, established at the United Nations Conference on Human Settlements in 1996, can be viewed at http://www.hsd.ait.ac.th/agenda/habitat.htm.

[15] Ironically, agricultural techniques were profoundly affected by the introduction of steel tools and large livestock in the sixteenth century (Nigh, 1975), so even this tradition has been affected by Western agricultural technology.

[16] The practice of participatory mapping was developed and popularized primarily in South and Southeast Asia (Chambers, 1997: 113 ff.).

[17] The earliest recorded uses of swithen in England date from early in the thirteenth century. The *Oxford English Dictionary* (1989, XVII: 401) cites Izikowitz (1951: 7) as the first modern usage of "swidden". Izikowitz himself attributes the term to Ekwall (cf. Ekwall, 1955).

[18] Cf. the title to Condominas' (1977) famous ethnography of Montagnard swidden cultivators, "We Have Eaten the Forest" (in the original French, *Nous Avons Mangé la Forêt de la Pierre-Génie Gôo*).

[19] The difficulty of burning wet tropical forest is reflected in the cultural prescriptions and proscriptions that surround burning in parts of Borneo, including freedom to ignore unfavorable

bird omens, lack of responsibility under customary law if a fire escapes to an adjoining swidden, proscriptions against drinking or bathing on the morning of a burn, and so on.

[20] The relatively high labor productivity of swidden agriculture allows swidden communities to be, counter-intuitively, much more involved in cultivation of commodity crops for global markets than more intensive cultivators like irrigated rice farmers (Dove, 1993; Pelzer, 1978).

[21] We are indebted to Pyne (1995: 86) for this reference.

[22] This places state antipathy toward swidden fires in a different light. Pyne (1993: 256) writes, "As soon as it was politically and technically feasible, [colonial] foresters instigated fire control measures. As often as not, fire suppression was one of the most powerful means of controlling indigenes."

[23] Note Agrawal's (1995) observation that the post-modern critique of essentialist constructions like this divide is much more prevalent within academic communities in more-developed than less-developed countries.

[24] We are grateful to Carol Carpenter for this insight.

BIBLIOGRAPHY

Agrawal, Arun. 'Dismantling the divide between indigenous and scientific knowledge.' *Development and Change* 26: 413–439, 1995.

Alcorn, J.B. 'Indigenous people and conservation.' *Conservation Biology* 7(2): 424–426, 1993.

Alcorn, J.B. 'Economic botany, conservation, and development: What's the connection?' *Annals of the Missouri Botanical Garden* 82(1): 34–46, 1995.

Anderson, Benedict. *Imagined Communities*. London: Verso, 1983.

Anderson, B. 'Census, map, museum.' In *Becoming National: A Reader*, G. Eley and R.G. Suny, eds. New York: Oxford University Press, 1996, pp. 243–259.

Anonymous. 'Instrucciones para la campaña contra incendios de montes.' Vol. 893 *Expediente* 11, p. 1. Archivo General del Estado de Oaxaca: Asuntos Agrarios, Serie V Problemas por Bosques, 1930a.

Anonymous. 'Suplica se sirva dictar las ordenes conducentes a evitar la introduccion deproductos forestales fraudulentos.' Vol. 893 *Expediente* 2, p. 1. AGEO: Asuntos Agrarios, Serie V. Problemas por Bosques, 1930b.

Bajracharya, Sama and Lajana Manandhar. *World Habitat Data Report on the Celebration of World Habitat Day*. Lalitpur: Lumanti Support Group for Shelter, 1997.

Balée, W. and A. Gélly. 'Managed forest succession in Amazonia: The Ka'apor case.' *Advances in Economic Botany* 7: 129–158, 1989.

Bandy, D.E., D.P. Garrity, and P.A. Sanchez. 'The worldwide problem of slash-and-burn agriculture.' *Agroforestry Today* 5(3): 1–6, 1993.

Baviskar, Amita. 'Reverence is not enough: Ecological Marxism and Indian *adivasis*.' In *Creating the Countryside: The Politics of Rural and Environmental Discourse*, E.M. Dupuis and P. Vandergeest, eds. Philadelphia: Temple University Press, 1996, pp. 204–224.

Baviskar, Amita. 'Who speaks for the victims?' *Seminar* No. 451, 452, 1997.

Boserup, Ester. *The Conditions of Agriculture Growth*. Chicago: Aldine, 1965.

Bray, David Barton. 'The struggle for the forest: Conservation and development in the Sierra Juarez.' *Grassroots Development* 1991, pp. 1513–1525.

Brody, H. *Maps and Dreams*. New York: Pantheon Books, 1982.

Brondízio, E.S., S.D.M. Cracken *et al.* 'The colonist footprint: Towards a conceptual framework of land use and deforestation. Trajectories among small farmers in frontier Amazonia.' In *Deforestation and Land Use in the Amazon*, C. Woods and R. Porro, eds. Gainesville: University Press of Florida, 2002, pp. 133–161.

Brosius, J. Peter. 'Endangered forest, endangered people: Environmentalist representations of indigenous knowledge.' *Human Ecology* 25(1): 47–69, 1997.

Bryan, Frank M. *Yankee Politics in Rural Vermont*. Hanover, New Hampshire: University Press of New England, 1974.

Bryan, Frank M. *Politics in the Rural States*. Boulder, Colorado: Westview Press, 1981.

Callicott, J. Baird, and Michael P. Nelson, eds. *The Great New Wilderness Debate*. Athens: University of Georgia Press, 1998.

Chambers, R. *Whose Reality Counts? Putting the Last First*. London: Intermediate Technology, 1997.

Chance, John K. *La Conquista de la Sierra: Españoles e Indigenas de Oaxaca en la Epoca de la Colonia*. Oaxaca: Instituto Oaxaqueño de las Culturas, CIESAS, Fondo Estatal Para la Cultura y las Artes, 1998.

Colchester, M. 'Self-determination or environmental determinism for indigenous people in tropical forest conservation.' *Conservation Biology* 14(5): 1365–1367, 2000.

Condominas, G. *We Have Eaten the Forest: The Story of a Montagnard Village in the Central Highlands of Vietnam*, Adrienne Foulke, trans. New York: Hill and Wang, 1977 [1957].

Conklin, Beth A. 'Body paint, feathers, and VCRs: Aesthetics and authenticity in Amazonian activism.' *American Ethnologist* 24(4): 711–737, 1997.

Conklin, Beth, and B.A. Graham. 'The shifting middle ground: Amazonian Indians and eco-politics.' *American Anthropologist* 97(4): 695–710, 1995.

Cronon, William. 'The trouble with wilderness; or, Getting back to the wrong nature.' In *Uncommon Ground*, William Cronon, ed. New York: W.W. Norton, 1995, pp. 69–90.

Dahal, Dilli R. *Demolition of Squatter Houses at Kohiti and other Environmental Problems related to the Bishnumati Corridor: A Sociological Analysis*. Kathmandu: Asian Development Bank, 1997.

Derrida, Jacques. *Writing and Difference*, A. Bass, trans. Chicago: University of Chicago Press, 1978.

Dobbs, David and Richard Ober. *The Northern Forest*. White River Junction, Vermont: Chelsea Green, 1995.

Dove, Michael R. 'The agroecological mythology of the Javanese, and the political-economy of Indonesia.' *Indonesia* 39: 1–36, 1985.

Dove, Michael R. 'North-South relations, global warming, and the global system.' Special issue on 'Human Impacts on the Pre-Industrial Environment.' *Chemosphere* 29(5): 1063–1077, 1994.

Dove, Michael R. 'Local dimensions of 'global' environmental debates.' In *Environmental Movements in Asia*, Arne Kalland and Gerard Persoon, eds. Surrey: Curzon Press, 1998, pp. 44–64.

Dove, Michael R. 'The life-cycle of indigenous knowledge, and the case of natural rubber production.' In *Indigenous Environmental Knowledge and its Transformations*, Roy F. Ellen, Alan Bicker, and Peter Parkes, eds. Amsterdam: Harwood, 2000, pp. 213–251.

Dove, Michael R. 'Inter-disciplinary borrowing in environmental anthropology and the critique of modern science.' In *New Directions in Anthropology and Environment: Intersections*, C.L. Crumley, ed. Walnut Creek, California: AltaMira Press, 2001, pp. 90–110.

Eghenter, Christine. *Mapping Peoples' Forests: The Role of Mapping in Planning Community-Based Management of Conservation Areas in Indonesia*. Washington, DC: Biodiversity Support Program, 2000.

Ellen, Roy F. "What Black Elk left unsaid." *Anthropology Today* 2(6): 8–12, 1986.

Escobar, Arturo. *Encountering Development: The Making and Unmaking of the Third World*. Princeton, New Jersey: Princeton University Press, 1995.

Fairhead, James, and Melissa Leach. *Misreading the African Landscape: Society and Ecology in a Forest-Savanna Mosaic*. Cambridge: Cambridge University Press, 1996.

Ferguson, James. *The Anti-Politics Machine: 'Development,' Depoliticization, and Bureaucratic Power in Lesotho*. Cambridge: Cambridge University Press, 1990.

Fernandez, K., ed. 'Evictions in Nepal 1996.' In *Eviction Watch Asia 1996*. Singapore: Asian Coalition for Housing Rights, 1997, pp. 47–50.

Flyen, Cecile and Clementine Munch. *Historic City Core of Kathmandu: Changes and Upgrading of Public Areas*. Trondheim: Division of Town and Regional Planning/Norwegian Institute of Technology, 1990.

Fox, Jefferson. 'Mapping the commons: The social context of spatial information technologies.' *Common Property Resource Digest* 45: 1–4, 1998.

Fox, Jonathan. 'Governance and rural development in Mexico: State intervention and public accountability.' *Journal of Development Studies* 3: 21–30, 1995.

Fujimura, Joan.' Crafting science: Standardized packages, boundary objects and 'translation'.' In *Science as Practice and Culture*, Andrew Pickering, ed. London: University of Chicago Press, 1992, pp. 168–211.

Furnivall, J.S. *Colonial Policy and Practice: A Comparative Study of Burma and Netherlands India*. New York: New York University Press, 1956.
Garner, Paul. *La Revolucion en Provinciasoberania Estatal y Caudillismo en las Montañas de Oaxaca (1910–1920)*. Oaxaca: Fondo de Cultura Economica, 1988.
Gomez-Pompa, Arturo, Jose Salvador Flores, and Victoria Sosa. 'The Pet Kot: A man-made tropical forest of the Maya.' *Interciencia* 12: 10–15, 1987.
Gupta, Akhil. *Postcolonial Developments: Agriculture in the Making of Modern India*. Durham, North Carolina: Duke University Press, 1998.
Gutierrez, Jose L. 'Se remite ejemplar del reglamento para constituir corporacion de defensa contra incendios' Vol. 892 *Expediente* 22, p. 4. AGEO: Asuntos Agrarios, Serie V. Problemas por Bosques, 1930.
Hagenstein, Perry. *A Challenge for New England: Changes in Large Forest Land Holdings*. Boston: The Fund for New England, 1987.
Hall, A. *Sustaining Amazonia*. New York: Manchester University Press, 1997.
Harley, J.B., and D. Woodward, eds. *The History of Cartography*. Vol. II, Book II: *Cartography in the Traditional East and Southeast Asian Societies*. Chicago: University of Chicago Press, 1994.
Harwell, Emily E. 'Remote sensibilities: Discourses of technology and the making of Indonesia's natural disaster.' *Development and Change* 31: 307–340, 2000.
Hays, Samuel. P. *Beauty, Health, and Permanence: Environmental Politics in the United States, 1955–1985*. New York: Cambridge University Press, 1987.
Hecht, S. and A. Cockburn. *The Fate of the Forest: Developers, Destroyers, and Defenders of the Amazon*. New York: Verso, 1989.
Henley, D. 'Minahasa mapped: Illustrated notes on cartography and history in Minahasa, 1512–1942.' In *Minahasa Past and Present: Tradition and Transition in an Outer Island Region of Indonesia*, Reimar Schefold, ed. Leiden: Research School CNWS, 1995, pp. 32–57.
His Majesty's Government of Nepal (HMG) and Asian Development Bank. *Environmental Policy Assessment: Kathmandu Urban Development Plans and Programs: Concept Plan for the Bishnumati Corridor*. Kathmandu: Halcrow Fox and Associates, 1991.
HMG Nepal Ministry of Housing and Physical Planning and Asian Development Bank. *Kathmandu Urban Development Project Preparation Report*. Kathmandu: HMG, 1992.
HMG Nepal Ministry of Housing and Physical Planning and Kathmandu Urban Development Project. *Community Participation in Development Programs: Working Paper*. Kathmandu: COWI Consult/Padco/Nepal Consult, 1996.
HMG Nepal. *National Shelter Policy*. Kathmandu: HMG, 1996.
Huntington, Samuel P. *The Clash of Civilizations and the Remaking of World Order*. New York: Simon and Schuster, 1996.
Ingold, Tim. 'Globes and spheres: The topology of environmentalism.' In *Environmentalism: The View from Anthropology*, Kay Milton, ed. ASA Monograph 33. London: Routledge, 1993, pp. 31–42.
International Union for the Conservation of Nature (IUCN), Stanley International (Canada), Matt-McDonald Ltd. (UK), and East Consult (Nepal). *Bagmati Basin Water Management Strategy and Investment Program: Final Report*. Kathmandu: IUCN, 1994.
Kain, R.J.P., and E. Baigent. *The Cadastral Map in the Service of the State: A History of Property Mapping*. Chicago: University of Chicago Press, 1992.
King, Victor T. *The Peoples of Borneo*. Oxford: Blackwell Publishers, 1993.
Kleinman, P.J., A.D. Pimentel, and R.B. Bryant. 'The ecological sustainability of slash-and-burn agriculture.' *Agriculture, Ecosystems and Environment* 52: 235–49, 1995.
Klyza, Christopher McG. and Stephen C. Trombulak. *The Future of the Northern Forest*. Hanover, New Hampshire: University Press of New England, 1994.
Kozak, Dave. 'Maintaining large forest landholdings in northern New England.' *Appalachia*, June 1989, pp. 22–44.
Lembaga Adat Punan Besar Dayak Punan KalTim. *Misi Dan Visi Masyarakat Adat Punan Dayak*, 1999.
Lewis, M.G. 'Future encounters in new contexts.' In *Cartographic Encounters: Perspectives of Native*

American Mapmaking and Map Use, M.G. Lewis, ed. Chicago: University of Chicago Press, 1998, pp. 273–284.
Li, Tania M. 'Images of community: Discourse and strategy in property relations.' *Development and Change* 27: 501–527, 1996.
Li, Tania M. 'Marginality, power and production: Analyzing upland transformations.' In *Transforming the Indonesian Uplands*, Tania M. Li, ed. Amsterdam: Harwood, 1999, pp. 1–44.
Li, Tania M. 'Articulating indigenous identity in Indonesia: Resource politics and the tribal slot.' *Comparative Studies in Society and History* 42(1): 149–179, 2000.
Lohmann, Lawrence. 'Green Orientalism.' *The Ecologist* 23(6): 202–204, 1993.
Luloff, A.E. and Mark Nord. 'The Forgotten of Northern New England.' In *Uneven Development in Rural America*, T.A. Lyson and W.W. Falk, eds. Lawrence: University Press of Kansas, 1993, pp. 125–167.
Lynch, Owen and Kirk Talbott. *Balancing Acts: Community-Based Forest Management and National Law in Asia and the Pacific*. Washington: World Resources Institute, 1995.
Manandhar, Lanjana. Personal Communication. Kathmandu, October 5, 1997.
Mares, Jose. 'Se remite plan general para la campaña contra incendios de montes.' vol. Legajo 895 *Expediente* 21, p. 6. AGEO: Asuntos Agrarios, Serie V. Problemas por Bosques, 1932.
Momberg, Frank, K. Atok, and Mertua Sirait. *Drawing on Local Knowledge: A Community Mapping Training Manual. Case Studies from Indonesia*. Jakarta: Ford Foundation, 1996.
Moran, Emilio F. *Developing the Amazon*. Bloomington: Indiana University Press, 1981.
Mundy, B.E. *The Mapping of New Spain: Indigenous Cartography and the Maps of the Relaciones Geográphicas*. Chicago: University of Chicago Press, 1996.
Nepstad, D.C., A. Moreira *et al. A Floresta em Chamas: Origins, Impacts e Prevencao de Fogo na Amazonia*. Brasília: World Bank, 1999.
Nigh, Ronald Byron. *Evolutionary Ecology of Maya Agriculture in Highland Chiapas, Mexico*. Ph.D. dissertation. Palo Alto, California: Stanford University, 1975.
Northern Forest Lands Council. *Finding Common Ground: Conserving the Northern Forest*. Concord, N.H.: Northern Forest Lands Council, 1994.
O'Connor, James. 'Uneven and combined development and ecological crisis: A theoretical introduction.' *Race & Class* 30(3): 1–11, 1989.
Otto, J.S. and N.E. Anderson. 'Slash-and-burn cultivation in the Highlands South: A problem in comparative agricultural history.' *Comparative Study of Society and History* 24: 131–47, 1982.
Oxford English Dictionary. 2nd ed. Oxford: Clarendon Press, 1989.
Peluso, N.L. 'Whose woods are these?: Counter-mapping forest territories in Kalimantan, Indonesia.' *Antipode* 27(4): 383–406, 1995.
Pereira, C. and A. Faleiro. *Proposta de Criacao de uma Linha de Crédito Ambiental para a Amazonia*. Manuscript. Belém: FETAGRI/IPAM, 2000.
Pichón, F.J. 'Settler agriculture and the dynamics of resource allocation in frontier environments.' *Human Ecology* 24(3): 341–371, 1996.
Pickering, Andrew. 'From science as knowledge to science as practice.' In *Science as Practice and Culture*, Andrew Pickering, ed. Chicago: University of Chicago Press, 1992, pp. 1–26.
Poffenberger, Mark and B. McGean, eds. *Communities and Forest Management in East Kalimantan: Pathways to Environmental Stability*. Berkeley: University of California Press, 1993.
Pradhan, Prafulla Man. Personal communication. Kathmandu: September 29 and October 5, 1997.
Pyne, Stephen J. 'Keeper of the flame: A survey of anthropogenic fire.' In *Fire in the Environment: Its Ecological, Climatic, and Atmospheric Chemical Importance*, P.J. Crutzen and J.G. Goldammer, eds. New York: John Wiley, 1993, pp. 245–266.
Pyne, Stephen J. *World Fire: The Culture of Fire on Earth*. New York: Henry Holt, 1995.
Rabindran, Shanti. 'The role of large and small landholders during Indonesia's land fires: A GIS-econometrics analysis of satellite and land use data.' *Council on Southeast Asia Studies Seminar, Yale University*, 6 December 2000.
Rademacher, Anne. *Restoration as Development: Urban Growth, River Restoration, and Riparian Settlements in the Upper Bagmati Basin, Kathmandu, Nepal*. Master's thesis. New Haven, Connecticut: Yale School of Forestry and Environmental Studies, 1998.

Ramos, Fernando. 'En Sierra Juarez, obtienen premios al merito ecologico 14 comunidades.' *El Imparcial*, p. 7B. Oaxaca, 2000.

Rangan, Haripriya. 'Romancing the environment: Popular environmental action in the Garhwal Himalayas.' In *In Defense of Livelihoods: Comparative Studies in Environmental Action*, J. Friedmann and H. Rangan, eds. West Hartford, Connecticut: Kumarian Press, 1992, pp. 155–181.

Redford, Kent H. 'The ecologically noble savage.' *Cultural Survival Quarterly* 15: 46–48, 1990.

Redford, Kent H. and S.E. Sanderson. 'Extracting humans from nature.' *Conservation Biology* 14(5): 1362–1362, 2000.

Reidel, C. 'The political process of the northern forest lands study.' In *The Future of the Northern Forest*, Christopher McG. Klyza and Stephen C. Trombulak, eds. Hanover, New Hampshire: University Press of New England, 1994, pp. 93–111.

Ruthenberg, H. *Farming Systems in the Tropics*, 2nd ed. Oxford: Oxford University Press, 1976.

Sachs, Wolfgang. 'One world.' In *The Development Dictionary: A Guide to Knowledge as Power*, Wolfgang Sachs, ed. London: Zed Books, 1992, pp. 102–115.

Said, Edward W. *Orientalism*. New York: Vintage/Random House, 1978.

Schmink, M. and C.H. Wood. *Contested Frontiers in Amazonia*. New York: Columbia University Press, 1992.

Schwartzberg, J.E. 'Introduction to Southeast Asia cartography.' In *The History of Cartography*. Vol. II, Book I: *Cartography in the Traditional East and Southeast Asian Societies*, J.B. Harley and D. Woodward, eds. Chicago: University of Chicago Press, 1994, pp. 689–700.

Schwartzman, S., A. Moreira, and D.C. Nepstad. 'Rethinking tropical forest conservation: Perils in parks.' *Conservation Biology* 14(5): 1351–1357, 2000.

Scott, James C. *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed*. New Haven, Connecticut: Yale University Press, 1998.

Sigaut, F. 'Swidden cultivation in Europe: A question for tropical anthropologists.' *Social Science Information* 18(4/5): 679–694, 1979.

Simonian, Lane. *Defending the Land of the Jaguar*. Austin: University of Texas Press, 1995.

Sirait, M., S. Prasodjo, N. Podger, A. Flavelle, and J. Fox. 'Mapping customary land in East Kalimantan, Indonesia: A tool for forest management.' *Ambio* 23(7): 411–417, 1994.

Slater, C. 'Justice for whom? Contemporary images of Amazonia.' In *People, Plants, and Justice*, Charles Zerner, ed. New York: Columbia University Press, 2000, pp. 67–82.

Slotkin, Richard. *Regeneration Through Violence: The Mythology of the American Frontier, 1600–1860*. New York: Harper Collins, 1973.

Strommen, Katherine, HMG Ministry of Housing and Physical Planning, and the University of Trondheim. *Planning for Urban Development and Environmental Upgrading: an Environmental Impact Assessment of the Bisnumati Link Road*. Kathmandu: HMG, 1991.

Tanaka, Masako. *Conditions of Low Income Settlements in Kathmandu: Action Research in Squatter Settlements*. Kathmandu: Lumanti, 1997.

Taylor, Peter J. and Frederick H. Buttel. 'How do we know we have environmental problems? Science and the globalization of environmental discourse.' *Geoforum* 23(3): 405–416, 1992.

Terborgh, J. *Requiem for Nature*. Washington, DC: Island Press, 1999.

Thongchai Winichakul. *Siam Mapped: A History of the Geo-body of Siam*. Honolulu: University of Hawaii Press, 1994.

Thrupp, L. A., S. Hecht, and J. Browder. *The Diversity and Dynamics of Shifting Cultivation: Myths, Realities, and Policy Implications*. Washington, D.C.: World Resources Institute, 1997.

Toniolo, A. and C. Uhl. 'Perspectivas Economicas e Ecológicas da Agricultura na Amazonia Oriental.' In *A Evolucao da Fronteira Amazonica: Oportunidades para um Desenvolvimento Sustentável*, O.T. Almeida, ed. Belém: IMAZON, 1996, pp. 67–100.

Tsing, Anna. 'Becoming a tribal elder and other green development fantasies.' In *Transforming the Indonesian Uplands*, Tania M. Li, ed. Amsterdam: Harwood, 1999a, pp. 159–202.

Tsing, Anna. *Notes on Culture and Natural Resource Management*. Environmental Politics Working Paper Series, University of California, Berkeley, 1999b.

Tsing, Anna. 'The global situation.' *Cultural Anthropology* 15(3): 327–360, 2000.

Tura, L.R. 'Notas Introdutórias sobre os Fundos Constitutcionais de Financiamento e sua

Configuração na Região Norte.' In *Campesinato e Estado na Amazônia: Impactos do FNO no Pará*, L.R. Tura and F.d.A. Costa, eds. Brasília: Brasília Jurídica, 2000, pp. 29–46.

Tyrtania, Leonardo. *Yagavila un Ensayo en Ecologia Cultural*, 1st ed. Mexico: D.F. Universidad Autonoma Metropolitana, Unidad Iztapalapa, Division de Ciencias Sociales y Humanidades, 1992.

United Nations Population Fund. *The State of World Population*. New York: UNFPA, 1995.

United Nations. *Habitat Agenda and Istanbul Declaration on Human Settlements Summary: Road Map to the Future*. United Nations Department of Public Information. DPI/1846/HAB/CON, 1996.

Urry, John. *The Tourist Gaze: Travel and Leisure in Contemporary Societies*. London: Sage, 1990.

Valentin, Karen. *Urban Squatters in Kathmandu: Perspectives on Hierarchy and Heterogeneity*. M.A. thesis, University of Copenhagen, 1995.

Various. 'Los vecinos de Ixtlan de Juarez denuncian que los rancheros de Rancho Chivo han provocado un incendio.' vol. 900 *Expediente* 18, p. 9. AGEO: Asuntos Agrarios, Serie V. Problemas por Bosques, 1942.

Various. 'En que los comuneros de Xiacui denuncian el incendio de los bosques por los habitantes de La Trinidad, Ixtlan.' vol. 900, Exp 19, p. 9. AGEO: Asuntos Agrarios, Serie V. Problemas por Bosques, 1945.

Wallerstein, Immanuel. *Historical Capitalism*. London: Verso, 1993.

Weimarck, G. *Ulfshult: Invesitgations Concerning the Use of Soil and Forest in Ulfshult, Parish of Örkened, During the Last 250 Years*. Lund, Sweden: C.W.K. Gleerup, 1968.

Wolf, Eric. 'Closed corporate peasant communities in Mesoamerica and Central Java.' *Southwestern Journal of Anthropology* 131–18, 1957.

Wolf, Eric. 'The vicissitudes of the closed corporate community.' *American Ethnologist* 13: 325–329, 1986.

World Resources Institute. *The Urban Environment*. New York: Oxford University Press, 1996.

Yami, Hisla and Stephen Mikesell. *The Issues of Squatter Settlements in Nepal: Proceedings of a National Seminar*. Kathmandu: Concerned Citizens Group of Nepal, 1990.

Zerner, Charles. 'Telling stories about biological diversity.' In *Valuing Local Knowledge: Indigenous People and Intellectual Property Rights*, S.B. Brush and D. Stabinsky, eds. Washington, DC: Island Press, 1996, pp. 68–101.