Chapter 3

The Cultural and Economic Globalisation of Traditional Environmental Knowledge Systems

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Introduction

In 1999, participants of the World Conference on Science for the Twenty-First Century called for a new ‘social contract’ between science and society on the grounds that science had entered a new phase in which the nature of the problems it faces, and therefore its function, have changed (World Conference on Science 1999). In this chapter I explore some of the broad implications of this ‘new phase’ – which includes massive technological change, widespread economic and political re-structuring and the dramatic increase in the transnational flows of ideas, goods, people, capital and services – for both indigenous knowledge and its relationship to science. I suggest that traditional environmental knowledge (TEK) has undergone unprecedented validation, commoditisation and politicisation, and that these interrelated processes can be instructively examined in the context of technological, social and political changes following the re-organisation of the global economy during the end of the twentieth century. As local, and especially traditional and indigenous knowledge, acquire new meanings as an economic and political resource, opportunities are created for its flow, transmission, incorporation and transformation, opening spaces for both cooperation and conflict between the actors who claim ownership or representation over different kinds of knowledge.

Before examining the complex interrelationships between TEK and global processes, it is instructive to define and qualify a few terms and concepts. Globalisation, broadly defined as ‘the intensification of economic, political, social and cultural relations across borders’ (Holm and Sorensen 1995: 1) is by no means a novel process. A world economy linking Europe and Asia through trade dates back to the thirteenth century (Abu-Lughod 1989), and even before then there were extensive movements of peoples, goods, ideas and technologies among different regions of the world. This world economy has undergone successive phases of expansion and contraction with occasional collapses (Hall 2000, Holton 1998). The rise of capitalism in the sixteenth century marked a new wave of expansion and the creation of a particular form of global economy (Wallerstein 1974).

Globalising processes have clearly increased in scope and intensity over the past century. Robertson (1992), for example, identifies several distinct phases, the latest of which is characterised by 1) the replacement of a bipolar international geopolitical system – itself linked to the Cold War – with a more fluid and uncertain one; 2) an unparalleled ‘time-space compression’ due to the revolution in communications technology; 3) the growth of the information and service sectors; 4) the spread of economic neoliberalism; and 5) the growth of transnational social or environmental movements. It is this syndrome of interrelated yet distinct processes, encompassed by the term ‘globalisation’ (cf. Mittelman 2000), that I focus on in this chapter.

There is some confusion in the use of the terms ‘international’, ‘multinational’, ‘transnational’ and ‘global’, as these are sometimes used interchangeably or interpreted differently. I follow the simple convention that ‘international’ refers to relationships between nation-states, in contrast to transnational processes, which operate at a level above or beyond national determination and control (Holton 1998: 10). While transnationalism overlaps with globalisation, the latter has a broader connotation: global processes take place in a global space and are in effect de-centred from specific national territories. While transcending individual nation-states, transnational processes may still be anchored to one or more nation-states (Kearney 1995). The international economy of the nineteenth and early twentieth centuries was largely based on exchanges between national economies, carried out by actors and institutions based within particular nations, and mostly involved trade. Since the 1960s, economic globalisation has been increasingly transnational in kind: greater integration of the world's financial markets and de-regulation of capital transfers means that flows of capital by far exceed flows of goods. In a transnational economy, capital investment, marketing and manufacturing are structured according to optimal profitability and a growing number of transnational companies are in effect no longer necessarily tied to any one particular nation-state (Holton 1998: 52, Neef 1999: 13). This transformation in the nature and organisation of global
capitalism, I suggest, instructive to our understanding changes in the meanings, values and struggles linked to indigenous environmental knowledge and its transformations.

Because globalisation is by definition a complex and heterogeneous process with distinct, yet clearly overlapping and linked economic, political, social and cultural aspects, its effects are not experienced in the same way everywhere or by everyone (Long 1996). My analysis regarding the commoditisation and politicalisation of indigenous knowledge – including a discussion of ‘biopiracy’ and questions relating to struggles over the rights for control, representation and use of knowledge – draw mostly on experiences from the Americas, though even within this region the processes I describe are not universal nor do they have the same effects everywhere (see also Alexiades 2003).

Modernisation, Globalisation and the Changing Role of Traditional Knowledge

Throughout much of recent history, the paradigm of modernisation retained a hegemonic presence in the development ideology of nation-states throughout the world (Norgaard 1994). Three conceptual cornerstones underlie the modern project: scientism, the belief that the scientific worldview is the only way to a true understanding of the world; developmentalism, the belief in progress based on certain patterns of consumption; and statism, the emphasis on the modern nation state as the legitimate form of political authority (Ekins 1992: 207). Modern education, the expansion of the market and in particular, the promotion of waged labour and mass consumption are all critical elements of this modernising project (Phillips 1998).

In the decades after the Second World War, ‘Third World’ countries, aided and abetted by ‘First World’ countries, embarked on a massive project of modernisation. This period of social engineering, characterised by nation-building, urbanisation and industrialisation subordinated rural ‘peripheral’ populations – including their subsistence practices, traditions and knowledge – to those of political and economic ‘cores’. This led to the logical superposition of universalist ideals espoused by modernity and the marginalisation of all that is considered ‘primitive’, including, of course, traditional environmental knowledge. Under the aegis of modernity, tradition became ‘something to be overcome, to be subverted rather than encouraged, its legitimacy questioned’ (Ellen and Harris 2000: 11).

In recent decades, and particularly since the 1970s, modernisation has given way to a new historical project, globalisation or neo-modernisation (Phillips 1998). Like modernisation, globalisation seeks to stabilise global capitalism, only through global – as opposed to national – economic management. Moreover, rather than suggesting that poor nation-states ‘develop’ by replicating the paths of industrialised countries, globalisation encourages actors to ‘position’ themselves in the global economy through regional specialisation (McMichael 1996). Amidst de-centralised production and consumption and constantly shifting markets, diversity has become, in the words of Klein (1999: 115, cited in Edelman 2001: 500) ‘the mantra of global capital’. The transition from modern to post-modern capitalism, therefore, has signified a shift in the value – symbolic, political and economic of cultural and biological diversity.

The Validation and Valuation of Indigenous Knowledge

Above, I have argued that broad technological, social and political changes have signalled a shift in the meanings and values attached to ‘peripheral’ places, peoples and knowledge. The revitalisation of TEK is evident in the extent to which it has become validated and valued in the context of scientific research and in economic and social development.

Science, TEK and the Rise of Cultural Relativism

Ethnocentric views of indigenous cultures have been used consistently throughout the past centuries as a means to justify their colonisation, submission and forced integration. Columbus’s failure to recognise the existence of an indigenous language during his first encounters with Amerindians (Todorov 1984: 30), illustrates a crude ethnocentrism which prevails in the modernist discourse and its denial of the value, and at times even the existence, of indigenous knowledge. While still prevalent, modernist views of cultural diversity and the value of local knowledge became increasingly questioned in the late twentieth century. Local, especially indigenous environmental, knowledge has in fact undergone a process of unprecedented validation and recognition within such centres of political and economic power as government and multilateral development agencies, international donors, international and national non-governmental organisations (NGOs), scientific institutions, private corporations and the media (Anani 1999, Sillitoe 1998: 223-224).

The validation of indigenous knowledge can in turn be seen to be part of a broader tendency towards cultural relativism, the notion that all cultures, no matter how idiosyncratic or strange they might appear to an outsider, are internally coherent, meaningful and intrinsically worthy of respect (Winthrop 1991). Influential nineteenth- and twentieth-century social scientists, such as Boas, Durkheim, Evans-Pritchard and Malinowski, were instrumental in spreading a relativist perspective of culture in and beyond academia. Ethnoscience’s emphasis on the complexity and systematic nature of local knowledge, particularly environmental knowledge, has been particularly influential in changing perceptions of traditional, and especially indigenous, knowledge
Similar developments were taking place around the same time in the context of international health. For example, the Alma Aa Conference of 1978 organised by the World Health Organisation proclaimed that adequate health for the world’s poor could only be achieved by integrating traditional medicine into primary health care delivery programs (Bannerman et al. 1983, WHO 1988). Several years later, the notion that indigenous medicinal plant knowledge could help identify cures for diseases such as cancer and AIDS was widely popularised by some ethnobotanists and the media (Balick et al. 1994, Plotkin 1993). As a result, European and American audiences commonly associate the rainforest as a source of “miracle cures” (Alexiades 2004). Despite this widespread perception and the renewed interest in some scientific circles regarding the promising role of indigenous knowledge in drug development (Heinrich 2000, Prance et al. 1994), indigenous knowledge continues to play a fairly minor role in commercial drug discovery (ten Kate and Laird 1999: 62).

While rhetoric about the environment and traditional knowledge has clearly not always translated into practice, its emergence nonetheless signals a shift in how indigenous environmental knowledge is viewed and represented within centres of power. This in turn has created new opportunities for the utilisation of indigenous knowledge in the context of development (Sillitoe et al. 2002, Warren et al. 1989).

**Sustainability, the Rise of the Information Economy and the Revitalisation of TEK**

In contrast to the modernist development paradigm, the concept and rhetoric of sustainable development privileges rather than discriminates against local forms of environmental knowledge, organisation and participation. The 1987 Brundtland report, the 1992, the United Nations Conference on the Environment and Development (UNCED) Rio Declaration on Environment and Development and Agenda 21, for example, all specifically identify indigenous knowledge as a critical resource for achieving sustainable development. While the degree to which indigenous or traditional resource management regimes are “sustainable” is clearly a complex question, the integration of development and environmental agendas has in some instances helped repossession ‘peripheral’ knowledge in relation to centres of economic and political power (Wilmer 1993). It has also made indigenous knowledge an important political resource in indigenous claims to territory and rights (Muehlebach 2001).

The popularisation and validation of indigenous knowledge has also been facilitated by the environmental justice movement and its wide network of contacts in government, and among multilateral development agencies, scientists, the media and local communities (Ribiero and Little 1998). Within this revisionism lies a long legacy of idealising and romanticising indigenous cultures, even if these representations reveal more about the anxieties and fantasies of
modernity and its discontents than about indigenous peoples themselves (Ellen 1986, Kremch 1999). As noted by Ellen and Harris (2000: 13), ‘In this new vision, indigenous peoples are given central focus because of rather than in spite of their cultural differences’.4

At a broader level, the emergence of sustainable development of the 1980s reveals a new awareness of the importance of diversity to social wellbeing:

Awareness of such heterogeneity is reflected in the questioning, in certain policy circles, of standardised solutions to problems of economic development, employment and welfare, in favour of what are described as more flexible, localised and ‘sustainable’ strategies. This shift implies, at least in public rhetoric, a greater recognition of the strategic contribution that local knowledge, organisation and participation can make to development. (Long 1996: 39)

The shift in development from ‘standardised solutions’ to ‘flexible and localised strategies’ resonates with a broader shift in the structure of economic organisation. During the first half of the twentieth century the industrial phase of capitalism emphasised the development of the industrial sector, centralisation, mass production and consumption. As such, the industrial age was structured around vertically integrated organisations with high costs of communication, information and transportation. The second half of the twentieth century, on the other hand, gave way to a new form of economic organisation, referred to as post-modern or network phase of capitalism, where economic growth is propelled by the knowledge industries and the service sector. Today, revolution in communications technology has dramatically reduced costs of communication, information and transportation, leading to decentralised production and consumption, emphasising horizontal networks and the development of specialised, or ‘niche’, markets – the so-called ‘flexible accumulation’ model of late capitalism (Harvey 2000: 294, Oman 1997).

These trends were intensified by the recession of the world economy in the late 1970s, which had devastating effects on the economies of countries that had become heavily indebted following ambitious industrialisation and modernisation projects. As the prices received for their products declined, many countries – in Latin America particularly – were forced to default on their loans. The extension of further loans, deemed essential for economic recovery, was made contingent on the acceptance of drastic structural adjustment policies imposed by the International Monetary Fund (IMF) and the World Bank (Phillips 1998). This, coupled with the collapse of the Soviet block in the 1990s, gave huge impetus to the spread of free-market economics.

The renewed interest in market processes as mechanisms to achieve development and conservation goals (Coker and Richards 1992, Edwards 1995, Freese 1998), and the growing influence of non-state actors, including the private sector and NGOs (Fisher 1993, 1996) in development resonate with these post-

1980s free market economic policies and the concomitant dismantling of the welfare state. In a similar vein, Ribeiro and Little (1998) suggest a causal relationship between the shift towards an information and service based economy and the growth of the environmental movement.

The economic, moral and philosophical importance projected onto diversity is most clearly revealed in the popularisation of the terms ‘biological diversity’ and ‘cultural diversity’ (Wilson 1988), sometimes referred to as biocultural diversity (Maffi 2001). The following statement by Marglin (1990) echoes similar arguments made by scientists and environmentalists, and reflected by the media (see for example, Linden 1991):

Cultural diversity may be the key to the survival of the human species. Just as biologists defend exotic species like the snail darter in order to maintain the diversity of the genetic pool ... so should we defend exotic cultures in order to maintain the diversity of forms of understanding, creating and coping that the human species has managed to generate (Marglin 1990: 6).

The Commoditisation of Knowledge

Capitalism is inherently expansionist and self-enlarging (Prugh et al. 2000: 71). The continuous development of new commodities, products of human activity with an assigned market price, is one of the ways to maintain such growth. Not surprisingly then, commoditisation is a particularly noticeable trend in modern capitalism (Grimes 2000). While demand for such cultural commodities as ‘ethnic art’ can be traced to the colonial era (Thomas 1987), the recent surge in interest and mass marketing of this and other cultural commodities, including ‘native spirituality’, ‘world music’ and ‘cultural tourism’ suggest that in post-colonial times culture has become ‘a primary field of entrepreneurial and capitalistic activity’ (Harvey 2000: 296). The consumption of culture in the global ‘cultural supermarket’ has become an important means through which post-industrial citizens define their identity (Mathews 2000). This increased commodification of culture, and by implication of cultural diversity, suggests, once more, an economy in which the importance of diversity, heterogeneity and difference is emphasised, both in terms of supply (niche marketing) and demand (lifestyle choices).

In addition, the shift towards an information-based economy has profoundly altered the social, political and economic value and meaning of information and knowledge (Castells 1993, Long 1996). The technological revolution in communications and computing make it possible to generate information that was heretofore unattainable, transmit it instantaneously around the globe, and – in a rapidly growing number of instances – sell it in information markets (Melody 1994: 21). Advances in automation, computing and biotechnology have funda-
mentally transformed the commercial potential of biological and genetic resources (Verpoorte 2002) and contributed to an informational perspective of nature and the world (Alexiadis 2003, Alexiadis in preparation).

This perspective is particularly palpable in many of the discussions on biological and cultural diversity. Nazarea's remark, for example, that 'genes and cultures have something very important in common: both are repositories of coded information essential to adaptation and survival' (Nazarea 1998: 73), illustrates the extent to which the informational view of diversity has been normalised, both conceptually and in a utilitarian sense. This informational dimension of local environmental knowledge is especially significant in the context of science and its goal of producing, in the words of Latour (1986, cited in DeWalt 1994) 'immutable mobiles', or trans-local knowledge. The flow of knowledge across social spheres, particularly in the context of commoditisation, entails its disassociation from its social context and its re-incorporation into new, often geographically and culturally remote, social and economic settings. Just as commodities are defined and redefined as they flow between different spheres of social and economic exchange (Haugaard et al. 2000), the flow of knowledge within the global network is inevitably transformed, in terms of its meaning, roles and context in which it is produced and reproduced (Ellen et al. 2000).

As knowledge becomes appropriated, circulated, commoditised and transformed, questions regarding rights to access, representation, ownership and control become paramount. Not surprisingly, the issue of intellectual property rights has moved to the forefront of international and national regulatory agendas during the past two decades. The Trade-Related Intellectual Property Rights (TRIPS) agreement issued in the Uruguay round of GATT is indicative of three interrelated processes: the growing importance of the knowledge and the information sector, including the software, entertainment and biotechnology industries; the increased commoditisation of genetic resources; and the globalisation in the flow of these different products, largely through the expansion of transnational corporate activity. The Convention on Biological Diversity also responds to this new context by seeking to establish a regulatory framework through which nation-states can control access to genetic resources and develop material transfer and benefit-sharing agreements (Dutfield 2002, Monagle and Gonzales 2001). 5

Pistorius and van Wijk (2000) discuss these changes in the context of agriculture and the historical development of what they identify as three major production strategies. The first of these, non-industrial agriculture, was the main global agricultural production strategy until the end of the nineteenth century, and continues to form the basis of the agriculture practiced by the world's majority of economically and socially marginalised farmers. These farmers depend on free access to a wide range of plant genetic resources as a means to guarantee their families' food security and oppose patenting of plant varieties and intellectual property rights regimes.

During much of the twentieth century, the Organisation for Economic Co-operation and Development (OECD) countries and their multilateral agencies (World Bank, the Future Harvest Centres of the Consultative Group on International Agricultural Research and others) actively promoted agro-industrialisation via plant generic resource collection and conservation, emphasizing plant breeding and plant breeder's rights as mechanisms to guarantee national, as opposed to family, food security. This period of agricultural development coincides with the period of modernisation and nation building outlined earlier.

The 1980s marked the beginning of what Pistorius and van Wijk refer to as market-led agro-industry, with an emphasis in crop development through the application of revolutionary biotechnologies, which rely on the use of genetic information from biodiversity and not simply from crop genetic resources. In contrast to the family-level and state-level control of the two previous production strategies, production is now controlled by large transnational corporations, which in turn is facilitated by national de-regulation and economic liberalisation, and extended to non-OECD countries through such institutional mechanisms as the World Bank and the WTO. Changes in U.S. patent law in the 1980s allowing patents on life forms (Mooney 1997), and the internationalisation of intellectual property rights regimes through TRIPS, reflect a shift in the strategic and economic role of genetic information and, more generally, biodiversity.6

New powerful conflicts of interest arise from the dual status of knowledge as a public resource, whose value depends on it being shared, and as a private resource, whose value depends on it being guarded. Indigenous leaders and activists in Latin America, for example, have expressed concern that the value of indigenous knowledge as a tool for cultural revival and self-determination, a process known as revalorización, is being increasingly frustrated by fears that once diffused, such knowledge will be misappropriated (Alexiadis 2003). Scientists too are increasingly torn between their obligation to disclose the results of their research to the scientific community and to the general public, and their obligations to either corporate or indigenous partners, who may require withholding certain kinds of information from publication (Laird et al. 2002). The privatisation of science (Busch et al. 1999), the rapid growth of agribusiness and biotechnology, and the increased mobilisation of indigenous and environmental watchdog organisations concerned with the social and environmental impacts of these industries (Feder 1999, McCarthy 1999, Shiva 1997) are likely to continue generating conflicts of interest as different forms of environmental knowledge fulfil diverse, often contradictory, roles.
The Politicisation of Knowledge

The revitalisation of traditional environmental knowledge bears distinct, intersecting and often conflicting social and economic dimensions — in the form of ethnic revitalisation and commoditisation, for example. Traditional environmental knowledge has thus become politicised in new ways, at times serving as an arena where struggles over representation, control, authenticity, property and equity are played out in an increasingly interconnected world.

New Social Movements and the Politics of Identity

Economic liberalisation and the dismantling of the welfare state have eroded the presence of the state in the service sector, including health, education and development. Coupled with a global tendency towards democratisation (Clark 1997), this in turn has created new spaces for the growth of civil society7 (Edelman 2001), as evidenced by the rapid growth in the number and influence of non-governmental and grass-roots organisations (Blunt and Warren 1996; Escobar and Alvarez 1992).

The revitalisation of ‘tradition’ and the re-emergence of indigenous political agency is evidenced by the growing number of peoples who define themselves as indigenous, the proliferation of indigenous associations, federations, community-based organisations and NGOs, the recognition of indigenous collective rights in national and international jurisprudence and the increasing presence of indigenous delegates within the United Nations (Colchester 2002; Muehlebach 2001; Nagel 1996; Warren 1998; Wilmer 1993: 5). This ‘re-indigenisation’ reflects the importance of identity, based on ethnicity, locality or religion, as a form of cultural and political renewal in an era of increasingly globalised exchanges (Cornell 1998; Clark 1997; Turner 1993; McMichael 2000: 286).

Like environmental activism, indigenous and human rights activism have become increasingly transnational (Brysk 2000; Varese 1996), often involving strategic alliances between different organisations and movements (Poole 1990; van de Flier 1994). These ‘new social movements’ have emerged as collective form of resistance amidst globalisation in the same way as trade unions formed in response to the industrial phase of capitalism (Clark 1997; Falk 1993; Finger 1994; Sklair 2000). Not surprisingly, the commercial, political, ethical, legal and moral issues surrounding use, access and control of local environmental knowledge and genetic resources lie at the core of a number of social movements (Edelman 1999; Mooney and Majka 1995) and international organisations such as the Indigenous People’s Biodiversity Network and the Indigenous Knowledge Program (Muehlebach 2001: 435).

As an instance of ‘globalisation from below’ (Falk 1993) these movements have shifted, even if at times only temporarily and partially, the balance of power between indigenous peoples and national governments (Burger 1987; Kearney 1995; Wilmer 1993). A rapidly growing indigenous movement has not only succeeded in blocking large-scale hydroelectric development projects in Brazil and Canada (Fisher 1994; Aubry and Mclnroy 1994), but has also pushed constitutional reform in the Philippines, Ecuador and Bolivia (Maybury-Lewis 1984), and led to indigenous self-government in many parts of Eurasia, Asia and the Americas (Cordillera Peoples Alliance et al. 2005; Dahl et al. 2000; Wessendorf 2005).

The crisis of modernity, the growth of civil society and the emergence of identity as a vehicle for political and spiritual renewal, have created new opportunities for indigenous political organisation. Cultural knowledge, including environmental knowledge, is particularly important as a means of legitimising claims to secondary resources, such as land or natural resources. As knowledge becomes increasingly valued, circulated and transformed, it becomes increasingly contested. As a result, struggles over rights of access and representation of knowledge serve as means through which broader and deeper conflicts are expressed and negotiated.

Disputes over the appropriation of Native American spirituality by non-native actors, for example, not only revolve around questions of authenticity and legitimacy, but also of justice. Brown (1998: esp. 201-202) provides an insightful critique of the notion that any minority group can claim collective property rights over culture, and the legal, political and social implications of treating culture as property, given culture’s unbounded and dynamic nature. However, the issue is not only whether Europeans and Americans have the right to, or even can, represent or appropriate elements of Native American culture (Jorámon 1990), but the fact that such appropriation follows from a history of abuse, marginalisation and violence directed at native Americans in general, and against native American spirituality in particular (Hall 2000: 257-258).

Science, TEK and the Crisis of Representation

The Enlightenment, with its emphasis on individualism, materialism, rationalism, universalism and the role of science as the privileged source of truth, has come under increased scrutiny and reflexive criticism (Inayatullah 1997; Roberts and Hite 1999: 18; Touraine 1989). Concomitantly, a preoccupation with heterogeneity, uncertainty, and subjectivity is evident in much of contemporary science, philosophy and aesthetics. For some, this emphasis on fragmentation, ephemerality, difference and ‘otherness’ reflects a ‘crisis of representation’ brought about by the radical transformation of the experience of time and space following the dramatic advances in communications technology and the re-organisation of capitalism (Harvey 2000: 294), with the concomitant plurality of power and heightened economic competition this has entailed (Bergen 2000: 181; see also Friedman 1998).

One facet of the crisis of representation is the questioning of authority, both with regards to what is established as ‘the truth’ and the procedures used to
determine that truth. An important dimension of this debate concerns the power relationship between scientific and other knowledge systems, including local knowledge. While many scholars, environmentalists and development workers note the importance of considering the 'local perspective', in practice this perspective is afforded an inferior status to the 'scientistic perspective'. The subordination of local to scientific knowledge is evident in the ways that 'local' views of the environment are presented as illusory and incomplete, in contrast to the presumed objectivity and totality of the 'global' view (Ingold 1993: 31). Campbell (2002), for example, provides an elegant example of how scientific knowledge and technology, in this case linked to the use of Geographical Information Systems (GIS), was used to subordinate or block local forms of knowledge and understanding. In practice such distinctions often serve to legitimate the disembpowerment of local people in the management of their environments (Brotius 2002. Fairhead and Leach 1996).

In other instances, the value of traditional knowledge is presented as contingent upon its scientific validation. An example of this position was articulated by U.S. officials during the World Conference of Science, who expressed concern that traditional knowledge should be considered as a science, a demand heard from a variety of developing countries, suggesting instead that traditional knowledge 'be studied more - to be scientifically validated' (Nature 1999). By characterising Western sciences as transcultural and universal and indigenous knowledge systems as culturally and locally grounded, the latter are implicitly relegated to a lower order of knowledge production (Senmai and Kinseloe 1999: 21). Making the validation of traditional knowledge contingent on scientific testing reveals a power relationship between both systems of knowledge (Viergever 1999). Agrawal (1995, 2002) further suggests that the distinction between 'scientific' and 'indigenous' knowledge refines a false dichotomy and ultimately serves to further marginalise disadvantaged groups.

The issue of power relations is particularly important in the context of local environmental knowledge given the common observation that the groups 'that control the greatest wealth of traditional knowledge and biological resources may be the most marginalised by nation-states' (Brush 1993: 664). Similarly, Alcorn (1995: 1) identifies the status difference between bearers of ethno-botanical knowledge and development specialists as one of the barriers for implementing and incorporating such knowledge in development. The following statement by Robbins (1999) clearly articulates the fundamental importance of power relations in structuring contact and exchange along the local-global continuum:

Given the terrible inequalities of power and wealth that continue to structure the world of nations, no version of worldliness - wherever it is located, however close it remains to the grassroots - cannot be accused of depending and benefiting from these inequalities ... Even human rights activism involves actions of unequal power and mobility and can thus be classified as a form of the "aerial global view". This is no
true of the inequalities between First and Third World governments than of the inequalities between a metropolitan and a Third World NGO. It also distinguishes activists in a Third World capital from the rural population they are trying to help. The differentials of power and privilege are equally dramatic at every scale. No good intention, no democratic scrupulosity, can wish them away. (Robbins 1999: 5)

Globalisation has also profoundly reshaped the social, political and economic fields in which scientific knowledge is produced, and hence the relationship between science and society and between 'scientistic' and other forms of knowledge. For one thing, the relationship between science, technological innovation and the economy has changed in fundamental ways (Castells 1993). The great technological advances of the nineteenth and early twentieth century, including steel, electric power, telegraph, telephone, automobiles and aviation, were mainly the creation of 'taalented tinkers' such as Bell, Edison, Kelly and Bessmer, who 'were indifferent to science and the fundamental laws underlying their investigations' (Bell 1999: 20). In contrast, the new industries of the twentieth century, including computing, fibre optics and biotechnology, all derive from within the core of the great scientific advances of the twentieth century, notably relativity theory and genetics.

The changing role of science in the new economy, the advent of potentially destructive and widely feared technologies such as nuclear energy and genetic engineering, and a widespread crisis of authority and representation, have all contributed to a growing distrust of science within certain sectors of society, as exemplified by the 'science wars' of the 1990s (Ross 1996). This coupled with a decrease in public funding and the widespread privatisation of science has created new challenges and conflicts of interest for its practitioners.

Accusations of 'biopiracy', levelled against many scientists and scientific institutions in the recent past, highlight some of the new and complex economic, legal and political dimensions of the revolution in biotechnology, and illustrate how science increasingly operates under public scrutiny (Riordan 1995, Weinberg 2001). The level of suspicion directed towards scientists may be perplexing to some, particularly in instances and regions where highly predatory resource extraction schemes operate space and largely unchallenged (Laid et al. 2000).

One way of reconciling this apparent paradox is by considering bioprospecting, linked as it is to new technologies and to an increasingly globalised economy, as emblematic of a new order of social, political and economic relations and its concomitant tensions (Clement and Alexiades 2000, Mooney 1997). As a social phenomenon, biopiracy thus expresses the collective memory of a colonial and neo-colonial past, as well as the fear of a new technological and economic order in which notions of national, subnational and individual sovereignty or integrity are threatened (Alexiades in preparation, Jackson 2002).
In a discussion of the rediscovery, reification and reinvention of indigenous knowledge within the environmental and development sector, Ellen and Harris (2000) note a clear tendency towards decontextualising and disaggregating indigenous knowledge. Escobar has expressed scepticism about the appropriation of local knowledge of biodiversity:

'\textquote{Modern biology is beginning to find local knowledge systems to be useful comple-}
ments. In these discourses, however, knowledge is seen as something that exists in the \textquote{minds} of individual persons (shamans, sages, elders) about external \textquote{objects} (plants, species), the medical or economic \textquote{utility} of which their bearers are supposed to \textquote{transmit} to the modern experts. Local knowledge is not seen as a complex cultural construction, involving not objects but movements and events that are profoundly his-}

The 'universalising discourse' of indigenous knowledge as homogeneous, systemic and static, runs the risk of repeating the errors of past development projects by 'ignoring specific local experience in favour of a generalisable and universal solution' (Harris 1996: 14, cited in Ellen and Harris 2000: 15). Such an approach is in turn unlikely to be effective in addressing social and environmental problems 'on the ground', possibly discrediting the value of local knowledge as an effective tool for development.

A central question then, is not whether indigenous environmental knowledge has value and application outside of its own particular context, but rather how it is used, represented or appropriated, by whom, to what ends, for whose benefit, and under what conditions. Likewise, it is not the appropriation, circulation and transformation of local environmental knowledge that is novel; it is the economic, social and especially political significance that such knowledge has acquired, and concomitantly, the spaces for cooperation and conflict that such a shift has created.

Globalisation, Integration and Fragmentation

Contemporary globalisation has given way to two fundamental, interrelated yet apparently contradictory processes: integration and fragmentation. The simultaneous occurrence of these two processes is revealed in all aspects of social life affected by globalisation. In economic terms, for example, while increased capital flows and foreign direct investment have led to economic integration at one level, regional specialisation and the creation of an international division of labour have led to new and simultaneous forms of economic fragmentation (Gereffi 2000, Petras 1999: 15). This fragmentation is evidenced by increasing social and economic polarisation within and between countries (Cox 1997: 26, Böröcz and Smith 1995).

In geopolitical terms, the interplay of integration and fragmentation is exemplified by the tendency for some regions and nations to become simultaneously uni-

fied and disaggregated at different levels. Some analysts suggest that regionalisation represents a more significant form of geopolitical and economic integration than globalisation (Fernández and Mommen 1998), whereas others see it as a facet or a stage in globalisation (Cox 1994). Western Europe is a case in point, where countries like the United Kingdom and Spain are being integrated 'from above' into the European Union, while simultaneously experiencing a fragmenting pull 'from below', in the form of separatist or autonomy movements. The end of the Cold War and the collapse of the Soviet Union has also contributed to the fragmentation of nation-states. The tendency for geo-political fragmentation is also particularly evident in regions where political boundaries were laid down in recent colonial or post-colonial contexts, and within which claims to sovereignty based on race, religion or ethnicity are effectively being articulated in a post-Cold-War context.

In the realm of culture, the interplay between integration and fragmentation is expressed as the simultaneous processes of homogenisation and heterogenisation: Just as globalisation gives impetus to cultural homogenisation, so too does a global thrust undermine state power and unleash subterranean cultural pluralism' (Mittelmann 1997: 8). Appadurai (1994) sees the tension between these two as the central problem of today's global interactions. Just as fragmentation occurs as a reaction to integration, heterogenisation also emerges as a response to homogenisation (Mittelmann 1997).

Amid this tension, products become increasingly valued in terms of local variation as opposed to, and in response to, standardisation. For example, renewed interest in heirloom varieties of fruits and vegetables and in locally grown and processed food products occurs as a response to increased transnationalisation, industrialisation and homogenisation of food products (Béard and Marchenay 1996, Norberg-Hodge 1998). The 'Appelation Contrôlée' denomination, geographical indications and the 'Slow Food' network are among the legal mechanisms and business initiatives which respond to the demands by consumers who reject mass-produced food for reasons of quality, health or environment (Downes and Laird 1999, Stille 2001). Widespread interest and revival in local, traditional and indigenous arts and crafts can clearly also be understood in this context.

The engagement of particular localities within a global field leads to a unique interpretation of the global and the local, to the localisation of the global, or to 'glocalisation' (Robertson 1995). These global-local interchanges, epitomised by the slogan 'Think Globally. Act Locally', are a defining aspect of contemporary social life, and are particularly important in the context of how local environmental knowledge is circulated and transformed. The notion that local medicinal knowledge has considerable potential and application in curing such 'global' ailments as AIDS or cancer is an example of one type of global-local interchange, the globalisation of the local (Brosius 2000).

International property rights regimes, particularly TRIPS, are in effect globalising and extending market notions of property into locally managed
resources, be these environmental knowledge or genetic resources, that until recently were shared according to other principles. At the same time, some forms of local environmental knowledge, or its representation, are becoming a powerful vehicle through which individuals and groups establish identity on the basis of ethnicity, religion or locality, distancing themselves from other groups. Brossius (2000) provides an example of the opposite type of global-local interchange, the localisation of the global, describing how the Penan people in Borneo have appropriated ‘globalised’ views of indigenous knowledge in their own representations of environmental, and specifically medicinal, knowledge.

The interplay between both tendencies does not necessarily mean that there is equivalence in scale. With regards to linguistic diversity, the overall global tendency is clearly towards homogenisation, including the loss of a large number of indigenous oral languages (Kane 1997), even though in some areas particular languages are in the process of revitalisation and recovery (Schmidt 1990). Likewise, the overall tendency in the world is homogenisation of agro-biodiversity, despite the above mentioned exception, in which there is a concomitant counter tendency towards heterogenisation. In corporate terms, the valuation of diversity generates a form of ‘mono-multiculturalism’ (Klein 1999: 115, cited in Edelman 2001: 300) across a myriad differentiated markets.

Traditional Environmental Knowledge in a Post-September 11 World: A New Phase?

Never static, the world economy is always in a state of flux. In this chapter I have focused on the transition between the industrial and the network phases (cf. UNDP 2002) of modern capitalism. The violent political and social events that have unfolded since 11 September 2001 highlight the degree of contingency and uncertainty in the world, and may suggest a turning point, if not in the organisation of the world economy, then certainly in the political and social context in which different social, economic and knowledge systems engage with each other. On the one hand, the experience of ethnonationalist violence in the Balkans and post-colonial Africa, and of post 9/11 ‘Islamic terrorism’, have crystallised fears of social breakdown through the assertion of religious, ethnic or ethnonationalist difference. Ethnonationalist and religious violence may clearly damage agendas that strive to facilitate multiculturalism in its various forms, or indeed the appetite for cultural commodities, based as they are on the fascination with the ‘other’.

This, coupled with a tendency for political unilateralism and closing of borders, seems to run counter to the tendency for increased interpenetration and flow of peoples, goods, ideas and capital, which have all so clearly been favoured by economic globalisation and underpinned by the revolution in communication technology. While the long or even medium-term impacts of these political changes on the form of the world economy are uncertain, they could foreseeably help reshape the social meanings projected on local forms of being and knowing and, more generally cultural diversity. This shift could easily be accelerated by the way in which the ‘war on terrorism’, hinging as it does on a strategically undefined term, be seized by central governments as a way of suppressing movements of ethnic resistance, particularly given the conflicts that underlie indigenous and State simultaneous claims to sovereignty (Wilmer 1993: 2). In other words, current political events may signal a shift in the power balance between local and central forms of knowledge, organisation and control, which in turn will have an impact on how local knowledge is construed internally and engaged with externally. In addition, the post-September 11 wars are subjecting academics, in the U.S at least, to new and more intense levels of public and political scrutiny by special interest groups, interest groups which are deeply suspicious of the kinds of agendas that support indigenous rights to self-determination (Jackson 2002).

In the specific context of conservation, a renewed tendency away from relying on local forms of knowledge, organisation and control is already evident in the backlash against community-based resource management strategies. The growth of an environmental surveillance industry in parts of the world and the privatisation of areas of conservation (Brockelman et al. 2002; Oates 1999; Spinage 1998; Srikanthamata and Brockelman 2002; Terborgh 1999) may also undermine – or at least redefine – how local people and knowledge are drawn upon in development and conservation agendas, which, as we have seen, have become important arenas for the validation of such knowledge systems.

Conclusions

In the introduction to this volume, Hecker makes a plea for pulling together the different strands and approaches to the study of TEK. In this chapter I have sought to link the revitalisation of TEK, and more generally of local forms of environmental knowledge, organisation and control, to the broad political, social, economic and technological transformations that unfolded after the 1970s. In effect, the reorganisation of the world economy in the last twenty century entailed a shift away from centralised modes of organisation, control, production and consumption and from an industrial model of development model based on replication to one emphasising decentralisation and regional specialisation, themselves underpinned by a revolution in communications technology and the emergence of a networked knowledge and service economy. This shift has taken place amidst a global environmental crisis, the growth of civil society and of local and indigenous social movements, the increased interpenetration of local and global processes and actors, and the heightened presence of the market in almost every aspect of social life. In this new context, local and
traditional knowledge, and more generally cultural diversity, have often acquired new and powerful meanings: rather than an obstacle to modern development, they have been redefined as potentially valuable resources in political, social, ecological, economic and spiritual renewal.

The increased commodification and politicisation of culture, knowledge and information coupled with the increased means and opportunities for information sharing and exchange have raised complex questions regarding authenticity, control and benefit-sharing resulting from the flow and transformation of indigenous environmental knowledge in the context of commerce, development and science.

As the entire world becomes increasingly interconnected, inequity becomes increasingly apparent and its effects increasingly destabilising. There is some evidence to suggest that while inequity has decreased in some cases, in others it has actually increased. The income gap between the world's richest and poorest almost tripled between 1960 and 1998 (UNDP 2001: 16-17), reflecting sharp new divisions between those who have the capital, mobility and skills to flourish in global markets and those who do not. One concern is that attempts to achieve international economic integration will create domestic social disintegration (Rodrik 2000), feeding a cycle of instability and conflict. Contributing to this are the destabilising effects of global media, which bring into bold relief the ideological, social and economic differences that exist between the strong and weak, rich and poor, young and old, and educated and undereducated (Westmacott 1999). Growing inequality will further contribute to the generation of social tension, some of which may be discharged precisely at those who – such as many anthropologists or ethnobotanists – operate at the interface between political, economic and intellectual elites and disenfranchised groups (Zarembo 2001). It is easy to envision how the increased uncertainty, polarisation and conflict of a post-September 11 world may heighten these tensions, placing new ethical and moral burdens on anthropologists and practitioners of sister disciplines (Price 2002).

The problems addressed by science have themselves become inherently more complex and explicitly linked to social, political and economic processes (Kay et al. 1999). Issues such as global warming, pollution, deforestation or loss of biodiversity are not only challenging from a technical standpoint, but are also embedded in complex, dynamic, inherently indeterminate and somewhat unpredictable social and political systems, involving local and global actors, events and trends (Fundowicz and Ravez 1991). Additionally, scientists are increasingly being encouraged, if not pressured, to define and operationalise such problematic concepts as sustainability in a scientific manner, as well as to inform policy (Lefèvre and Norgaard 1996).

As scientists enter arenas where 'facts are uncertain, values are in dispute, stakes are high, and decisions are urgent' (Prugh et al. 2000: 94), the contradic-


tions of pursuing an objective science amidst a value-loaded and socially charged reality become evident (Shrader-Frechette and McCoy 1993). One can anticipate these challenges will continue to grow, as the world becomes increasingly interconnected through mass media and telecommunications, and as scientists become accountable to – or at least scrutinised by – an increasingly diverse range of stakeholders.

Minimally, this will require an awareness of the broader political and social ramifications of one's practice, particularly in terms of how this is represented to and perceived by communities outside of academia. The developing new context of science is thus pushing those in academia to dynamically engage with other spheres of social life such as politics, public relations, business and media, simultaneously incorporating new and often contradictory forms of knowledge, approaches and methodologies. This in turn presents new challenges and opportunities for those who practice or teach science and its articulation with other systems of knowledge (Alexiades and Laird 2002). Recognising that 'scientific' and 'indigenous' knowledge are more 'an active verb than a noun' (Gardner 1995: 187) may be a significant first step, allowing one, as the different chapters in this book illustrate, to consider the processual and contextual aspects of knowledge systems, including how knowledge systems develop over time, respond to changing realities, and interface with other knowledge systems.

The re-organisation of capitalism, coupled with increased transnational flows of peoples, ideas, goods and capital, has unleashed powerful centrifugal and centripetal forces of integration and fragmentation, of homogenisation and heterogenisation, of democratising information and guarding knowledge, of exploitation and liberation, of division and interconnectedness, of ethical absence and moral assertion (Trevor 1999). The interplay of these conflicting forces is reshaping the junctures between different social bodies and their knowledge systems. Herein lies a central challenge for those wishing to help articulate 'scientific' and 'traditional' knowledge systems: to help redefine the relationship between different societies, between different forms of knowledge and knowing, in a social environment characterised by contingency, uncertainty and conflict, and concomitantly by opportunities to articulate alternative world views, establish new forms of political agency and develop new alliances. For the communities that generate and manage 'traditional' knowledge, these changes may also provide new opportunities for reconfiguring power and social relations, for hybridisation, innovation and organisation, while simultaneously implying challenges in their ability to maintain some control over their ways of life and modes of thought.

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Bibliography


Notes

1. The terms 'indigenous knowledge' and 'traditional knowledge' defy the false dichotomy of 'modern' versus 'traditional', obscuring the degree to which local forms of knowledge have been historically appropriated and incorporated into scientific knowledge and vice versa (Ellen and Harris 2000; Semali and Kunchehie 1999). These blanket terms include a broad range of very different, fluid and continuously changing systems of local, shared, empirical, holistic and integrative forms of knowledge, itself embedded in practice and situated within broader cultural traditions (Ellen and Harris 2000: 3; Hobart 1993). For a review of the different terms, including a discussion of their history and meaning, see the introduction by Heckler and the chapter by Zeitz (Chapter Two).

2. Using the plural form of the term, 'capitalisms' would better convey the ways in which this economic system is structured over time and across regions and contexts (see Blum 2000 for an overview of some of the regional and historical variations of capitalism in different regions and over time).

3. Hegemony refers to a structure of order that gains enough acceptance and stability so as to remain unquestioned, appearing as the natural order to most actors. Such systems of meaning are underpinned by a structure of power in which one nation state is usually, but not necessarily, dominant (Cox 1981, cited in Connor 1994: 4).

4. As some have repeatedly noted, although these idealised, romanticized and essentialized representations have been effectively used by environmentalist and indigenous activists, they may in the long-term backfire, particularly if indigenous people 'fall to meet these unrealistic expectations on the ground' (Brosius 1997; Conklin and Graham 1995; Goodman 2001; Redford 1991).

5. While both TRIPS and CBD are examples of regulatory globalisation (cf. Drahos 2001), their approach to a series of common issues, including the role and rights extended to traditional knowledge, is quite different, creating several conflicts of interest among signatories (Durfield 2000; Monagle and Zoakes 2001).

6. This shift is also evident within the OECD in its extension to the field of biodiversity and economic development (OECD 1999, 2002).

7. Civil society is here defined as the organisations and individuals who work to promote a public good from a civil society standpoint (Yamamoto 1995, cited in Win 1998: 101).

8. In 1993, the richest 1% of the world's people received as much income as the poorest 75% (Mylanta 2001, cited in UNDP 2001). Inequality has also increased within countries; a study of 77 countries with 82% of the world's population shows that inequality rose in 45 countries and declined in 16 countries, between the 1950s and the 1990s (Cronin 1999, cited in UNDP, 2001).

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Chapter 4

Competing and Coexisting with Cormorants

Ambiguity and Change in European Wetlands

David N. Cars, Sandra Bell and Mariella Marzano

Introduction

This chapter explores issues surrounding environmental change or, more precisely, local peoples’ experiences and perceptions of environmental change, in relation to a particularly virulent conflict that exists across European wetlands between commercial and recreational fishermen, the fish-eating bird, the Great Cormorant, and those responsible for wildlife conservation and management. This conflict is embedded in two important global environmental challenges: the conservation of biodiversity and the sustainable management of natural resources. However, as with most human-wildlife conflicts, cormorant-fisheries conflicts are acted out at the local level (Anderson and Berglund 2004; Croll and Parkin 1992).

Wetland environments are historically recognised as “shifting landscapes”, large sectors being either temporarily or permanently under water creating conditions where inhabitants must adapt to the natural fluctuations of their watery worlds. However, there is evidence that many groups of people are finding it increasingly difficult to negotiate the rapid environmental changes that are occurring across many European wetlands (Bell 2004; Tonder 2005). On the surface, local assessments of environmental change are usually articulated in a relatively straightforward manner, for example, people claim that more and more cormorants are feeding on declining fish stocks in direct competition with fishermen. The simple explanation that assumes a direct causal relation-