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Ethnobotany in the Third Millennium: expectations and unresolved issues

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Abstract. The intersection of technological, social, economic, political and environmental factors in the late 20th century has reshaped the meanings and importance of local environmental knowledge and associated genetic resources, as well as of local forms of organization and control. This new social context has created new opportunities for the growth and consolidation of ethnobotany, both in terms of its theoretical sophistication and its social relevance. Indeed, ethnobotany's position at the human-environment interface, as well as at the interface between different social groups, knowledge systems and academic disciplines, provides a strategically privileged position from which to engage with many of today's complex social and environmental problems; for example by facilitating dialogue and exchange between different specialists and stakeholders, by generating new forms of knowledge, and by developing new mechanisms for dialogue and exchange in a world that, while increasingly interconnected, is also riddled with conflict. This new context and its associated expectations also place new philosophical, ethical, epistemological, methodological and institutional demands. The related issues of interdisciplinarity, interculturality and participation are likely to remain central concerns to ethnobotanists striving to bridge different kinds of social divides, in a world permeated by contingency, change and inequity.

Key words: Ethics, Ethnobotany, Globalization, Indigenous knowledge

Resumen. La combinación de factores tecnológicos, sociales, económicos, políticos y medioambientales de finales del siglo XX ha transformado la importancia y el significado de los conocimientos locales, así como las formas de organización y control local. Este nuevo contexto social y político genera a su vez nuevas posibilidades y retos para la etnobotánica, tanto a nivel de su evolución teórica, como en cuanto a su alcanze social. Por un lado, la posición estratégica de la etnobotánica (ya sea por su enfoque sobre el nexo persona-medio ambiente, o por su capacidad de vincular diferentes tipos de actores sociales, conocimientos o disciplinas) ofrece a esta una posición privilegiada para la búsqueda de soluciones a problemas sociales o ambientales muy complejos. Así, por ejemplo, la etnobotánica puede contribuir a generar nuevos tipos de conocimientos y redes de intercambio, o a facilitar el diálogo en un mundo cada vez más interconectado pero a la vez cargado de conflictos. Este mismo contexto, sin embargo, también impone importantes retos filosóficos, éticos, epistemólogicos, metodológicos y organizativos. En este sentido, las reflexiones sobre la interculturalidad, la interdisciplinariedad y la participación probablemente mantendrán su vigencia entre aquellos etnobotánicos que busquen crear puentes en un mundo caracterizado por la contingencia, el cambio y la desigualdad.

Palabras clave: Conocimientos índigenas, Etnobotánica, Ética, Globalización

INTRODUCTION

Science, as a process seeking to develop a systematic understanding of our surrounding reality, has always been guided by a vision of how the world is ordered in the present and how it should be in the future. The golden era of botanical exploration between the 17th to the 19th centuries, for example, developed out of and helped sustain the project of European colonization of the tropics and, subsequently, the industrial revolution (BROCKWAY 1979; MILLER & REILL 1996). Indeed the need to identify and develop new agricultural and industrial commodities for the global economy was part of the guiding vision during the emergence of economic botany and ethnobotany (CLÉMENT 1998). If we accept that science is grounded in a continuously changing social and political context, then we can hope that by examining this context we can derive meaningful

insights about the legacy and the directions of our field of study, and particularly about the challenges and opportunities that emerge amidst the powerful social, economic and technological transformations sweeping the world today (LUBCHENCO 1998).

Ethnobotany's position at the interface between genetic resources and social knowledge, as well as between different knowledge systems, social groups and, in many cases, regions, is particularly critical in this regard, given that is precisely these junctures that are being profoundly reshaped by diverse but interrelated processes linked to globalization (ALEXIADES 2003). As I hope to show, these processes have meant that the guiding vision of ethnobotany has become broader, and more complex and heterogeneous. Indeed, while some talk of a paradigm change, paradigm splits may be a more accurate term to describe how different approaches continue to unravel within ethnobotany (cf. TOLEDO 1995). The multi-faceted and heterogeneous nature of our subject area and the diverse background and focus of its practitioners, makes it difficult, if not presumptuous, to propose what "directions" this area of study might or should take. Rather, what I will attempt to do is to highlight some of the broader questions and issues that have emerged in recent years, identifying areas for potential collaboration or conflict, and highlighting some of the ways in which ethnobotany can engage with this new social, ethical and political context. I begin by noting the recent expansion and growth of ethnobotany, outlining some of the underlying factors. I then discuss how the very technological, social, political and economic processes that have propelled ethnobotany, are creating a new context, defined by new opportunities and challenges. This new context is characterized by 1) the validation, commoditization and politicization of genetic resources and local environmental knowledge; 2) the interpenetration of local and global actors and processes; 3) an unfolding environmental crisis; and 3) the growth and expansion of civil society and social movements, particularly in relation to environmental issues and identities.

On the one hand, these changes have led to a renewed interest in the potential of local knowledge and associated plant resources (and hence ethnobotany) for social, ecological, and even spiritual, renewal. On the other hand, however, the same processes are associated with widespread and diverse conflicts over ownership, access, rights, control and representation of local knowledge and plant resources. As a result, I argue, ethnobotany is both sustained and challenged by the promises and difficulties of living in an increasingly interconnected and troubled world.

THE RISE OF ETHNOBOTANY IN THE LATE 20th CENTURY

Ethnobotany, as the large number of academic and general interest publications, websites, courses, workshops academic programs and media attention suggest, has experienced an unparalleled period of growth in the past twenty years. Indeed, within this period, the word "ethnobotany" has moved out of the somewhat esoteric margins of science into the academic and public mainstream. This revitalization of ethnobotany is evident in post-industrial, industrializing and non-industrialized nations alike, suggesting its link to broader structural processes, in ways which I outline below (see also ALEXIADES 2003; ALEXIADES, In preparation).

The global environmental crisis

At one level, the rising prominence of ethnobotany is clearly related to the growing environmental crisis and the emergence of the environment as locus of local, national and transnational debate. The Brundlandt report of 1987 and the 1992 World Conference on the Environment are two events that marked a paradigm change of sorts, in the sense that they signaled the repositioning and unification of two agendas which until then were construed as opposed: economic development and the conservation of natural resources. Even though the concept of sustainability remains elusive and extremely difficult to define in practice (HARRISON 2000), and even though tension between social development and conservation is often palpable and not easily resolved (OATES 1999; SULLIVAN 2002), the fact remains that sustainability has become an important organizing

concept for development, and one which privileges, in principle at least, local forms of knowledge, organization and action (LONG 1996). This contrasts with the ideology and language of modernist development espoused by industrialized and non-industrialized nations alike in the post-war era, which by definition marginalized local knowledge and local forms of organization. Clearly, the global environmental crisis and the paradigm of sustainable development have created a powerful platform for the growth and expansion of ethnobotany, given its primary focus on local environmental knowledge and on human-environment relations (ALEXIADES, In preparation).

The legitimization of traditional knowledge

While traditional environmental knowledge and the people developing, holding, and managing this knowledge have historically been marginalized, certain forms, aspects or representations of traditional environmental knowledge have in fact recently undergone a process of unprecedented validation and recognition within such centers of political and economic power as government and multilateral development agencies, international donors and development organizations, research institutions, private corporations and the media (ALEXIADES, In preparation). A diverse community of scholars and practitioners have played a critical role in the process of legitimizing traditional knowledge, showing it to be complex, sophisticated, and highly relevant to contemporary problems in the fields of public health (BANNERMAN *et al.* 1983), resource management and conservation (REDFORD & PADOCH 1992) and development (POSEY 1982; WARREN *et al*. 1989; SILLITOE 1998). A number of influential publications in the late 20th century specifically identified ethnobotanical knowledge as a promising resource in drug development (FARNSWORTH & MORRIS 1976; PLOTKIN 1993; PRANCE *et al.* 1994), an idea which was quickly seized and popularized by the mass media (ALEXIADES 2003). In effect then, scholars in ethnobotany and related fields have played a key role in validating local knowledge, often by suggesting its potential for economic and social development. In this sense, the legitimization of local knowledge and practices has both favored and been favored by the new paradigm of sustainability.

New social movements

Concomitant to the environmental crisis and the legitimization of traditional environmental knowledge, the last decades have also seen the growth and consolidation of local, national and international environmental and indigenous movements (MAYBURY-LEWIS 1984; VAN DE FLIERT 1994). In some cases, strategic alliances between both movements have thwarted or slowed the advance of environmentally or socially damaging development projects (CONKLIN & GRAHAM 1995; FISHER 1996a). These partnerships have often been based on notions, even if at times stereotyped and romanticized, of the conservation potential of traditional resource management skills, which in turn have been used as rhetorical tools to mobilize support (ELLEN 1986; POOLE 1990). The emergence of these new social movements also reflects the opening of new spaces for the growth of civil society, and has been accompanied by the proliferation in the number of non-governmental organizations and their rising prominence in the fields of health, education, conservation, resource management and community development (BLUNT & WARREN 1996; FISHER 1996b). This in turn has created a new backdrop for ethnobotany, strategically poised as it is between many of the key actors and issues at stake, particularly in terms of developing research partnerships and agendas, and in terms of influencing policy and development.

THE POLITICS OF IDENTITY

The end of the 20th century saw a marked "re-indigenization" of the world, as evidenced by the growing number of peoples who define themselves as indigenous, by the proliferation of indigenous organizations, and by the recognition of indigenous collective rights in national and international jurisprudence and forums (WILMER 1993; NAGEL 1996; MUEHLEBACH 2001; COLCHESTER 2002). This in turn reflects the renewed importance of identity, based on ethnicity, locality or reli-

gion, in political and social life (Cornell 1988; Turner 1993; Clark 1997). McMichael (2000), for example, notes that in an increasingly globalized world, the "politics of identity tend to substitute for the civic (universalist) politics of nation-building" (ibid: 286), and suggests that local knowledge is an important resource in this process. In many cases, representations of traditional environmental knowledge have been used by indigenous activists as a way of legitimizing broader claims and asserting a collective identity in national and international politics (Muehlebach 2001). This renewed interest in local knowledge has given ethnobotany a sense of relevancy and urgency, particularly in the context of linguistic and cultural erosion and amidst processes relating to recovery of local languages, knowledges and agrobiodiversity (Maffi 2001).

Globalization and localization

Neoliberal structural adjustments coupled with increased technological, economic and socio-political integration at a supra-national level (the European Union, the World Trade Organization and the growth of transnational corporations being examples) have eroded the role of the nation-state, strengthening that of the private sector and, indirectly, that of civil society. In many cases this has also been accompanied by a tendency towards de-centralization and fragmentation at a sub-national or regional level. Together with a generalized move towards liberal democracy, this reversion to greater local political autonomy has created a new and powerful backdrop for the growth and expansion of ethnobotany, especially given a renewed interest in local participation and in finding locally-based solutions to social or environmental problems. The same processes have contributed to greater interconnection and exchange between local and global actors. Almost by default, ethnobotany is strategically well positioned to grow within these expanding local-global interstices. One example of such global-local interchanges in the context of ethnobotany is the International Cooperative Biodiversity Groups, a program financed by three federal agencies in the U.S. which has supported a number of local biodiversity research and prospecting projects, all involving local communities, local, national and international NGOs and research institutions, as well as a commercial partner (Rosenthal 1999).

Ethnobotany in a Changing World

The intersection of the factors outlined above has transformed the social, political and economic meanings of traditional environmental knowledge and associated biological resources. It is amidst this transformation that new opportunities and challenges for ethnobotany are shaped. The implicit or explicit role of ethnobotanists as mediators between different knowledge systems and social groups has important implications with regards to what, how, for whom, for what and by whom knowledge is collected, represented, disseminated and used. Because our world is increasingly interconnected yet riddled with inequity and conflict, and because the social and political stakes linked to knowledge and its transformations are greater now than before, this aspect of ethnobotany has recently acquired renewed importance.

Ethnobotanical resources and their transformations

When knowledge, cultural artifacts or other resources join transnational flows, they become detached from a particular place and context and eventually become re-attached to other, at times geographically, culturally or socially distinct social systems. In doing so, their social and economic value often changes; in other words, they are fundamentally transformed (Ellen *et al*. 2000; Alexiades, In preparation). The flow and concomitant transformation of knowledge, technology and resources is clearly not new: indeed, this process is intrinsic to our human history. Global exchanges of food plants at different times in history, for example, have had a major impact in human affairs (Hobhouse 1987). Moreover, the staples and "cultural keystone" species (cf. Turner 2002) of many societies are indeed introduced plants: the Irish or the Ukranians and the potato, the Yanomami and the banana, the northern Italians and maize and the southern Italians and the tomato, are but a few examples of intro-

duced plants that acquired central material and symbolic importance in a relatively short period of time (SMOLE 1976, #162; MCNEILL 1991, #160).

While the flow and appropriation of ideas, technologies, goods and plantes is clearly not new, the "intensity" or "rate" of such flows, and the particular "political meanings" attached to these flows are clearly more recent, reflecting not only the effects of a revolution in communications technology, but also the transformation of culture, knowledge and genetic resources into a "primary field of entrepreneurial and capitalistic activity" (HARVEY 2000).

One reason for the politicization of ethnobotanical knowledge and associated genetic resources is that, the flow, demand and use of these within the global economy does not take place in a level playing field. Among other things, the global economy is characterized by unequal distribution of wealth, technology and natural resources among and within regions and nations. One of the paradoxes of the world system is that the capital-rich nations or regions are generally relatively resource-poor. Or, said differently, the countries and regions with most of the world's natural resources tend also to be the poorest (KLOPPENBURG & BALICK 1996). While plants, goods, knowledge, ideas and technologies flow in all directions, the economic, social and political marginalization of some regions and countries is clearly linked to the net flow of resources out of these areas. One of the ways in industrialization helps create inequity is by concentrating economic value on the processing, as opposed to the extraction, of resources: the value of raw materials bought from resource rich regions by technology-rich ones is low compared to the value of the manufactured products sold back to them.

In many cases, the resources that "flow" into industrialized regions do so as public goods but return to non-industrialized regions as private goods. From the perspective of resource-rich regions, the flow out of the system brings in no wealth, but the flow into the system of the processed resource subtracts wealth. KLOPPENBURG'S (1988) analysis of agriculture provides many examples of the way in which the plant genetic resources have been historically used as public goods by breeders to produce plant varieties that were then sold back to the countries who provided the genetic materials. There are three additional interrelated factors that have further politicized ethnobotany and ethnobotanical resources.

First, and as I have already mentioned, technological advances in genetics and biotechnology have created new opportunities for industry to produce commodities by using DNA from a wider range of living organisms than ever before: indeed genetic materials from animals can now be used to develop new strains of plants. Biodiversity has, in this sense, become an economically important resource and, once again, the resource required for industrial development in technology-rich regions, is more abundant in technology-poor regions. In a sense then, genetic resources have become a new frontier for economic development and, consequently, for expression of tension generated by the relations and conditions of inequity that characterize our world (ALEXIADES 2003).

Second, changes in the United States patent law in 1980 allowed patenting of life forms (MOONEY 1997), creating a new and highly controversial context for the transformation of public goods into private ones, particularly given the fact that the law does not recognize "traditional knowledge" as a form of "prior art". In other words, U.S. patent law does not recognize unpublished or unpatented knowledge or use in a foreign country as a form of "prior art", which would otherwise void filing a patent in the U.S. for that knowledge (WISER & DOWNES 1999). The conflicts that have emerged from lax U.S. patenting laws are magnified by the fact that they are currently being internationalized through such legal and institutional mechanisms as TRIPS and the World Trade Organization (DOWNES 1998; DUTFIELD 2002).

Third, the current and potential use of the new "life industry" technologies, notably cloning and genetically modified organisms, have generated a huge amount of public anxiety and controversy, in both technology rich and poor regions, generating powerful currents of public opinion and contributing to the growth of transnational activist organizations such RAFI (Rural Advancement Foundation International) and GRAIN (Genetic Resources Action International). Through the successful use of the internet and an international net-

work of contacts, these groups have become a powerful voice capable of organizing effective protests and campaigns at very short notice.

Ethnobotanical resources: access and property rights, control and representation

The transformation of ethnobotanical knowledge and resources in the global economy has several distinct, albeit frequently overlapping, dimensions: economic, legal, symbolic and political. Through the process of industrialization and commodification, public resources become privatized, and this privatization is frequently, and in the case of genetic resources increasingly, protected through such legislative and judiciary means as patents, copyrights and trade marks. Recent examples of this kind of legal and economic transformation are the widely publicized and controversial cases involving patents and trademarks filed on ayahuasca, turmeric, basmati rice and neem, plants with a long history of traditional use (Downes & Laird 1999). Two main points of contention regarding the privatization of traditional biological and cultural resources by corporate interests are a) whether such transformations are morally, ethically and politically acceptable, even in principle, and b), if so, what mechanisms can be put into place to ensure at least some financial returns or benefits flow back to those who manage these resources.

Cultural objects and knowledge also undergo symbolic or social transformations in that the meanings projected onto them and their social roles are inevitably and fundamentally changed as they are appropriated by different people, in different places, and for different reasons (Ellen *et al.* 2000). Not surprisingly, conflicts are generated as different views and claims regarding "authenticity" and rights to ownership or representation are simultaneously articulated. An example of this is the appropriation of North and South American indigenous shamanistic practices by non-indigenous "New Age" practitioners in Europe and North America, which have led to debates about the legitimacy of such appropriations (Joralemon 1990). The increased interest and demand in indigenous art, specialty foods and other "niche" market goods creates the opportunity for new meanings and conflicts to emerge as cultural objects enter transnational flows.

Because the issues are complex, multidimensional, contextual and dynamic, the positions on them are likewise multiple and changing. Once again, the strategic position of ethnobotany with regards to many of these issues has brought many of its practitioners, wittingly or unwittingly, into the debates. It is certainly beyond my scope to review the many proposals and models that have been put forward to reconcile the conflicts of interest that emerge as different users lay diverse claims over different kinds of ethnobotanical resources. Nevertheless, it may be useful for the purpose of our overview to group some of the major distinct, albeit often overlapping, responses, particularly with respect to how they relate to science and the practice of ethnobotany:

1) *Actively resist the application and expansion of western intellectual property rights regimes.* A number of environmental, human rights and indigenous activists and scientists actively oppose not only the patenting of life forms, but any research or activity that in some way can lead to the patenting of life forms, particularly indigenous genetic and cultural resources (e.g., Mooney 1997; Shiva 1997). A number of prominent ethnobotanists and research projects have been effectively and vocally targeted by activist organizations seeking to identify and denounce instances of "biopiracy" (e.g., Zarembo 2001). The difficulty of tracking biological samples, the increased interpenetration of the private sector in science and the use of scientific publications in bioprospecting or in substantiating patents over life forms all complicate and politicize ethnobotany's relationship to the new life industries (Hersch-Martínez 1992; Parry 2000; Laird *et al.* 2002).

2) *Withhold knowledge from public diffusion.* A number of practitioners, indigenous activists and scholars have taken active measures to protect certain kinds of knowledge by either withholding publication or by deploying a range of strategies that seek to afford varying levels of protection to different kinds of knowledge, and according to specific circumstances (Laird *et al.* 2002). The conflict of interest between sharing and guarding knowledge is clearly not new, though again the interpenetration of the private sector in science

has made such conflicts more common, obvious and worrying (EICHENWALD & KOLATA 1999; GOLDBERG 1999). A contrasting strategy is that of "defensive publishing", whereby environmental knowledge and descriptions of indigenous plant resources are explicitly placed in the public domain to undermine the legal precedent for their privatization through the granting of patents (e.g., THE CRUCIBLE GROUP 1994). Community registries are another strategy being pursued locally and nationally, in an attempt to control the access of particular kinds of ethnobotanical knowledge (DOWNES & LAIRD 1999).

There have also been claims by some indigenous groups to collective rights over such "cultural property" as images, text, ceremonies, music, songs, stories, symbols, beliefs, customs, ideas and other physical and spiritual objects and concepts (Inter-Apache Summit on Repatriation 1995, cited in BROWN 1998). These claims extend beyond the commercial appropriation of indigenous knowledge by corporate interests and beyond the complicity, intended or not, of some scientists in that process. What some of these claims to collective ownership articulate, as BROWN (1998) has cautioned, is the right to exercise control over outsider appropriations and representations of indigenous culture, for aesthetic, academic or other purposes, and to reclaim knowledge and materials gathered in the past. In other words, there are some indigenous claims that suggest that culture constitutes a form of property collectively owned by a particular group of people who in effect have the right to control its diffusion beyond the confines of the group.

These claims are not easy to reconcile with the fluidity, dynamism and adaptability that appears to characterize much of traditional environmental knowledge and management systems (MARTIN, In press), particularly given the fact that as a social product, traditional knowledge is continuously generated through the process of contact and exchange between different knowledge systems, including non-indigenous and cosmopolitan scientific knowledge.

3) *Utilize western intellectual property rights regimes and other contractual agreements.* A broad range of initiatives, pursued by a heterogeneous group of stakeholders involving concerned institutions, academics, and indigenous and community leaders and activists, propose using or modifying western intellectual property rights instruments, such as patents, copyrights, trademarks, trade secrets, geographical indications or *sui generis* systems of protection, for example, as ways of ensuring that local actors receive some form of compensation for the commercial use of their knowledge. The strategy here therefore is to protect traditional knowledge by allowing local actors to privatize it, or to recognize some form of collective ownership during its privatization or commercialization (GLOWKA 1998; DOWNES & LAIRD 1999; WILDER 2001).

Some have argued that western property rights regimes cannot adequately protect indigenous knowledge or are incompatible with indigenous collective rights and indigenous notions of knowledge and associated resources (e.g., MATAATUA DECLARATION 1993). Specific concerns include the following (see DOWNES 1997, for a balanced background to the limits and possibilities of IPR for protecting indigenous knowledge):

a. they undermine free exchange among indigenous people of commonly held resources;

b. they often (notably in the case of patents and copyrights) extend rights to individuals or groups of individuals, and not collective entities;

c. they often cannot protect information that does not result from a specific act of "discovery";

d. they serve to stimulate commercialization, possibly conflicting with indigenous concerns to prohibit commercialization and restrict distribution;

e. they recognize only market economic values;

f. they are subject to manipulation by economic interests wielding greatest political power;

g. they are expensive, complicated and time-consuming to obtain and defend;

h. they can ultimately contribute to undermining, rather than protecting, indigenous knowledge (cf. NADASDY 2002).

Another set of options, particularly common in the context of bioprospecting ventures (MORAN *et al.* 2001), hinges on developing contractual or other kinds of formal agreements between a social body representing local stakeholders and government, private or international institutions, thus

guaranteeing prior informed consent and some kind of benefit-sharing (Gollin 2002; Guerin-McManus *et al.* 2002; Laird & ten Kate 2002; Tobin 2002).

4) *Develop alternative models to claim and exercise traditional resource rights.* Over time, the concept of intellectual property rights has been expanded and reformulated as a broader issue of resource rights, centered around broader notions of environmental justice, prior informed consent, participation and benefit-sharing (Posey & Dutfield 1996).

The presence of indigenous cultural and biological resources in agricultural commodities, pharmaceutical preparations, cosmetics and perfumes, books, music and art is not novel in the sense that cultural artefacts and biological materials have always flowed between social systems, but it is novel to the extent that changes in technology and in the organization and resistance to modern capitalism have injected these resources with new political life. The new political dimension of indigenous knowledge is manifest in the ways in which it is used to legitimize diverse claims by indigenous activists and in current struggles over property rights regimes in the midst of a new knowledge-based economy (Muehlebach 2001).

These issues highlight some of the difficulties faced by ethnobotanists, who often straddle different social worlds and who need to reconcile competing claims and conflicts of interest between different interest groups. While there is clearly no simple or universal answers, it is evident that ethnobotanists need to address these issues explicitly and in the context of the particular circumstances of their own research. Conservation and development programs are one particular context in which many ethnobotanical research programs are framed, and which I will now turn to in order to examine some of the promises and challenges facing ethnobotany in the third millennium.

Ethnobotany, conservation, development and social change: defining roles and responsibilities

The notion of a value-free, and hence replicable, scientific method is central to the modern western research ethic (Appadurai 1997), yet this notion is one that appears to be increasingly unrealistic given the fact that the issues tackled by scientists, especially those working at the interface of humans and the environment, are highly complex and linked to social, economic and political issues. Scientists from many parts of the world find it increasingly difficult to distance themselves, or to justify their distancing, from the social transformations and problems that are sweeping through their own societies. Moreover, interest and funding in ethnobotany has unquestionably grown from the promise that, by gaining an understanding of the ways in which humans think about, classify, manage, manipulate and use plant species and communities, ethnobotanical reserarch can help planners, development agencies, conservation organizations, governments and communities devise and implement more sound conservation and development practices. Some have gone beyond that, suggesting that ethnobotanical research is an excellent vehicle for community empowerement; that is, that ethnobotany can not only provide useful insights for development, but also serve as a useful process in development (Tuxill & Nabhan 2001). This raises many important ethical, conceptual, theoretical and methodological questions, two of which seem to me particularly important: How do we construe, articulate and operationalize the relationship between different knowledges, knowledge systems, actors, needs and views in the context of the intercultural and interdisciplinary contact which characterizes our field? What opportunities and challenges lie beyond the rhetoric of participation and interdisciplinarity that permeates much of development, conservation and environmental scholarship?

Ethnobotany and interculturalism: the relationship between "scientific" and "traditional" knowledge

One of the most important contributions of socio-cultural anthropology to society has perhaps been validating the concept of relativism, the notion that cultural differences, no matter how idiosyncratic or strange they might appear to an outsider, are deserving of respect and understanding in their own terms (Barnard & Spencer 1996). In this sense, cultural relativism is a histo-

rical exception, and one that runs counter to the opposite and universal tendency of ethnocentrism (BARFIELD 1997). While in the social sciences cultural relativism points to a method and a perspective used to better understand human society and behaviour, cultural relativism is part of a broader historical project which in essence tackles the difficult question of how we as humans form communities and societies based on notions of sameness and "otherness".

Given the post-colonial reality of mass migration and multi-culturalism and the compression of time and space by the communications revolution, the issue of how we define and interact with "the other" has acquired important social and political ramifications. By demonstrating the complexity, sophistication and adaptability of indigenous, traditional and local knowledge and management of plants, ethnoscientists have contributed to the historical project of cultural relativism.

For ethnobotany, however, the issue of relativism extends beyond a general recognition of the value in the "other" to the issue of how and what kinds of authority are extended to different types of knowledge and ways of knowing. While all ethnobotanists almost by default recognize the intrinsic worth of traditional knowledge, different strands and lineages within ethnobotany construe the relationship between "traditional" and "scientific" knowledge in different ways (see ANDERSON 2000, for a review of the meanings ascribed to science and the positions regarding its authority and relationship to "truth", in the context of ethnobiological knowledge). As is often the case, this question has complex epistemological and political dimensions. For some, the applicability and value of traditional environmental knowledge needs to be tested and validated by science. An example of this position, usual within scientific orthodoxy, was reiterated by representatives to the U.S. during the United Nations 1999 World Conference of Science. This position contrasts with those of several delegates who insist that traditional knowledge be considered and given the status of science (NATURE 1999). Indeed, for some (e.g., AGRAWAL 1995), the distinction between local and scientific knowledge is in itself meaningless and ultimately serves to marginalize local people.

Ethnobotany and interdisciplinarity

The questions and problems addressed by science have become increasingly and inherently more complex and linked to social, political and economic processes (KAY *et al.* 1999). At the same time, scientific disciplines and knowledge has become increasingly specialized, creating a fundamental conflict of interest between the need to specialize in order to understand and contribute to the growing body of knowledge, and the need to address complex questions by integrating different bodies of knowledge and practices of knowing. As problems become more complex, as different actors are brought together into common social fields, questions of inter-cultural and interdisciplinary communication will continue to become increasingly important. Environmental issues are an instance of the kinds of multidimensional and complex questions that scientists, from different disciplines and backgrounds, are asked to assess. The growth of environmental scholarship and specifically of ethnobotany in the past decades clearly owes much to the extent to which this subfield has been infused by such different fields as geography, history, pharmacology, evolutionary biology, ecology, agronomy, forestry, soil science, linguistics and socio-cultural anthropology, among others. While there is much talk of the value of interdisciplinarity, multidisciplinarity and transdisciplinarity, there have been fewer discussion of the practical, institutional and epistemological difficulties of enabling interdisciplinary intercourse.

At one level, interdisciplinary exchange and communication shares many of the same obstacles of intercultural communication and exchange, given that people in different scientific communities may talk past one another without knowing it because of differences in how science is done in different fields. In this sense, the challenges of interdisciplinarity bear some important similarities with the challenges of establishing partnerships in a multicultural context.

Ethnobotany and participation

APPADURAI'S (1997: 59-60) distinction between "weak internationalization" in which "we take the

elements that constitute the hidden armature of our research ethic as given and unquestionable, and proceed to look around for those who wish to join us" and "strong internationalization" in which "the very elements of this ethic could be subjects of debate, and to which scholars from other societies and traditions of inquiry could bring their own ideas about what counts as new knowledge and about what communities of judgement and accountability they might judge to be central in the pursuit of such knowledge" might well apply to the issue of how different disciplines and societies can come together to generate new knowledge and understandings regarding human-environment interactions.

The concept of participation has been widely appropriated as a rhetorical device in the development literature and in development projects. HERSCH-MARTÍNEZ (1992), for example, drawing on the writings of Oakley and Muller, distinguishes between participation in health care projects as a means to achieving certain pre-established goals, and as an end in itself; that is, as a vehicle of empowerment. The moment power relations seep into a particular social exchange, as they almost inevitably do; then the issue of participation becomes central to the process of communication. Key questions, easy to ask but hard to resolve, include: who is given and who is denied a voice? by who? why? how? As ethnobotanists, and more generally scientists, seek to engage with other of specialists, academic and non-academic, as well as non-specialists, the general public for example, the process of establishing a meaningful dialogue becomes imperative, particularly if the intent is to either generate new knowledge or to incorporate multiple views and knowledge surrounding complex issues (cf. WEBER & WORD 2001).

CONCLUSIONS: ETHNOBOTANY, CONTINGENCY, VARIABILITY AND CHANGE

The transition into the third millennium has been one of rapid technological and social change and a concomitant restructuring in the global economy. A number of factors have been particularly important with regards to reshaping the very interfaces that define the practice and subject matter of ethnobotany. These include: 1) the global environmental crisis and more generally a crisis of modernity and of faith in the values of modernity (notably those of progress and the central authority of science), 2) time-space compression due to revolution in communications technology and mass media, 3) a global tendency towards democracy and the growth of civil society, 4) the re-indigenization of many parts of the world, 5) a renewed interest in traditional and local knowledge and its promise for social, economic and even spiritual renewal, 6) the emergence of an information economy with a concomitant regime of intellectual property rights, and 7) the demise of the welfare state and increased privatization and market penetration. As a result of the interplay between these different factors, traditional knowledge and biological resources have become scientifically, socially, economically and politically more prominent, and more opportunities have been created for exchange and interaction between people from different places and with different backgrounds, skills, needs and expectations.

This new social and political context in which ethnobotany is embedded is characterized by environmental and social change, movement, migration and interpenetration and blurring of spheres and categories which until recently tended to be viewed more as distinct and bounded: the local and the global, the private and the public, conservation and development, the academic and the applied, to name a few. Not surprisingly, there appears to be a shift in focus within ethnobotany, and this may in turn be part of a trend, away from an emphasis in the study of categories, towards the study of processes, including dynamic changes of ethnobotanical knowledge in response to change.

The landscape in which ethnobotany unfolds has thus become more complex, more dynamic and in many ways more interesting, but also harder to travel through. This is because the world is, despite our best efforts and intentions, riddled by inequity, injustice and conflict, and because as different views and needs come together, conflicts of vision and interest inevitably arise. Anticipating and addressing these conflicts is not easy, though urgent and vital, given our commitment to enga-

ging with different kinds of knowledge systems and peoples in an increasingly interconnected world. In order to meet these expectations, ethnobotany will need to continue to mature. Issues relating to interdisciplinarity, multiculturalism, participation, and to power relationships between different stakeholders in the research enterprise are likely to continue shaping future developments in the field. Ethnobotany's placement at the junctures of disciplines, peoples and forms of knowing suggests it will continue to have a privileged place from which to comment on and engage with the unfolding events in our surrounding social and ecological systems.

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