

**Ecological Ethnobotany:  
Stumbling Toward New Practices and Paradigms**

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## **Abstract**

The practice of ethnobotany has changed over the past century since the coining of the term ethnobotany by John Harshberger in 1896. This shift in practice is revealed through an examination of current definitions of ethnobotany which emphasize ethnobotany as the study of peoples=interactions with plants. The influence of ethnoecology has challenged ethnobotany to adopt a more holistic and accountable perspective. An ecological ethnobotany is one possible response to these critiques. Ecological ethnobotany may be tentatively defined as the relational study of peoples=interactions with plants as situated in an ecological and social context. Concerns with accountability have led both ethnobotanists, and the people with whom they work, to develop codes of conduct. There is also a developing body of international law to which ethnobotanists must be attentive. These developments within the practice of ethnobotany suggest that the ethnobotany of the future will become more holistic in approach and based upon cooperative research projects developed jointly between ethnobotanists and plant harvesters.

## **Introduction**

This paper is based on a review of a number of ethnobotany texts in order to arrive at a current understanding of ethnobotany and point to a future direction for the new millennium. Due to the scope and breadth of ethnobotany it is impossible to discuss in detail the specific interests of the discipline and associated methodologies. The approach taken in this paper is to first examine the definition of ethnobotany put forward by various authors. There is a surprising degree of consensus on the definition given the scope of the discipline. Next, the paper turns toward an examination of how ethnoecology has influenced ethnobotany. Ethnoecology is often utilized both as a specific term to distinguish a particular branch of the ethnosciences as well as provide more of an epistemological and methodological challenge to the ethnosciences. This reflects the dual role that ecology has played within the sciences in general as both a discipline and a critique of Newtonian science (Berkes 1999). The critique of ecology, along with that of the people with whom ethnobotany has often undertaken research, has led to a change in the practice of ethnobotany during the 1990s. The paper examines whether this shift requires a change in the objectives of ethnobotany or a more substantive change in its epistemology and methodology. The paper

concludes by providing a reflection on a possible direction for changing ethnobotanical practice.

## Definitions

Ethnobotany was a term first suggested by John Harshberger in 1896 to delimit a specific field of botany as *the use of plants by aboriginal peoples* (Cited in Cotton 1996:1). Prior to the use of the term ethnobotany many botanists were already including the use of plants by people within their studies. One of Carl von Linné's early publications was the *Flora lapponica*, published in 1737, which included a discussion of the ways in which specific plants were utilized by the Lapplander (Sami) people (Olsen and Svanberg 1998). However, it was Harshberger who proposed that a discipline of ethnobotany might be developed with its own definition, scope, objectives and methodologies (Cotton 1996). Although Harshberger's (1896) definition and vision still provide the core for the science of ethnobotany, it has also been reformulated through the practice of ethnobotanists during the Twentieth Century. A slight change in emphasis can be seen through a review of current definitions.

ethnobotany is considered to encompass all studies which concern the mutual relationship between plants and *traditional peoples*. (Cotton 1996:1, original emphasis)

In broad terms, ethnobotany is the study of the relationships between plants and people. The two major parts of ethnobotany are encapsulated in the word itself: *Aethno*, the study of people, and *Abotany*, the study of plants. Arrayed between these two points labeled *Aethno* and *Abotany* lies a spectrum of interests ranging from archaeological investigations of ancient civilizations to the bioengineering of new crops. However, the field is limited on both sides. On the botanical side of the field, few ethnobotanical studies are concerned with plants that have no connection to people. On the ethno side, most studies are concerned with the ways indigenous peoples use and view plants. And those uses and those views can provide deep insights into the human condition. (Balick and Cox 1996:3)

Over this century the field [ethnobotany] has moved from the natural history of plant uses by primitive peoples as observed by western scientists to a wide range of interests of plants in cultural and ecological contexts. (Ford 1994:viii)

The ideal definition of ethnobotany is, in my view, a broad one. Since the term is derived from *ethno*-, pertaining to *Arace*, people, cultural group, nation, and *botany*, *Athe science of plants*, a logical definition is *Athe science of people's interactions with plants*. Some prefer to restrict the discipline to the study of

aboriginal, pre-industrial peoples and their relationships with plants, but this definition does not recognize the complex relationships and interdependence between plants and modern societies of all types. It should be acceptable to study ethnobotany among Canadian Chinese, Canadian Ukrainian, Asia American, and Black American cultures as much as among modern Native American groups. (Turner 1995:264, original emphasis)

As evident in Harshberger's 1896 definition the early definitions of ethnobotany restricted the field to the study of how *aboriginal* people *used* plants (Clément 1998). Botanists, anthropologists, explorers, missionaries and other people who traveled the globe would see a plant, identify/classify/name the plant for the purposes of science, ask a person the name of the plant in the local language and/or list the local uses of the plant. This resulted in numerous monographs on the *AX* cultural group uses of plants, such as, *How Indians Use Plants for Food, Medicine and Crafts* (formerly titled *Uses of Plants by the Chippewa Indians*), written by Francis Densmore in 1928. The particular focus of such monographs would vary depending upon the specific interest (i.e., scientific classification, rituals, discovery, linguistics, commercial use and etc.) of the person undertaking the study. While some would interpret these early foci of ethnobotany as the articulation of colonial economies, imaginations and projects (Clément 1998), it can also be seen as the basic data gathering stage of the ethnobotanical discipline. The puzzle, to utilize Kuhn's framework and terminology (Kuhn 1962), reflected in the early definition, was to determine the spectrum of plants and uses and incorporate them into a comparative and universal system of knowledge for economic, material and museological purposes (Clément 1998). This narrow definition of ethnobotany can be seen to be carried on in the discipline of economic botany which is still *A* devoted to the past, present, and future uses of plants by people *@* as expressed by the banner on the *Journal of Economic Botany*. The discipline of ethnobotany, however, has become a much broader discipline which, as shown in the recent definitions, is interested in all studies about the relationship between people and plants.

Ford (1994[1978]) captured the expanding definition of ethnobotany in his 1994 introduction to the book, *The Nature and Status of Ethnobotany*, as shown in his definition quoted above. In Ford's (1994) conceptual, *tree ring* diagram of ethnobotany, *A* all studies *@* are defined as including:

1. Useful Plants Formerly of primitive people but expanding to include western and non-western cultures;
2. Cognition of Plants Folklore, linguistics and ethnosience, world view and social communication - gender, ethnicity, class; and,
3. Ecology Community interactions and human behavior - conservation, genetic preservation.

It is interesting that ethnobotany has moved its focus from the *use* of plants by people to the *relationship* between people and plants which includes use, cognition and ecology. In comparison, economic botany has maintained a narrow focus on use while expanding its definition to include all people. Recent definitions of ethnobotany (Balick and Cox 1996; Cotton 1996; Ford 1994; Turner 1995) demonstrate consensus on the move to include more than just use by focusing on the relationship between people and plants. However, there is not consensus whether the discipline should focus on all people (Ford 1994; Turner 1995), or *traditional* and/or *indigenous* peoples (Balick and Cox 1996; Cotton 1996). Neither Cotton (1996) nor Balick and Cox (1996) provide a clear argument as to why ethnobotany should be limited to *traditional* and/or *indigenous* peoples. Given recent discussions on the concepts of tradition (Borofsky 1987), culture (Appadurai 1997; Borofsky 1994; Friedman 1994), and science (Atran 1990; Clément 1998) within the anthropological literature, the inclusion of *traditional* and/or *indigenous* in the definition of ethnobotany is bound to raise more problems than it solves. It is evident that people who have lived in one locale for a long time have particularly rich sets of knowledge about and cognition of plants and local ecology (see for example, Berkes 1999; Berlin 1992; Turner 1974). A more fundamental issue in relation to knowledge, however, is found within the discussion of the relationship between knowledge as practice and knowledge as heritage (Borofsky 1987;1994; Ingold 1993). The specification of knowledge can only be undertaken through empirical research. The dynamic relationship between people and plants and the mutually constitutive nature of this relationship is one which likely exists among all people whether the knowledge is practiced or gained through visits to museums. Definitions of ethnobotany such as those proposed by Turner (1995) and Ford (1994), and which simply emphasize the dynamic and mutually constitutive relationship between people and plants, point to the future of ethnobotany as opposed to its past.

## **Ethnobotany and Ethnoecology - Is a Holistic Ethnobotany Possible?**

Ethnoecology has been utilized in at least three distinct ways in the ethnobotanical and ethnobiological literature. The first emphasizes the perspective that ethnoecology is the sum of the individual ethnoscience disciplines (i.e., ethnobotany, ethnozoology, ethnopedology and etc.) Ethnoecology in this perspective becomes the broad discipline which unites the sub-disciplines into a whole. This reflects a broader debate in ecology between the Newtonian and holistic concepts of ecology. A Newtonian approach to ecology assumes that wholes can be constructed from the parts (Odum 1983). Ecology has often been used within anthropology in this context whereby the ecological setting forms an early chapter of an ethnology and is really used as a synonym for environment. Specific studies on parts of the ecosystem are added together to provide an understanding of the ecology. This is reflected by Martin in his description and definition of ethnoecology.

As a discipline which integrates many diverse academic fields, ethnoecology is having an impact on the way that basic and applied research is carried out. After decades in which the natural sciences and even the social sciences have become increasingly reductionistic, ethnoecology promises to give a holistic view of our knowledge of the environment. This basic goal of natural history, nearly abandoned in the quest for specialized knowledge in fields such as particle physics and molecular genetics, is gaining new importance as scientists seek to understand the ecological wisdom of local people.

The term ethnoecology is increasingly used to encompass all studies which describe local people's interaction with the natural environment, including subdisciplines such as ethnobiology, ethnobotany, ethnoentomology and ethnozoology. Ethnobotany refers to the study of the interactions between people and plants. (Martin 1995:xx)

While striving for holism this approach misses the emphasis of Odum (1983) for the study of ecology, and Malinowski (1973) for the study of culture, that the whole is understood by the relationship among the parts not the addition of the parts. The whole has to be understood as an independent abstraction with its own generative principles, relations of causality and dynamics but not a primordial essence. The second way in which ethnoecology could be utilized is to follow Clément's (1998) suggestion that a narrow definition of the ethnosciences should focus on the

science of X discipline as practiced by a local people. In this case ethnoecology would be the science of how people understand the relationship between humans, animals, plants and physical elements of a locale. A third way in which ethnoecology has been utilized is as a concept which influences the practice of the ethnosciences. As Beaucage and Taller de Tradición Oral de CEPEC in quoting Toledo (1992) note:

[Ethnoecology] is a meeting place for the various scholars and practitioners interested in the dynamic relationships between humans and their environments, whether they be biologists, agronomists, health or development specialists. (1997:46)

This concept of ethnoecology is built upon the holistic line of thought within ecology. The main emphasis is on the process in which people with different experiences and knowledges share their expertise in order to build a holistic understanding of a geographic area such as a watershed. This perspective of ethnoecology implies an epistemological and methodological shift for the ethnosciences. For our epistemology, it suggests that the legitimacy and authority of knowledge should not be restricted to scientific disciplines and institutions but should include the knowledges and institutions of other people. Methodologically, it emphasizes that people should not be objects of research in order to create Aetic@ or Aemic@ representations of peoples=knowledge, but should be subjects/partners in a cooperative process of knowledge creation. Given the incentive structures of scientific institutions this concept of ethnoecology will be difficult to implement, but does map out a vision for future research.

My personal perspective is that ethnoecology has both specified relational knowledge held by different societies (for example, Berkes 1999) as well as provided a challenge to those of us involved in more specific ethnoscience endeavors, such as ethnobotany. However, I think there are two approaches which may be followed in response to this challenge. First, we may use the relationship between plants and people as the starting point for our research with the long term objective of increasing the number of relationships that we include in our understanding of a people or location. This is the spider web approach to holism. An individual starts constructing the web at a center point but increasingly adds strands to the web in an outward pattern. Second, we can utilize our specific knowledges of the relationship between people and plants to build a holistic understanding of, say, a watershed in cooperation with other people. This second

approach requires the recognition of the legitimacy and authority of other knowledges and institutions within our epistemology, while working to create new knowledges and institutions built through the cooperation of scientists and other people. Methodologically, the inclusion of people as subjects, instead of objects, of research requires us to engage in processes of negotiation in order to determine mutually beneficial objectives for theoretical and applied research projects. Ethnoecology, in some of its variants, can be as mechanistic and reductionistic as any other scientific discipline. In order to move towards an ecosystem perspective and a holistic understanding of the relationships of an ecosystem the most important contribution of ethnoecology is that it challenges us to reflect upon our epistemology and methodology in order to construct a relational perspective. This is what some might term ecological ethnobotany or ethnobotany with an ecosystem perspective.

### **Changing Ethnobotanical Practice**

Clément (1998) has identified three stages in the history of ethnobotanical research which he terms the **Preclassical**, **Classical** and **Postclassical**. Both the **Preclassical** and **Classical** stage included an interest in documenting the economic use, vernacular nomenclature, and systematic classifications of plants as well as broader interests such as the knowledge of resources and how to manage them. (Clément 1998:163) Clément (1998) suggests that the practice of ethnobotany shifted around 1950 when researchers moved from creating **etic** representations of these topics to constructing **emic** representations. **Etic** representations communicate the researchers ideas about what people know about plants whereas **emic** representations are an attempt by the researcher to interpret how people know what they know about plants. As has now been made clear by anthropologists both require a moment of interpretation on the part of the researcher (Clifford 1986). It is the shift to the **Post-classical** stage during the 1990s (Clément 1998) which is reflected in the above discussion on ethnobotany and ethnoecology and reflects marked cooperation between Western scientific researchers and Native peoples. (Clément 1998:163)

One of the striking characteristics of current ethnobotanical practice is the attempt to include co-operative research and applied projects within the overall objectives of the discipline.

This shift is reflected in a review of ethnobotanical texts. Ford's (1994[1978]) book is a compilation of key ethnobotanical papers from the mid to late Twentieth century which are all focused on theoretical questions of interest to the discipline. By the 1990s the ethnobotanical texts of Balick and Cox (1996); Cotton (1996) and Martin (1995) include discussions of: how to create local benefits through ethnobotanical research; co-operative research projects; intellectual property rights regarding ethnobotanical knowledge; and, ethnobotanical research ethics. The Declaration of Belem, presented in Table 1, was one of the first signals that a change was occurring in the practice of ethnobotany. This declaration was developed as a self-regulating set of guidelines during the First International Congress of Ethnobiology held in 1988. It provides a basic set of ethical guidelines for carrying out ethnobotanical research.

Since this original ethical statement many ethnobotanical researchers have proposed further research guidelines, such as those shown in Table 2, which were developed by Gary Martin (1995) for inclusion in an ethnobotanical research manual. Indigenous peoples and others have also taken the initiative to indicate to ethnobotanical researchers what they expect when researchers would like to undertake research with people of a community. An example of the type of research that some indigenous people would like undertaken is shown in Table 3 which contains a statement from an indigenous trans-amazonian political institution. There have also been a number of initiatives undertaken to reform international law in order to provide protection for indigenous cultural and natural resources. As shown in Table 4 there has been a gradual recognition of intellectual property rights for indigenous people in regards to cultural and natural resources. However, the extent to which people hold intellectual property rights in law for genetic material is limited by current patent laws and is still an evolving and vigorous area of debate (Posey and Dutfield 1996). It should be clear at this time to most ethnobotanical researchers that the critiques of ethnoecology and indigenous peoples, along with changes in social science ethics and international law, will require the practice of ethnobotany to shift towards a collaborative theoretical epistemology and an applied methodology. The challenge will be whether

ethnobotanical researchers will be able to balance the commercial and academic demands of their discipline with the need to work with people as research partners on cooperative knowledge production and projects.

### **Toward New Ethnobotanical Practices**

The definition and scope of ethnobotany has remained impressive even by the narrowest definition of the discipline. As Turner (1995) notes in her review of ethnobotany the discipline still undertakes research on the relationship between people and plants in the areas of: linguistics; cognition; education; healing; nutrition; archeology; paleology; resource tenure and management; and, livelihood. Clément (1998) is correct in identifying a shift during the 1990s whereby the people with whom ethnobotanists traditionally undertake research have begun to demand more accountability and cooperation from ethnobotanists. There are two possible responses to this challenge. First, it is possible to retreat into historic documents, the mythic past and pollen grain analysis to maintain the epistemological relationship between researcher and object. This allows us to maintain a focus on our scientific puzzles, projects and technologies along with the discovery of public domain knowledge with the potential for private commercial value. Second, it is possible to enter the chaotic fray where research object becomes subject and requires from us accountability and cooperative research projects. Those among us who have chosen this second option, for philosophical or practical reasons, along with the people with whom we undertake research do not have a clear path for how this type of ethnobotany should be practiced. I do think, however, that some of the work done by ethnoecologists does provide a glimpse of what this path may look like.

Ethnobotanical knowledge is what we bring to the meeting place where those people interested in discovering, recovering and knowing local ecosystems, in an attempt to restore both the cultural and ecological resilience and integrity of those places, gather. This requires us to focus less on the boundaries between different types of knowledges and resources and more on

how those knowledges may be related. This will allow us to increase our understanding of an ecosystem which includes humans as well animals, plants and the physical elements as subjects. We need, in other words, to rethink the nature/culture dualism and its role in our epistemology (Descola and Pálsson 1996; Ingold 1988). That is the epistemological shift which seems to be required. Second, the meeting should generate common objectives such as A practical alternative methods of producing food, medicine, and other goods and services without putting at risk the long-term productive uses of the environment@ (Beaucage and Taller de Tradición Oral de CEPEC 1997:46). While this statement contains a materialist focus, goods and services should also include symbolic and cultural processes such as education, healing, and identity. Ethnobotanists will still use specific methodologies to undertake specific types of work within this broad scope. However, a movement towards accountability and inclusion of people as the subjects of research requires a shift toward seeing our research as part of an on-going conversation (Gudeman and Rivera 1990). This conversation will include establishing relationships of trust through the communication of our interests and knowledge while listening and respecting the interests and knowledge of those with whom we wish to work. This will allow us to engage in conversations which can create new knowledges which are useful to those people whose livelihoods are lived at the scale of local ecosystems and communities. Hopefully, the result of this shift in our epistemology and methodology will result in mutually beneficial theoretical and applied research projects which support the cultural and ecological resilience of ecosystems.

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**Table 1. The Declaration of Belem.** Source: Martin (1995:241-242).

As ethnobiologists, we are alarmed that:

SINCE

- tropical forests and other fragile ecosystems are disappearing
- many species, both plant and animal, are threatened with extinction
- indigenous cultures around the world are being disrupted and destroyed

and GIVEN that

- economic, agricultural and health conditions of people are dependent on these resources
- native peoples have been stewards of 99% of the world's genetic resources
- there is an inextricable link between cultural and biological diversity

THEREFORE, as members of the International Society of Ethnobiology, we strongly urge action as follows:

1. Henceforth, a substantial proportion of development aid be devoted to efforts aimed at ethnobiological inventory, conservation and management programs.
  2. Mechanisms be established by which indigenous specialists are recognized as proper authorities and are consulted in all programs affecting them, their resources and their environments.
  3. All other inalienable human rights be recognized and guaranteed, including linguistic identity.
  4. Procedures be developed to compensate native peoples for the utilization of their knowledge and their biological resources.
  5. Educational programs be implemented to alert the global community to the value of ethnobiological knowledge for human well-being.
  6. All medical programs include the recognition of and respect for traditional healers, and the incorporation of traditional health practices that improve the level of health of these populations.
  7. Ethnobiologists make available the results of their research to the native peoples with whom they have worked, especially including dissemination in the native language.
  8. Exchange of information be promoted among indigenous and peasant peoples regarding conservation, management and sustained utilization of resources.
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**Table 2. Guidelines for conducting ethnobotanical studies with local people, communities and indigenous organizations.** Source: Martin (1995:244-246).

**1. Represent and conduct yourself honestly.** Local collaborators must be told your complete institutional affiliation, be it a university, company, governmental agency or non-profit group. Introduce yourself formally to the traditional authorities and leaders of indigenous organizations. This may include presentation of official letters of introduction giving your full name, as well as your local and permanent addresses. The letter should be on official letterhead and signed by an official of your institution. Treat local authorities with the same respect that you would show to a mayor or similar public official in your own city or country.

During your discussion of what the research will entail, explain what you already know about the local environment and what you have learned from others in the region. Explore the ways in which your work may be used for the welfare of the community. Do not attempt to cajole, coerce or trick your informants into revealing data that they consider to be secret. Do not conduct research under false pretense, such as using your activities to influence surreptitiously the religion, culture or economy of local people.

**2. Reveal your source of funding.** The source of funds for the fieldwork should be made explicit, including all obligations required by the funding agency. When possible, a copy of the proposal and grant contract should be presented to collaborating scientists, traditional authorities or local counterparts. It is particularly important to reveal any intentions to commercialize local knowledge or natural resources, by yourself or by your sponsor.

**3. Explain your objectives and methods.** Before beginning your research, visit the traditional authorities of the community to ask for their permission and cooperation. Describe what you plan to do and what you are seeking to learn. Whenever possible, present your project in a public forum such as a town meeting, or to an interested group of citizens organized as a community health committee or similar body. Be prepared to repeat your objectives and methods at any time, particularly when you meet local people in the field or visit them in their homes. Demonstrate what you are accomplishing by sharing with local people the pressed plants, transcribed lists of plant names, photographs of landscapes and other visual aids developed in the course of the study.

**4. Collect botanical samples carefully.** Select your plant material with conservation of local genetic diversity in mind. Do not deplete plant populations, particularly when collecting large samples for phytochemical analysis or for germplasm conservation. Ask permission before gathering any plants which are cultivated or managed. Be aware that stands of plants that appear to be wild may in fact be protected by local people. Ensure that the locality in which you are collecting has no special spiritual significance which entails protection of plant populations by local people. When in doubt, enquire before you collect.

When making collections of agricultural produce, show appreciation for the seeds, fruits and tubers that farmers give you. To you it may be just another germplasm accession, but as any proud gardener knows, harvesting exemplary produce implies hard labor and great pride.

**5. Return the results.** Let the community and indigenous organizations be aware of all manuscripts and published works that result from the research, providing copies of those that local people might wish to consult. Search for ways to provide technical information in a usable form by, for example, translating materials into languages spoken in the region, convening workshops and exhibits to present the results of the study and offering data that aid the execution of development projects.

**6. Give credit to collaborators.** In each project, you should discuss the advantages and disadvantages of disclosure with your local counterparts and make an informed decision that follows their wishes. When local people give their assent, publish the name and location of the communities that hosted the study and identify the key informants and research assistants. Co-author works with local people or support their efforts to publish their perspectives on the research and their analysis of the results.

In areas where retribution is taken against rural people who try to better their standard of living, gain title to their land or fight for basic human rights, you may endanger your collaborators' lives by publishing or even mentioning their names. Even under less dramatic conditions, some local people may prefer to go unnamed for personal or cultural reasons. Given the lack of strict guidelines for compensating the intellectual property rights of indigenous people, some communities may ask that local knowledge

about resources be kept secret. If requested, respect local people's right to anonymity or their desire to keep some information confidential.

**7. Compensate your counterparts.** Compensate those who offer their time, skills or expertise. Establish a form of payment (cash, gifts, exchange of services) that will not disrupt local lifestyles or economic patterns and that will not encourage people to give improvised data. If materials gathered during the course of your research prove to be marketable, work with the community and commercial enterprises to negotiate a contract or other formal agreement which ensures equitable distribution of the profits.

**8. Build local infrastructure.** Strengthen the ability of local people, communities and indigenous organizations to carry out their own ethnobotanical research. Contribute plant specimens to regional and community herbaria, give books to research centers, leave extra sets of dryers, presses and other collecting equipment. Encourage international and governmental authorities to consider local people as expert consultants and to confer with them when assessing the social and environmental impact of development programs. Promote the involvement of traditional healers into local health programs. Search for ways of creating an exchange of plant knowledge between local people and reinforcing networks of communication between communities. Help community leaders to contact foundations and aid them in preparing proposals for grants and technical support.

**9. Continue your efforts back home.** Lobby development and research agencies, encouraging them to commit resources to programs aimed at inventorying, conserving and managing natural resources. Contact your lawmakers, urging them to introduce and support legislation that guarantees the intellectual property rights of indigenous people, providing a legal infrastructure for the protection of cultural knowledge and natural areas. Query business leaders, inquiring how they plan to return profits to local people and to contribute to the safeguarding of the environment. Work towards educating the general public about the global impact of the threats facing the indigenous peoples and natural areas of the world.

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**Table 3. Concrete Proposals from Indigenous Peoples for International Cooperation**

Source: Martin (1995:249-250).

For many decades now, most of our people have been experimenting with ways to participate in the encroaching market economies of our respective countries, while trying to survive as peoples intimately linked to the Amazonian forest. We have done this despite the hostility shown to us by the frontier society and despite the fact that, within the context of the market economy, we are desperately poor. For these reasons, we have organized ourselves in new ways, and developed and managed a variety of small programs to improve our health, education and economy. The following is a brief listing which suggests the kinds of programs which we are currently undertaking or wish to undertake. It is these small-scale, locally controlled initiatives which should be the cornerstone of future Amazonian development.

Programs for territorial demarcation and defense, including research on territorial composition, land use patterns, soil and forest classifications; demarcation of territories; titling and registration of territories; training of paralegals, topographers; relocation of settlers and miners squatting on indigenous territories; recuperation of lands illegally taken; the establishment of complementary forest reserves, wildlife reserves, national parks and joint programs to manage them.

Programs for resource management, including research on land use capabilities, soil quality, inventories of flora, fauna and mineral reserves, indigenous management Practices; training in research methodology; projects for managing forests through sustainable harvesting practices; Projects for improving the productivity of rubber, Brazil nut and other extractive activities; projects of recovering lands and resources devastated by conquest and colonization.

Programs to strengthen material self-sufficiency, including research on traditional crops, foods gathered from the forest, farming practices, hunting and fishing technologies; projects for improving productivity, stability and diversity of traditional farming systems; projects to introduce or improve small animal husbandry; projects to manage food resources found in the forest; projects to replenish and manage flora for housing, clothing and utensils.

Programs for economic development, including projects for industrialization on a small scale of products extracted from the forest; projects to adapt traditional artisan products to market demands; establishment of community marketing channels; establishment of community-controlled transportation systems; projects to improve productivity of agriculture and animal husbandry where directed at the market.

Programs for maintaining a healthy community, including research on traditional healing practices, traditional medicines, health problems common to indigenous communities; projects to strengthen traditional health practices; projects to improve drinking water, nutrition and sanitary conditions where deficient; community-controlled health systems including primary care, diagnostic services and stores of basic medicines; education and training for health care personnel.

Programs for bilingual and intercultural education, including research on the linguistics of Amazonian languages, on pedagogies relevant to our situations and cultures; training for indigenous teachers, linguists and pedagogues; preparation of education materials.

Programs to defend our rights as peoples, including research on reported violations of indigenous peoples' rights, on Indian customary law; training of indigenous lawyers and paralegals; recourse to top legal advice when necessary; participation in fora promoting the rights of indigenous peoples; campaigns to end slavery, captive communities, debt peonage and forced labor among indigenous peoples; campaigns against forced removals or relocations of indigenous peoples.

Programs for research and documentation, including the coordination and systematization of information relevant to the programs of indigenous peoples within their organization; establishment of libraries and research centers in the service of indigenous peoples and others who seek new models for Amazonian development.

Programs for strengthening and communicating our voice, including systems which allow easy communication among indigenous communities and organizations; participation in local, regional, national and international fora where decisions are made which affect our well-being; visits and exchange of experiences among indigenous communities, organizations and programs.

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**Table 4. Developing legislation towards the protection of indigenous people's scientific and cultural resources.** Source: Cotton (1996:369).

<b>Date</b>	<b>Events</b>
1957	Convention Concerning the Protection and Integration of Indigenous and Other Tribal and Semi-tribal Populations in Independent Countries (International Labour Organisation).
1981	A UN Working Group on Indigenous Populations was created following an initiative by the Sub-commission on Prevention of Discrimination and Protection of Minorities. This Working Group has been working to produce a Draft Universal Declaration on the Rights of Indigenous Peoples.
1987	IUCN Working Group on Traditional Ecological Knowledge--working to establish recognition for the value of indigenous knowledge and the need for genuinely equitable partnerships.
1989	Since the 1957 convention became regarded as too assimilationist, the convention was updated to the Convention Concerning Indigenous and Tribal Peoples in Independent Countries; this granted indigenous people very limited rights over natural resources, although no rights to royalties on ethnobotanical materials.
1989	The International Society of Ethnobiology called for mechanisms to compensate indigenous peoples for use of their specialist knowledge. 1989 UNESCO pass a resolution on the Safeguarding of Traditional Culture and Folklore.
1992	Agenda 21 advocates the active involvement of indigenous peoples in projects concerned with conservation and sustainable development. 1993 An updated version of the Draft Declaration, on the Rights of Indigenous Peoples goes much further than any other document in recognising indigenous rights over genetic resources; however, this does not yet form a part of international law.
1994	Working Group on Traditional Intellectual, Cultural and Scientific Resources, set up in Oxford, UK to discuss mechanisms for the protection and recognition of indigenous knowledge and natural resources.

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