

Chapter 3

Ethics in Ethnobiology: History, International Law and Policy, and Contemporary Issues

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Ethical questions in ethnobiology and other fields that engage communities or draw on community knowledge as the focus of study are some of the most difficult and intractable considerations researchers may face in their careers. Difficulties can arise from several

directions, such as differing principles and values, conflicting obligations, insufficient understandings, unmet expectations, and the general complexity of working in real-world situations. Dominating all of these considerations is that, like anthropology, in ethnobiology “the subject of study stares back”.

A well known context for raising ethical issues in ethnobiology is the practice of bioprospecting based on traditional knowledge¹ of Indigenous and local peoples.² Over the last couple of decades, traditional knowledge related to biological diversity and genetic resources has been sought after by government, academic and industrial researchers to identify leads for the development of new drugs, healthcare products, health foods, and other useful consumer goods. Particularly when commercial exploitation is involved, bioprospecting and other acts of taking and using traditional knowledge beyond the cultural context where it originated have become increasingly complex and contested on both ethical and legal grounds. A spectrum of views exists. At the extremes, proponents (largely within academe, government, and the private sector) argue that scientific validation and exploitation of traditional knowledge related to biodiversity and genetic resources will bring prestige and economic opportunities to Indigenous and local communities and/or national governments of “developing” countries, offer new products and other advancements to wider society, and create incentives for the conservation of disappearing ecosystems. Opponents argue that knowledge and resources are being “stolen” from Indigenous and local communities (i.e., biopiracy), eroding their cultures and the ecosystems upon which they depend, interfering with cultural responsibilities (e.g., to past and future generations), and undermining Indigenous rights to traditional resources, intellectual property, and biocultural heritage (Bannister and Solomon 2009a). As will be discussed later in this chapter, the complex of ethical, legal, political, and ecological issues revolving around the use, misuse, and commodification of traditional knowledge was and continues to be a key catalyst in the development of ethical guidance for ethnobiologists worldwide.

This chapter first provides historical background on applied ethics and describes the emergence of ethical standards within the field of ethnobiology. It then focuses on the current international policy context for ethical and related legal issues raised and perpetuated by biocultural research in ethnobiology. It concludes with a summary of contemporary issues and suggestions that today’s ethnobiologists and others working in a biocultural context arguably have an ethical obligation to become informed about and consider carefully in negotiating the many potential dilemmas and sensitivities of working with traditional knowledge and associated living cultural heritage.

INTRODUCTION

In the simplest sense, ethics is how we treat one another. The word *ethics* comes from the Greek work *ethos*. Earliest uses were geographic, referring to an “accustomed place” or abodes of animals, plants, and men (Skeat 1963). The idea of ethos as a place or local environment to which one was accustomed came to embrace the local customs

¹There is no single agreed definition of traditional knowledge and it is beyond the scope of this chapter to enter into the longstanding debate on a definition. The term refers generally to the knowledge, traditions and innovations of Indigenous and local peoples, and is used here in accordance with common usage in international environmental law (e.g., Convention on Biological Diversity).

²As discussed subsequently, the term “Indigenous and local peoples” has no single agreed definition. In this chapter the term is used in accordance with international human rights law (e.g., ILO 169).

and habits, or *mores*, of places. In other words, the concept shifted from describing the character of a place to the moral character of the people inhabiting that place (Liddell and Scott 1940).

Today, ethics has several meanings. It is used as a synonym for *morality*, wherein morality is seen as largely inherent in cultures and societies. For example, “do not harm others” and “do not lie” are part of the set of moral standards shared by most members of a culture or society, referred to as “common morality”. The relationship of ethics to morality is debated by philosophers, some treating both as equivalent terms coming from the same root words for “custom”, others figuring ethics as a subset of morality, and still others seeing morality as a subset of the broad ethical question of “How should I live?” (Downie 2005; Williams 1985). Ethics is also an academic field of inquiry within philosophy that subjects commonly accepted moral beliefs and customs to rational critique. Philosophers have elaborated numerous ethical theories that provide frameworks for evaluation of moral judgments, moral character, and acceptability of actions.

More generally, ethics can be thought of as inquiry into moral decision making which attempts to sort out right and wrong, benefits and harms of human action (and inaction), and moral obligations to others. Ethics, in this sense, is about seeing problems and enacting mechanisms, such as frameworks of principles and guidelines, to allow address of those problems.

When there is no law at risk of being broken, most people tend to weigh their actions under certain circumstances and in light of potential outcomes. An ethical dilemma occurs when it is not clear what we ought to do in a given situation, such as when negative consequences result from seemingly ethical actions; when actions are inconsistent with one’s moral or religious beliefs; or when there is a sense of conflicting obligations to do the right thing.

General scientific ethics and standards for responsible research conduct are well established, largely defining and perpetuating the institution of science, especially as an academic endeavor. These fundamental principles and their implementation include:

- Reproducibility and scientific validity, which rely on defined methods for experimentation and treatment of data;
- The integrity of the scientific process, which requires avoiding bias and conflicts of interest;
- The quality of science, which depends on sharing knowledge through publication and openness;
- Proper attribution in citing other’s work and in determining authorship, which are essential mechanisms for credit and accountability; and
- Ethical treatment of human participants in research (National Academy of Sciences 1995).

Unintentional errors or negligence in the above are largely mediated by mechanisms such as peer review, while scientific misconduct, particularly deception (i.e., fabrication, falsification, or plagiarism), is seen as antithetical to scientific values, with severe consequences.

General scientific ethics are built upon the pursuit of knowledge as a fundamental value. They go beyond common morality, but do not provide any contextual guidance for researchers within their field of specialty. This may be adequate for some sciences but not for others. An additional layer of ethics is particularly important for research that is directly engaged with the social world, where unintended consequences may arise as result of

people, communities, or cultures being subjected to a focused inquiry. Likewise, there are ethical considerations (e.g., access, species conservation) in studying the biological world. Ethnobiology, as a discipline that focuses on the cultural and biological interface, requires a comprehensive and integrated assessment of ethics applied to both the social and biological realms.

HISTORY OF RESEARCH ETHICS AS RELATED TO ETHNOBIOLOGY

Ethics emerged as an applied academic discipline in the 1960s and 1970s as academics and professionals from a variety of backgrounds began to question some of the assumptions of their disciplines in the face of new observations and some deeply troubling revelations, particularly relating to technological advancement, sustainable development, human and environmental health, and human rights. Some of these concerns included accelerated technological change and threats from technology (e.g., nuclear armaments, Three Mile Island), and massive expansion of industry and pollution based on advances in science [e.g., Rachel Carson's (1962) *Silent Spring*], including critique of the Green Revolution (Brush 1992; Clawson and Hoy 1979; Conway and Barbier 1990; Shiva 1989). Anthropologists, geographers, development practitioners and others in the 1970s and 1980s called into question many of the assumptions of dominant development models of the time, which focused on economic and technological development (Blunt and Warren 1996; Chambers 1979; Chambers et al. 1989; Escobar 1991; Johannes 1978; Peluso 1992). Their studies uncovered the persistence, resilience, and fundamental importance of contributions of traditional knowledge, technologies, and lifestyles to human development, wellbeing and livelihoods.

A common theme was that the dominant development models failed to take into account market externalities (or market failures) and distributive justice. Market externalities occur when there are spillover impacts of economic transactions onto others who are not directly involved in the transactions. Externalities may be either positive, such as when others may benefit from the wildlife that are maintained in intact habitat on private lands, or negative, such as when pollution created in the manufacture of consumer goods drifts across borders to harm others who neither manufactured, consumed, or otherwise benefitted from the transaction. These negative spillovers created ethical problems related to the unequal distribution of both the benefits and the harms of development, known as distributive justice problems.

Another set of disturbing events was the uncovering of secret histories of medical and military experimentation on humans, including among others: (i) the Tuskegee Syphilis Study (1932–1972), which charted the effects over 40 years of untreated syphilis on males of African-American descent, many of whom were recruited for the study and intentionally infected with syphilis without their knowledge, then denied treatment based on their participation (Jones 1981; Tuskegee University 2010); and (ii) atrocious human experimentation on concentration camp prisoners in Nazi Germany during the 1940s in World War II, leading to the Nuremberg Doctors Trial and a judgment by the war crimes tribunal which established a new standard for ethical medical experimentation on humans that became accepted worldwide, called the Nuremberg Code (Mitscherlich and Mielke 1949). Both the Tuskegee and Nuremberg cases heavily influenced the development of international standards for biomedical research. Key ethical principles included voluntary informed consent of the participant, weighing of risk against expected benefit, and ensuring participants can withdraw from a study without consequence. These core principles have been elaborated on and expanded over the last couple of decades and are still embodied in contemporary

ethical standards for all research involving humans in north America, including the *Belmont Report: Ethical Principles and Guidelines for the Protection of Human Subjects of Research* in the United States (National Commission 1979) and, in Canada, the *Tri-Council Policy Statement: Ethical Guidance for Research Involving Humans* (CIHR et al. 1998) as well as the Canadian Institutes for Health Research (CIHR) *Guidelines for Health Research Involving Aboriginal People* (CIHR 2007). An extensively revised second edition of the *Tri-Council Policy Statement* is anticipated by early 2011, containing two new sections highly relevant to ethnobiology on Aboriginal Research and Qualitative Research.

An additional influence on contemporary research ethics is the controversy that emerged over the alleged role of anthropologists in gathering military intelligence under the guise of social sciences research during wartime, such as Project Camelot in Chile (1964) and the Vietnam War (1955–1975). The issues raised by these controversies put social science research under public scrutiny and influenced the eventual development of a Code of Ethics by the American Anthropological Association (1998) to provide guidelines for making ethical choices within the complex situations within which anthropologists may be conducting their work (Hill 1998).

Following this period, ethics increasingly referred to codified standards of behavior for researchers and professionals (e.g., biomedical ethics, environmental ethics, legal ethics, human research ethics, animal care ethics), which began to emerge as codes of ethics, codes of conduct, and research protocols of various forms. Today a vast amount and diversity of ethical guidance exists and continues to be developed by academic societies and professional associations, non-governmental organizations, Indigenous organizations, and Indigenous and local communities, as these groups increasingly seek to clarify their ethical stances and codify guidance to others with the intent of fostering ethical, equitable, and productive working relationships.³

Another important strand in the historical evolution of ethical standards for ethnobiology is the Indigenous rights movements of the 1970s. While the first organized international movements of Indigenous peoples date back to around 1900 in North America and Scandinavia, more stable international networks came much later, with the most dramatic gains in institutionalizing Indigenous rights related to biocultural knowledge in the international arena occurring over the last couple of decades. The first international standard specifically devoted to Indigenous rights was the International Labor Organization's (ILO) *Indigenous and Tribal Peoples Convention 169* (adopted in 1957 and revised in 1989). While ILO 169 is considered to be limited in scope, it continues to be a key international legal instrument on Indigenous rights to self-determination, cultural and spiritual values, practices, and institutions (discussed in a later section). The most recent advancements include the *United Nations Declaration on the Rights of Indigenous Peoples* (General Assembly 2007) and the establishment of a Permanent Forum on Indigenous Issues in 2000. The *Declaration* addresses the rights of Indigenous peoples in respect

³Many diverse examples exist and are available online, ranging from codes of ethics of academic and professional societies (e.g., Code of Ethics of the American Anthropological Association 1998; Guidelines of Professional Ethics of the Society for Economic Botany 1995; International Society of Ethnobiology 2006), to research guidelines and protocols developed by Indigenous communities (e.g., Akwesasne Good Mind Protocol 1995; Mi'kmaq Research Principles and Protocols 2000; Protocols and Principles for Conducting Research in a Nuu-Chah-nulth Context 2004; Six Nations Council Ethics Committee Protocol), to ethical codes and guidelines developed by Indigenous organizations for projects involving Indigenous peoples (e.g., Alaska Federation of Natives Guidelines for Research 1993; Traditional Knowledge Research Guidelines: A Guide for Researchers in the Yukon 2000), to name only a few.

of self-determination, culture and language, land and resources, environment and development, intellectual and cultural property, Indigenous law and treaties, and agreements with governments, among other things. The Permanent Forum on Indigenous Issues was established by the United Nations Social and Economic Council to serve as an advisory body to the Council on Indigenous issues related to economic and social development, culture, the environment, education, health, and human rights (Bannister and Solomon 2009b; UNPFII website).

Within international Indigenous rights instruments, protection of traditional knowledge is viewed as integrally linked to self-determination, since knowledge appropriation and commodification tend to be viewed broadly as related to human and land rights, as well as potential involving intellectual property and cultural heritage rights. It is important to note, however, that framing traditional knowledge as intellectual property is more a reflection of Eurocentric institutions than of Indigenous peoples. For many Indigenous peoples, “protection” of their traditional knowledge systems within an intellectual property legal framework is an alien concept. Indeed, this apparent contradiction inspired the promotion of “traditional resource rights” by the late Darrell Addison Posey and colleagues (Posey and Dutfield 1996) as an integrated rights concept that is guided by human rights principles and recognizes the inextricable links between cultural and biological diversity.

By the early 1990s, largely stimulated by the intensive bioprospecting efforts of academic–industrial partnerships and resulting claims of biopiracy, legal protection of traditional knowledge, and issues of permission, credit and financial compensation for use of traditional knowledge became topics of contentious international debate at the intersection of international environmental and human rights law, and launched a concerted effort by the International Society of Ethnobiology to develop ethical guidance for ethnobiologists (Bannister and Solomon 2009a).

ETHNOBIOLOGICAL ETHICS AND THE INTERNATIONAL SOCIETY OF ETHNOBIOLOGY

In 1988 the First International Congress of Ethnobiology was organized in Belém, Brazil by the late Darrell A. Posey and colleagues. Posey, who had started his career focusing on ethnoentomology and traditional resource management by the Kayapó of Brazil, had come to see the value of traditional knowledge and resource management systems as crucial to implementing the emerging concept of sustainable development. He also recognized the need for a coming together of diverse actors to tackle the complex and pressing issues at stake. The congress resulted in the founding of the International Society of Ethnobiology (ISE), which was established as an umbrella organization through which scientists, environmentalists, and Indigenous peoples could work together to protect the world’s endangered biological and cultural diversity.

At the time of Posey’s work, the Kayapó were, and continue to be, galvanized in struggles against government projects to build large hydroelectric dams along the Xingu River and other rivers in the Amazon Basin. Many Indigenous peoples at the time were also protesting the use of their traditional knowledge and cultural resources without their permission and without compensation. Posey advocated going beyond ethical obligations set out by research institutions and academic societies at the time to include issues related to human rights. The 600 delegates from 35 countries, including representatives from 16 Indigenous organizations who participated in the first Congress joined together in the

Declaration of Belém, supporting the notion that “all other inalienable human rights be recognized and guaranteed, including cultural and linguistic identity” (International Society of Ethnobiology 1988; Article 3).

The *Declaration of Belém* also explicitly recognizes the continuing destruction of ecosystems throughout the world, and its devastating biological and human implications. Recognizing that the knowledge underlying the resource management practices of the world’s Indigenous peoples is directly tied to the maintenance of biological diversity, the *Declaration of Belém* underscores the point that loss of traditional knowledge is inextricably linked to loss of biological diversity and *vice versa*. The *Declaration of Belém* was the first international declaration to call for mechanisms to be established to recognize and consult with Indigenous specialists as proper authorities in all activities affecting them, their resources, and their environments, and that procedures be developed to compensate Indigenous peoples for use of their knowledge and their biological resources (ISE website).

Throughout the rest of his career, Posey continued to press for the recognition of Indigenous rights, challenging ethnobiologists to develop higher levels of awareness and commitment to respect and protect Indigenous rights and cosmologies in research. Recognizing the role of ethnobiologists as intermediaries between scientific and Indigenous cultures, and how academic data often flow into the private sector for commercial purposes, Posey argued that a lack of relationship between researchers and holders of traditional knowledge can facilitate not only commodification of the knowledge but of the sacred: “the plant, animal, or crystal that an ethnopharmacologist wants to collect may, in fact, encompass, contain, or even be the manifestation of an ancestral spirit—even the healer’s grandmother” (Posey 2002).

Posey’s work catalyzed a new wave of intellectual and political debate on the ethics of research related to biocultural diversity, and laid the foundation for reconceptualizing issues of appropriation of traditional knowledge, from local to international levels. Using the *Declaration of Belém* as a foundational set of principles, Posey established an Ethics Committee under the ISE in 1992 with a specific mandate to develop a Code of Conduct for the Society. Until his death in 2001, Posey led an extensive process of open hearings, working sessions, discussion, and debate involving hundreds of people from all parts of the world and including Indigenous and non-Indigenous scholars, professionals, activists and practitioners. Over a decade later, after extensive drafting and redrafting that also involved a thorough assessment of many existing codes, guidelines, and research protocols as well as key issues arising within relevant international policy fora, the final version of the ISE Code of Ethics was unanimously adopted by the ISE membership at the Tenth International Congress of Ethnobiology in Chiang Rai, Thailand in 2006 (with an amendment in 2008 to include an Executive Summary and Glossary of Terms).

The ISE Code of Ethics consists of a preamble, purpose, 17 principles, and 12 practical guidelines. It is founded on the value of “mindfulness”, described as “a continual willingness to evaluate one’s own understandings, actions, and responsibilities to others” (ISE 2006).

The ISE Code of Ethics is characterized by a number of progressive principles that expand on contemporary research ethics standards and draw on international human rights and environmental law in a way consistent with Posey’s visionary direction.

- Indigenous prior proprietary rights and cultural responsibilities are explicitly acknowledged.

- Active community participation in all stages of research from inception to implementation and interpretation are encouraged.
- The concept of “educated prior informed consent” is promoted, which recognizes informed consent not only as an ongoing process but as requiring an educative component that employs bilingual and intercultural education methods and tools to ensure understanding by all parties involved.
- The precautionary principle is supported through promoting proactive, anticipatory action to identify and to prevent biological or cultural harms resulting from research activities or outcomes.
- Researchers are expected to incorporate reciprocity, mutual benefit, and equitable sharing in ways that are culturally appropriate and consistent with the wishes of the community involved.
- Research is viewed as a cycle of continuous and ongoing communication and interaction, which should not be initiated unless there is reasonable assurance that all stages can be completed.
- Supporting Indigenous communities in undertaking their own research based on their own epistemologies and methodologies is a priority.
- The importance is underscored of acknowledgement and due credit in accordance with community preferences in all agreed outcomes (e.g., publications and educational materials) including co-authorship when appropriate, and extending equally to secondary or downstream uses and applications such that researchers will ensure that connections to original sources of knowledge and resources are maintained in the public record.
- Research is expected to be conducted in the local language wherever possible, which may involve language fluency or employment of interpreters.
- Researchers are also expected to have a working understanding of the local context prior to entering into research relationships with a community, which includes knowledge of and willingness to comply with local governance systems, cultural laws and protocols, social customs, and etiquette (above list excerpted from Bannister and Solomon 2009a: 157–158).

The principles underscore additional layers of duty that compel researchers to be concerned about the dignity and autonomy of individuals, as well as that of the communities involved and affected. Ethical duty is also extended beyond humans to include the surrounding environment upon which humans depend, acknowledging rights and obligations to both living and non-living, across past, present, and future.

Importantly, the ISE Code of Ethics represents a widely accepted standard internationally, which is explicitly meant to support and enable but *not supersede* community-level processes and structures:

This Code of Ethics recognizes and honors traditional and customary laws, protocols, and methodologies extant within the communities where collaborative research is proposed. It should enable but not over-ride such community-level processes and decision-making structures. It should facilitate the development of community-centered, mutually-negotiated research agreements that serve to strengthen community goals.

The ISE Code of Ethics offers guidance on key issues that are under debate in international law and policy fora in relation to appropriation of traditional knowledge. In particular, these include prior informed consent (PIC), mutually agreed terms (MAT) including benefit sharing, capacity-building, recognition of customary laws, and underscoring the vital role of community research protocols in changing research practice, including shifting the power dynamics of decision making and likely requiring more formal processes and agreements to lay out the goals and terms of research as mutually defined with source communities and traditional knowledge holders. This will be discussed in a subsequent section.

INTERNATIONAL LAW AND POLICY DEBATES AND NEGOTIATIONS

Key Concepts, Terms and Definitions

As noted previously, over the past quarter-century Indigenous peoples and local communities have not only been of increasing interest to anthropologists and others, but also have become the subject of international law. From the founding of the League of Nations in 1920, and continuing with the founding of the United Nations in 1945, groups began petitioning the international legal system to recognize their human and political rights, including the political right to self-determination (Mauro and Hardison 2000).

The right to political self-determination for groups within national boundaries is recognized in many countries of the world. These groups go by many names, including tribes, Indigenous, local community, Aboriginal, Native, and First Nation. There is no single concise definition for any of these terms, and there exist numerous legal and academic treatments. As the international legal system took up this issue and began to address its complexities, it settled on the term “*Indigenous*” as a common way to refer to these groups.

The most common and influential definition of Indigenous is found in ILO’s *Indigenous and Tribal Peoples Convention 169* (ILO 169), originally adopted in 1957 and revised in 1989. ILO 169 recognizes tribal and Indigenous groups as distinct peoples. It does not define Indigenous and tribal peoples, instead providing a list of elements to guide nation states in their identification. Elements common to both tribal peoples and Indigenous peoples are that they possess: (i) traditional life styles; (ii) a culture and way of life different from the other segments of the national population, for example, in their ways of making a living, language, customs; and (iii) their own social organization and traditional customs and laws (ILO 2003). Additionally, Indigenous peoples are those who have been living in historical continuity in a certain area, or before others “invaded” the area (ILO 2003). ILO 169 considers self-identification and the collective desire to remain as distinct peoples to be the leading criteria.

The use of plural “*peoples*” is critical and the designation was hard fought internationally by Indigenous groups and others. In the United Nations system, all nation states are considered to be ruling bodies that collectively represent their peoples, and which possess sovereignty, self-determination, and the right to govern and set rules for their citizens. A *sovereign* has the power to grant, withhold, and distribute rights among citizens. Governments commonly refer to this process as balancing rights among stakeholders. A sovereign does not have the right to govern or make laws for other peoples, or to balance

the rights of their citizens against citizens residing in other countries. Sovereigns make agreements on behalf of their peoples in a number of different ways, including declarations, agreements, conventions, and treaties. *Declarations* are aspirational documents, although they may contain elements of codified and customary international law, and set a direction for the elaboration of international law over the long term. *Agreements* are binding documents made between two or more states, usually involving a narrow issue. *Conventions* and *treaties* are highly formal, larger scale agreements involving many issues. Through these different instruments, sovereigns come to agree on cooperative actions and voluntarily limit the exercise of their sovereign powers. Sometimes these limits are considered to be universally binding, or *erga omnes* norms (Latin: “applying to all”), such as laws related to human rights (e.g., the prohibition against genocide). At other times, any limits are seen as strategic and voluntary.

Two other distinctions are helpful in understanding international law. The first is the distinction between “soft law” and “hard law”. These occur on a continuum, and treaties usually contain elements that cover the whole spectrum. *Soft laws* are measures (e.g., policy statements, principles, guidelines), aspirations which those agreeing to a treaty (the “parties”) have agreed to move towards in a process of progressive implementation. *Hard law* takes the form of binding the parties to specific actions, which they agree to implement in a reasonable amount of time after ratifying the treaty. These actions may be accompanied by sanctions or penalties.

The importance of this discussion for ethnobiologists is the observation that a large percentage of the groups and individuals informing ethnobiological research are now the subject of international law, and are increasingly acknowledged to possess considerable political rights to self-determination. The international system is setting out principles that lead national governments to take measures in their national legal systems to recognize and implement these rights. Indigenous rights to lands, waters, sacred places, biodiversity, genetic resources, and traditional knowledge are increasingly being recognized in national constitutions, statutes, agreements, policy, administrative rulings, memoranda, executive orders, statements of understanding, protocols, and other instruments as part of a national hard law and soft law.

The recognition of Indigenous sovereignty and self-determination is well advanced in a number of nations, particularly in those nations known as settler states, in which there was a clear initiation of a phase of colonization that separated prior inhabitants from the colonizers, such as in Latin America and Caribbean, Australia, Canada, New Zealand, and the United States. In New Zealand, the United States, and some of Canada, the colonizers signed treaties with the inhabitants, an instrument used for agreements between nations.

These developments provide a rich ground for analysis from an ethnological point of view. At the international level, the legal system has begun to construct a legal regime that applies the concept of Indigenous to an extremely diverse group of cultures with different histories and forms of political, social, and economic organization—estimated at over 10,000 distinct groups, with 370 million people in 70 countries (UNPFII 2010). Some of these peoples are nomadic, some are dispersed in tropical forests with little political organization, while others, such as the Quechua and Aymara in the Andes, number in the millions. Many governments of Africa, however, do not recognize Indigenous peoples, but instead refer to “local communities”. In these governments’ view, they are “all Indigenous to Africa” (Henriksen 2008).

The legal movements described above draw from explicit principles contained in existing international legal instruments, known as international customary law. They are

also entering new ground where there is little precedence. Where the law is confronted by new situations, it turns to create *sui generis* law (Latin: “of its own kind”), or law that is unique. Much of United Nations human rights law, as well as national law in modern democracies, focuses on the rights of individuals. In contrast, Indigenous rights are characterized as collective rights. Anthropologists have pointed to the complex nature of collective systems, and have developed a number of concepts to describe them, such as commons, common property systems, communal systems, and collective resource management systems. Although there is no single Indigenous position on these concepts, they are disputed by some Indigenous activists, academics, politicians, and communities, who use counter-naming strategies to develop and apply their own concepts and epistemologies.

To cite one example, some Indigenous scholars reject the use of the terms *cultural property* and *cultural resources*. They believe these concepts reflect the materialism of the West, which isolates living processes and relationships in nature that have a spiritual basis to create material objects that can be commodified, alienated, dispassionately managed, privatized, and sold in the market (Farhata 2008). One initiative at the international level attempts to introduce the concept of *collective bio-cultural heritage*, which refers to the holistic dimension of traditional knowledge inseparable from nature, and is based on balance, reciprocity, and duality (Swiderska 2008). Along with other Indigenous representatives, these authors reject the ability of existing Western legal systems, such as the intellectual property rights (IPR) system, to protect their rights, lands and heritage. Other Indigenous scholars disagree, believing that Indigenous epistemology can find a path to expression and that, with proper modification and the elaboration of *sui generis* law, protections can be found within Western legal systems (Carpenter et al. 2009).

It is for the reader to pursue the details of the arguments set out above and draw his/her own conclusions—the purpose here is not to settle the disputes, but to point out that the elaboration of a collective rights regime that can effectively address the concerns of millions of different Indigenous peoples involves some very difficult conversations between groups with very different ideologies, orientations and worldviews, and will remain sites of cultural contestation. These struggles do not only involve Indigenous peoples against the state. They also involve struggles among Indigenous peoples themselves over the future of their societies, and with those who make claims of Indigeneity in an attempt to capture the rights to resources, lands, and protections offered by the new laws (Li 2010).

International treaties are negotiated in diplomatic contexts. They may take decades to negotiate. They are, by their nature, extremely conservative and abstract processes. Because they intend to promote or establish law, they have to work within the constraint of developing and using concepts that can be understood by all of the state representatives and be accepted by consensus. Consensus in this case is not majority vote, but a process where principles, language, and commitments are only accepted when no one objects. Because of this, international law often remains at the level of principles and guidelines, and leaves out much of the ethnographically rich detail of laws at the national and local level. International law is not a “magic bullet” that can slay bad actors on the international stage by laying out detailed instructions on rightful behavior and force states into compliance. A few treaties have criminal provisions that allow for sanctions and penalties. More often, treaties work by promoting the development of national laws that fulfill their intentions. Once a treaty is ratified, much work must still occur domestically, and those engaging in these processes must be prepared to work at multiple levels with strategies appropriate for each case.

United Nations Treaties

There are few treaties that have any detailed provisions related to traditional knowledge and biological resources. After more than 25 years of negotiation, the United Nations General Assembly adopted the *United Nations Declaration on the Rights of Indigenous Peoples* (UNDRIP) on 13 September 2007 in a pivotal moment for the recognition of the collective rights of self-determination of millions of marginalized peoples. In 41 articles, the *Declaration* sets out a broad range of rights to possess, control, participate, and make decisions over diverse sectors such as education, spirituality, traditional knowledge, lands, waters, and genetic resources; rights to be free of coercion, dispossession, or eviction; and to have these rights recognized by the wider societies in which they are embedded.

Although the *Declaration* is the touchstone of principles for nations to carry into national laws, policies, and ethical guidelines, it is not a treaty. Two treaties are currently being negotiated (as of August 2010), that if completed will likely contain internationally binding commitments that will affect ethnobiological research, as they contain provisions related to traditional knowledge, biodiversity, and genetic resources:

(i) Convention on Biological Diversity

The Diversity (CBD) treaty entered into force in 1993. The three main objectives of this convention are: (a) conservation of biological diversity; (b) sustainable use of its components; and (c) fair and equitable sharing of the benefits arising out of the utilization of genetic resources. It was the first international treaty to contain substantial provisions relating to Indigenous peoples, containing Article 8(j), which states:

Subject to national legislation, respect, preserve and maintain knowledge, innovations and practices of Indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices and encourage the equitable sharing of the benefits arising from the utilization of such knowledge innovations and practices.

United Nations Environment Program 1993

In 2000 the CBD began negotiating the *International Regime on Access and Benefit Sharing* (ABS), scheduled to be completed by October 2010. The draft treaty addresses issues specifically related to genetic resources, and includes legal provisions on traditional knowledge and associated genetic resources. In addition, states adopted the voluntary *Bonn Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of the Benefits Arising out of their Utilization* (Bonn Guidelines), a precursor to the ABS, but which still remains a useful source of measures that can be adopted nationally and locally (SCBD 2002). The Convention is also considering the adoption of the *Tkarihwaié:ri Ethical Code of Conduct on Respect for the Cultural and Intellectual Heritage of Indigenous and Local Communities Relevant for the Conservation and Sustainable Use of Biodiversity* (Tkarihwaié:ri is taken from the Mohawk, and means the “proper way”; SCBD 2009). These ethical guidelines are designed to work in the same way as the Bonn Guidelines, to provide a set of ethical principles for collaborating with Indigenous peoples that can shape both the law and ethical climate of nations. The CBD has also adopted the *Akwe: Kon Voluntary Guidelines for the Conduct of Cultural, Environmental and Social Assessments Regarding Developments Proposed to Take Place on, or Which are Likely to Impact on, Sacred Sites and on Lands and*

Waters Traditionally Occupied or Used by Indigenous and Local Communities (Akwe: Kon Voluntary Guidelines).

(ii) World Intellectual Property Organization

In 2000, the World Intellectual Property Organization (WIPO) set up the Intergovernmental Committee on Genetic Resources, Traditional Knowledge, and Folklore (IGC) to explore the relationship of the intellectual property system to the intangible heritage and associated resources and expressions of Indigenous peoples and local communities. In 2009 they began negotiating a potentially internationally binding treaty targeted to be completed by 2012.

CONVENTION ON BIOLOGICAL DIVERSITY: INTERNATIONAL REGIME ON ACCESS AND BENEFIT SHARING

The CBD International Regime on ABS is looking at issues related to the international trade in genetic resources. In the past, the developed countries of the North have often been accused of biopiracy, or of taking genetic resources freely from their source locations in developing countries without permission and/or compensation. Ethnobiologists have been accused by Indigenous peoples and activists of directly and indirectly facilitating this kind of unfair misappropriation (Posey and Dutfield 1996). Biotechnology corporations have developed natural products based on ethnobotanical leads and the use of genetic resources derived from Indigenous peoples without permission or compensation (Kloppenborg 1991). The issue of what precisely constitutes biopiracy is complex (for a recent in-depth treatment, see Robinson 2010).

In relation to Indigenous peoples, the ABS Regime can be broken into two parts—issues related to *access* to traditional knowledge and associated resources, and issues related to *benefit sharing* once traditional knowledge or genetic resources have been obtained. Article 15 of the CBD asserts that the states are sovereign over their natural resources, such that any other state that wishes to access them must first obtain permission, or *prior informed consent* from the sovereign. State sovereignty over genetic resources was a dramatic reversal of an earlier principle of international law, that is, that genetic resources formed a part of the common heritage of humankind. Under Article 15, sharing is based on the consent of both parties to the terms of the sharing agreement, or *mutually agreed terms*. Both PIC and MAT ensure that an agreement must be made before genetic resources can be obtained and used, and thus set the conditions for benefit sharing.

Article 15 also recognizes rights to ABS for Indigenous and local communities, but is not specific as to how these rights will be implemented. The ABS Regime addresses this in more detail. While the ABS Regime had not been finalized at the time of writing, several observations can be made relating to the practice of ethnobiology. As noted, the CBD stipulates that states are sovereign over genetic resources. This is disputed by many Indigenous peoples, who believe the *Declaration on the Rights of Indigenous Peoples* and other international law support a claim to their own sovereign rights to genetic resources.

The ABS Regime does contemplate Indigenous and local community rights over genetic resources, but these rights are subject to national legislation. The ABS Regime, therefore, will most likely only give guidance in this regard, and leave it to the states to decide how to take that guidance. The scope may be limited only to genetic resources occurring directly on Indigenous territories (i.e., not yet collected), or include genetic resources held

in museums, collections, seed banks, or gene banks. Even if Indigenous peoples fail to gain recognition of their sovereign rights, or if the scope is limited, they will likely increasingly have recognized rights to control access to some subset of national genetic resources in most cases.

The scope of rights for traditional knowledge related to the conservation and sustainable use of biodiversity is also still under debate. Indigenous peoples have consistently argued that in their cosmivision, traditional knowledge and genetic resources cannot be separated, and have defended language that always refers to “rights to traditional knowledge and associated genetic resources” combined. Many states have tried to limit their obligations only to traditional knowledge, with the majority of the control over access to genetic resources remaining vested in the state.

Despite Indigenous cosmivision, it is common for traditional knowledge and genetic resources to be considered separately. There are four common permutations of how traditional knowledge and genetic resources are encountered, each raising different sets of issues: (i) undisclosed traditional knowledge held within a group, with genetic resources acquired outside legal territories; (ii) disclosed traditional knowledge found away from Indigenous territories (e.g., in books, databases, the minds of neighbors) with genetic resources acquired on the territories; (iii) both disclosed traditional knowledge and associated genetic resources acquired away from Indigenous territories; and (iv) disclosed traditional knowledge found away from Indigenous territories, and genetic resources acquired on them.

Each scenario presents difficult ethical and legal issues. For example, how does one identify rights holders to traditional knowledge that is widely circulated? Are there rights to control access and/or derive benefits? In the Western system, once knowledge has been disclosed publically, it begins a journey towards the public domain, in which others may have free access to the knowledge without any obligations to the original holders. This may not be consistent with the belief of the knowledge holders themselves, who often hold that there are spiritual values and social and spiritual obligations that are inextricably linked to the use of the knowledge, as well as harms that may result from misuse (Tulalip Tribes 2003).

There is also the issue of “embodied traditional knowledge”. Economists and intellectual property lawyers have referred to the knowledge embodied in technology—the structure of technological innovations contains information about the knowledge that went into its construction. National and international technology law protects innovators against reverse engineering or the unauthorized extraction of such knowledge through inference from design. Indigenous peoples, for example through countless generations of selection and breeding, have also embodied their traditional knowledge in the breeding of plants and animals and the creation of biocultural landscapes. To the extent that their labor has shaped the pool of genetic resources, questions arise about rights to control access and/or share in the benefits of their use. The current ABS Regime acknowledges such embodied traditional knowledge, but only provides a recommendation that benefits should be shared.

The two strongest outcomes from the ABS Regime are likely to be related to the issue of PIC and the recognition of the importance of customary law in determining conditions of both access and benefit sharing. In Article 15 of the CBD, PIC refers to a government-to-government relationship in which one government must obtain legal consent from a delegated authority of another state before an action is started. Governments create specific offices with decision-making authority to which those wishing to access genetic resources apply, and the agencies are empowered to give an unambiguous reply to accept or deny

access, and provide the terms of access if it is given. The ABS Regime will likely recognize that Indigenous and local communities also have the right to PIC for currently undisclosed traditional knowledge. The scope of rights to disclosed traditional knowledge and associated genetic resources is still under negotiation, but some states are expected to adopt domestic legislation that requires potential users of traditional knowledge and associated genetic resources to obtain consent before access and use, regardless of whether the uses are commercial or non-commercial.

Indigenous peoples are also promoting the recognition of customary law by the ABS Regime. This is important because it is the basis on which Indigenous peoples value and make decisions on access and benefit sharing related directly to their customs, and beliefs about proper and improper uses of traditional knowledge and genetic resources, including the moral, spiritual, and physical consequences of violating those beliefs. Many Indigenous peoples consider themselves stewards or guardians of the land and other living beings, based on a model of proprietorship rather than property owners (Carpenter et al. 2009; Tsosie 2000). They believe it is both a matter of ethics and political self-determination to directly recognize their right to set the terms and conditions of the use of their knowledge and genetic resources, and to have their beliefs respected outside of their lands.

The above is difficult to achieve in practice, as even sovereigns cannot directly require respect of their beliefs or laws from other sovereigns. But it is in the nature of treaties that sovereigns cross-recognize one another's laws on the basis of mutual benefit. Such mutual recognition of national laws, known as comity, is a common outcome of treaties. Indigenous peoples are asked to recognize the national laws related to non-Indigenous property, and they believe it is part of the right to self-determination, as recognized in the *United Nations Declaration on the Rights of Indigenous Peoples*, to have their legal traditions respected. The scope of this principle in the ABS Regime is still unclear, but it is recognized that, at a minimum, Indigenous peoples can embody their beliefs in setting the terms of access and use of their traditional knowledge and genetic resources according to MAT, which are consistent with their traditions.

In summary, the ABS Regime is likely to affect ethnobiological research by increasingly recognizing the legal, political, and human rights of Indigenous peoples to varying extents to control access to and the use of their traditional knowledge and associated genetic resources.

WIPO INTERGOVERNMENTAL COMMITTEE ON GENETIC RESOURCES, TRADITIONAL KNOWLEDGE AND FOLKLORE (IGC)

Many of the issues raised by the CBD are also raised in treaty negotiations at WIPO. Indigenous representatives have objected to the negotiations because of their perceptions of the nature of IPR. Their position is that the rights to Indigenous intangible cultural heritage arise from their spiritual and political traditions, which are protected through human rights rather than property rights. As in the discussion of genetic resources, they believe that the existing intellectual property system cannot be sufficient to protect their rights because the system is fundamentally based on commercialization, commodification, and alienation of rights of ownership or guardianship (Sunder 2007). Other Indigenous scholars and representatives are more supportive of the potential for *sui generis* legal principles to protect intangible knowledge, genetic resources and tangible expressions, using these negotiations as an opportunity to correct "flaws" in the current system (Carpenter et al. 2009).

Both sides agree that there are significant barriers to protection in the current IPR system. The general theory behind intellectual property law is that people require incentives to produce innovations. Sovereigns, therefore, grant monopolies for limited periods of time to innovators, allowing the latter to control and prosper from their innovations. The developers of intellectual property theory proposed limited durations for protection because it was obvious that if IPR did not expire, knowledge would quickly grow into an impassable thicket of exclusive property. The concept of the public domain was created as a conceptual space where intangible creations would become free for anyone to use anywhere without restriction as part of the common heritage of humankind.

In many intellectual property systems around the world, the monopolies run for about 20 years for patents, and “life plus 70” for copyrights (from the time of production to the end of the creator’s life, plus 70 years). There are three important exceptions to this rule: trade marks, trade secrets, and geographical indications, which have indefinite terms of protection. Trade marks, like Coca-Cola™, are visual symbols that are protected as long as they are used. Trade secrets, like the formula for Coca-Cola™, are protected as long as they are kept secret. Geographical indications are appellations (geographically based names) that are permanently tied to products from particular groups or regions. If a product advertizes itself as a Bordeaux wine, it must be produced in the Bordeaux region in France.

The intellectual property system makes certain exceptions to protection. Copyrighted works only protect the exact expressions contained in the works, but do not protect the information contained in the expression. Users of copyrighted works can, therefore, extract the information and use it immediately, without having to wait for the copyright to expire into the public domain. In many countries, fair use laws allow users to extract small amounts of expressions in texts without have to ask for permission or pay a fee to a copyright holder. Both of these exceptions are tied to the concept of freedom of expression, a strong democratic ideal and fundamental human right that keeps people free from coercion and oppression. The laws also generally make exceptions for non-commercial, educational, and reporting uses.

These existing intellectual property law principles can be contrasted with the circulation and regulation of knowledge, genetic resources, and traditional cultural expressions within Indigenous communities. Traditional societies can mostly be characterized as having strong spiritual traditions, which permeate all aspects of their societies (Posey 1999). They do not generally view their knowledge as “data” or “information”, but often as something that has its origin and continuing connections to a spiritual domain. Even reference to the “intangible” can misrepresent traditional concepts of knowledge, as many Indigenous peoples believe knowledge is material and tangible and has existence in the spirit world. There is, of course, no single description of how Indigenous peoples view and use their knowledge, and there is a wide spectrum of concepts ranging from the relatively secular and practical to the highly sacred and secret (Rose 1995).

The idea of the public domain is absent or much diminished in traditional societies (Gibson 2007; Sunder 2007; Tauli-Corpuz 2005; Tulalip Tribes 2003). Consider the classic example of a family song where it is sung in public. Although the audience may hear the song, it is also aware that the song is entrusted to the family, which has the sole proprietary right to sing it. The use of the song is socially regulated by traditional sanctions, norms and institutions, or customary law. Under many cultural rules, controls on the use of family songs are perpetual. Similarly, Indigenous peoples have secret, ritual, or ceremonial practices, which under their traditions are not to be shared or used outside their appropriate contexts.

Still, much knowledge is not guarded in this way, and may be widely circulated. Agricultural knowledge and resources such as seeds and tubers are often shared widely

within and between communities (Brush 2004). Even in these cases, such sharing is often accompanied by beliefs about their appropriate uses, and obligations to respect spiritual and social norms, such as showing reciprocity for shared resources (Matsumura 2006; but see Brush 2005). Previously shared knowledge raises factual, normative, and strategic issues. A description of a historical pattern is factual, but that is not, in itself, sufficient to make it normative. To do so would be to commit the naturalistic fallacy of claiming that whatever naturally occurs is justified simply by its natural occurrence. Even if agricultural knowledge has been widely shared, it was historically shared among rural peoples with similar worldviews, which is very different from today's densely populated, digitally connected, and technologically advanced world where agricultural knowledge takes on many dimensions that it did not have in the past.

The above leads to strategic considerations of the governance of traditional knowledge. Different types of knowledge may have different governability. Knowledge about growing potatoes, for example, can largely be applied only to potatoes. Growing a potato is a demanding task, and occurs in a specific place. If one shares knowledge about growing potatoes with others, the main way they can use it is to grow potatoes themselves on their own lands. In primarily subsistence economies, there will likely not be high competition for potato markets, so sharing the knowledge is an example of non-rivalry where another's use of knowledge or resources does not interfere with one's own. This is asserted with a caveat. Rivalry and non-rivalry related to traditional knowledge are applied with the significant assumption that it only involves the information content of the knowledge. Indigenous peoples who believe that there are spiritual dimensions of knowledge, that misuse has cosmic and physical impacts, or that knowledge is expressed through sacred breath would evaluate rivalry and non-rivalry using different criteria.

Traditional agricultural knowledge can be contrasted with knowledge of the uses of wild living resources. Wild species will generally occur at much lower abundances and have greater variability. Sharing knowledge about a relatively scarce resource that one has little control over can lead to rival uses, where others do interfere with one's own access because of competition for the same resource. The issue of governability of traditional knowledge and associated resources, linking life-history characteristics of exploited species and social-ecological variables, is in its infancy, but is important in understanding strategic issues in making decisions related to knowledge and resources, particularly in a globalized world.

The IGC is not expected to finish its work until 2012 at the earliest, and not all United Nations treaty negotiations are completed. But there is wide recognition that the current IPR laws are not protecting Indigenous peoples from the exploitation of their intangible knowledge, or from the improper granting of IPR to products derived from their resources without permission. One of the current principles under discussion is to provide an indefinite term of protection to traditional cultural expressions (e.g., art, dance, music, symbols, patterns) for an indefinite period in a way similar to trade marks. The protections would last as long as the holders of the traditions persist as recognizable peoples.

CONTEMPORARY ISSUES FOR ETHNOBIOLOGISTS

The considerations outlined above highlight just a few of the wicked problems posed by the intellectual property system, access and benefit sharing agreements, and the collection, dissemination, and use of traditional knowledge. Governments, Indigenous peoples, and

academics are grappling with many interrelated ethical and legal issues. The United Nations is not alone in developing laws; a number of governments are developing constitutional provisions or statutes, and some regional organizations (e.g., the Andean Pact among South American governments) have elaborated (or are elaborating) their own regimes. Ethnobiologists will face increasing regulation of access and use of traditional knowledge in the near future.

Academic and scientific commitments are deeply linked to beliefs in freedom of expression, the common heritage of human kind, and the value of the public domain. Many ethnobiologists work within the evolutionary tradition, which tells a specific materialistic story about the origin of humankind, its evolution and dispersal across the globe, and about the diffusion and mixing of knowledge, resources, and cultures. The scientific narratives are well corroborated, and the principles deserve deep respect. However, it must also be recognized that these narratives can conflict with narratives, beliefs, and principles that are held just as deeply by Indigenous peoples. The negotiations are occurring at a site of high contestation between worldviews.

Characterizing Indigenous worldviews in any realistic way is not possible here, but a common gross generalization is that Indigenous peoples have a collective identity based on creation stories that tell them where they came from, which ties them to the land. They often tell of a sacred journey, of creation or emergence in place, or of cosmological origin. Although there are many accounts that refer to traditional knowledge as an adaptive system developed by trial and error over millennia, this is not the account given by many tradition holders (Posey 1999). Although they recognize the role and value of experimentation and innovation, they commonly believe this is based on a deeper reality where knowledge comes as a gift of the Ancestors, Spirits, or Creator, and may come from direct communication with beings in a cosmic dimension, in dreams, or in direct conversation with plants and animals. The spiritual nature of this knowledge creates correlative rights and responsibilities, and sets appropriate uses (Solomon 2004). They are correlative in the sense that it makes no sense for many Indigenous peoples to talk about rights without also respecting obligations. This is the basis for the claim that there generally is no exact equivalent of the public domain in Indigenous cultures, because knowledge and resources are never unregulated, and always associated with customary laws or community protocols.

The UNDRIP, the CBD and the IGC all represent a movement to recognize Indigenous rights and a new pluralism to respect other ways of thinking and being. These efforts are far from ideal. The dispute over concepts is high. The legal non-Indigenous worldview has become entrenched from hundreds of international agreements over 100 years, with long discussions required to come to common understandings of legal terms of 195 United Nations-recognized states.

If a plant processing method has been held within a family “since time immemorial”, is there any justification under intellectual property law or scientific ethics that could justify its being appropriated into the public domain, or freely used on the justification of freedom of expression? Can an exemption be made on the basis of non-commercial research, if there is a high likelihood that once disclosed in a publication, the knowledge would be unfairly exploited? And what should be done with knowledge that is already in circulation, recorded in texts, or housed in databases, that the legal system and most publics consider to already be in the public domain? Did the transfers of knowledge occur based on a full understanding by all parties of the consequences of sharing, or on mutually agreed terms? Was the sharing based on an agreement involving entire communities who made a collective decision to share their knowledge held in common?

One common reason for making traditional knowledge available is that it can defeat improperly issued patents. For a patent to be valid, it has to be a true invention. If it is based on something previously known that is part of the public domain (“prior art”), it cannot be patented. Some have used this reasoning to advocate the widespread development of databases of traditional knowledge in the public domain (Alexander et al. 2004; Hardison 2005). But defeating patents is only one issue with which Indigenous peoples are concerned—even non-commercial research may pose ethical and spiritual issues. Patents concern 20-year monopolies, and defeating them only stops the monopoly, not non-monopolistic commercial or non-commercial uses. In the Pacific Northwest, for example, tribes are much less concerned about biopiracy from pharmaceutical companies than about non-tribal harvesters who harvest scarce cultural resources and leave the traditional practitioners with little or nothing to perform ceremonies or rituals or for subsistence.

Indigenous peoples have expressed their willingness to share some of their knowledge for good causes, and even with the politicization of these debates, many still work and will continue to work with academic researchers. Indigenous peoples generally are not against all sharing, and there are many reciprocal benefits from this kind of research. They have clearly expressed the desire to reserve their most sacred traditions to themselves, to require their free, prior, and informed consent, to have their knowledge protected and to have their customary laws and community protocols respected. Giving consent will require that all parties understand the terms being used, have a clear understanding of all reasonably known outcomes and consequences, identify a process through which an authoritative decision can be made in the face of conflict, and agree on a method of fair and culturally acceptable conflict resolution (Bell and Kahane 2005; Hardison 2006; United Nations Economic and Social Council 2005).

Sorting these issues out and respecting Indigenous expectations is not easy. Ethnobiologists need to pay close attention to the terms of the dialogues, try not to make assumptions, and ensure that the rights and aspirations of the holders of the knowledge are respected. The potential for misunderstanding can be high. For example, several meanings of “protect” have been used in the United Nations system, national laws and stakeholder discussions. Protect may mean: (i) protection against extinction, in this case the knowledge should be recorded and distributed as widely as possible; (ii) protection as part of the global commons or common heritage of human kind, a position that proposes recording and wide dissemination, and supports the idea of traditional knowledge being in the public domain, or temporarily regulated by licenses that have few restrictions on use; (iii) protection against any use by outsiders, a position that is commonly applied to secret and sacred knowledge; (vi) protection against use contrary to customary law and spiritual values; (iv) protection against some or all commercial uses; or (vii) protection of benefit sharing, that is, ensuring that if traditional knowledge is used, the holders of knowledge can receive and determine the type of benefits they receive, which may be non-monetary benefits. Capacity-building and information-sharing, for example, are common desired outcomes for research partnerships.

Traditional knowledge and resources may not be treated in a single way. Communities will make their own classification and decisions about different types. Indigenous peoples may elect to put some types of knowledge in the public domain or create a traditional knowledge commons license—a kind of contract that can allow for wide use while reserving the right to control some uses, such as commercial use. For other types, such as secret and sacred knowledge, strict protection may be sought.

In many cases, PIC will be a difficult standard to meet, at least until Indigenous peoples create institutions to address these new situations. Individualism is favored in legal systems,

in part because it is relatively easy to define an authoritative agent with a clear right to make decisions—the individual, or the corporation figured as an individual. As discussed previously, many groups do not have a social structure that easily fits onto the classic “notional community” (a theoretical or imagined community). There are significant questions about how to sort out disputes within and between communities. Identifying a process to get a collective authoritative answer can be difficult.

Anthropologists have a long history of study on the issue of knowledge diffusion (Brown 2003.), and understand that there are likely to be many cases of confusion, power struggles, and contested claims over the identification of rights holders (Brown 1998; Nicholas and Bannister 2004). Some Indigenous culture groups, like the Athabaskans and Coast Salish, may share knowledge and resources in common over a wide area, and dispute decisions about sharing them.

Indigenous peoples and researchers alike will have to become more knowledgeable about the IPR system, the human rights system, and emerging laws and principles. Indigenous peoples do not usually have a history with activities such as publishing, recording, or patenting, which would put them in contact with the IPR system. Even researchers can be naïve about IPR, for example the distinction between fact and expression, the typical passage from protection to the public domain in the current intellectual property system, and the inability to ensure protection (as Indigenous peoples understand it) once knowledge has been published. For example, under the Bayh-Dole Act (University and Small Business Patent Procedures Act of 1980) in the United States, the federal government allows universities to apply for IPR for federal government-funded research. Most universities today aggressively pursue this right, and even put conditions into faculty contracts that force them to pursue, or allow the university to pursue, patents on their research. Often the university, not the researcher, holds the patents. Dissertation and other publishing requirements of universities, as well as freedom of information laws, may not be able to ensure that all personal agreements between researchers and Indigenous communities can be honored. The commitments that an individual can uphold are often limited by the policies of the institutions to which they have employment obligations.

As applied scientists, ethnobiologists straddle the worlds of scientific understanding and social justice, according the priorities and lenses of science, and seeking equity for the peoples with whom they work. To sit astride this divide requires great skill, sensitivity and diplomacy. Indigenous worldviews and political struggles may use narratives that do not always fit comfortably with scientific models and evidence. Even where there may be a general fit, there are conflicts in the details. There are two broad threats in these conflicts. The first concerns the potential contribution of scientists to the erosion of the underlying belief systems that maintain traditions and beliefs that underlie desired ends, such as conservation practices, sustainable harvest, and the maintenance of biocultural diversity. The second is that when the scientific evidence conflicts with Indigenous narratives, scientists can have adverse impacts on Indigenous political struggles to achieve recognition of their human rights and rights to their traditional lands and waters.

When faced with these dilemmas, ethnobiologists should keep in mind the aphorism, *primum non nocere* (Latin: “first, do no harm”—origin uncertain but often ascribed to Hippocrates). In part, this requires developing a working understanding of the larger ethical, legal, and political picture in which research is embedded. It also involves gaining a level of cultural competency at the local level, understanding community research protocols and governance structures, enabling meaningful community participation, and being mindful not to impose external assumptions about what constitutes “help” on Indigenous and local peoples who will speak for themselves if the rest of us listen.

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