UNIVERSITY OF THE ARCTIC

Module 4
Traditional Knowledge

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Key Terms and Concepts

- colonization
- cultural bias
- living knowledge
- traditional knowledge (also known as Indigenous knowledge, traditional ecological knowledge)
- western scientific knowledge

Learning Objectives

Upon completion of this module, you should be able to:

1. Define traditional knowledge
2. Describe the physical and social contexts in which traditional knowledge develop
3. Describe the historical impact of social change on traditional knowledge systems
4. Give concrete examples of the impact of declining traditional knowledge and lifestyles
5. Compare traditional knowledge with western knowledge
6. Provide examples of the ways in which modern science and traditional knowledge are working together

Module Readings

Read the Overview and Lecture for Module 4, then read the assigned readings from the *Reading File* given below.

Reading 10: Frances Abele, “Traditional Knowledge in Practice”

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Reading 11: Fikret Berkes, "Traditional Ecological Knowledge in Perspective"

Reading 12: Marc Stevenson, "Indigenous Knowledge in Environmental Assessment"

Overview

This particular module will help you explore and understand traditional knowledge. As Indigenous communities struggle for survival and political recognition worldwide, most, if not all, are using and renewing the beliefs and practices that have sustained specific ways of life for countless generations prior to modernization and industrialization. Even as this process unfolds, Indigenous peoples are working feverishly to avoid losing the wealth of knowledge and experience held by elders and traditional teachers in Indigenous communities.

Traditional knowledge will be understood within the context of the Indigenous societies in which it occurs: it will be seen to develop and change in accordance to a people's relationship with the land and with other peoples.

Issues to be discussed include indigenous lifestyles and modernity, the problems of preserving and protecting traditional skills, environmental issues and knowledge regimes, and the relation between scientific knowledge and Indigenous knowledge.

Lecture

Defining Traditional Knowledge

We all have multiple identities. For example, at various times, a woman may be a mother, sister, daughter, student, teacher, and coach. At other times, that same woman may simply be a person or human being. There are many different ways of defining that one individual. If that woman comes from Circumpolar Canada, she may at one time have been ill-named "Eskimo." She may see herself as Inuit, and she may also see herself as Nunavummiut, depending on where she lives. How she names herself in her own language may or not be the same as how outsiders identify her. The reasons for holding any one definition may be her own or the reasons may be held by someone else for a particular purpose.

It is the same when we try to define what traditional knowledge is. As you will see below, there are a variety of definitions arising from slightly different perspectives or purposes. And yet you will also find that these definitions are embraced by commonalities.

Why Define It At All?

Quite simply, it is important to define traditional knowledge in order to distinguish it from other kinds of knowledge. Traditional knowledge reflects belief systems and ways of life that are distinct from modern, industrial belief systems and ways of life. Defining traditional knowledge becomes particularly important when the people with whom it originates are trying to preserve and renew their cultural identity.

What are Some Definitions?

The following definitions are attempts to gather within their meaning all that Indigenous peoples *know*. It reflects debate among academics, some institutional decision-makers, environmental resource managers, and policy makers. Such terms include traditional knowledge, traditional ecological knowledge, traditional environmental knowledge, and Indigenous knowledge. Notice the slight differences and the many similarities of the definitions.

The Traditional Knowledge Working Group of the Government of the Northwest Territories in Canada was one of the first government policy makers to attempt to define the knowledge of Indigenous peoples, and they came up with this definition of *traditional knowledge*:

> Traditional knowledge is knowledge that derives from, or is rooted in the traditional way of life of aboriginal people. Traditional knowledge is the accumulated knowledge and understanding of the human place in relation to the universe. This encompasses spiritual relationships, relationships with the natural environment and the use of natural resources, relationships between people, and is reflected in language, social organization, values, institutions and laws. (Legat 1991, 12)

Traditional ecological knowledge, according to Environmental Information Partnership, based in Ontario, Canada, is

> environmental knowledge that has been gathered by aboriginal peoples who have lived in and observed a particular area for generations, and has been handed down by statements, beliefs, legends, customs, from generation to generation by word of mouth or by practice, based on facts, truths, or principles. (EIP 1996, i)

Burgess (1996, 16) quotes Huntington's definition of *traditional ecological knowledge* as "systems of experiential knowledge gained by continual observation and transmitted among members of a community. It is set in a framework that encompasses both ecology and the interactions of humans and their environment on physical and spiritual planes."

The Dene Cultural Institute developed a definition of *traditional environmental knowledge* as being far broader that knowledge that merely pertains to the environment:

> Traditional environmental knowledge is a body of knowledge and beliefs transmitted through oral traditions and first hand observation. It includes a system of classification, a set of empirical observations about the local environment and a system of self management that governs resource use. Ecological aspects are closely tied to social and spiritual aspects of the knowledge system. The quantity and quality of TEK varies among community members, depending upon gender, age, social status, intellectual capability and profession (hunter, spiritual leader, healer, etc.). With roots firmly in the past, TEK is both cumulative and dynamic, building upon the experience of earlier generations and adapting to the new technological and socioeconomic changes of our present. (Stevenson 1996, 281)

The use of the word "traditional" in these definitions is often seen as problematic. Readers can dangerously assume that it only relates to the past and that "traditional" is not "contemporary"(Stevenson 1996, 279). Abele (1997) has argued that the use of the word "traditional" can obscure the fact that all knowledge evolves and develops over time or that "traditional" knowledge can be misinterpreted to refer instead to a people's tradition of knowledge, which may have been influenced by other peoples, other traditions of knowledge. The danger then is the possible exacerbation of the social and political marginalization that faces Indigenous peoples, and of the belief that traditional knowledge can have no real impact on today's environmental, social, and cultural problems.

Lorraine Brooke gives the following definition of *Indigenous knowledge*:

> It includes facts, concepts, theories about the characteristics which describe the objects, events, behaviours and interconnections that comprise both the animate and inanimate environments of Indigenous peoples. The various types of information and concepts that define an individual's knowledge have been developed through that person's observations of, experiences with, and explanations about the physical environment and living resources that characterise the territory in which they live. The content and extent of knowledge varies from individual to individual and there can be a specialisation in expertise. The knowledge is commonly shared between individuals, which encourages an exchange and critique of both facts and ideas at any one point in time; and it is transferred from one generation to the next through the oral tradition thus enabling the knowledge base of Indigenous societies to be transmitted and expanded over time . . . Even though Indigenous knowledge is not quantitative in nature, it does not mean that it is not precise. In fact, the need to be precise is one of the primary identifying elements of this knowledge base. (Brooke 1993, 36–37)

What are the Common Understandings?

By now you will have noticed that each of these definitions refer to similar aspects of Indigenous peoples' lives, and that there are also some slight differences. Whatever the definition being used, there are some basic elements that comprise traditional knowledge.

In a book called *Best Practices in Indigenous Knowledge*, the authors attempt to illustrate the use of Indigenous knowledge in cost-effective and sustainable strategies to help poor people in their daily struggle for survival. De Guchteneire, Krukkert, and von Liebenstein (2002) summarize for us the common characteristics evident in all of the above definitions:

Characteristics of Indigenous Knowledge

- IK is generated within communities
- IK is location and culture specific
- IK is the basis for decision making and survival strategies
- IK is not systematically documented
- IK concerns critical issues of human and animal life: primary production, human and animal life, natural resource management
- IK is dynamic and based on innovation, adaptation, and experimentation
- IK is oral and rural in nature

Social and Historical Context

The Social Context

The various definitions we have just explored are simply current or contemporary ways to name and describe how Indigenous peoples, since time immemorial, have sustained themselves within their local environments and developed and enhanced their cultural identities. In the circumpolar regions of the earth, Indigenous peoples were forced to observe and adapt in order to survive. The lessons learned over time, passed on orally through generations, shared within extended families and across communities were reinforced and refined.

> Since time immemorial, we were put here to take care of the land. Our grandfathers did not abuse the land and it is our turn to pass our knowledge on to our younger generation. What our forefathers kept all this time is very precious. It's now in our hands. Our Creator has given us the responsibility for taking very good care of what we have. If we don't take care of it, we will lose our own culture one day. (John Petagumskum in McDonald, Arragutainaq, and Novalinga 1997, 6)

Traditional knowledge can be seen to be comprised of two aspects. The first is its practical base. Traditional explanations of environmental phenomena, winds or water currents for example, are based on cumulative collective experience , tested over centuries, by people who had a sophisticated and practical knowledge of the land on which they depended for every aspect of life.

Children learned directly from their parents, aunts, uncles, grandparents and other elders. Instruction was always rooted in practice. Children learned by observing their elders and imitating their behaviour, and were guided and gently directed by their elders. A sense of competence and encouragement was built into the process because children defined what they were ready to learn by demonstrating approximate emulation of adult behaviour. Mastery of a particular task followed a dynamic process of repeated progressive attempts by the learner interspersed with guidance and direction as required to achieve that mastery.

> When we talk about the hunting territory, the person never just thinks of himself. He thinks also of his children and his grandchildren. He thinks about how he will leave this land and what state it will be in when his children and grandchildren get it. (John Mathews in McDonald, Arragutainaq, and Novalinga 1997, 6)

People could then supplement, refine, and innovate an ever-expanding circles of mastery of tasks and practices through ongoing instruction from elders. Yet the emphasis remained on those practices which had withstood the test of time and which were most effective and efficient.

Learning *how* to do things crucial to survival was not the only aspect of traditional knowledge. While learning how to do a particular task, children were taught ideas and values that existed within their particular society. These ideas and values could be expressed in stories, in comments, or in corrections of behaviour. Generally, children did not ask elders to instruct them, but the elders took the initiative in preparing and advising them whenever they thought it appropriate. In fact, the great respect in which elders were held often meant that young people were reluctant to pose questions to elders unless they were invited to do so.

> It was Inuit law not to abuse or play with animals and, even today, I'm really afraid to break those laws. I've taught my children and grandchildren not to abuse them either. Also, we are taught not to wound an animal if we aren't going to eat it. . . . My father told me if I wound an animal I shouldn't make it suffer because it also hurts inside when in pain (Matilda Sulurayok in McDonald, Arragutainaq, and Novalinga 1997, 6)
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> The land was always shared with the animals, and our Ancestors understood their movements very well. . . . Our people knew where the caribou would winter and where they would stop. It's the same thing for migrating birds. Our people had a special place for them to eat. They understood the kind of land they needed, and that the birds would give us a food supply. . . All the hunters and young hunters-to-be where told where to hunt, and where not to hunt. The birds

> knew where they had a priority, and where they could eat properly and be healthy. Only when the right season did the people hunt them. (Louis Bird in McDonald, Arragutainaq, and Novalinga 1997, 6)

Thus the second aspect of traditional knowledge, the spiritual aspect, is integral to the ethical beliefs and world views of Indigenous peoples. It may be virtually impossible to measure scientifically the validity or truth value of the spiritual aspects of traditional knowledge, but its social existence and transmission can be witnessed, and the effects of that spiritual aspect on the environment can be seen measured (e.g., conservation of resources).

A general characteristic of traditional knowledge is the understanding that all parts of the environment—plant, animal, rocks, water, human beings—have a life force. And human life is not considered superior to other parts of creation: in fact, some Indigenous traditions see human beings as the last to be placed on earth by the Creator (thus the least experienced and knowledgeable) and to be perhaps the weakest creature on earth and thus in need of help from the rest of Creation.

A fundamental principle arising from these beliefs, reinforced by stories and teachings, is that human beings can use the land and its bounty but do not have the right to control or exploit the animate or inanimate elements of the environment.

The two aspects of traditional knowledge, the spiritual and the practical, arose out of direct experience with the living land and from the interpretations of that experience. Human beings witnessed and responded to the daily and seasonal cycles of the world around them: as a result, that cyclical nature also can be seen to characterize the nature of traditional knowledge.

This can be understood in two ways. First, traditional knowledge tells us that human beings are not separate from the earth and its cycles but are part of it. If that is true, then human beings must have their own cycles (which Western science corroborates as true). Our knowledge is a part of us, it makes up who we are. So, then, it is not unreasonable to assert that our knowledge is subject to cycles just like those we see in the environment. The cycle of birth, growth, maturity, decay, death, and rebirth that human beings readily see in plants and animals is also the same cycle of knowledge. What we know also goes through the cycle of birth, growth, maturity, decay, death and rebirth. Some things we learn for the first time and we add that to what we already know. Some things we learn more about or relearn and this also adds to what we know. Knowledge is thus like the rings of a tree: as it grows, it is still the same tree but also different.

Knowledge too is like any living, animate being: it comes from a seed of some kind. Using the example of a tree, when we look at a seed, all of what that tree will become is locked as potential within the shell of that seed. When it is nurtured under proper conditions, that seed will grow. Thus all of what makes us human beings (and what we know) is inside us from the time

we are seeds, and given the proper nourishment, we can enact the potential within us.

A Story About Knowledge

The Creator called the trickster, Nanaboozhoo, to his side and told Nanaboozhoo that one last creature was to be lowered to Earth by the Creator and that this last creature, the human being, would be given a special role as custodian or caretaker of creation. The Creator had decided to balance this responsibility, to instil humility, by making it difficult for human beings to come by knowledge for survival.

So Nanaboozhoo was charged with the task of finding a place to keep knowledge, to make knowledge difficult to come by, so that humans would remain humble in their custodial task. So Nanaboozhoo enlisted the help of all the animals. “Where should knowledge be kept?” Nanaboozhoo asked.

The mighty salmon said, “Let me take it on my back down the river to the one great ocean and hide it in the water’s depths. Human beings will not find knowledge there.”

Nanaboozhoo replied, “No, human beings are destined to explore the ocean depths, and they will too easily find knowledge there.”

The great bear cried, “Let me put knowledge on my back and carry it into the mountains. There I will hide it so that my younger brothers stay humble in their task.”

“No,” said Nanaboozhoo, “Human beings will surely travel to all the mountaintops and will too easily find knowledge.”

Even the powerful eagle, the Creator’s messenger, offered a solution: “Let me carry knowledge to the moon where I will hide it from the human beings according to the Creator’s plan.”

Nanaboozhoo shook his head, saying, “No, my friends. Human beings will one day even travel to the moon and will too easily find knowledge.”

All were silent, thinking, until the mole spoke up. Spending her life so close to the earth, without eyesight but with great vision, the mole said, “I know where you can keep knowledge so that it will be very difficult to find. Only the most courageous, curious and humble human being will thus find it if you keep knowledge here.”

Nanaboozhoo asked, “Where, my sister?”

“Put it inside them,” the mole replied. “Put it inside them.”

The Impact of Colonization on Traditional Knowledge

Colonization is “the subjugation of one people by another through destruction and/or weakening of basic institutions of the subjugated culture and replacing them with those of the dominant culture” (Lee 1992, 213).

The incursion of colonizing nation-states into the traditional territories of Indigenous peoples has been a global pattern throughout human history. Although the timing varies, the colonization of Indigenous peoples in the circumpolar region has occurred for two reasons, reasons similar the world over:

- to exploit the natural resources found in the territories of Indigenous peoples; and
- to execute some notion of "empire" or "manifest destiny," to solidify economic, social, and political power.

Settler societies in North America, northern Asia, and northern Europe have forcibly replaced indigenous languages, imposed foreign systems of governance, religion, education, and economic livelihood. Modernization and industrialization have brought some material benefits to some Indigenous societies but the overall pattern of colonization in the circumpolar region and the world over has seen Indigenous peoples relegated to the margins of the broader societies into which they are assimilated.

Indigenous peoples have been forced into sedentary communities to facilitate appropriation of their lands for resource development or settlement by colonizers. They have seen their traditional forms of governance, spiritual practice, subsistence practices, and even their languages and cultural traditions attacked, outlawed, and dismissed as archaic or savage. Indigenous peoples of the circumpolar region have seen artificial boundaries erected between them although they may share linguistic or cultural affinities.

All aspects of indigenous ways of life have been affected. This includes traditional knowledge.

Colonization has adversely affected the transmission, preservation, and protection of traditional for the following reasons:

- traditional knowledge has not been systematically documented until recently;
- it is largely orally transmitted in an era where the written word and other media dominate;
- Indigenous peoples have become isolated from one another and no longer share knowledge;
- enforced shifts away from traditional subsistence practices erodes the vitality of that knowledge;
- health and social problems arising from poverty have decimated populations, including the elders who are keepers of collective knowledge; and

- the dominance of western scientific traditions and assimilation into free market societies has devalued the importance of Indigenous traditions and knowledge, both for Indigenous peoples and others.

The transition from the lifestyles which breath life into traditional knowledge is often a difficult and complex phenomena as this following case study by Einar Bergland illustrates:

Lifestyle Changes Among Saami Reindeer Herders

This case study outlines the experience of three Saami reindeer herders in Norway affected by a 1993 Norwegian program intended to facilitate reindeer herders' transformation to a new life and living. Program participants received an income subsidy over five years while they attempted to make a new living via education or self-employment.

Mathis: A 33 year-old Saami who quit reindeer herding when he was 23, before implementation of the government program. He chooses education.

Mathis had already completed some high school and job training. Currently he holds an administrative/managerial position in reindeer herding, but one far from direct work with reindeers and the reindeer herders' life.

He says, "If I had been older than 23 it would have been real difficult to change because the norms, the values, the expectations, etc., becomes a still more integrated part of yourself, of your identity. As you get older external as well as internal relations make a change still more difficult."

He illustrates it in the following way: "As a Saami nomad you have varying things to do: when you enter a Norwegian world you do not move around and you get specific things to do such as office work or you become a plumber or something else.

Your relation to time changes. You have to follow the clock instead of your own rhythm or the rhythm of nature. You have to adjust to the clock and in connection to this to a life model governed by the clock."

He was eased into his decision to leave the reindeer herder life because that traditional lifestyle was already declining within his family, and because his parents supported Mathis' further formal education. Although these conditions facilitated the transformation, the change has not been without problems.

"It is difficult to find out what education you shall choose and to foresee the consequences of the choice because you do not really connect anything to what it means to be a plumber, etc."

Two years after the first interview, Mathis was interviewed again. He said, "It is now 10 years since I left reindeer herding, but I still feel like I am a reindeer Saami. I cannot imagine living the rest of my life the same place."

Klemet Ante and Mikkel Ole: Both close to 50 years old, they were optimists and wanted short courses to become self-employed as neither had formal education.

Klemet Ante only had few reindeers while Mikkel Ole had a middle-sized herd. For Klemet Ante the lifestyle change process had been smooth at the start, while for Mikkel Ole it was full of conflict and has made him pessimistic.

Initially, Klemet Ante believed he had found a living where he could combine knowledge from his old life with his present activities. He already organized tours for tourists before he entered the program and his business grew. He said, “I found the program good. Without it, I would not have had a fixed income: the program has facilitated the transformation.”

Mikkel Ole: “Firstly I was told to slaughter the reindeers; then I could apply. They lack respect for a person who stops his life as a reindeer herder. I have nothing to say now. My friends and I do not talk the same language. I have no work and no relations. Although reindeer herding is bad it is better to be inside than outside.”

Mikkel Ole took a number of courses and presented many ideas, but his self-employment plans have not worked out. In November, 1997 a full page story in a Finmark newspaper described his repeated failed attempts to secure a subsidy to establish his own small business.

By this time both Mikkel Ole and Klemet Ante had been in the program 4 years. The program included 34 middle-aged persons, only three or four of which managed to become self-employed. The rest decided to try to go back to reindeer herding.

Concerning Klemet Ante, he participated in two courses but withdrew from the last. He lost his temporary office job and alcohol problems had started.

Per Anders, an older Saami who was paid by an earlier program to stop traditional reindeer herding.

Per Anders said, “The life in the mountains I mastered. I felt at home, I knew all what was needed to know. I was a reindeer Saami and I liked my life. But papers and tax schemes, I could not write. I had a low basic school education. I learned to read, not to write.

It was an enormous change to stop as a reindeer herder. For three years I did nothing. Then I started to carve wood spoons, cups etc. I could not just stay on the sofa. I had to learn to carve. I would say my work is unsuccessful. Anyhow I like it. I sell to tourists. Sometimes I have a little stock which I sell later, it is both a hobby and a living that supplements my pension.”

Conclusion

To change a life, based on traditional knowledge where the traditional lifestyle includes norms, values, relations to nature, time, work and

leisure is extremely difficult because it is such a comprehension change, a change of identity. Your achieved competencies have no value. Often de-learning is needed for achieving a new learning.

Many persons leaving their traditional life experience that they are "nobody" and have no competencies when they enter the transformation process and they lose their self-confidence.

To establish a new social identity can mainly be done in two ways: They can reduce the importance of earlier knowledge and self-consciousness. The other way is to use the achieved traditional knowledge as a platform for further learning, a learning related to traditional knowledge (tourist guides, home carving, field tasks in the mountains etc).

Age, program type, social security and social are extremely important factors for a successful transformation.

Contemporary Uses of Traditional Knowledge

Despite the deleterious impact of colonization, modernization, and industrialization on Indigenous peoples and on their traditional knowledge, Indigenous peoples and their allies have found ways in which to preserve, protect, and renew traditional knowledge.

Integration with Western Knowledge Systems

It used to be a joke among Canada's Indigenous peoples that traditional family structure was made up of children, parents, grandparents, and an anthropologist. This joke implies that western scientists, academics, and researchers have long been a part of the lives of Indigenous peoples.

The history of that relationship has unfortunately too often followed the pattern of broader colonization. Indigenous peoples have historically been cast as inferior human beings, without social, economic, or political order, and without the knowledge—philosophies, ethics, and practices—required to organize themselves over countless generations. The traditional knowledge of Indigenous people has too often been seen as superstition. A cultural bias has kept Indigenous people in the shadows as the unknowing and the studied. Instead, Western scientists have cast a shining light upon themselves as the ones who know; the studiers.

Western scientists, academics, and researchers have historically neglected to fully include Indigenous peoples as true partners when studying traditional lifestyles, practices, and knowledge. Yet with the late global social and political resurgence among Indigenous peoples, there have been burgeoning movements by which traditional knowledge has been accorded increasing respect both by Indigenous peoples themselves and non-indigenous scholars.

It is clear that Indigenous peoples themselves are aware of the impact of colonization on their communities, that elders are passing away without conveying the wealth of knowledge that they carry, and that there is some urgency to preserve what they know. Indigenous communities, in Canada anyway, have grown tired of solutions to problems—laws, regulations, institutions—that have simply not worked or that have exacerbated existing problems. As a result, Indigenous peoples are increasingly looking within for the knowledge necessary to adapt, survive, and thrive in a contemporary world.

On the part of Western scientists, the shift is impelled by the urgency to find solutions to the earth's mounting environmental devastation and the increased demands of an exploding population.

As a result, there is increasing interest in integrating traditional knowledge with the knowledge of biologists, botanists, climatologists, and others. Burgess notes,

> The environmental, resource management and research community has shown particular interest in traditional environmental/ecological knowledge, as TEK appears to hold answers that Western scientific methods of investigation have yet to provide in relation to ecosystem health and the complex web of relations that exist between humans, animals and the environment. (1999, 4)

These different knowledge systems may enjoy some integration because they share an identical purpose: "both are intellectual processes or constructions that have evolved for societies to understand the universe" (Cordova 1997, 32).

Yet there are differences that make such integration a dicey proposition:

Indigenous Knowledge	Western Scientific Knowledge
qualitative	quantitative
intuitive	rational
holistic	reductionist
moral, spiritual	supposedly value-free
considers "mind" and "matter" together	mechanistic
based on empirical observation	based on experimentation and systematization
generated and held by the users themselves	generated by specialists
diachronic (long-time series of information on one locality	synchronic (short-time series over a large area)

As you can see, the above table makes generalizations about both Indigenous knowledge and western scientific knowledge. Be careful to remember that the boundaries between the two are not so hard and fast and that both kinds of knowledge can exhibit different aspects. For example,

Indigenous knowledge, said to be intuitive, can also be rational as a result of empirical observation.

Thus the integration of the two knowledge systems faces a number of barriers

> *Different perspectives*: There is frequently a distinct difference in what Indigenous peoples think are significant impacts and what policy makers and those in favour of development projects think are significant impacts. These differences are probably rooted in both the habits of mind and the practical priorities of each group.
>
> *Scientific scepticism*: Scientists are sceptical about the credibility or reliability of indigenous knowledge gathered through interviews, preferring "hard" data such as biophysical data. Some may dismiss traditional knowledge as subjective, anecdotal, and unscientific.
>
> *Politics*: Policy makers may resist altering established decision-making processes to accommodate the use of traditional knowledge, for reasons having to do with an interest in controlling the process. (Sallenave 1994, 14)

Thus Sallenave clearly illustrates the potential for nation-states, through policy makers, prospective resource developers, scientists, and environmentalists, to perpetuate the conditions of colonization where they impose their power and subjugate traditional knowledge. Cultural bias can limit the ability of western scientists to see traditional knowledge as a distinct system: the danger is to try to understand it from within a Western scientific knowledge system and, because of the differences between the two kinds of knowledge, this does not always work. It can result in traditional knowledge being ignored, misunderstood, misrepresented, and appropriated.

The pitfalls that may beset the integration of Western scientific knowledge and traditional knowledge are not inevitable as this case study demonstrates.

Respectful Integration of Western Scientific Knowledge and Traditional Knowledge

Hudson Bay is one of the world's largest inland seas; it includes James Bay, Hudson Strait, and all interconnecting channels. The expansion of development projects throughout the bioregion over the last 50 years and of large-scale hydroelectric development in the last 20 to 30 years, with further projects planned, has raised ecological, social, cultural and economic concerns—primarily among resident Cree and Inuit. Fearing that incremental development was compromising the bioregion's carrying capacity, three organizations—the Canadian Arctic Resources Committee, the Municipality of Sanikiluaq, and the Rawson Academy of Aquatic Science—obtained funding from Canadian and American foundations, industry, and governments to carry out a three-year research programme beginning in 1992. The overall purpose of the programme was to situate future development of the region within a sustainability framework. More specific goals included the following:

- to assess the potential sensitivity of the region to cumulative impacts induced by changes both within and external to it;
- to define conceptual and informational deficiencies from traditional ecological knowledge and scientific perspectives that limit the ability to assess problems facing the region;
- to discuss findings as part of an iterative process of information sharing among all interested parties, including government agencies, energy corporations, and Cree and Inuit.

The TEK component of the programme brought together representatives of 29 of the 34 Inuit and Cree communities in the region in 19 five-day workshops. Participants were asked to

- describe important biological, physical, and human processes influencing the behaviour of ecological communities in Hudson and James Bays;
- identify ecological changes occurring in the bays and surrounding lands;
- assess the effects of human activities, including hydroelectric, mining, and forestry development, on economically and ecologically important wildlife species.

This research process was carried out by Cree and Inuit with the assistance of an advisory committee of three academics, one researcher in the federal Department of Indian Affairs and Northern Development, and a consultant. All information generated at the community workshops was recorded, translated into English, and transcribed. The resulting text was over 2,000 pages in length. It was then mapped and converted into a Geographical Information System (GIS) database to illustrate ecological components, processes, and changes.

A first analytical task was to construct a food web of Hudson Bay. In doing so, community representatives listed 174 animal, bird, fish, and plant species. Environmental observations were broad, rich, and detailed and reached back 50 years, providing a baseline that scientists in the programme envied. Certain plants, insects, and animals were identified as indicators of environmental change.

In some fields of inquiry, TEK supported conclusions derived from science. This was the case in increasing variability in climate and weather patterns and seasonal air temperatures. In other fields, such as currents, sea ice, and polynia and lead formation, TEK was able to expand greatly upon limited scientific knowledge. In relation to key species hunted by Inuit, including polar bears and beluga whales, TEK and science disagreed as to likely numbers, distribution, and annual travel patterns. When observations and interpretations were pieced together, the TEK evidence suggested the natural environment was changing rapidly as a result of human decisions both inside and outside the region and of natural processes. As a result, Inuit and Cree are suggesting with some urgency that TEK be used in resource planning and project-specific environmental assessment in the region, and that this information guide the formulation of sustainability policies.

TEK is seen by Cree and Inuit in the region as a web of relations between people and their environment that needs to be understood if both are to be sustained. The programme showed that TEK could make a real contribution to resource planning and decision making in a large region by providing indicators and early warning signs of environmental changes that result from local, regional, or global processes. Importantly, this research programme was carried out in the face of great political disagreements between governments and aboriginal peoples as to what resource developments should be undertaken in the region.

While much research needs to be done, it seems that TEK could help to provide the "workable criterion for making decisions about human/environment relations" identified by Oran Young, and ensure that sustainable development is more than declaratory rhetoric. (Fenge 2002)

Protecting Traditional Knowledge

The previous case study noted that the Indigenous peoples of the Hudson Bay region participated in a research partnership on traditional knowledge because of their own ecological, social, cultural, and economic concerns.

Communities may want to honour and preserve traditional knowledge for a number of reasons. Some communities have identified a range of economic benefits to be gained from sharing their knowledge with others—eco-tourism, art, cultural interpretation, and clothing are some examples. Preserving traditional knowledge also contributes to the cultural and political goals of self-determination and self-reliance (especially the ability to support traditional lifestyles) by creating strong, ongoing appreciation within the community of its history and its roots.

If the impact of colonization, modernization and industrialization could be addressed in isolation, then perhaps making traditional knowledge live would suffice for Indigenous peoples. However, Indigenous peoples do not exist in isolation and this requires the protection of Indigenous knowledge.

Because traditional knowledge has a wide range of commercial and scientific uses, it is becoming increasingly valuable to non-indigenous outsiders. One unfortunate outcome of this interaction is the situation where traditional knowledge has been gathered and used without contacting the source of knowledge. One example is the use of traditional medicines as a basis for developing pharmaceutical products and herbal remedies.

Abuses of traditional knowledge include:

- unlicensed and unauthorized commercialization of traditional knowledge;
- taking images, such as photographs, film and video of Indigenous peoples, their way of life, et cetera;

- using, reproducing or copying indigenous names, images and arts without permission;
- use and misuse of symbols without permission;
- disclosing secret knowledge and cultural property;
- publishing research without recognition or reward for the knowledge holders;
- entering into community research without fully explaining how the research will be used or who owns the results (Brascoupe and Mann 2001, 7).

For Indigenous peoples, the strongest means to protect traditional knowledge is to ensure its continuity as a dynamic, evolving system that reflects and regulates the lives of Indigenous communities.

A healthy ecosystem has incredible diversity in its flora and fauna. The same principle of diversity holds true for traditional knowledge in a healthy human environment. Although traditional knowledge is differentiated by gender, age, social status, and specialization of practices, many will hold common, similar teachings and lessons and no one person will know everything. Knowledge may stay in a community for hundreds of years but the process of learning it in each generation may be different. If one elder dies, the community will lose some specialized knowledge but the common body of knowledge will continue. Knowledge is shared for the benefit of the community, both as a means to equalize the social power knowledge bestows and to preserve it.

Because our knowledge is a part of us, and we are living beings, then our knowledge is in a sense "living" too and must be nurtured like all life. The primary lesson for Indigenous peoples within their own communities, then, is to learn and practice traditional knowledge. Seek out elders and traditional teachers. Listen to the stories, ask questions, practice the techniques, and discuss it all with your peers. Honour the sacred.

Study Questions

1. In the case study of Saami reindeer herders, how could the protection of traditional knowledge help the people affected by social change?

2. How does cultural bias affect the legitimacy accorded to the traditional knowledge of Indigenous peoples by non-indigenous peoples?

3. How can respectful integration of western scientific knowledge and traditional knowledge help to protect the traditional knowledge of Indigenous peoples?

4. What are some of the characteristics of traditional knowledge that can protect it from abuses?

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Supplementary Reading/Materials

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Other Resources

Alaska Native Knowledge Network: Indigenous Knowledge Systems: http://www.ankn.uaf.edu/iks.html

Arctic Council Indigenous Peoples Secretariat: Indigenous Knowledge: http://www.arcticpeoples.org/

Canadian Arctic Resources Committee: Resource Centre: http://www.carc.org/resource/index.php3

Information Gateway to Nunavut: Interviewing Inuit Elders: http://www.nunavut.com/traditionalknowledge/index.html

Inuit Circumpolar Conference: http://www.inuitcircumpolar.com/index.html

World Intellectual Property Organization: Traditional Knowledge: http://www.wipo.int/globalissues/tk/

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