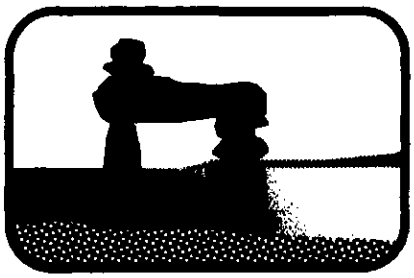

Informing the Fact: Inuit Traditional Knowledge Contributes Another Perspective

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SUMMARY
This paper discusses the differences between Inuit traditional knowledge and western science views, and presents a perspective designed to bring these two world views together. This is believed to be a highly desirable approach for the successful conduct of research and resource management projects on Inuit lands. Each world view has something to contribute to the other. Distinctions between indigenous (including Inuit) traditional knowledge and western science are identified using examples from wildlife resource management. These examples pinpoint issues that have emerged from previous attempts to integrate indigenous traditional knowledge with western science. These examples also provide insight into the elements necessary to facilitate a constructive working relationship between indigenous people and western scientists. The perspective presented synthesizes these elements to suggest the means to achieve constructive working relationships between Inuit people and practitioners of western science.

RÉSUMÉ
Le présent article met en relation les différences entre l'approche des connaissances traditionnelles inuit et celle des connaissances scientifiques de l'Occident et, on y décrit une proposition visant à intégrer ces deux modes de connaissance. Nous croyons qu'il s'agit d'une approche éminemment souhaitable et qui permettra de mener avec succès des projets de recherches et de gestion des ressources naturelles sur les terres inuit. Chacune de ces approches possède des caractéristiques qui profitera à l'autre. Des différences entre le monde des connaissances traditionnelles indigènes (Inuit entre autres), et celui des connaissances scientifiques occidentales sont illustrées en s'appuyant sur des exemples dans le domaine de la gestion des ressources fauniques. Ces exemples permettent de mettre en lumière certains problèmes qui se sont manifestés lors de tentatives d'intégration antérieures des connaissances traditionnelles avec les connaissances scientifiques occidentales. L'étude de ces exemples permet également de faire ressortir les facteurs à considérer pour l'édification d'une relation constructive viable entre les peuples indigènes et les scientifiques. L'approche proposée donne une vue synoptique des facteurs à considérer en vue de l'établissement d'une relation constructive viable entre le peuple inuit et les scientifiques occidentaux.

INTRODUCTION

Traditional indigenous knowledge to the Inuit is not what scientific knowledge is to Euro-Canadians. Inuit knowledge is a part of a holistic experience which encompasses physical, mental, emotional and spiritual awareness. In contrast, western science is particularistic and prides itself in both a discrete understanding of a subject and in comparative analyses. In the past, these two differing perspectives have been integrated and used together with variable success. This paper proposes a dynamic mechanism whereby these two world views can complement each other to facilitate a mutually respectful understanding of the natural world. In addition, it calls for a commitment by indigenous researchers and western scientists to work through the impediments inherent in the integration of two distinct views. Inuit and western knowledge is considered here in the context of global change and its impact on resource management, a significant issue in the socio-economic development of the Arctic. With this orientation in mind, this paper examines ways of bringing these views together in a process of discovering innovative means of improving natural resource management.

WHAT IS TRADITIONAL KNOWLEDGE?

Traditional knowledge is experience, acquired by the process of carefully building, over long periods of time, an intimate and intuitive understanding of the environment. This knowledge is a cumulative, collective experience. People who live close to nature and derive their sustenance from the land and sea are usually the custodians of indigenous traditional knowledge. Some obvious custodians of traditional knowledge, whether native or non-native in ethnic origin, are fishers, hunters, trappers and farmers. Euro-Canadian culture has its own kind of traditional knowledge, on a variety of topics and including superstitions, folk medicine and "old wives tales."

While much of this traditional knowledge is passed on consistently over time, it is a lived experience whereby each generation incorporates adaptations that add to the knowledge base. Inuit learn through lived experiences. Once a child or adult has accumulated some experience, stories are told to add texture and variation to the experience. Traditional knowledge is communicated orally through stories about past and present events. It accumulates from one generation to another over time by sharing experiences, skills and understanding. Inuit knowledge is expressed by what they do rather than by any description (Bielawski, 1990, p 63).

Within an aboriginal "world view," culture and language sustain traditional knowledge, but this way of "knowing" is much more than culture and language. It is a way of being, learning and knowing that is very different from a Euro-Canadian "world view" with its own culture and language. The survival of aboriginal people has depended upon their knowledge of and relationship with the environment, and their ways of organizing themselves and their values (Anawak, 1989, p. 45). Traditional knowledge of Inuit life as passed from one generation to the next uses stories and experiences defined within the reality of the culture. This knowledge ensured the survival of the Inuit when they lived solely off the land. Inuit pass on traditional knowledge primarily through demonstration, practice and testing (Briggs, 1985, p. 40); even today, the elders show and test the youth in the ways of the land. Despite losses in specific knowledge that have occurred through European con-

tact, Inuit still possess a world view founded in the Arctic landscape. Under the right circumstances it can add informed explanations to the scientific view of the world (Bielawski, 1990, p. 66).

In contrast to western science, traditional indigenous knowledge is based on continual direct observation of nature accompanied by a detailed understanding of the local environment. This knowledge is expressed in oral traditions that describe the behavior of animals and hunters. In making decisions about harvesting animals, hunters consider their knowledge holistically, whereby: "information leads into the domain of spirituality and metaphor where accumulated knowledge, intuition and the subtlest of connections with the natural world can generate choices on a basis that is quicker and surer than narrow rationality. In this way, the decisions of hunters are close to the certainties of artists. By denying reduction to a limited set of variables the fullness of both cultures and consciousness come to bear on each day's activities". (Cizek, 1990, p. 15).

This review attempts to address the differences between Inuit traditional knowledge and western science. At no time does it diminish the role of technology or science in the lives of the Inuit. The fact that science and technology have been embraced by the Inuit is evident in the way that they currently live their lives. This review does suggest, however, that technology and science as a part of Inuit life needs to be defined by them in a manner that brings together these perspectives to create a constructive working relationship.

EMERGING RELATIONSHIP WITH SCIENCE

The term "Traditional Ecological Knowledge" has been developed by Euro-Canadians as a way of recognizing indigenous knowledge as a valuable body of knowledge. An expanding environmental movement, frustrated with the omission of aboriginal knowledge, has led to a search for alternatives to western science's approach to northern ecological resource management. There is a growing body of literature (Berkes, 1993; Bielawski, 1990; Colorado, 1988; Cousins, 1994; Gunn *et al.*, 1988; Johannes, 1993; Nakashima, 1990; Stenton and Rigby, 1995) that demonstrates the value of incorporating traditional knowledge with western science.

In order to fully appreciate the complexity of the issues facing southern scientists as they work within northern communities, it is necessary to be aware of the distinct characteristics of western science and traditional knowledge. Table 1 shows the considerable differences that exist in the way information is acquired and transmitted. Traditional knowledge is subjective and based on relationships with all living things, and the environment. Western science, on the other hand, is based on objectivity and attempts to limit relationships to a comparison of discrete observations. Traditional knowledge emphasizes problem-solving based on real life experiences in an ever-changing environment. Conversely, western science emphasizes hypothesis testing and problem solving based on tightly controlled, repeatable and predictable experiments. Hobson's (1992) solution to this dilemma is "to find a way to collect, classify and interpret traditional knowledge on resources, environment and culture so that it can be used in other contexts without losing native content and value" (Hobson, 1992, p.2). Western scientists are interested in working with the Inuit to develop ways of integrating this knowledge in the effective management of northern resources. The following examples of organizational and administrative practices in managing wildlife demonstrate various attempts to integrate traditional knowledge with western science. The first study shows the benefits of bringing together traditional knowledge and western science.

Contribution of Ecological Knowledge of Inuit to Wildlife Management in the NWT

Gunn *et al.* (1988, p. 22), indicated that Inuit observations provided valuable information on animal habits. When polar bears were endangered and Inuit hunters complied with regulations to refrain from hunting, they continued to observe polar bear behaviour. In another study, Inuit hunters observed the changing feeding patterns of walruses and noted, as biologists have documented in their observations, that the walrus is a predator of seals. In co-operation, Inuit hunters and western scientists can collect a valuable qualitative data base of ecological knowledge.

Many scientists working in the north have attemped to distinguish between Inuit and western science (Freeman, 1985; Nelson, 1969; van der Post and Taylor, 1985; Nakashima, 1986). Gunn *et al.* (1988, p. 29) demonstrated that western and Inuit researchers acknowledge the strength of each other's system of observation. As shown in the following study, however, there is still work to be done.

Table 1 The differences between traditional knowledge and western science.

Traditional Knowledge	Western Science
Recorded and transmitted through traditions	Recorded through the written word
Learned through observation and hands on experience	Learned in a situation abstracted from the applied context
Does not view human life as superior to other forms	Views humans as having the inherent right to control nature for their own interest
Holistic	Reductionistic
Intuitive in its mode of thinking	Analytical
Mainly qualitative	Mainly quantitative
Based on data generated by resource users	Based on data collected by specialized researchers
Based on diachronic data	Based on synchronic data
Rooted in the social context	Hierarchically organized and vertically compartmentalized
Spiritual and based on cumulative, collective experience	Employs methods of generating, testing, and verifying hypotheses

Adapted from Johnson (1992)

Environmental Impact Assessment and Management Boards

In preparing Environmental Impact Assessments, "Inuit biogeographical information" on eider ducks was useful to western scientists developing Arctic wildlife inventories (Nakashima, 1990, p. 23). Year-round observations, as well as temporal and spatial information on distribution, are two features of traditional knowledge that enrich the scientists knowledge base. In a limited way, western science has been able to apply research methods to Inuit temporal and spatial information to develop a baseline for monitoring natural variability.

The strength of this work lies in the potential contribution of Inuit knowledge to the Environmental Impact Assessment process. Nakashima (1990, p. 23) stated that "traditional environmental knowledge" offers scientists an opportunity "to overcome shortcomings in scientific knowledge. In recognizing a value and utility for traditional knowledge, Inuit are empowered to influence processes that have socio-cultural impact on the north. Traditional knowledge, correctly used, can act as a buffer between northern scientific-based development and the Inuit's relationship to northern ecosystems and the maintenance of a land-based economy" (Nakashima, 1990). Although successful on one front, other legislative and administrative barriers to developing a relationship between traditional knowledge and western science exist. This issue is more fully developed in the work of Cizek (1990) in a study of the Beverly–Kaminuriak Caribou Management Board.

Cizek (1990) found two very different conceptual views for wildlife management. Cizek (1990, p. 27) reported that: 1) "the scientific system emphasizes the implementation of regulations governing seasons, quotas, bag limits, gear restrictions, and their enforcement by means of licence forfeiture, fines, seizure, and even personal confinement; 2) the indigenous system emphasizes a consensus on the basis of pooled knowledge, flexibility of response to immediate conditions, management practices such as land rotation or sanctuary and enforcement by means of gossip, ridicule and avoidance". He also noted that aboriginal resource users see harvesting problems in terms of a direct impact on their communities, and want quick resolution. However, they are unfamiliar with bureaucracy and due process, and thus their efforts to influence decision-making are limited. On the other hand, government personnel are knowledgeable about bureaucratic processes, but have limited awareness of the local impact of administrative procedures on aboriginal resource users.

Aboriginal participation on advisory boards, and employment in technical and managerial positions, does not always lead to a successful integration of traditional knowledge into western administrative systems (Cizek, 1990, p. 25). "Native people merely provide data and the state system continues to do the managing and allocation with no reference to the paradigm of indigenous systems" (Cizek, 1990, p. 27). In highlighting the administrative impediments for decision making between aboriginal resource users and government representatives, Cizek (1990, p. 28) showed the limited role traditional knowledge plays in the implementation of management practices. The following examples elaborate on these evolving relationships in the context of co-management.

Co-management Arrangements

Osherenko (1988, p. 18) described co-management arrangements between government resource agencies and user groups, which delineate rights and obligations, rules governing actions, and procedures for decision making. Government agencies do not transfer power but share decision-making authority with resource users. Co-operation by informed resource users is necessary to manage wildlife (Feit, 1988, p. 77).

The Beverly-Kaminuriak Caribou Management Plan in the central Canadian Arctic

As with Cizek (1990, p. 26), Osherenko (1988, p. 20) described how government agencies' rules and regulations generate tensions with the indigenous systems. If these two orientations can be reconciled in a spirit of co-operative understanding, wildlife knowledge can expand more easily.

The Beverly–Kaminuriak co-management board attempted to reduce tensions between the government and indigenous systems by taking steps to ensure that traditional knowledge is passed on to young people. An education program about traditional knowledge on caribou health, migratory patterns, and behaviour over the last several centuries has been integrated with scientific techniques for gathering current data, and is offered through the elementary and high school program along with the relevant biological training. It has also been adapted for adult education programs. It is through these schemes that scientists work together with indigenous resource users.

The Northern Quebec Beluga Management Plan

The need to conserve beluga whales in northern Quebec was initially documented by scientists. In response, the Canadian government relinquished jurisdictional control and encouraged the Inuit to initiate a conservation plan. The government agency subsequently adopted this plan and recognized it as a co-management arrangement. The success of this agreement created opportunities for other joint ventures. One of these was the publication of a bilingual information booklet about the biology and management of arctic seals and whales. Co-management played a role in communicating traditional knowledge about the beluga whales to young people. Secondary schools incorporated the information on the belugas in an ecology class. All of these actions resulted from the co-operative efforts of indigenous resource users and government agencies.

Yukon-Kuskokwim Delta Goose Management Plan in Alaska

In another case, Osherenko (1988, p. 34) described how resource users in Alaska co-operated with governmental agencies in the co-management of wildlife. The Migratory Bird Treaty Act controlled the harvesting of migratory geese and their eggs as a source of fresh meat and eggs. A successful reduction in the harvesting of geese and the collecting of eggs demonstrates a strong commitment by the indigenous resource users and the government agencies, but achieving an agreement on these matters was not without tension. Greater openness on the part of scientists in explaining their work resolved many of the misconceptions.

Summary

Upon examination of these case examples it appears that seeking the co-operation of the indigenous resource users through co-management arrangements has had considerable impact on the protection of wildlife. The success of these agreements was influenced by building relationships through improved

communication, sharing of information, developing greater respect for each other's point of view, and demonstrating flexibility in dealing with problems when they arise. Given that a lack of co-operation was characteristic of the initial relationship between government agencies and resource users, these results are significant. Osherenko (1988, p. 41) suggested that "the fundamental reason for cooperation is that both sides realize they need each other in order to protect resources they both value".

Adaptive Management Strategy

Adaptive Management is another strategy that has emerged in an attempt to bring western science and traditional knowledge together, complementing the co-management practices noted above. Adaptive management responds to "problems of uncertainty" which are inherent in attempts to deal with resource management issues within a dynamic ecological system (McDonald, 1988, p. 65). In this sense it more closely resembles the Inuit way of learning through experimentation in an uncertain environment.

McDonald (1988, p. 65) believed that socioeconomic issues are an integral part of resource utilization and must be dealt with when managing resource problems. "Policy decisions are made in response to the impact of past management activities by establishing a flexible open-ended process that is adaptive to changing biological and socioeconomic relationships within the ecological management system" (McDonald, 1988, p. 65). The movement from co-management to adaptive management takes into account the multiple environments and is a more holistic approach. It corresponds with current thinking among all aboriginal people that renewable and non-renewable resources are sustained within a socioeconomic, political environment, and all interact with one another. Since the emphasis is on a living system that is always changing, adaptive management techniques are viewed as working in conjunction with nature, rather than trying to control it. The next alternative for consideration is self-management within a state management system.

Self-management

Self management is a community-based managerial and regulatory practice for the conservation of wildlife. It is not limited to indigenous communities, since authority can be given to any local or regional jurisdiction. In the case of indigenous communities, self-management gives indigenous users, who are involved in the management of the species, freedom to observe and collect information that is congruent with their culture. Applications for some of this information may be inconsistent with the interpretations of western scientists, however. Self-management approaches may be more effective in some situations than others. Hence, there is still a need to find a way to use both traditional knowledge and western science to address the limitations of the current approaches and applications to resource management.

DISCUSSION

In the co-management projects, communication, including an ongoing mechanism to facilitate interactions between government agencies and indigenous resource users, contributed to constructive decision making and positive relationship building. A willingness to work together was another important ingredient, and was motivated by mutual concern for and commitment to the health and sustainability of the resources. Adaptive management and self-management models propose additional elements for a successful working relationship between western science and traditional knowledge. These elements include: a flexible, open process for dealing with uncertainty; a holistic approach for responding to multiple environments and incorporating socioeconomic concerns; and a mechanism whereby indigenous resource users can manage wildlife within their cultural context.

The use of participatory research methods which involve the Inuit in the design and implementation of the projects, and offer educational and skill-training experience for Inuit within their northern cultural context, are necessary elements for the development of a working model which integrates the two perspectives while maintaining respect for each other's uniqueness. Additional important elements are outcomes that are visible within the northern communities. At another level, the process by which people from either perspective come together and commit to the undertaking in a mutually beneficial way may have more impact on its success than the method and the design.

Some researchers who have worked with aboriginal cultures have considered and tried different ways of bringing the two world views together. Berkes (1981, p. 144) proposed a "hybrid form" of resource management that unifies both scientific and traditional knowledge. He did not recommend integrating the two; rather, he suggested a hybrid model that permits both to co-exist and work together.

Bielawski (1990, p. 64), perceived a closer relationship between Inuit knowledge and western science. She believed that there are similarities in the way people view problems and that these similarities facilitate a constructive working relationship for solving them. She proposed a model that embraces parts of Inuit traditional knowledge and western science, noting that both indigenous knowledge and western science have assimilated parts of each other's world.

In contrast, Colorado (1988, p. 49) argued that a bicultural research model needs to emerge. She suggested that community-based participatory research lends itself well to creating a venue for cross-cultural dialogue. Applying the principles of community-based participatory research creates an opportunity for interaction between western and native science in a bi-cultural way.

Colorado, a first nations woman, challenged aboriginal people to articulate native science in contemporary terms to permit scholarly exchange, growth and empowerment of Native people in the scientific arena (Colorado, 1988, p. 62). Western scientists can facilitate this development by acknowledging the emergence of this knowledge and interacting with aboriginal people on their terms. Community-based participatory research offers the greatest potential for legitimizing traditional knowledge in relation to western science.

Another Perspective of Informing the Fact

Researchers who have worked within aboriginal communities have tried various approaches to develop a practical model to build connections between western scientific knowledge and aboriginal traditional knowledge. This paper proposes a perspective whereby traditional knowledge encounters and contributes to informing western scientific fact. At this juncture of difference, both traditional knowledge and western science become intertwined. A goal of this perspective is that the emerging connections will be influenced by values of mu-

tual respect and a willingness to accept other points of view. In the studies cited above, it was noted that it is difficult to fully implement a practical working relationship that incorporates western science and traditional knowledge. Hence, the following perspective employs some of the successful elements from existing models. It is designed from a community-based, participatory research approach. Key parts of the following perspective are guidelines for successful implementation of an approach that integrates western science and Inuit traditional knowledge as community and territorial issues evolve.

Workshop

A workshop can bring together Inuit and western scientists to discuss perceptions and create ideas for developing a joint venture. In this context, presentations can be made to identify relevant issues. The socioeconomic, political and cultural context can be considered in relationship to the expressed concerns. Presentations should be balanced to include traditional knowledge along with western scientific approaches. However, the presentations should not be focussed on the skills and knowledge of the individual. Presentations should focus on various perceptions of the issues required for a collaborative undertaking in the northern environment.

Community Support

Small group discussions following workshop presentations can cement relationships, keep communication open, and build community support. Building community support for implementation of a program requires ongoing communication and periodic events such as workshops. Community support is an essential element of any cross-cultural joint undertaking, and must be viewed as such by both western scientists and the Inuit who commit to it.

Working Committees

As programs develop and specific issues are identified, formal working committees may be established. Working within a community's existing committee structure keeps lines of communication open and strengthens the community's participation in the development of the venture (St. Denis, 1992, p. 59). In Inuit communities there are elders' committees, hunters and trappers' associations, committees of the Hamlet council, as well as specific organizing committees for local developments. Western science and traditional knowledge employ different styles of communication which makes it difficult to access information from each other and understand both points of view. Within this broad context of community involvement, both the western scientists and the Inuit need to clearly identify their commitment to a joint venture and to mechanisms that respect cultural orientation. Hence, working separately initially allows both groups to establish a point of view from their strengths, before entering into the bicultural challenge of working together.

Timely, strategic meetings can bring together western scientists and the Inuit to continue a dialogue and to move beyond a limited cultural view. Eventually, a steering committee can oversee the implementation of the venture. The timing is critical; both groups need to be sufficiently clear on "how it will benefit them" before there is a merger into a steering committee.

Training Community Researchers

Integral to any northern relationship is a commitment to creating learning opportunities in collaboration with the community. Western scientists working in the north have a responsibility to extend the learning environment of academic institutions into the field research program (Stenton and Rigby, 1995, p. 54). It is possible that arrangements could be made with educational institutions for academic credit where appropriate.

To any joint venture, Inuit bring traditional knowledge which can inform fact-based western science of the northern context. The benefits of training and involving Inuit in scholarly research projects are obvious: 1) Inuit are year-round residents in the research site and can access data outside of the summer field seasons; 2) they have an intimate knowledge of northern culture and can identify some subtle phenomena normally outside of western scientists awareness; 3) they can develop meaningful relationships with western scientists for the purpose of sustaining the northern landscape and its ecology; 4) they can assist to ensure that the project is relevant and remains so; 5) they can provide a different world view and an opportunity for western scientists to develop both teaching and research skills outside of their normal academic and cultural frame of reference.

Process

The most difficult aspect to describe and to replicate in the real world is the process required to successfully commit people to bring a joint venture to completion. Such a process calls for a willingness to deal with "uncertainty", a recognition of the need for each other, a commitment to the tasks defined in a joint venture, and an appreciation for developing a working relationship.

A community-based participatory research approach can facilitate the process, by bringing people together in a partnership that can expand from sharing and giving information to one of building knowledge together (Tandon, 1988, p. 12). The success of such a bicultural process depends on a willingness to create a new relationship to knowledge development by working together in a cross-cultural context.

Action-based Results

The final element of successful implementation of this approach is the creation of outcomes that generate results. Translating ideas and theory into practical application is seldom easy. Western science and traditional knowledge perspectives have different norms for dealing with "uncertainty and unpredictable events". These cultural attitudes affect the success or failure of any joint undertaking (Flaherty, 1995, p. 3). While implementation of results is an integral part of applied western science, in practice, successful implementation in a cross-cultural setting is a difficult challenge. Without a commitment to delivering results-based outcomes to the Inuit who live in the north, accountability for implementing program results is weak.

Implementation from a western science perspective often ends with the presentation of recommendations in a published report which does not correspond with the expectations of Inuit. Funding agencies are not yet sensitive to adequately financing the approach advocated herein. Using community-based participatory research in the development and implementation of joint ventures, can increase the likelihood of results-based outcomes. Partnerships are a vital part of this strategy, in promoting imaginative, innovative and perhaps unexpected solutions.

CONCLUSIONS

One of the benefits of community-based participatory research is its potential to

allow traditional knowledge to inform western science while valuing both equally. This partnership between traditional knowledge and western science in the creation of new knowledge has the potential to make a significant contribution to both the process and content of research projects. In addition, it has the potential to make a difference to the Inuit and to the quality of their lives and northern environment.

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