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PROBLEMS WITH INTEGRATING TRADITIONAL ECOLOGICAL KNOWLEDGE INTO CONTEMPORARY RESOURCE MANAGEMENT

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Abstract

There is growing recognition of the importance of indigenous peoples' knowledge in ensuring the ecological and socio-economic sustainability of natural resources. This paper will focus on the problems associated with attempting to integrate indigenous peoples' knowledge into dominant State management systems. Within the context of Canadian resource management, these problems with 'integration' are in part a product of how traditional ecological knowledge (TEK) is understood by researchers who attempt to collect and subsequently use this knowledge. Problems with how TEK is conceptualized include: 1) TEK research does not represent all components of indigenous knowledge; 2) TEK is understood as mere 'data' which is at risk of being 'lost'; and 3) TEK is only considered relevant when validated by Western science. As a result of these factors, there are also critical problems that arise when researchers attempt to integrate TEK into Western resource management. For example, there are problems with: 1) how TEK is collected and represented; 2) attempts to harmonize disparate worldviews and incompatible notions; and 3) how TEK is incorporated into an unchanged Western resource management system. This paper concludes that there is a much greater potential to meaningfully incorporate indigenous knowledge into sustainable resource management when TEK holders have direct involvement in management processes through community-based, adaptive resource decision-making institutions.

I. Introduction

A decade of research in Canada has attempted to document Aboriginal peoples' ecological knowledge to determine how this knowledge has or could contribute to contemporary sustainable resource management practices. This paper will describe the problems associated with how TEK is currently defined and also with how it is integrated into State resource management systems. TEK research does not represent all components of indigenous knowledge but rather TEK is understood as mere `data' which is at risk of being `lost'. Likewise, TEK is only considered relevant when validated by Western science. As a result of these factors there are also critical problems which arise when researchers attempt to integrate TEK into Western resource management. For example, there are problems with how TEK is collected and represented.

Attempts to harmonize disparate worldviews and incompatible notions are also problematic. Finally, there is the fundamental problem of attempting to integrate TEK into an unchanged Western resource management system. These problems are in part a product of how traditional ecological knowledge (TEK) [2] is understood by most non-Aboriginal researchers who attempt to collect and subsequently use this knowledge. TEK is more than just information; its transfer into knowledge happens within a different context, informed by a fundamentally different world view and therefore consists not only of `ecological data' but also of spirituality, values, normative rules and cultural practices.

a) `Discovering' the Value of TEK for Forest Management

Recognizing the limitations of State resource management systems to manage resources, to ensure both ecological and socio-economic sustainability, there has been a growing awareness of the importance of knowledge held by Aboriginal people. For example, in the case of forest management in Canada the reasoning goes that because Aboriginal people have "developed a unique cultural and spiritual connection with the land and an intimate knowledge of the forest and other ecosystems and their traditional way of life is based on the idea of using and managing the resource so that it will last in perpetuity. It stands to reason that their ecological knowledge can contribute to sustainable forest management practices" (NRC 1997).

A central theme in the literature on TEK is the development of sustainable resource management through the `integration' of TEK with science. Ecologists and resource managers have thus begun to `discover' TEK and are seeking to integrate this knowledge in contemporary resource management. TEK has been discussed as a `tool' for ecologists, and a means to improve resource management and environmental impact assessment (Huntington 2000). Clark (1998) writes, "[i]t used to be a question of whether agencies that manage natural resources should integrate traditional knowledge and wisdom in management decisions; now it is one of how".

b) What is TEK?

Despite widespread use, the term `traditional ecological knowledge' is a problematic and fairly ambiguous term. In literature on the subject it has generally come to refer to the knowledge that indigenous peoples have of the natural environment around them as a result of intimate and sustained contact with the land. Berkes (1993) arrived at a working definition based on major works on the subject up to that point:

> TEK is a cumulative body of knowledge and beliefs, handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment.

This definition conceptualizes TEK as consisting mainly of procedural ecological knowledge, for example knowledge of how animals behave or why a local plant occurs in a particular location. This has important ramifications for how TEK research is undertaken and contributes to the problems discussed below.

c) TEK Research as `Misappropriation of Knowledge'

In essence TEK has become the next frontier; it is something to discover, to document and to be used to improve Western scientific resource management. TEK is only conferred value and validity when it contributes to Western science. Smith (1999) describes this activity as `trading the Other' and also notes how indigenous culture continues to be commoditized by this trade. One consequence of `trading the Other' is what Aroha Mead calls the `misappropriation of indigenous knowledge' and is readily apparent in areas such as the patenting of organisms and products identified and produced by indigenous peoples (cited in Smith 1999:100). In other areas, such as environmental and natural resource management `misappropriation of indigenous knowledge' is less visible but the focus on the `integration' of TEK into dominant Western science has significant implications for indigenous peoples attempting to regain decision-making over those lands and resources on which they depend.

Similarly, the focus on TEK as `data' which can be collected and `integrated' has detracted attention from the existence and efficacy of Aboriginal systems of land management and the development of alternative ways to meaningfully include Aboriginal people and TEK holders in decision-making regarding resources. TEK when viewed in this limited way has spawned a large

research focused primarily on `extracting' indigenous knowledge, validating it against Western scientific paradigms and `integrating' it with dominant Western science and management systems. In the process, indigenous knowledge and systems of management are marginalized.

II. Problems

1. Problems with how TEK is Defined and Conceptualized

a) TEK does not represent all that is Indigenous Knowledge

The Assembly of First Nations has described indigenous knowledge as consisting generally of four interlinked components including:

1. creation stories and cosmologies which explain the origins of the earth and its people;
2. codes of ritual and behaviour that govern peoples' relationships with the earth;
3. practices and seasonal patterns of resource utilisation and management, that have evolved as expressions of these relationships;
4. body of factual knowledge that has accumulated in connection with these practices (AFN 1995:2).

It is generally these last two components, the practices and facts that have been the focus of TEK research efforts. Figure 1 presents the various elements of indigenous knowledge pictorially.[3] In this representation TEK exists within a web of indigenous knowledge. At the center of this web are elements of the culture associated with spirituality which are often overlooked by non-indigenous researchers. The small points represent discrete facts which are the predominate components of indigenous knowledge which can be understood by outsiders, validated and are subsequently removed from this web to be applied in Western resource management. If the analogy is taken one step further it is possible to see that removing these `data' points would weaken the structural integrity of the web. Likewise, the `data' points are interconnected to the web and cannot be fully understood when they are removed from their context. There is a need for the consideration of indigenous knowledge as a whole.

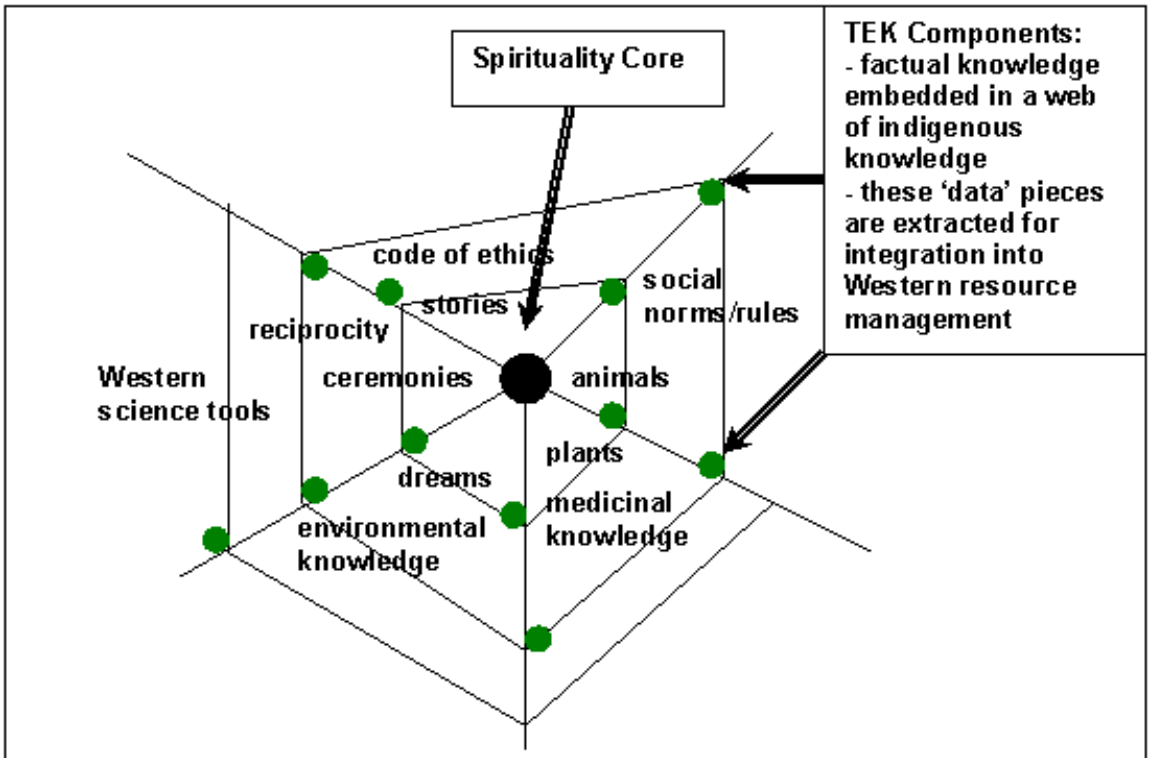

Figure 1: Conceptualization of TEK within an Indigenous Knowledge web.

b) TEK `Data' is Understood as Disappearing

Because TEK is currently conceptualized as consisting of `data' and generally valued in utilitarian terms for what it can contribute to Western management systems, there is an accompanying pressure to collect this information before it is `lost'. This notion does not recognize that like any knowledge system, indigenous knowledge has always and will continue to evolve as it acquires new knowledge through "synthesis and hybridization" (Johnson 1992b:10 citing Mulvihill 1988:12). To demonstrate that indigenous knowledge is dynamic and evolving Figure 1 also includes Western science tools in the outer web. Elements of Western science, such as cartographic maps and Geographic Information Systems, may be incorporated into the indigenous knowledge web but the core values will be maintained.

c) TEK is Considered Valid when Compared Against Western Knowledge

Another feature of the way TEK is currently framed is that the information needs to be evaluated against `expert' knowledge based on Western scientific paradigms before it is considered valid and useful. Early efforts to collect TEK focused on evaluating indigenous knowledge against Western science. For instance, in their study of the !Kung hunters' knowledge of animal behaviour Jones and Koner (1989) were preoccupied with validation and motivated by the notion that "if we are to use traditional societies as a source of useful knowledge about wildlife we need a way to evaluate this knowledge."

There is also a preoccupation in TEK research to either prove or disprove the usefulness of TEK to Western science. For example, Freeman (1985) demonstrates the validity and usefulness of "Inuit TEK of the social structure and behaviour of musk-oxen"...which contradicted `scientists' conventional wisdom, (and) were independently corroborated". Conversely, Diamond (1987) was concerned with demonstrating that there were examples of `bad' natural resource management amoung `traditional' peoples.

2. Problems with Attempts to Integrate TEK

a) TEK Research is approached from a Western Paradigm

Significant operational problems with the way TEK research is conducted and how Aboriginal knowledge is collected, represented and controlled are also evident. Stevenson (2000) aptly describes several problems with the process of TEK research, summarized below:

> 1) problems which TEK is meant to help `solve' are usually identified by non-aboriginal people such as biologists, government employees, resource managers and others trained in the Western scientific paradigm;
>
> 2) the methods or research designs developed to address these problems almost never originate in the aboriginal communities;
>
> 3) non-aboriginal researchers are often the interpreters, collectors and managers of TEK owing to a lack of `capacity' in aboriginal communities;
>
> 4) TEK, which exists and is given meaning in an oral context is translated from its original language into that of the dominant culture and then transferred into text or map format, which then becomes the authoritative source or reference, excluding the people who hold this knowledge from decision-making.
>
> Likewise, TEK research presents other important questions such as: who can use this knowledge?; what use will this knowledge be put to?; and whom will this knowledge benefit? TEK researchers have noted that these issues can be addressed by ensuring that the wishes of knowledge holders, about where and how TEK should be used are protected. In practice it is difficult to reconcile the underlying issues of authority and spiritual aspects of knowledge. TEK research which asks knowledge holders to give their knowledge to outsiders who will then publish this information in documents or on cartographic maps has the potential dangerous outcome of shifting the authority over knowledge from elders to outsiders and documents.

TEK is also created and transferred in a language and cultural context different from the context which most TEK researchers hold. There are two main problems with this. First, transferring information from one language to another inevitably affects its meaning. Second, the way

knowledge is transferred may vary culturally and much TEK research requires that knowledge holders breach cultural codes about how and to whom new knowledge is given. For example, in one community "elders were very concerned abut giving away information ...[and] also identified a need to redefine certain words such as `management'" (Michel 2002:4). TEK holders and elders have participated in TEK research despite these concerns because they want to pass on their knowledge to the next generation but opportunities for knowledge to be passed on traditionally may be decreasing or because they hope to demonstrate the impact of resource development on their lands or to secure a place for their communities and knowledge in decision-making.

TEK researchers are attempting to reconcile these desires with the problems described by using participatory research methodologies and trying to find new ways to document TEK which preserves its oral and cultural context (for example, video). It is important to recognize that even if the research process looks participatory when the framework used to approach the research is based on the supremacy of Western ways of knowing and systems it can be very `disempowering' and not at all "useful in contracting the invading industrial culture that devalues and suppresses the traditional ways of the community life as ignorance, backwardness, superstition, and inefficiency" (Park 1993).

The challenges for both TEK researchers and TEK holders are great and require that both are committed to creating new methods for research to ensure that indigenous knowledge, in its entirety, is maintained, respected and afforded a suitable position.

b) Difficulty Harmonizing Worldviews and Incompatible Notions

Even while research struggles to understand indigenous knowledge as a whole, there are key differences between an indigenous way of knowing and the Western paradigm which do not mesh. For example, Bielawski (1992) points to the underlying contrast between scientific and Inuit knowledge bases - that the Inuit do not separate people from nature, while Arctic scientists do. Because of this fundamental difference management models which seek to combine the expertise of both scientists and Aboriginal land users remain "primarily western, scientific and bureaucratic" (Bielawski 1992).

Indigenous scholars have described several other spiritual and cultural elements of indigenous worldview that are fundamentally different from the Western worldview. LaDuke (1994:128) describes cyclical thinking and reciprocal relations and responsibilities to the Earth and creation as common tenets in an indigenous worldview. It stands to reason then that the TEK which comes from this worldview cannot be easily integrated with dominant Western ways of managing resources.

The oral tradition within which TEK is created and transferred also reveals fundamental incompatibilities with the `integration' of TEK with Western management. In English, the forest is a `natural resource' - a raw material that can be used for human benefit. This resource is `managed' to increase its' utility to humans. In contrast the word `management' is contentious for Aboriginal peoples who "see themselves as belonging to [the land] rather than it to them" (LaDuke 1994:146). Similarly `wilderness' is a cultural construct of the English language which ignores significant evidence that historically all people have been manipulating the natural world on various scales (Cronon 1996).

c) TEK is combined without Changes to Western Resource Management System

There has been a great deal of effort to compare and contrast TEK with scientific knowledge in the hopes of finding common ground on which to better integrate TEK into natural resource management (Mailhot 1993; Berkes 1993; and Hipwell 1998). These studies have tended to focus on how the three main characteristics of science, notably reductionism, objectivism and positivism differ from TEK. Further, these studies have shown why it has been difficult for researchers and resource managers trained in the Western scientific tradition to `integrate' TEK effectively and also why TEK holders are often sceptical of Western science and management institutions. Rather than seeking ways to integrate this `data', other researchers are pointing to the need to understand TEK as part of an entirely different worldview with its associated values, institutions and management systems.

3. `Redefining' TEK in Research

The problems associated with `integrating' TEK into Western scientific management systems demonstrate that TEK as mere `data' is no longer a useful or workable notion and it is necessary to `re-define' the discourse concerning TEK in resource management. Aboriginal systems of land management and the knowledge which informs them cannot merely be `integrated' into State management based on Western paradigms without devaluing both the knowledge and the culture where they came from. The idea of co-existence has been presented as a concept which recognizes that to approach sustainability Western management systems will need to `accommodate' rather then `assimilate' alternative Aboriginal systems of land management and TEK.

Co-existence requires that the government and scientific community "accept Western science as only one method of seeking and interpreting knowledge" (Johnson 1992a). Unfortunately, this concept rarely finds expression in the discourse in which `integration' of TEK is currently set. While the purpose here is not to offer solutions to these problems this brief examination reveals that the question should not be so much `how to integrate TEK into resource management' but `how to integrate TEK holders?' Where TEK holders have direct involvement in management processes through community-based, adaptive resource decision-making institutions there is a much greater potential to meaningfully incorporate indigenous knowledge into sustainable resource management.

III. Conclusion: Community-based, Adaptive Institutions of Resource Decision-Making and Stewardship

`Discovery'- of land, of culture, and now of knowledge about `sustainable' development and resource management has characterized much of the interactions between indigenous peoples and settler society. As Chief Wavey cautions, we must resist `discovery' (Wavey 1993). This paper has argued that fundamental issues about how TEK is defined are at the root of the barriers in the way that Aboriginal values and knowledge are incorporated into contemporary management practice. Removing TEK (as it is understood in literature) from the community and worldview which created it and `integrating' it into the dominant Western scientific management paradigm to achieve sustainability can represent a misappropriation of that knowledge. When TEK is used merely to provide data for a State system which continues to adhere to the Western scientific paradigm and to do the managing it is not likely to benefit the providers of that knowledge.

There is a need then to move beyond the current discourse in which TEK is merely `data' and begin to ask how Aboriginal land management systems and the TEK that informs them can form the basis of community-based, adaptive institutions of resource management. To this end, collaborative research can be directed at addressing the need for a shared and articulated understanding of local values and concerns as well as alternative land management perspectives in order to achieve both community stewardship and economic development goals.

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[2] Traditional Ecological Knowledge and the acronym TEK are used throughout this paper although other terms such as `Indigenous Knowledge', or `Traditional Knowledge' are often substituted in the literature and do not necessarily correspond to terms used by indigenous peoples themselves to refer to their knowledge.

[3] It is important to note that Figure 1 is the author's own representation of one way that TEK can be conceptualized and is based primarily on literature by Aboriginal and non-Aboriginal scholars and therefore could not and does not suppose to represent an Aboriginal perspective of indigenous knowledge.