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Eleanor R. M. Waters

European Master's Degree
in Human Rights and Democratisation

Arctic Voices from the Frontlines of a Warming World.
The Importance of Indigenous Knowledge in the Climate
Change Discourse

E.MA European Master's Degree
in Human Rights and Democratisation



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Arctic Voices from the Frontlines of a Warming World

**The Importance of Indigenous Knowledge
in the Climate Change Discourse**

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ABSTRACT

Arctic ice is melting at unprecedented rates, drastically altering arctic ecosystems, habitats, and lifestyles. Due to their subsistence ways of life, indigenous peoples have comparatively contributed very little to climate change, yet they are among the first to bear the brunt of its negative effects. Arctic indigenous peoples see human-induced climate change as a human rights issue, closely intertwined with self-determination and land rights. The various indigenous voices of the Arctic tell us they want to defend their cultures and will not be mere victims. They are increasingly vocal and involved in local, regional, and global solutions. The research in this paper reveals the impacts of climate changes on traditional arctic ways of life. The contributions of indigenous ecological knowledge to adaptation initiatives are assessed and indigenous worldviews with inherent ties to the environment are discussed. A case study exposes the challenges of incorporating indigenous knowledge in Western science and politics. The Arctic Voices have a groundswell of support among scientists, researchers, environmentalists, and humanitarians yet there is very little government policy or action to help them combat climate change. As Arctic peoples continue to amplify their voices, policy and decision makers must listen in order to reach ethical and sustainable solutions to this crisis.

Keywords: climate change; arctic; indigenous knowledge; indigenous rights; policy

“We are here to say, that our political rights, territorial rights, and human rights should be reflected in the future climate change agreement and to promote our traditional knowledge as part of the solutions to climate change.” - Rodion Sulyandziga from the Centre for Support of Indigenous Peoples of the North, Russia, 9 June 2014.

“Climate change poses threats and dangers to the survival of Indigenous communities worldwide, even though they contribute the least to greenhouse emissions. In fact, Indigenous Peoples are vital to the many ecosystems in their lands and territories and help enhance the resilience of these ecosystems. In addition, Indigenous Peoples interpret and react to the impacts of climate change in creative ways, drawing on traditional knowledge and other technologies to find solutions that society at large can replicate to counter pending changes.” - H.E. Miguel D’Escoto Brockmann, President of the United Nations General Assembly to the Indigenous Peoples’ Global Summit on Climate Change, Anchorage, Alaska, 23 April 2009.

PREFACE

This master's thesis is an original, unpublished, independent work by the author, Eleanor R. M. Waters. It is the product of four months of research, including one week of field research conducted in Finland. Motivation for the topic stems from an interest in both indigenous rights and environmentalism. For Arctic indigenous peoples, climate change is not only an environmental issue but also a human rights issue and a question of survival.

After conducting preliminary research on internal displacement caused by climate change in the Arctic, I became fascinated with the growing recognition of indigenous knowledge appearing in intergovernmental reports, assessments, and declarations. After reading speeches by indigenous leaders and records of interviews with other indigenous peoples, I began to see an overwhelming assertion that indigenous knowledge can provide answers to climate change questions. I then focused my research in this direction to understand why and how indigenous knowledge is being recognized and utilized, and what some of the specific challenges are when including it in the climate change discourse.

I've always sought ways to incorporate indigenous perspectives into my everyday life and am grateful for the opportunity to dedicate my academic pursuits to this field.

I would like to give special thanks to my supervisor René Kuppe for his insight and guidance; Tero and Kaisu from Snowchange for their time, inspiration, and good company; Markku Suksi for organising and guiding the E.MA Lapland trip; and The Ludwig Boltzmann Institute of Human Rights for their financial support towards my research in Finland. I extend my gratitude to Timothy Feller for his invaluable editing support.

Vienna, 12.07.2014

A handwritten signature in black ink that reads "E. Waters". The signature is written in a cursive, flowing style with a large initial "E".

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ACRONYMS

AC – Arctic Council

ACIA – Arctic Climate Impact Assessment

CAVIAR – Community Adaptation and Vulnerability in Arctic Regions

IACHR – Inter-American Commission on Human Rights

ICC – Inuit Circumpolar Council

IGO – Intergovernmental Organization

IK – Indigenous Knowledge

IPCC – Intergovernmental Panel on Climate Change

IPY – Inter Polar Year Scientific Program

IQ – Inuit Qaujimajatuqangit

MEA – Multilateral Environmental Agreement

OHCHR – Office of the High Commissioner of Human Rights

TEK – Traditional Ecological Knowledge

TK – Traditional Knowledge

UN – United Nations

UNDRIP – United Nations Declaration on the Rights of Indigenous Peoples

UNFCCC – United Nations Framework Convention on Climate Change

UNPFII – United Nations Permanent Forum on Indigenous Issues

UNU-TKI – United Nations University Traditional Knowledge Initiative

WSK – Western Scientific Knowledge

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1 INTRODUCTION

There is significant consensus in the scientific community on human-induced climate change, and nowhere in the world are the effects more evident than in the Arctic. With melting sea ice and changing landscapes, the Arctic is warming at a rate of almost twice the global average.

People around the world are mobilizing to confront the threats that climate change presents. Beyond what global warming is doing to our planet's ecosystems, scientists and policy makers alike are questioning and hypothesizing the major threats this phenomenon poses to human life on our planet.

These dramatic impacts are being felt by the indigenous peoples of the Arctic, who are coping with changes to the ecosystems that their communities depend on.

Local indigenous communities in Alaska have been forced to leave their land due to melting ice, a fate that many other Arctic communities potentially face.

Animals on which communities depend for subsistence living are adapting to changing habitats, which disrupts indigenous hunting practices. Some species may disappear.

Arctic peoples in Scandinavia are concerned with how climate change in combination with industrialization and modernization is threatening their cultures and indigenous leaders are framing climate change as intrinsically linked to their right to self-determination.

The Inuit have expressed that greenhouse gases are infringing on their human rights and that the very existence of their subsistence lifestyles, central to their cultural identity, is in danger.

Indigenous peoples have a long history of adapting to change. Yet many are fearful that present changes are occurring at such a rate that the very survival of their distinct cultures is threatened.

The voices across the Arctic are diverse. Some voices speak strongly against resource extraction and development in the Arctic; others welcome new opportunities for economic growth. A resounding message from the Arctic Voices is that regardless of

what is to come, indigenous peoples want to play the leading role in shaping their future. Their traditional knowledge, intrinsic to their social and cultural values, is a crucial tool for maintaining their identities and adapting to climate change.

For millennia, indigenous peoples have been living in the Arctic, using their close relationship with nature to adapt and adjust to a changing climate. As excellent observers and interpreters of their environments, they can offer valuable insights into the past, present and future of their local areas. Currently, they are using their knowledge systems to develop local strategies to address climate change. Some of these strategies include working with scientists and researchers. The modern scientific world is taking note of the value of indigenous knowledge. Its relevance to address this threat constitutes a quickly developing research area.

The industrialized world is responsible for human-induced climate change and Arctic residents are disproportionately coping with a problem they have contributed little to. However, they demonstrate that they will not be victims of the unfolding crisis, as they become a growing force behind local, regional, and global solutions.

Addressing human-induced climate change remains embroiled in political debate. Hence, concrete action to address climate change by States (particularly Arctic nations) is limited. It is characteristic of international bodies, especially those that operate on consensus, such as the Arctic Council¹, that concrete efforts to address global environmental issues are slow to come about. The current lack of action of Kyoto Protocol members to extend their greenhouse gas emissions commitments by ratifying the Doha Amendment underpins this point. Moreover, countries such as the USA and Canada (two of the largest CO₂ emitting States) are not members of the Kyoto Protocol, depicting their lack of commitment to environmental concerns.

The indigenous of the Arctic do not have time to wait for international consensus, thus numerous local initiatives are underway. Communities are making plans to protect their culture, rights, and homeland, often through collaboration with other stakeholders. The use of their traditional knowledge is the cornerstone of these efforts.

¹ The Arctic Council is an intergovernmental forum made up of Canada, Denmark, Finland, Iceland, Norway, the Russian Federation, Sweden, and the United States of America and six Arctic indigenous groups have Permanent Participant status.

There is a growing discourse on linking climate change with human rights and the framing of it as a human rights issue. Arctic indigenous peoples are some of the first to utilize this approach.²

Indigenous groups across the Arctic are working to use all resources available to plan for the future, predominantly through community-based initiatives that involve support from and collaboration with various NGOs, scientists, researchers, and institutions. Despite the success of some local efforts, there is a widespread call for governments to support adaptation and mitigation strategies, and in some cases relocation. Global warming is occurring at such a speed that all actors, including governments, will need to take action to combat this threat. A shift in social consciousness is needed to move governments to act on climate change. It will be the ways we think about and approach our environments that will be the best solution to addressing climate change. Indigenous peoples' worldviews, if heard, can inform and help shape a new consciousness that will foster greater respect for the environment: "Indeed, the alternative perspectives and worldview embodied in the situated knowledge of Indigenous populations make it easier to imagine and design alternative approaches to addressing climate change than those based on science alone."³

The purpose of this paper is twofold: to examine the value of using indigenous knowledge to help address human-induced climate change, and to uncover some of the challenges to including it in policy and decision-making. In order to conduct this assessment, this paper will introduce the reader to the indigenous experience of climate change in the Arctic, identifying some of the specific challenges being voiced. By focusing on the challenges to human life in the Arctic, this paper puts a human-face on

² Inuit have used legal human rights avenues to claim that global warming is harming every aspect of their life and culture. The Inuit petition was submitted by Sheila Watt-Cloutier, the president of the ICC at the time, "with the support of the Inuit Circumpolar Conference", on behalf of all the Inuit of the Arctic regions of the United States and Canada; it is signed by 62 people in addition to Watt-Cloutier. *See: Petition to the Inter American Commission on Human Rights Seeking Relief From Violations Resulting from Global Warming Caused by Acts and Omissions of the United States*, 7 December 2005. Available at: <http://www.inuitcircumpolar.com/files/uploads/icc-files/FINALPetitionICC.pdf>. Accessed 30 June 30, 2014.

³ James D. Ford, Will Vanderbilt, and Lea Berrang-Ford, "Authorship in IPCC AR5 and its implications for content: climate change and indigenous populations in WGII," *Climate Change* 133, no.2 (2011): 201-213, 202.

climate change, ultimately leading to a better understanding of the cultural and socio-economic repercussions. Examples of how the indigenous peoples are addressing climate change through the use of their traditional knowledge are provided, highlighting indigenous agency, ingenuity, and resilience.

Recognition of the value of incorporating traditional knowledge into both adaptation initiatives and policy to address climate change is growing. However, the tangible application and prioritization of indigenous knowledge in policy remains to be seen. Research in this paper reveals that despite the growing acknowledgement of how indigenous knowledge can be beneficial to policy makers, an implementation gap exists as institutions and governments do not receive nor understand enough indigenous knowledge to give it weight in policy. Because indigenous peoples continue to encounter difficulties making their voices heard, particularly in political spheres, this paper contains a case study considering the challenges of including indigenous perspectives in policy. Well-intentioned arctic climate studies, which may lead to policy decisions, do not have adequate indigenous content. More research on the ways indigenous knowledge can provide solutions for both the Arctic and the world at large is needed.

In the following chapter (two), the physical changes to the Arctic environment caused by global warming are presented. The disambiguation of terminology is followed by a discussion on the challenges and advantages of containing these topics in a human rights framework.

Chapter three narrows in on the human experience, revealing how climate change is directly affecting the lives of the people of the North. The content delves into the disproportionate negative impacts, emphasizing risks to subsistence lifestyles and traditional knowledge transmission. The realities of displacement and relocation are included. Beginning with the topic of the vulnerability of indigenous peoples, the chapter closes with its counterpart, resilience, to emphasize indigenous agency.

Chapter four examines how indigenous traditional knowledge compliments science and research by adding a needed dimension that includes observations, interpretations, concerns, and responses to climate change. Examples of how indigenous knowledge has

been paired with modern science to create successful adaptation activities are provided. ‘Think Global, Act Local,’ captures this discussion well, as indigenous knowledge is very specific to local communities, yet the value of it is being increasingly recognized and utilized at the global level. Consideration will be given to indigenous world-views that foster close connections between humans and their environment. This holistic vision should be heard and considered as part of the indigenous knowledge contribution to the debate on climate change.

Through the content analysis of two sources and an Arctic Council policy document, the last chapter (five) takes the form of a case study, which seeks to reveal how indigenous knowledge is being included in governance and policy. More specifically, this section will address where the discrepancies lie between knowledge at the community level and how it is passed on to influence policy documents. This analysis will open up to a discussion on some of the obstacles that persist, hindering the ‘authentic indigenous voice’ in governance structures.

The increasing accessibility of resources in the Arctic due to melting ice has led to a new geo-political battle with numerous nations and independent actors all seeking to stake their claims in the transforming region. As attention increasingly shifts northwards, Arctic indigenous peoples have an important contribution to make. It is time that their voices are heard regarding all issues that pertain to their homeland, especially climate change. Their ecological wisdom can create a strong foundation for appropriate adaptation and mitigation strategies. Their world-vision and stewardship can demonstrate that alternative ways of living on our planet are possible and practical.

Indigenous peoples are on the frontlines of climate change and are actively finding solutions. They are adapting to changes in their livelihoods and cultures. As the rest of the world connects the dots between global warming and its ramifications for our planet, what can we learn from the indigenous peoples of the Arctic?

2 SETTING THE STAGE

This section outlines the background information necessary to grasp concepts and content discussed in the remainder of the paper. The scientific foundations of human-induced climate change and the impacts of other change-factors such as oil drilling in the Arctic underpin the urgency of this crisis. Terminology of indigenous peoples and their knowledge is defined followed by an analysis of a human rights approach to climate change in the Arctic.

2.1 The Arctic is Melting

The Arctic is warming twice as fast as the rest of the planet, and consequently its ecosystems and inhabitants are suffering from dramatic impacts of climate change. The most significant change is the decline in the density, age, and extent of sea ice. Since the 1980s the Arctic has been warming at approximately twice the global rate, with the strongest temperature changes in the world at approximately one degree per decade.⁴ Rising temperatures speed up the melting of glaciers and ice caps and cause early ice thaw on rivers and lakes. Sea ice that keeps the Arctic cool by reflecting solar radiation is vanishing, contributing considerably to the warming of our planet. The sea ice decline averages at a rate of 13 per cent per decade, and scientists predict that the Arctic Ocean is to be nearly ice-free in summer months within this century, possibly even within a few decades.^{5,6} The polar ice cap is now melting at the rate of nine per cent per decade,⁷ and records show that Arctic ice thickness has decreased by 40 per cent since the 1960s.⁸

⁴ IPCC, Working Group II Contribution to the IPCC Fifth Assessment Report on Climate Change 2014: Chapter 28, *Polar Regions*, 4.

⁵ Ibid.

⁶ Conservation of Arctic Flora and Fauna, “Arctic Biodiversity Assessment: Report for Policy Makers” (Akureyri, Iceland: CAFF, 2013), 9.

⁷ Natural Resources Defense Council, “The consequences of Global Warming On Glaciers and Sea Levels,” Accessed 1 July 2014. Available at: <http://www.nrdc.org/globalwarming/fcons/fcons4.asp>.

⁸ Ibid.

Arctic sea ice coverage set an all-time record low in September 2007, with almost half a million square miles less ice than the previous record set in September 2005.⁹ To put this into perspective, within the past three decades a disappearance in sea ice has occurred in an area that is the equivalent size of Norway, Sweden and Denmark combined.¹⁰ Greenland holds ten per cent of the total global ice mass, and this is shrinking at unprecedented rates. Evidence reveals that global sea level is now rising at an increased pace, indicating a rate of rise of 3.05 millimetres per year - which is significantly higher than the rates averaged over the last several thousand years.¹¹ Melting ice, stronger storms, an increase in erosion, thawing permafrost, and more unpredictable and sporadic weather are other direct effects of climate change that are greatly impacting life in the Arctic. The most recent Arctic Biodiversity Assessment done by the Conservation of Arctic Flora and Fauna states that climate change is by far the most serious threat to Arctic biodiversity and exacerbates all other threats.¹² Important work is underway to understand the complex and extensive impacts climate change poses to human life on our planet. The Intergovernmental Panel on Climate Change (IPCC), an internationally accepted authority on climate change under the auspices of the United Nations (UN), produces reports, which have the agreement of leading climate scientists and the consensus of participating governments. The three main aims of the IPCC are to assess human-induced climate change; the impacts of human-induced climate change; and options for adaptation and mitigation.¹³ In their 2013 report the IPCC stated that the largest driver of global warming is carbon dioxide (CO₂) emissions from fossil fuel combustion, cement production, and land use changes such as deforestation.¹⁴ Evidence for the human influence on global warming is growing, and the report states that it is extremely likely (95-100%) that human influence

⁹ Ibid.

¹⁰ Ibid.

¹¹ National Ocean and Atmospheric Administration (NOAA), "Is Sea Level Rising?" Last modified 10 April 2014. Available at: <http://oceanservice.noaa.gov/facts/sealevel.html>.

¹² Conservation of Arctic Flora and Fauna, "Arctic Biodiversity Assessment: Report for Policy Makers," 9.

¹³ IPCC, "Principles Governing IPCC Work," Approved at the Thirty-Seventh Session, Batumi 2013. Accessed 1 June 2014. Available at: <http://www.ipcc.ch/pdf/ipcc-principles/ipcc-principles.pdf>.

¹⁴ IPCC, Climate Change 2013: The Physical Science Basis - Summary for Policymakers, Observed Changes in the Climate System, 10.

has been the dominant cause of the observed warming since the mid-20th century. There are direct links to the warming of the atmosphere and ocean, changes in the global water cycle, reductions in snow and ice, sea level rise, and climatic extremes.¹⁵ In this paper we will stay within the realm of human-induced climate change, focusing on the impacts that it has on indigenous peoples. The term *anthropogenic climate change* will also be used, which refers to the production of greenhouse gases emitted by human activity.

Global Warming is not the only change agent presenting risks to the environment and its peoples, and the stress of climate change acts “in conjunction with other stressors, yielding even greater risks to Arctic biodiversity.”¹⁶ The receding sea ice presents opportunities for companies to exploit both onshore and offshore oils reserves. Drilling for oil is extremely dangerous as there is a major risk of spills due to harsh weather and transport from remote locations. In addition to this vulnerability, the clean up of potential spills is very difficult; the effects of some spills have already left ecosystems permanently damaged.¹⁷ Another concern is the contamination caused by global industrial pollution such as mercury increase in marine life, which pollutes and destabilizes the Arctic food chain. The opening up of Arctic sea routes in warmer seasons will lead to an increase in shipping and tourism. These and other changes will bring new stressors to the region.

Scientists claim that rapid climate change in the polar regions will impact both natural and social systems and may exceed the rate at which some of their components can successfully adapt. The sea ice that underpins the marine ecosystem upon which people and wildlife alike depend on for subsistence is dramatically shrinking and thinning.

¹⁵ Ibid., 15.

¹⁶ Conservation of Arctic Flora and Fauna, “Arctic Biodiversity Assessment: Report for Policy Makers,” 9.

¹⁷ Marybeth Holleman, “After 25 Years, Exxon Valdez oil spill hasn’t ended.” CNN, International Edition. Last modified 25 March 2014. Available at: <http://edition.cnn.com/2014/03/23/opinion/holleman-exxon-valdez-anniversary/>.

2.2 Indigenous Peoples and Traditional Knowledge

Indigenous Peoples cannot be defined by one single definition, as it would inevitably be either over or under-inclusive, making sense in some societies yet not in others. Considering the diversity of indigenous peoples, even in institutions such as the United Nations, a formal universal definition has yet to be agreed upon. A widely accepted definition of the term is provided in Jose R. Martinez Cobo's Study on the Problem of Discrimination against Indigenous Populations.¹⁸ Also, Article 33 of the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) adds to a comprehensive understanding of the term, emphasizing the importance of self-identification, that indigenous peoples themselves have the right to define their own identity as indigenous.¹⁹ In most definitions it is recognized that indigenous peoples have a special connection to their environment.

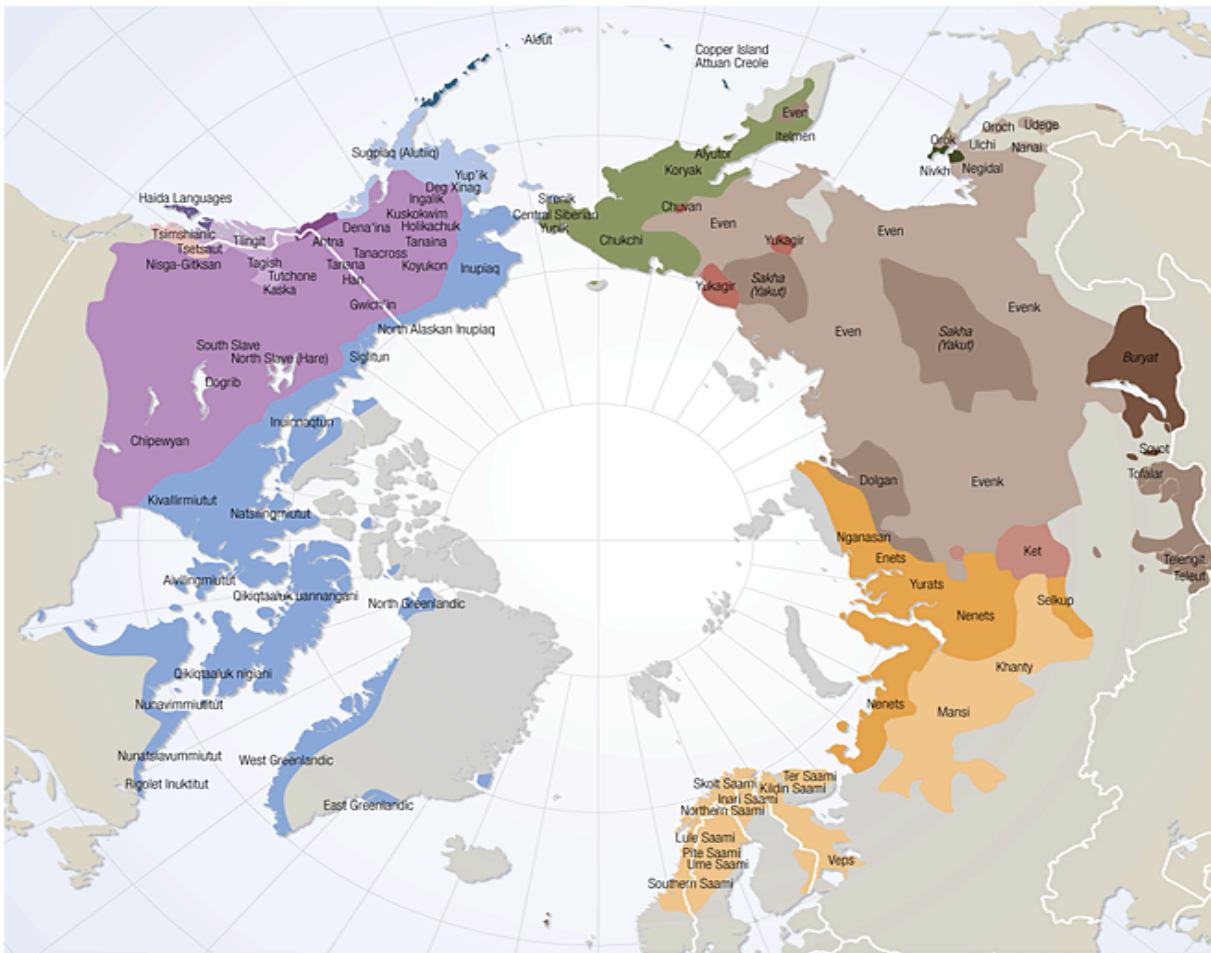
The indigenous peoples of the Arctic inhabit eight Nordic countries, all of which are developed countries in which indigenous groups make up a small minority (approximately 10%) of the population. With territorial borders in the Arctic, the 'Arctic Five' countries are Canada, Denmark (Greenland), Norway, Russia, and the United States.²⁰ Sweden, Finland, and Iceland are also usually considered Arctic states because their territories are partly within the Arctic area. There are over forty different ethnic groups in the Arctic.²¹

¹⁸ "Indigenous communities, peoples and nations are those which, having a historical continuity with pre-invasion and pre-colonial societies that developed on their territories, consider themselves distinct from other sectors of the societies now prevailing on those territories, or parts of them. They form at present non-dominant sectors of society and are determined to preserve, develop and transmit to future generations their ancestral territories, and their ethnic identity, as the basis of their continued existence as peoples, in accordance with their own cultural patterns, social institutions and legal system..." Quoted by The Secretariat of the United Nations Permanent Forum on Indigenous Issues, "State of the Worlds Indigenous Peoples," http://www.un.org/esa/socdev/unpfii/documents/SOWIP_introduction.pdf.

¹⁹ UN General Assembly, Universal Declaration of Human Rights, 10 December 1948, 217 A (III), Article 33. Available at: <http://www.refworld.org/docid/3ae6b3712c.html>. Accessed 1 July 2014.

²⁰ Elizabeth Ferris, *A Complex Constellation: Displacement, Climate Change and Arctic Peoples*, LSE Project on Internal Displacement, 30 January 2013, 2. Available at: <http://www.brookings.edu/~media/research/files/papers/2013/1/30-arctic-ferris/30-arctic-ferris-paper.pdf>.

²¹ Arctic Centre (Arktinen Keskus), "Arctic Indigenous Peoples," Available at: <http://www.arcticcentre.org/InEnglish/SCIENCE-COMMUNICATIONS/Arctic-region/Arctic-Indigenous-Peoples>. Accessed 5 June 2014.



- | | | |
|--|--|---|
| Na'Dene family | Eskimo-Aleut family | Altaic family |
| <ul style="list-style-type: none"> Athabaskan branch Eyak branch Tlingit branch Haida branch | <ul style="list-style-type: none"> Inuit group of Eskimo branch Yupik group of Eskimo branch Aleut group | <ul style="list-style-type: none"> Turkic branch Mongolic branch Tunguso-Manchurian branch Chukotko-Kamchatkan family Ket (isolated language) Nivkh (isolated language) Tsimshianic (isolated language) |
| Indo-European family | Uralic-Yukagirian family | |
| <ul style="list-style-type: none"> Germanic branch | <ul style="list-style-type: none"> Finno-Ugric branch Samodic branch Yukagirian branch | |

FIGURE 1: Demography of indigenous peoples of the Arctic based on linguistic groups²²

“Arctic indigenous peoples include for example Saami in circumpolar areas of Finland, Sweden, Norway and Northwest Russia, Nenets, Khanty, Evenk and Chukchi in Russia, Aleut, Yupik and Inuit (Inupiat) in Alaska, Inuit (Inuvialuit) in Canada and Inuit (Kalaallit) in Greenland. All of the above-mentioned countries except Iceland have indigenous peoples living within their Arctic territory. Official statistics do not necessarily recognize indigenous populations separately, although

²² Hugo Ahlenius, “Demography of Indigenous peoples of the Arctic based on linguistic groups,” UNEP/GRID-Arendal, Arctic Conservation Collection 2010. Available at: http://www.grida.no/graphicslib/detail/demography-of-indigenous-peoples-of-the-arctic-based-on-linguistic-groups_12f2.

differences occur. The number of indigenous people is not accurate because of the definition of indigenesness...”²³

The Inuit live across a vast region that crosses the political boundaries of Canada, Russia, Alaska, and Greenland. Despite their geographic disparity, former President of the Inuit Circumpolar Council (ICC) expresses that the “Inuit are one people... we speak the same language, eat the same whale mattaq [skin] and subsist on the same Arctic Ocean. And we are all dealing with the impact of climate change.”²⁴

Indigenous knowledge (IK) includes indigenous epistemologies, discourses, practices, and methodologies. By definition, indigenous knowledge encompasses other commonly used terms such as *traditional knowledge* (TK), and *traditional ecological knowledge* (TEK). Similar to the word ‘indigenous’, there is no universally accepted definition for IK, TK, or TEK in the literature, and the application of terms varies across regions and institutions. In intergovernmental organizations (IGOs) the term TK or IK is most often found. Whereas in more environmentally specific research pertaining to the environment, such as climate change adaptation initiatives and natural resource management, TEK is more commonly used. Also, the terms IK and TEK are used depending on the region and context.

Traditional ecological knowledge is an accumulation of knowledge passed down over generations and also accumulated during a lifetime, held by the elders of the communities. It incorporates experience of direct physical and spiritual relationship to the land and countless discussions with peers. The knowledge is passed on “through direct practice, participation, discussion and stories.”²⁵

The inheritance of TEK comes along with a responsibility to one’s family, elders, and community, and especially to mentors who have entrusted an individual through sharing

²³ Ibid.

²⁴ Quoted in: Report of the Indigenous Peoples’ Global Summit on Climate Change, Anchorage, 20-24 April 2009. Para 50, page 22. Available at: <http://www.un.org/ga/president/63/letters/globalsummitoncc.pdf>. Accessed June 6, 2014

²⁵ Curtis Rattray, “Talhtan Traditiona Ecological Knowledge,” in *Dispatches from the Cold Seas, Indigenous Views on Self Governance, Ecology, and Identity*, Tero Mustonen and Curtis Rattray (eds.) (Tampere: Tampere Polytechnic Publication, 2001), 138.

the information.²⁶

TEK can be viewed as a more specific classification of IK, as it includes ecology. However, many indigenous peoples do not view the human mind as separate from the earth, but rather as part of it. They accept that knowledge is intrinsically connected to the ecology. In this regard it is easier to understand how TEK may take on a broad application. TEK refers to knowledge of the environment derived from the experiences and traditions of a particular group of people. It can be seen as both dynamic and cumulative, building on past experiences and adapting to changing circumstances. For thousands of years TEK has guided cultures. Many groups continue to use TEK in their daily lives, though much of it has been lost due to the diminution and disappearance of cultural groups and the interaction with modern science.²⁷

The use of the term first became widespread in the 1980s but the practice is as old as ancient hunter-gatherer cultures.²⁸ Indigenous peoples have been found to have exceptionally detailed knowledge of local plants, animals, and natural history; anthropologists and scientific experts have spent much of the last century studying various forms of TEK and using these conceptions of ecological relationships to complement modern scientific knowledge, also known as scientific ecological knowledge or western scientific knowledge.²⁹ Acknowledgment of indigenous environmental knowledge can be seen in the work of the Arctic ecologist W.O. Pruitt Jr., who has used various Arctic indigenous terms to describe types of snow, claiming that this helped in the precision of his work.³⁰ Over the past decades there has been growing recognition and appreciation of TEK in a number of fields, especially ecology. Scholars have applied TEK to resource management, conservation and development

²⁶ Martha Johnson, ed., *LORE- Capturing traditional ecological knowledge* (Ottawa: Dene Cultural Institute and International Development Research Centre, 1992) Available at <http://web.idrc.ca/openebooks/644-6/>. Accessed 8 June 2014.

²⁷ David A. Cleveland, "Traditional Ecological Knowledge." *Encyclopaedia of Environmental Ethics and Philosophy*, J. Baird Callicott and Robert Frodeman (eds.) Vol. 2. (Detroit: Macmillan Reference USA, 2009) 318-322. Gale Virtual Reference Library. Accessed 18 April 2014.

²⁸ Fikret Burkes, "Traditional Ecological Knowledge in Perspective," in *Traditional Ecological Knowledge: Concepts and Cases*, Julian T. Inglis (Ottawa: International Program on Traditional Ecological Knowledge International Development Research Centre, 1993), 1. Available at: http://web.idrc.ca/openebooks/683-6/#page_1 Accessed 18 April 2014.

²⁹ Ibid.

³⁰ Ibid.

efforts. More recently, researchers, scientists, and policy makers are turning their the attention to climate change, examining the ways in which indigenous knowledge can inform and contribute to mitigation and adaptation measures.^{31,32,33,34}

Societies and cultures are continuously adopting new practices and technologies making it difficult to determine how and when and what kind of change would affect the labelling of a practice as *traditional*.³⁵ Thus, many scholars prefer to use the term indigenous knowledge or indigenous ecological knowledge, especially for northern indigenous groups whose lifestyles have changed considerably over the years.³⁶ The scientific branch of ecology is not directly compatible with TEK. However, if ecological knowledge is referred to as knowledge of the relationship of living beings with one-another and their environment, the term becomes more tenable.³⁷

Indigenous groups themselves do not always prefer this term. Canadian indigenous groups often refer to their *knowledge of the land* rather than ecological knowledge.³⁸ The Inuit have a distinct term for their knowledge: Qaujimaqatugangit.³⁹ These TEK frameworks are distinctive of a particular group's TEK. As it is locally specific, the term is often applied in the theoretical sense.

Similarly, the perspectives of those from within the group (emic) will invariably be

³¹ James Ford, Tristan Pearce, Barry Smit, Johanna Wandel, Mishak Allurut, Kik Shappa, Harry Ittusujurat, Kevin Qrunnut. "Reducing vulnerability to climate change in the Arctic: the case of Nunavut," *Arctic* 60, no. 2 (2007): 150-166, (Canada: Arctic Institute of North America, 2007) DOI: <http://dx.doi.org/10.14430/arctic240>.

³² Jan Salick and Nancy Ross, "Traditional peoples and climate change," *Global Environmental Change* 19, no. 2 (2009): 137-139.

³³ Nancy J. Turner and Helen Clifton, "It's so different today: Climate Change and Indigenous Lifeways in British Columbia, Canada," *Global Environmental Change* 19, no. 2 (2009): 180-190.

³⁴ Jonathan A. Ignatowski and Jon Rosales, "Identifying the exposure of two subsistence villages in Alaska to climate change using traditional ecological knowledge," *Climate Change* 121 (2013): 258-299. DOI 10.1007/s10584-013-0883-4.

³⁵ Fikret Burkes, Traditional Ecological Knowledge in Perspective, in Traditional Ecological Knowledge: Concepts and Cases, Julian T. Inglis, 2.

³⁶ Ibid.

³⁷ Ibid.

³⁸ Ibid.

³⁹ Inuit Qaujimaqatugangit is an Inuktitut phrase that is often translated as 'Inuit traditional knowledge', 'Inuit traditional institutions' or even 'Inuit traditional technology'. It comes from the verb root 'qaujima' - meaning to know and could be literally translated as 'that which has long been known by Inuit'. See: Qikiqtani Inuit Association, "Inuit Qaujimaqatugangit." Available at: <http://www.qia.ca/i18n/english/iq.shtm>. Last modified 2007.

different than the outsider's (etic) perspective.⁴⁰ TEK cannot be judged only at an emic level⁴¹ as impacts such as those from climate change affect various groups with different TEK and different management strategies. Therefore, a need exists to evaluate local solutions in global contexts of social, economic, and environmental sustainability.⁴² Regardless of the terminology, indigenous knowledge should be seen as an evolving process as opposed to a static body of knowledge. Knowledge that is continually observing and understanding environmental change is precisely what makes the holders of it so valuable in understanding climate change.⁴³

Indigenous knowledge encompasses knowledge and practice; a knowledge-practice-belief complex that is dynamic and adaptive, constantly changing while retaining cultural continuity.⁴⁴ It includes the ways in which indigenous groups understand and relate to their land and ecosystems and the ways in which knowledge is transmitted and learned, i.e. through oral histories, community narratives and worldviews.

2.3 Climate Change in a Human Rights Context

*“Climate change is a silent human crisis. Yet it is the greatest emerging humanitarian challenge of our time. Already today, it causes suffering to hundreds of millions of people most of whom are not even aware that they are victims of climate change...”*⁴⁵

The inclusion of indigenous knowledge must also be framed in a broader context of the indigenous movement to confront climate change; a movement which has been shaped

⁴⁰ Cleveland, "Traditional Ecological Knowledge."

⁴¹ Emic: of, relating to, or involving analysis of cultural phenomena from the perspective of one who participates in the culture being studied. Etic: of, relating to, or involving analysis of cultural phenomena from the perspective of one who does not participate in the culture being studied. *See: Merriam Webster Dictionary*, s.v. "emic," s.v. "etic." Available at: <http://www.merriam-webster.com/dictionary/emic>

⁴² Cleveland, "Traditional Ecological Knowledge."

⁴³ Derek Armitage, Fikret Berkes, Aaron Dale, Erik Kocho-Schellenberg, Eva Patton, "Co-management and the co-production of knowledge: learning to adapt in Canada's Arctic," *Global Environmental Change* 21 (2011): 995–1004.

⁴⁴ Fikret Berkes, *Sacred Ecology*, 3rd ed. (New York: Routledge, 2012), 17.

⁴⁵ Kofi Annan, former United Nations Secretary-General, 2009. Quoted by: The Center for International Environmental Law (CIEL), "Inuit Petition Recasts Climate Change Debate." Available at: http://www.ciel.org/Climate_Change/Inuit.html. Accessed 16 May 2014.

by as well as channelled through the human rights regime.⁴⁶ For decades indigenous groups and activists have been working to garner support for various indigenous rights issues. In recent years, a fruitful discussion has developed regarding the inter-linkages of climate change and human rights, in which Arctic indigenous peoples have played an important role. The most well known example to spark this debate was the Inuit Petition taken to the Inter American Commission on Human Rights (IACHR) by activist Sheila-Watt Cloutier on behalf of all Inuit of the Arctic Regions of the United States and Canada, “seeking relief from violations resulting from global warming caused by acts and omissions of the United States.”⁴⁷

Indigenous peoples have been particularly concerned with climate change for several reasons. These include their close relationship to their natural environments (which are closely linked to their culture and spirituality), their dependence on the environment for livelihoods and survival, and their long history of experience mitigating and adapting to climate change.⁴⁸

By identifying climate change as a human rights issue, indigenous peoples have demonstrated how climate change is woven together with other indigenous rights issues, such as the close links between a human right to the environment and rights to self-determination. Saami President Klemetti Näkkäljärvi specifically states that, “the reluctance of States to recognize increased autonomy as a solution to adapting to climate change is a common problem.”⁴⁹ He also argues that although research and the increased participation of indigenous peoples are continuously cited as preferred methods to deal with climate change, the most “efficient solution would be to secure indigenous peoples’ self determination at both national and international levels.”⁵⁰

The indigenous movement to stop human-induced climate change has grown into a

⁴⁶ A human rights regime is defined as a field of international relations in which actors’ expectations converge around a set of explicit or implicit human rights principles, norms, rules, and decision-making procedures. See: “Regime Theory,” http://www.public.iastate.edu/~pol_s.356/reg.htm.

⁴⁷ Petition to the Inter American Commission on Human Rights Seeking Relief From Violations Resulting from Global Warming Caused by Acts and Omissions of the United States. Cfr. *Supra* footnote 2, p. 11.

⁴⁸ Elizabeth Ferris, *A Complex Constellation: Displacement, Climate Change and Arctic Peoples*, 6.

⁴⁹ Klemetti Näkkäljärvi, “Climate Change and Traditional Knowledge,” *Arctic Science, International Law and Climate Change* 235 (2012): 105-109, 108.

⁵⁰ *Ibid.*

“major civil society voice and force, both within the United Nations climate conferences as well as in parallel and autonomous spaces.”⁵¹ Ben Powless, from the Indigenous Environmental Network in Canada, contextualizes this movement’s roots within a historic rise of an international indigenous movement framed around human rights. Due to the vulnerabilities and the disproportionate effects of climate change on indigenous communities, especially frontline communities, indigenous peoples have emerged as one of the most engaged non-state actors in this struggle. This movement has taken many forms. One is what Powless calls an identity-based movement, critiquing the historic processes and dominant worldviews that have brought about these unprecedented threats, which has grown out of indigenous engagement in international issues and specifically the human rights regime.⁵²

With the adoption of the UNDRIP in 2007, indigenous peoples asked for and received recognition of both individual and collective human rights. Notably there were four opposing votes: Australia, Canada, New Zealand, and the United States. Recognition of collective rights is part of what the indigenous people feel is needed for their self-determination and ability to deal with other issues like climate change. Thus, the international indigenous climate movement “in particular revolves around the recognition of Indigenous Peoples as collective rights-holders, as opposed to simply individual rights-holders who happen to belong to a group.”⁵³ The UNDRIP also recognizes the right of indigenous peoples to self-determination, the right to maintain their cultural traditions, the right to not be relocated without their permission, the right to participate in decisions which affect them, the right to own, sue, develop and control lands they have historically occupied, and the right to develop and determine priorities for the use of their land.⁵⁴ As evidenced at the United Nations Indigenous World Conference in June 2014, Arctic indigenous peoples have expressed concern that the rights enshrined in the UNDRIP have yet to be transposed into the full realization of

⁵¹ Powless, “An Indigenous Movement to Confront Climate Change,” Abstract.

⁵² *Ibid.*, 412.

⁵³ *Ibid.*, 413.

⁵⁴ UN General Assembly, United Nations Declaration on the Rights of Indigenous Peoples: resolution / adopted by the General Assembly, 2 October 2007, A/RES/61/295. Available at: <http://www.refworld.org/docid/471355a82.html>. Accessed 2 July 2014.

indigenous peoples rights. They are calling definitive measures at national, regional and international levels, aimed at assuring the full realization of the rights of indigenous peoples.⁵⁵

Climate change is not only a matter of physical change to the environment for indigenous peoples. It is also a threat to their livelihood, the resources upon which their economies depend, their social life and their traditional knowledge and cultures. Climate change is an environmental issue but also a human rights issue and thus increasing attention has been afforded to human rights norms and the linkages between legal responses to climate change and human rights. Although linkages between legal responses to climate change and human rights do exist, there are also significant limitations that are, “likely to hamper the use of human rights law in climate change settings.”⁵⁶

There are varied opinions on whether to apply a human rights approach to climate change. This discussion is better understood in the context of third generation rights, also known as ‘solidarity rights’. The emergence of third generation rights - the most recently recognized category of human rights - has sparked a heated debate among scholars regarding the viability of these rights, which are considered by some as “a host of normative expressions whose status as human rights is controversial at present.”⁵⁷ Third generation rights include the right to self-determination, development, and environmental rights such as the right to a healthy environment.

Environmental rights have moved to the centre stage of third generation human rights. Thus climate change and its infringement on human rights has inevitably become a hot topic leading to the on-going deliberation regarding the connection between human rights and climate change. Perhaps the most controversial question is whether a ‘human

⁵⁵ Arctic Indigenous Caucus, “Implementation of Rights of Indigenous Peoples,” Statement at the Interactive Hearing on the World Conference on Indigenous Peoples Organized by the President of the UN General Assembly, 17-18 June 2014. Available at: <http://wqip2014.org/wp-content/uploads/2014/06/Arctic-Statement-Interactive-Hearing-Implementation-of-IP-Rights-FINAL.pdf>.

⁵⁶Ole W. Pedersen, “Climate Change and Human Rights: Amicable or Arrested Development?” *Journal of Human Rights and the Environment* 1, no. 2 (2010): 236.

⁵⁷ The Center for International Environmental Law (CIEL), “Human Rights, Environment, and Economic Development: Existing and Emerging Standards in International Law and Global Society,” <http://www.ciel.org/Publications/olp3v.html>. Accessed 10 June 2014.

rights approach' to climate change is the right one. Some of the advantages and disadvantages to this school of thought are identified below, with particular focus on the Inuit petition to the IACHR.

While it is incontrovertible that climate change has the potential to undermine the enjoyment of human rights, seeking human rights remedies or redress before domestic and international courts presents significant challenges: Proving causality is a major difficulty that greatly hampers the effectiveness of such litigation in addressing climate change. Despite this challenge, there are also advantages to connecting climate change with human rights: Climate change campaigns using human rights terminology can be seen as a way to add normative strength and credibility to an otherwise frustrating and slow-moving international debate. In other words, human rights rhetoric is a persuasive framing tool in addressing climate change.⁵⁸

Individuals and groups, including indigenous peoples, are attempting to invoke third generation human rights in the context of climate change. In 2005, the Inuit petition alleged United States' responsibility for the adverse effects that climate change had on their traditional way of life. Ultimately the petition was rejected due to insufficient evidence of harm, yet after the rejection Inuit leaders requested and received a hearing before the commission to present more evidence.⁵⁹ The petition is an example of the difficulties that exist when making a human rights based case for climate change. Nonetheless, though not successful, the petition attracted international attention for the Inuit fight against climate change.

In 2008, following a similar plea from small island states, the UN's Human Rights Council requested the Office of the United Nations High Commissioner of Human Rights (OHCHR) to carry out a detailed study on the relationship between human rights and climate change.⁶⁰ The OHCHR stated that global warming will have implications for the full range of human rights, before addressing a number of specific rights in

⁵⁸ Pedersen, "Climate Change and Human Rights: Amicable or Arrested Development?" 238.

⁵⁹ Andrew C. Revkin, "Inuit Climate Change Petition Rejected," *New York Times*, 16 December 2006, http://www.nytimes.com/2006/12/16/world/americas/16briefs-inuitcomplaint.html?_r=1&. Accessed 1 June 2014.

⁶⁰ Human Rights Council, Resolution 7/23, Human Rights and climate Change, of 41st Meeting of 28 March 2008. Available at: http://ap.ohchr.org/documents/E/HRC/resolutions/A_HRC_RES_7_23.pdf

detail: The right to life, the right to adequate food and the right to health.⁶¹ It was also recognized that climate change may have detrimental effects on a number of rights of certain population groups, including indigenous groups and their collective right to self-determination.⁶² Certain linkages between climate change and human rights are clear and uncomplicated, such as those expressed in the Inuit petition that an increase in Arctic temperatures may have a serious effect on the health and livelihood of indigenous communities seeking to sustain their lifestyles in these environments.⁶³

A human rights approach to climate change invokes a notion of responsibility of States. The consequent positive obligations towards affected citizens then forces States to take action against climate change. In order to establish a violation of a human right, a victim (easily established in this case) and a violator must be established. Yet climate change does not constitute a prosecutable violator and because the Inuit claimed the United States in their petition, they needed to establish a link between the infringed-upon right and the nation that has either violated it, or has not fulfilled its positive obligation to protect its citizens.

As noted in the OHCHR report, it is “virtually impossible to disentangle the complex causal relationship linking historic greenhouse gas emissions of a particular country with a specific climate change-related event.”⁶⁴ Proving a causal link between one State’s emissions and for example damage from sea level rise, and a related possible human rights violation, is, “likely to present an inordinately difficult hurdle for prospective complainants to overcome.”⁶⁵ In his article on ‘Climate Change and Human Rights: Amicable or Arrested Development?’ Pedersen accurately notes that, “the argument that climate change is threatening the enjoyment of a number of human rights is not necessarily the same as the contention that climate change is violating those

⁶¹ Pedersen, “Climate Change and Human Rights: Amicable or Arrested Development?” 237.

⁶² UN Human Rights Council, Report of the Office of the United Nations High Commissioner for Human Rights on the relationship between climate change and human rights, 15 January 2009, A/HRC/10/61. Available at: <http://www.refworld.org/docid/498811532.html>. Accessed 2 July 2014, 10-13.

⁶³ Petition to the Inter American Commission on Human Rights Seeking Relief From Violations Resulting from Global Warming Caused by Acts and Omissions of the United States, Cfr. Supra footnote 2, p. 11.

⁶⁴ UN Human Rights Council, Report of the Office of the United Nations High Commissioner for Human Rights on the relationship between climate change and human rights, 20.

⁶⁵ Pedersen, “Climate Change and Human Rights: Amicable or Arrested Development?” 246.

rights.”⁶⁶ A legal duty must be breached in order to constitute a violation so the absence of a particular and clearly established duty-holder (who has failed to perform its obligation) is extremely problematic. Domestic responses to respect, protect, and fulfil citizens and the trans-boundary nature of climate change is another difficult obstacle, especially due to the limited extra-territorial application of human rights.⁶⁷ In other words, climate change is a global problem, and remedies sought at the domestic level risk treating climate change as a ‘state-by-state’ issue.⁶⁸

Other obstacles are the reluctance of international tribunals to ‘micro-manage’ in domestic environmental regulation and in domestic decision-making. Additionally, human rights based vocabulary is adversarial which can exacerbate conflict and lead to unfavourable outcomes, especially for special interest groups.⁶⁹

Finally there is an argument that a human rights approach crowds out other ways of understanding the dangers and problems of climate change, and therefore acts as a distraction, as States are less likely to achieve agreement (within on-going international debates) if they are being accused of violations.⁷⁰

Notwithstanding the criticism, the framing of climate change as a human rights issue is an effective advocacy tool, which can be used to increase public awareness. This may have been what was partly behind the Inuit petition before the IACHR.

Koivurova, Duyck and Heinämäki, in their article ‘Climate Change and Human Rights,’ assert that although the human rights legal strategy did not win the Inuit their case, they were still able to improve their position as victims through making such legal claims.⁷¹ Within the climate change debate, there are many “actors and decision-making structures” and the publication of their legal claims “allowed Inuit to reinforce their activities in the climate regime and to obtain a louder voice in the global regime.”⁷² This

⁶⁶ Ibid., 244.

⁶⁷ Ibid., 245

⁶⁸ Ibid., 245.

⁶⁹ Ibid., 245.

⁷⁰ Ibid., 245.

⁷¹ Timo Koivurova, Sébastien Duyck and Leena Heinämäki, “Climate Change and Human Rights,” in *Climate Change and Law*, Erkki. J. Hollo, et al (eds.) *Ius Gentium: Comparative Perspectives on Law and Justice* 21 (2013): 287-325, 323.

⁷² Ibid., 324.

is exemplified by how the ICC consciously brought its human rights petition to the public eye at the United Nations Framework Convention on Climate Change (UNFCCC) Conference of the Parties.

“By raising the human rights petition against the United States, the Inuit expanded society’s notion of who is entitled to participate in the fight against climate change. Through their consolidated agency, the Inuit also brought their plight – the death of their culture – into the public eye, which is not easily achieved.”⁷³

The Centre for International Environmental Law also agreed that, “before the petition, climate change debates centred around economic and environmental issues. The news generated by the petition and subsequent testimony played a major role in recasting the climate change as a matter of fundamental human rights. As a result, human rights is now a central component of the international climate debate.”⁷⁴

Nevertheless, a discourse on the coupling of human rights and climate change and the potential benefits of doing so is likely to grow in coming years.⁷⁵ There is no doubt that climate change presents major human rights implications. Consensus is far from established on whether a ‘human rights approach’ to climate change issues is effective in the long term. This paper intends to make the assertion that climate change indeed causes human rights implications. Yet, in line with the aforementioned potential risks, it does not propose the application of a human rights approach to climate change. Some suggest the use of caution in that there is a very real chance that, especially in the case of climate change, “human rights promise more than they can deliver.”⁷⁶

A complementary legal approach for protecting indigenous rights impacted by climate change may be through establishing human rights as a prerequisite for environmental protection. The way forward on this legal avenue is to strengthen procedural (participatory) rights, such as access to information, access to justice and the right to participate in decision-making.⁷⁷ Procedural principles of human rights play a more

⁷³ Ibid., 324.

⁷⁴ The Center for International Environmental Law (CIEL), “Inuit Petition Recasts Climate Change Debate,” Cfr. Supra footnote 43, p. 24.

⁷⁵ Koivurova et al., “Climate Change and Human Rights”, 288.

⁷⁶ Pedersen, “Climate Change and Human Rights: Amicable or Arrested Development?” 251.

⁷⁷ UN General Assembly, Rio Declaration on Environment and Development, 12 August 1992, A/CONF.151/26, Principle 10. Available at: <http://www.un.org/documents/ga/conf151/aconf15126-1annex1.htm>. Accessed 2 July 2014. See also: Aarhus Convention, 25 June 1998, Available at:

forceful role in the climate change regime.⁷⁸ This paper highlights the ways in which Arctic indigenous groups are setting a precedent by finding avenues to have their voices heard and acknowledged, ultimately shaping the greater deliberations on climate change.

<http://www.unece.org/fileadmin/DAM/env/pp/documents/cep43e.pdf>. Accessed 4 July 2014.
⁷⁸ Koivurova et al., “Climate Change and Human Rights”, 290.

3 THE HUMAN EXPERIENCE: CLIMATE CHANGE IMPACTS

*“We are deeply alarmed by the accelerating climate devastation brought about by unsustainable development. We are experiencing profound and disproportionate adverse impacts on our cultures, human and environmental health, human rights, well-being, traditional livelihoods, food systems and food sovereignty, local infrastructure, economic viability, and our very survival as Indigenous Peoples.”*⁷⁹

We’ve briefly covered why the Arctic is melting, the challenges that Arctic communities are facing, and the human rights arguments. Now, we look at the disproportionate negative consequences and challenges to subsistence lifestyles, including changes to traditional knowledge transmission and the loss of cultural and spiritual wellbeing. Examples from Scandinavia, Russia, U.S.A, Canada, and Greenland reveal both the similarities and differences between the ways in which communities across the Arctic are affected. This section concludes with an explanation of the ways in which indigenous knowledge can contribute to the resilience of communities, strengthening them to meet future challenges.

3.1 Vulnerability

Literature on climate change suggests that particular indigenous communities are likely to be disproportionately affected by climate change.^{80,81} Indigenous groups, including Arctic indigenous peoples, are regarded as some of the most marginalised, impoverished and vulnerable populations of the world.⁸² People in the Arctic rely on

⁷⁹ United Nations Framework Convention for Climate Change, *The Anchorage Declaration*, 24 April 2009, 1. Available at: unfccc.int/resource/docs/2009/smsn/ngo/168.pdf.

⁸⁰ UN Human Rights Council, Report of the Office of the United Nations High Commissioner for Human Rights on the relationship between climate change and human rights, 5.

⁸¹ Rachel Baird, “The Impact of Climate Change on Minorities and Indigenous Peoples,” Minority Rights Group International, Briefing, 2008, 1. Available at: <http://www.gsdc.org/go/display&type=Document&id=3945>.

⁸² International Work Group for Indigenous Affairs (IWGIA), “Climate change and indigenous peoples,” <http://www.iwgia.org/environment-and-development/climate-change>. Accessed 14 April 2014.

and have close connections to local wildlife, for their individual and collective well-being. Due to their dependence on hunting, living in remote regions and the reality of fragile ecosystems, indigenous populations are especially vulnerable to climate change.^{83,84} Climate change is destroying wildlife habitat and changing the way Arctic people interact with their ecosystems.

Climate changes target already vulnerable groups first. Especially those that are particularly susceptible to the negative impacts of climate change due to other stressors. Political and economic marginalization (evident in their on-going struggle for self-determination and rights over their land)⁸⁵ as well as existing social, health, and poverty disparities, are contributing factors leading to vulnerability. The International Council on Human Rights Policy states that, “populations whose rights are poorly protected are likely to be less well-equipped to understand or prepare for climate change effects; less able to lobby effectively for government or international action and more likely to lack to resources needed to adapt to expected alterations of their environmental and economic situation.”⁸⁶

Stefan Mikaelsson, a reindeer herder from Jokkmokk, Sweden and President of the Saami Parliament states, “the risk of losing our possibilities to claim rights to land and water are obvious if our ways to live are devastated by, for instance, a major change in climate.”⁸⁷

Some of the human rights that climate change is already undermining include the right to life, health, property, shelter, water, livelihood and culture.⁸⁸ The IPCC states that indigenous communities, especially those located in highly vulnerable locations along the ocean and river shorelines are already facing significant impacts on their health and

⁸³ Ibid.

⁸⁴ IPCC, Working Group II Contribution to the IPCC Fifth Assessment Report on Climate Change 2014: Chapter 28, *Polar Regions*, 15-16.

⁸⁵ International Work Group for Indigenous Affairs (IWGIA), “Land Rights and Indigenous Peoples,” <http://www.iwgia.org/environment-and-development/land-rights>. Accessed 14 April 2014.

⁸⁶ International Council on Human Rights Policy, *Climate Change and Human Rights: A Rough Guide*, 2008, 3. Available at: http://www.ichrp.org/files/summaries/35/136_summary.pdf.

⁸⁷ Tero Mustonen and Elina Helander, eds., *Snowscapes, Dreamscapes* (Fram Oy, Vaasa, Finland: Tampere Polytechnic Publications, 2004), 258.

⁸⁸ International Council on Human Rights Policy, *Climate Change and Human Rights: A Rough Guide*, 3.

well-being, and this is projected to increase.⁸⁹

3.2 Subsistence Living

“Indeed, hunting, fishing and gathering food is central to all indigenous peoples’ survival. It is perhaps felt most poignantly in the thousands of communities scattered across the northern Polar Regions of our planet. The threat that all of the Arctic’s indigenous peoples feel to their culture, their language, to their heritage and to their environment is intimately connected to the fear we all have regarding our inherent rights to hunting, fishing, and gathering.”⁹⁰

Most Arctic indigenous people come from or live a subsistence culture, a hunter-gatherer and sometimes nomadic way of life. These practices do not enable people to store excess food. They harvest, process, distribute, and consume just enough wild animals, fish, and plants needed to survive for a short time period. When the food supply runs out, the cycle repeats with hunting and harvesting.⁹¹ Communities organize their lives around seasonal calendars observing weather signs such as wind direction, rainfall, temperature change, celestial movement, animal behaviour, and the flowering of plants. These calendars shape how communities interpret and understand shifts in climate patterns.⁹²

Detailed and specialized knowledge of animals and fish behaviour, sea ice and terrestrial conditions, and weather, is essential for the successful harvesting of Arctic species. Indigenous knowledge has enabled indigenous societies to use, “highly productive ecosystems in the Arctic for millennia and serves a foundation for economic, cultural, spiritual and ethical concerns that guide the use and management of natural

⁸⁹ IPCC, Working Group II Contribution to the IPCC Fifth Assessment Report on Climate Change 2014: Chapter 28, *Polar Regions*, 3.

⁹⁰ Aqqaluk Lyngé (of Greenland), Former President, Inuit Circumpolar Conference (ICC); Remarks at the National Forum on the Future of Alaska Natives (1999). Quoted in: “Subsistence in Northern Communities: Lessons from Alaska,” Thomas Thornton, *The Northern Review* 23 (2001): 82.

⁹¹ Thomas Thornton, “Alaska Native Subsistence: A Matter of Cultural Survival,” *Cultural Survival Quarterly* 22, no. 3 (1998). Available at: <http://www.culturalsurvival.org/ourpublications/csq/article/alaska-native-subsistence-a-matter-cultural-survival#sthash.C0AwBgTP.dpuf>. Accessed 5 June 2014.

⁹² “Land Use and Adaptation – Traditional Knowledge and Climate Science Series,” YouTube video, 3:20, Posted by “UNUChannel,” 5 August 2012, <http://www.youtube.com/watch?v=FzBQZwpRhI0>.

resources.”⁹³

Recent drastic shifts in climate are altering habitats that have been intact for thousands of years and are consequently disrupting subsistence cultures, since they depend upon those habitats. The former President of the Inuit Circumpolar council, Aqqaluk Lynge, is declaring that these changes threaten the very survival of circumpolar peoples and their cultures.⁹⁴

Accessing and hunting animals is more difficult now. The changing sea ice is already impacting the subsistence-based economy especially by creating difficult access for the hunting of marine mammals inhabiting the sea edge. As the sea edge moves north, hunters need to travel longer distances to hunt animals that are moving out of reach of the communities. Many communities can no longer reach the edge of the ice where animals rest.⁹⁵ Subsistence hunting is not only becoming difficult, but also more dangerous.⁹⁶ Lynge explains that the sea ice has been the highway for the Inuit traditional hunting grounds and for thousands of years and using their intricate traditional knowledge, Inuit have been able to ‘read’ the sea ice.⁹⁷ They can no longer cross-rivers and lakes as they did before, resulting in dangerous travel conditions, especially for hunters. Subsistence living in the Arctic is now unsustainable.

Billy Cardinal from the Gwich’in community of Tsiigehtchic, Yukon, located at the confluence of the Mackenzie and Arctic Red River, tells stories of lakes that no longer exist because they’ve been washed into the river: “I looked good and I looked out at the lake there and there was just only dry dead birch sticking out at the point that was there, that is all that’s left of it.”⁹⁸

⁹³ *Arctic Climate Impact Assessment (ACIA)*, (Cambridge: Cambridge University Press, 2005), 1042p, <http://www.acia.uaf.edu>, 564.

⁹⁴ Report of the Indigenous Peoples’ Global Summit on Climate Change, 20-24 April 2009, Para 49, page 21, Available at: <http://www.un.org/ga/president/63/letters/globalsummitoncc.pdf>. Accessed 6 June 2014.

⁹⁵ NBC News, “Our year of Extremes: Did Climate Change Just hit home?” Video, Part 3, 3:40, 7 April 2014. <http://www.nbcnews.com/news/video/our-year-extremes-did-climate-change-just-hit-home-part-n73936>.

⁹⁶ IPCC, Working Group II Contribution to the IPCC Fifth Assessment Report on Climate Change 2014: Chapter 28, *Polar Regions*, 33.

⁹⁷ NBC News, “Our year of Extremes: Did Climate Change Just hit home?” Part 3, 2:05.

⁹⁸ Kaisu Mustonen together with Elders of Tsiigehtchic, “Traditional Knowledge of Ecological and Climate Changes in the Community of Tsiigehtchic, North-West Territories, Canada,” 171, in *Snowscapes, Dreamscapes*, Tero Mustonen and Elina Helander (eds.), (Fram Oy, Vaasa, Finland: Tampere

Inuit villages in Canada are experiencing rapid changes bringing a new dimension of stress and uncertainty. In the village of Tuktoyaktuk, sea ice that normally forms a protective barrier against erosion is melting, making the shoreline susceptible to storms. Erosion and thawing of the region's permafrost are primary concerns as they are destroying buildings and threatening the village cemetery.⁹⁹

A project in Greenland, called Sila Inuk, is focused on documenting Inuit hunters' observations of the climate change effects that they have experienced in their lives as well as what kinds of information they have gleaned from their grandparents.¹⁰⁰ Hunters speak of "thinning sea ice that makes hunting much more dangerous, changes to permafrost that alter spring run-off patterns, a northward shift in seal and fish species, and rising sea levels with more extreme tidal fluctuations."¹⁰¹ One hunter told the project, "The sea must be getting warmer because it doesn't freeze where it used to, even when the air is very cold," and another said that the snow melts so quickly in the spring now that, "it is as if the earth just swallowed it!"¹⁰² Similar to reports from other Nordic regions, many say their traditional knowledge is not as reliable as it was in the past for predicting safe ice conditions, which creates a great source of danger and anxiety for Inuit hunters.¹⁰³

Not all indigenous see the changes as negative. While melting ice causes disadvantages in terms of traditional ways of life such as fishing and hunting, some have argued that hydrocarbons, fish and minerals will attract increased government attention which could be beneficial for citizens in the region.¹⁰⁴ In Greenland in particular, some Inuit see opportunities for independence because of climate change, as a warming climate not only presents fishing and mining opportunities boosting economic growth, but also may help decrease reliance on subsidies from Denmark.¹⁰⁵ The Inuit in Canada are also exploring development opportunities made available from shrinking sea ice in the

Polytechnic Publications, 2004).

⁹⁹ Report of the Indigenous Peoples' Global Summit on Climate Change, Para 52, page 22.

¹⁰⁰ Ibid., Para 51, page 22.

¹⁰¹ Ibid.

¹⁰² Quoted in: Report of the Indigenous Peoples' Global Summit on Climate Change, Para 51, page 22.

¹⁰³ Ibid.

¹⁰⁴ Ferris, A Complex Constellation: Displacement, Climate Change and Arctic Peoples, 15.

¹⁰⁵ Ibid, 16.

summers. Tourism and trade are expected to grow in the Arctic, presenting both opportunities and threats for indigenous communities whose livelihoods are changed by the effects of climate change. The views among the Arctic indigenous peoples are far from unanimous regarding this complex subject, and there is a growing fear that despite the economic advantages, it will not be able to compensate for the negative effects on health and well-being.¹⁰⁶

The Indigenous know that many changes are inevitable and part of their adaptability is being ready to take advantage of new circumstances.

In contrast to the Inuit who depend upon ice, the Saami face different climate challenges with respect to forests, tundra and coasts, where they are involved in reindeer herding, gathering plants and berries and fishing in lakes and coasts.¹⁰⁷ The Saami now cope with longer growing seasons, a northward moving tree line, new insects, and changes in animal migration patterns.¹⁰⁸

Oral histories from the Jokkmokk Sámi in northern Sweden describe major changes in nature and weather over the past thirty years, including unstable weather patterns and an increase in thunderstorms, wetter autumns, erosion and melting glacier ice.¹⁰⁹ Some of the observed changes listed by herders in the area are: early springs, warmer winters, shrinking of grazing areas, difficult migration, difficulties with traditional weather prediction, and an increase in competing business activities such as mining.¹¹⁰

Some concerns for Russian indigenous groups are the increased risk of accidents due to fishing on thin ice; difficulty capturing walrus; and due to receding ice, the threat of polar bears. As the bears become confined to the mainland they are in competition with human populations over resources and territory.¹¹¹ A report presented by Mr. Vyacheslav Shadrin, Chief of the Council of Yukaghir Elders, at Indigenous Peoples Global Summit on Climate Change in 2009, reveals a situation of life or death for

¹⁰⁶ Ibid, 16.

¹⁰⁷ Report of the Indigenous Peoples' Global Summit on Climate Change, para 73, page 25.

¹⁰⁸ Ibid.

¹⁰⁹ Tero Mustonen and Eija Syrjämäki (eds.), *It is the Sámi who own this land – Sacred Landscapes and Oral Histories of the Jokkmokk Sámi*, (Oy Vaasa, Finland: Snowchange Cooperative, 2013) 51 -55.

¹¹⁰ Ibid.

¹¹¹ Quoted in: Report of the Indigenous Peoples' Global Summit on Climate Change, para 85, page 26.

Russian indigenous peoples. According to the report the traditional economies based on subsistence living are suffering serious impacts due to climate change, especially reindeer herding. The overwinter period is becoming more difficult due to a reduction in pastures. Advancing forests and thinning ice are also causing changing migration routes.¹¹²

In Siberia early break up of ice on rivers and severe ice-jam floods result in catastrophic consequences for villages and cities situated along rivers. This is exemplified by the 2001 Lena River flood, which demolished most of the buildings in the city of Lensk.¹¹³

Russia is warming faster than other parts of the world, and the Sakha region in particular is experiencing the greatest warming. Increased rate of rainfall, higher average mean air temperatures and an increase in permafrost degradation, have all been documented as results of climate change in the Sakha area.¹¹⁴

Communities have reported both positive and negative impacts due to the change in season patterns, however the overwhelming effects have been negative, putting a strain on Viliui Sakha cow-keeping¹¹⁵ and other subsistence practices.¹¹⁶

Ecological changes such as the solid ground turning into swamp water in the warm humid summers pose a threat to animals that indigenous peoples depend on for subsistence living. While freeze-thaw ice patterns are leading to horse starvation in the Sakha region¹¹⁷, Peyotr Kaurgin from the Turvaugin Herding Commune in Russia explains that similar causes are leading to starvation amongst reindeer in other parts of Russia.¹¹⁸ Permafrost melt is preventing the migrating reindeer from reaching the Arctic coastline, where what used to be solid ground is turning into swamp. The warm and

¹¹² Ibid., Para 24, page 26.

¹¹³ Susan A. Crate, *Climate Change and Human Mobility in Indigenous Communities of the Russian North*, LSE Project on Internal Displacement, 30 January 2013, 19. Available at: <http://www.brookings.edu/~media/research/files/papers/2013/1/30%20arctic%20russia%20crate/30%20climate%20russia%20crate%20paper>.

¹¹⁴ Ibid., 13.

¹¹⁵ Unlike other Arctic indigenous populations, in addition to reindeer the Sakha breed both horses and cattle. The Sakha are not indigenous peoples by Russian law; they can be called 'traditional local people' but they are not indigenous in domestic law.

¹¹⁶ Susan A. Crate, *Climate Change and Human Mobility in Indigenous Communities of the Russian North*, 17.

¹¹⁷ Ibid.

¹¹⁸ "Land Use and Adaptation – Traditional Knowledge and Climate Science Series," 16:30

humid summers are causing necrobacillosis, a foot-rot disease, infecting the hooves of the reindeer.¹¹⁹ Rain that freezes on snow is presenting a major risk to herders and their reindeer.¹²⁰

There are many differences between Arctic indigenous cultures and the ecosystems they depend on (for example, the Inuit depend on ice and the Saami on forest, tundra and coasts). Climate change is impacting the ways in which indigenous groups survive in their Arctic habitats.¹²¹ In the Russian and Scandinavian Arctic there are changes in foraging habits of the reindeer on which the communities depend.

Inuit tribes depend greatly on marine mammals and have reported massive declines in the walrus and seal populations, two vital commodities for their livelihoods.¹²² Due to multiple stressors, the IPCC expects that populations of marine mammals, fish and birds may not have enough time to adapt to the rapid changes in climate.¹²³ In the last ten to fifteen years there was a stark decline in reindeer and caribou populations, up to 30 per cent in some regions – a phenomenon that the IPCC links to both climate warming and anthropogenic landscape changes.¹²⁴ The examples of changes to subsistence life are numerous and scientists expect even faster rises in sea levels, more frequent and extreme storm winds and floods, greater decreases in sea ice, higher temperatures, and increased erosion and thawing of permafrost in the coming years. These changes threaten peoples' health and well-being, mainly because of the increased difficulties and dangers involved in food harvesting.

Climate change not only disrupts fishing, hunting, and herding activities; it has a major impact on social, cultural, and spiritual relationships. More than just economic resources, Arctic animals serve as a vital cultural resource for indigenous communities, as a foundation for their cultural identity and spiritual life. A dependence on various

¹¹⁹ Ibid., 8:00.

¹²⁰ Ibid., 16:30.

¹²¹ Ferris, *A Complex Constellation: Displacement, Climate Change and Arctic Peoples*, 13.

¹²² Ibid.

¹²³ IPCC, Working Group II Contribution to the IPCC Fifth Assessment Report on Climate Change 2014: Chapter 28, *Polar Regions*, 3.

¹²⁴ Ibid.

species is reflected in customs of communal hunting, herding traditions, and patterns of sharing.¹²⁵

Family participation in such activities leads to a sense of ‘social relatedness’ that is important to communities and to their cultural identity as it fosters a moral framework of the relationships shared between people, animals and the environment. This ‘social relatedness’ is rooted in concept of sharing: “For arctic hunting peoples, sharing can only be understood with reference to the sense of social relatedness that people feel they have with each other and with animals and the environment.”¹²⁶

First catch celebrations are a key component of the cultural relationship between humans and animals. In Greenland, for example, boys are taken at an early age on hunting trips with their fathers, to learn the skills and knowledge necessary to be a successful hunter. Gifts of meat from the boy’s first catch are given to every household in the community followed by a first catch celebration; symbolizing both the boy’s development as a hunter and the vitality and cultural importance of the hunting way of life.¹²⁷

The spiritual essence of animals for indigenous peoples is evident in their stories and traditions, such as mythologies, oral histories, creation stories, and animal ceremonialism. Parts of the landscape are sacred places, such as migration routes, “where animals reveal themselves to hunters in dreams, or where people encounter animal spirits while travelling.”¹²⁸

“In Alaska and Canada, Athapascan oral histories describe how features of the landscape, or the elements, such as the moon, sun, wind, stars, and so on, were originally human beings and whose spirits are now embodied in aspects of the natural world. In Greenland, Canada, and Alaska, Inuit stories about the origin of the elements, the sun and the moon, and other celestial bodies, are often related to myths about the balance between daylight and darkness, time and space, and between the human and natural worlds. In Siberia and Sapmi, one can find reindeer antlers that have been placed at sacred sites and adorned with gifts, and sacred stones placed on the tops of mountains and near lakes and rivers.”¹²⁹

¹²⁵ ACIA, 654.

¹²⁶ Ibid., 655.

¹²⁷ Ibid.

¹²⁸ Ibid., 655.

¹²⁹ Ibid., 655.

The intimate relationship with the environment and the animals that inhabit it, are the basis not only for their indigenous worldview “but are also related to mythological symbols and meteorological orientation.”¹³⁰ When these relationships change because of the effects of climate change, the peoples’ core identities are threatened.

These social events demonstrate the underlying customary ideologies of subsistence culture that keep kinship ties and social relationships alive. Many of the species upon which communities depend for their economic, social, cultural, and spiritual subsistence are in decline due to the changing climate.

For those living along the Yukon-Kuskokwim Delta, an entire way of life and spirituality depends on fish. Members of the Yup’ik community in Alaska are speaking out about how they are spiritually “brought down” by the shortage of King (Chinook) salmon, which has been linked to global warming.¹³¹

Reindeer herding is more than a livelihood for the Saami people; it is closely tied with many aspects of culture, including language, songs, child rearing and marriage.¹³² If climate change affects their ability to herd reindeer monumental changes to culture will ensue.¹³³

Sara James, Gwich’in activist and Goldman Environmental Prize winner, poignantly says, “Caribou are not just what we eat; they are who we are. They are in our stories and songs and the whole way we see the world. Caribou are our life. Without Caribou we wouldn’t exist.”¹³⁴ According to their oral history, the Gwich’in have depended upon caribou for more than 10,000 years. Caribou continue to provide food, clothing, and tools, and are an important component of the spirituality for Gwich’in.^{135,136} The

¹³⁰ Ferris, *A Complex Constellation: Displacement, Climate Change and Arctic Peoples*, 15. See also: Susan S. Crate and Mark Nuttall, “Introduction: Anthropology and Climate Change,” in Susan A. Crate and Mark Nuttall, eds., *Anthropology and Climate Change: From Encounters to Actions*. (Walnut Creek, CA: Left Coast Press Inc., 2009), 12.

¹³¹ Adam Weymouth, “When Global Warming Kills your God,” *The Atlantic Monthly Group*, 2 June 2014, <http://www.theatlantic.com/features/archive/2014/06/when-global-warming-kills-your-god/372015/>.

¹³² Rachel Baird, “The Impact of Climate Change on Minorities and Indigenous Peoples.”

¹³³ Ibid.

¹³⁴ Subhankar Banerjee (ed.), *Arctic Voices: Resistance at the Tipping Point*, (New York: Seven Stories Press, 2012), 222.

¹³⁵ Maymie Higgins, “The Sacred Place Where Life Begins,” *The Whisker Chronicles*, 19 December 2013, <http://thewhiskerchronicles.com/2013/12/19/the-sacred-place-where-life-begins/>.

Gwich'in call the coastal plain, where the Porcupine River herd of caribou migrate, "Iizhik Gwats'an Gwandaii Goodlit" (The Sacred Place Where Life Begins).¹³⁷

Changes in sea ice conditions are affecting the migration patterns of many animals, including the bowhead whale.¹³⁸ For the Iñupiat people who call themselves "People of the Whales," climate change is threatening their ties to this species, deeply impacting Iñupiat society. In addition to lowered whale populations and the consequent reliance on technology to hunt, sacred ceremonial places that spiritually and physically connect the people to the sea are being lost.¹³⁹

The changes being experienced are occurring so quickly and intensely and within so many systems, that it can make it difficult to rely on indigenous knowledge of past ways of coping. Erratic weather is causing people to not be able to make judgments about their environment based on their teachings as they had in the past. Due to the volatility in weather patterns, elders and other knowledge holders are no longer able to predict with certainty the proper times and places for planting and hunting. Inuit in Kinngait, Nunavut, find themselves relying more on the radio.¹⁴⁰ One of the subsequent problems is the loss of respect for elders and the traditional knowledge they relay, as it can no longer assure livelihoods and safety.

In her article 'The impact of climate change on minorities and indigenous peoples', Rachel Baird cites Olav Mathias-Eira, a herder and vice-chair of the executive board of the Saami Council, " 'There are a lot of starving reindeer in some years,' he says. The thinning of the Arctic ice has also made reindeer herding tracks dangerous, forcing people to find new routes. 'Old people used to tell us how to move the herds and where it was safe to go, now they are not sure if they can do that any more [...] because conditions are so different.' The loss of their ability has damaged old people's status, he adds: 'Suddenly, they are nothing.'"¹⁴¹

¹³⁶ The word "Gwich'in" means "people of the land." Cfr. Supra footnote 133, p. 43.

¹³⁷ Higgins, "The Sacred Place Where Life Begins"

¹³⁸ Kirsty Galloway McLean, "Land Use, Climate Change Adaptation and Indigenous Peoples," United Nations University, 30 October 2012, <http://unu.edu/publications/articles/land-use-climate-change-adaptation-and-indigenous-peoples.html>.

¹³⁹ Ibid.

¹⁴⁰ Anne Henshaw, "Sea Ice: the Sociocultural Dimensions of Melting Environment in the Arctic," in Susan A. Crate and Mark Nuttall, *Anthropology and Climate Change: From Encounters to Actions*, 15.

¹⁴¹ Baird, "The Impact of Climate Change on Minorities and Indigenous Peoples," 4.

For many Arctic communities it is a race against time. There is surmounting evidence that climate change will have “large effects on Arctic communities, especially where narrowly based economies leave a smaller range of adaptive choices.”¹⁴² Despite Arctic indigenous peoples having a history of adapting to change, there is great concern that such climate changes combined with other socio-economic factors are happening at a faster rate than social systems can adapt.¹⁴³ The changing sea ice is already greatly impacting wildlife and consequently, indigenous livelihoods. Moreover, these changes in resources represent a significant economic loss for many local communities, negatively impacting food security, health and well-being.¹⁴⁴ The Inuit petition to the Inter-American Court of Human Rights stated, “the subsistence harvest is essential to the continued existence of the Inuit as a people.”¹⁴⁵

3.3 Displacement and Relocation

Climate change is projected to cause mass migration in certain parts of the world in the future. The expected displacement of human beings due to climate change has recently been framed as a human security issue by the IPCC.¹⁴⁶ While particular areas of concern are predominantly in Asia, such as the highly populated Ganges-Brahmaputra Delta in Bangladesh and India where sea level rise caused by global warming is putting added stress on land, water, and food in this already at-risk region,¹⁴⁷ indigenous populations in the Arctic also face relocation. According to the IPCCs most recent climate impact assessment, “accelerated rates of change in permafrost thaw, loss of coastal sea ice, sea level rise and increased weather intensity are already forcing relocation of some

¹⁴² IPCC, Working Group II Contribution to the IPCC Fifth Assessment Report on Climate Change 2014: Chapter 28, *Polar Regions*, 3.

¹⁴³ Ibid.

¹⁴⁴ Ibid.

¹⁴⁵ Koivurova et al., “Climate Change and Human Rights,” 303.

¹⁴⁶ IPCC, Summary for policymakers, in *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 1-32.

¹⁴⁷ Union of Concerned Scientists, “Climate Hot Map: Global Warming Effects Around the World, Ganges-Brahmaputra Delta, Bangladesh,” Available at: <http://www.climatehotmap.org/global-warming-locations/ganges-brahmaputra-delta-bangladesh.html>.

indigenous communities in Alaska.”¹⁴⁸

Climate change is acting as threat enhancer causing intensified storm surges and thawing the permafrost on land that previously remained frozen throughout the year. As a result, several villages in Alaska are already experiencing crumbling infrastructure, contaminated drinking water, and the melting of natural ice cellars used to store food.^{149,150}

Referred to as a “village set to disappear under water in a decade,”¹⁵¹ Kivalina, an Iñupiat village in Alaska, is perhaps the most well known Arctic village that has fallen victim to global warming. Residents started noticing unusual signs of erosion as early as the 1950s and in 1992 the community voted to relocate, deciding on a new site by 1998.¹⁵² The community, however, could not find a government body to assist with the relocation, due to a lack of both national and international policies. The U.S. Government Accountability Office report in 2003 found that, “nearly two hundred native villages were affected to some degree by flooding and erosion, with thirty-one [among them Kivalina] facing imminent threats” such as flooding and erosion aggravated by rising temperatures, leaving the villages vulnerable to storms.¹⁵³

Many communities in these areas have been struggling to relocate for two decades with little success due to a lack of policies in place to assist them. In 2007, a precautionary evacuation of Kivalina was initiated due to the risk of flooding from a violent storm. Children were evacuated but many residents stayed in an attempt to protect their homes.¹⁵⁴ Despite the United States government’s acknowledgment of the dangerous circumstances and the need for relocation, there is still no assistance with relocation.¹⁵⁵

¹⁴⁸ IPCC, Working Group II Contribution to the IPCC Fifth Assessment Report on Climate Change 2014: Chapter 28, *Polar Regions*, 3.

¹⁴⁹ Quoted in: Report of the Indigenous Peoples’ Global Summit on Climate Change, para 53, page 22.

¹⁵⁰ Sheila Watt-Cloutier, “Climate Change in the Arctic,” 85, in *Paradigm Wars*. Jerry Mander and Victoria Tauli-Corpuz (eds.), (San Francisco: Sierra Club Books, 2006)

¹⁵¹ Stephan Sackur, “The Alaskan Village Set to Disappear under water in a decade,” BBC News Magazine, 30 July 2013, <http://www.bbc.com/news/magazine-23346370>.

¹⁵² Banerjee, *Arctic Voices: Resistance at the Tipping Point*, 208.

¹⁵³ *Ibid.*, 213.

¹⁵⁴ *Ibid.*, 214.

¹⁵⁵ *Ibid.*, 209-210.

In Newtok, a Yu'pik village in western Alaska, “the ground beneath [the village] is slipping into the sea at such a rate that the village may only have two more years before the first houses fall away.”¹⁵⁶ In another Alaskan village called Shishmaref, seven houses have already fallen into the sea and “engineers predict that the entire village of six hundred houses could be swallowed by the sea within the next few decades.”¹⁵⁷ Seawater has already reached the town’s airport runway, contaminated local drinking water, and there is now eight feet of seawater within the town dump, presenting a pollution risk to the nearby marine environment.¹⁵⁸

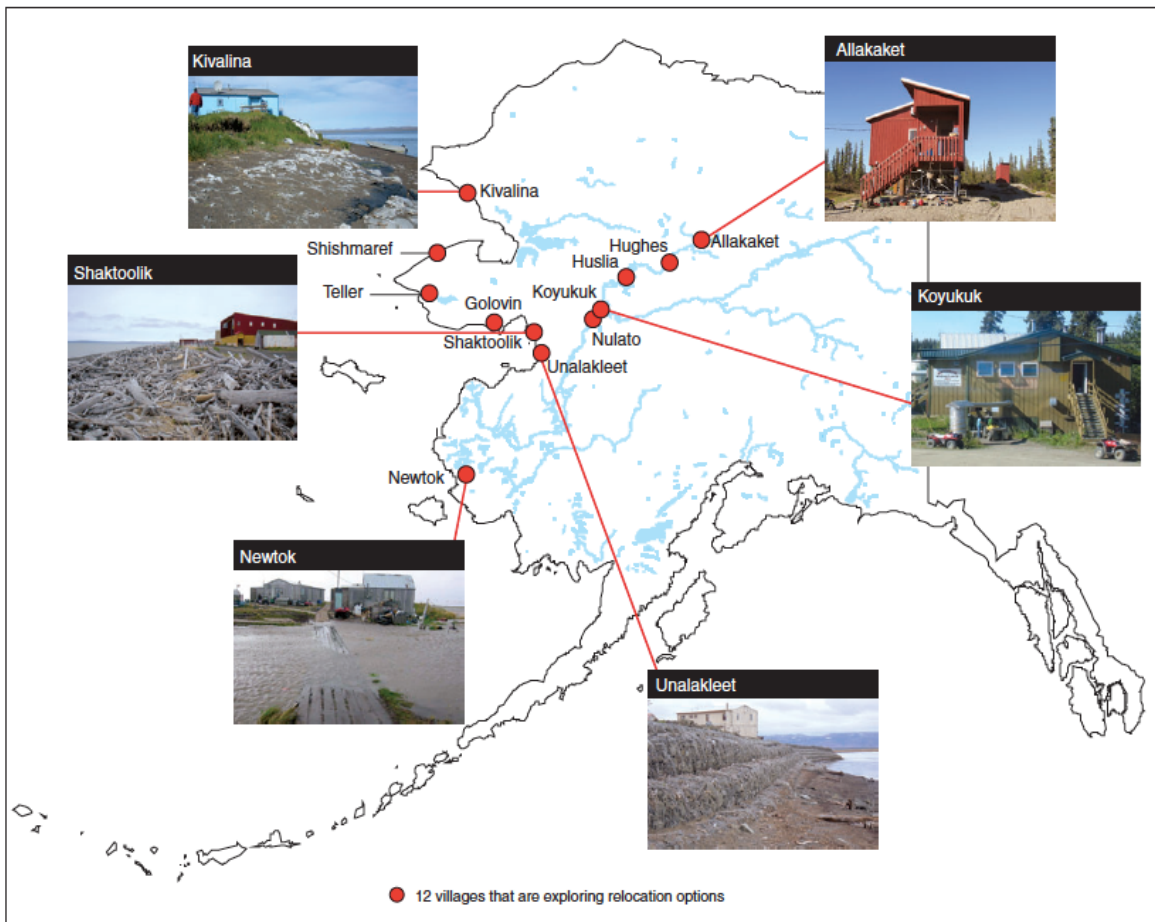


FIGURE 2: Locations of 12 Alaska Native Villages that are exploring relocation options¹⁵⁹

¹⁵⁶ Weymouth, “When Global Warming Kills your God.”

¹⁵⁷ Watt-Cloutier, “Climate Change in the Arctic,” 85.

¹⁵⁸ Ibid., 85-86.

¹⁵⁹ United States Government Accountability Office, Report to Congressional Requesters: Alaska Native Villages – Little Progress Has Been Made on Relocating Villages Threatened by Flooding and Erosion, 23 June 2009. Available at: <http://www.gao.gov/new.items/d09551.pdf>.

Even with the proper policies in place, relocation is not as simple as packing up belongings and moving to a new allocated area. As these drastic climatic forces continue, relocation will become increasingly imminent for thousands of indigenous communities, and governments will need to work together with communities to find ethical solutions to these climate change problems.

Relocation risks bringing back the horrors of the past relocations that indigenous peoples have suffered in Arctic countries. As Robin Bronen, Human Rights Attorney and Executive Director at the Alaskan Institute for Justice explains, “relocations that have happened to indigenous peoples have always been forced by governments and have led to their impoverishment and social fragmentation.” Susan A. Crate from the Center for Climate Change Communication underlines the deep social and psychological impacts of relocation and states that; “it’s not just a matter of moving chess players around on a chess board.”¹⁶⁰ There are deeper emotional and psychological issues that need to be considered and the often white-washed history of forced relocations in all Arctic countries continues to be a post-colonial issue that needs to be taken into consideration.

The Brookings LSE Project on Internal Displacement in cooperation with other scholars, has conducted commendable research in this area and offers some valuable suggestions:

- In order to enable indigenous peoples to make the decisions about what adaptation strategies are going to work, Robin Bronen proposes an, “adaptive governance framework” in which communities work together with governments, by addressing health indicators that represent the need for relocation.¹⁶¹
- Planned relocation as an adaptation step: “While migration is the result of individual decision-making and displacement is a response to dangerous situations, planned relocation is a proactive step which governments can take to

¹⁶⁰ Susan A. Crate, “Arctic indigenous peoples, displacement, and climate change: Tracing the connections,” Video, Interview with panel discussion participants and moderator, 30 January 2013, 0:50. Available at: <http://adventures-in-climate-change.com/capital-correspondent/?p=755>.

¹⁶¹ Ibid., 1:37 – 4:55.

ensure the rights of their people to survive.”¹⁶²

- Greater international support for indigenous groups working at the national level, to support indigenous groups in their efforts to develop recommendations: “For example, Alaskan indigenous groups may need support to develop strategies to change US disaster laws to finance relocation while Russian indigenous groups may need support to challenge federal government crackdowns on indigenous organizations. There may be ways that the broader international community – not just international indigenous groups – can support these efforts.”¹⁶³

Mobility used to be a way of life for the Arctic indigenous peoples but in a post-colonial Arctic most live in permanent settlements. Any significant move leaving the land of their ancestors would be a traumatic. Climate change is causing emergency situations, such as Kivalina, which result in inevitable relocation. As sea levels continue to rise, more people will have to move. When this occurs they should receive support not only in terms of infrastructure but support that least affects loss of culture and traditional way of life. Political structures need to be addressed and reformed as they currently fail to adequately respond to communities in need. A governmental body could be established to assist with intentional relocations and the socio-economic consequences that may ensue.

State adherence to international legal norms is an argument against unilateral relocation. Article 10 of the UNDRIP outlines that, “Indigenous peoples shall not be forcibly removed from their lands or territories. No relocation shall take place without the free, prior and informed consent of the indigenous peoples concerned and after agreement on just and fair compensation and, where possible, with the option of return.”¹⁶⁴

Indigenous people can use international frameworks related to migration, displacement

¹⁶² Ferris, *A Complex Constellation: Displacement, Climate Change and Arctic Peoples*, 4.

¹⁶³ *Ibid.*, 27.

¹⁶⁴ UN General Assembly, *United Nations Declaration on the Rights of Indigenous Peoples*, Article 10.

and relocation to strengthen their arguments.¹⁶⁵

Ultimately, collaboration between multiplicities of actors from community to government levels will be needed in order to implement plans that ensure the rights of indigenous peoples and their cultures.

3.4 A Resilient People

Often the discourse on indigenous peoples and climate change is framed in a way that places indigenous peoples in a victimized position. This is one of the aforementioned criticisms of the human rights approach that in order to file a human rights claim, there needs to be a ‘victim’.

It is a fact that indigenous people are extremely vulnerable (and became more so during the colonial era). It is imperative that they are also recognized and addressed as key actors with valuable capabilities and a cultural resilience for change.

Resilience is the ability to adapt to adversity and cope and recover from abrupt change. Indigenous peoples have been adapting to climate changes for millennia.

Agency is an important term that underpins the meaning behind resilience. Indigenous peoples are often characterized as powerless victims at the mercy of colonial powers. Yet, the ways in which they’ve persevered, adapted, and demonstrated innovative ways of both resisting and incorporating Western traditions, paints a very different picture than the patronizing notions of victimization and helplessness.

Therefore an approach that fosters empowerment is what is needed in order for communities to exercise their resilience and agency.

Focusing on indigenous peoples as ‘victims’ and as ‘vulnerable’ misses the broader picture. Focus should rather be on indigenous peoples’ ability to shape the future.¹⁶⁶ For those who are, “organized, confident to adjust their systems to changing circumstances, while maintaining their identity strong, will be better able to withstand shocks caused

¹⁶⁵ Ferris, A Complex Constellation: Displacement, Climate Change and Arctic Peoples, 27.

¹⁶⁶ Ferris, A Complex Constellation: Displacement, Climate Change and Arctic Peoples, 24.

by climate change.”¹⁶⁷

Arctic indigenous peoples in particular are often characterized by their ability to be resilient and flexible in their way of living.¹⁶⁸ The Arctic Centre based in Rovaniemi, Finland, stresses the importance of empowering northern indigenous peoples through legal instruments, political measures, and local arrangements, specifically mentioning the strengthening of occupations, languages and cultural expressions, including the use of traditional knowledge. This is “crucial for them to be resilient on their own terms in relation to the rapidly changing world.”¹⁶⁹

Former Chair of the United Nations Permanent Forum on Indigenous Issues (UNPFII) from 2005-2010, and recently appointed Special Rapporteur on the Rights of Indigenous Peoples, Victoria Tauli-Corpuz, has added to this important perspective while addressing members of the UNPFII this past spring: “ ‘It is time to step out of victimhood’ she said, ‘because we, indigenous peoples, can provide sustainable solutions to the world's crises. Indigenous peoples are not to be seen only as endangered victims to be protected [...] but also as carriers of knowledge and traditions that – far from being ancient and out-dated – can offer concrete solutions to modern crises.’ ”¹⁷⁰

For indigenous peoples resilience is rooted in traditional knowledge, “as their capacity to adapt to environmental change is based first and foremost on an in-depth understanding of the land.”¹⁷¹ Local fine tuned knowledge is essential for adaptation and long-term community resilience. Dr. Chie Sakakibara, a cultural geographer at the University of Oklahoma, notes the resilience of the Iñupiat people to adapt to their changing homeland:

“During my fieldwork, I realized that contemporary storytelling among the Iñupiat both reveals and helps them cope with an unpredictable future and serves as a way to maintain a connection to a disappearing land [...] In order to survive, the Iñupiat

¹⁶⁷ John Ahni Schertow, “Indigenous Resilience,” IC Magazine, 13 August 2011, <http://intercontinentalcry.org/indigenous-resilience/>.

¹⁶⁸ Arctic Centre (Arktinen Keskus). “Cultural Resilience and Human Rights - Perspectives of Northern Indigenous Peoples,” Available at: <http://www.arcticcentre.org/InEnglish/NEWS/march2014seminar>. Accessed 5 June 2014.

¹⁶⁹ Ibid.

¹⁷⁰ Antonella Cordone, “Indigenous peoples hold sustainable solutions to environmental crises,” Thomson Reuters Foundation, 27 May 2014, <http://www.trust.org/item/20140527220755-65acn>.

¹⁷¹ McLean, “Land Use, Climate Change Adaptation and Indigenous Peoples.”

have newly endowed their culture with the power to sustain their bond with the whales. This is a story of hope.”¹⁷²

Similar to the political climate change regime, where solutions and action to address remain for the most part stagnant, many actors such as the IPCC have yet to go beyond describing the negative impacts of climate change on indigenous communities. Rather than simply describing these impacts, Ms Gunn-Britt Retter, head of the Arctic Environment Department of the Saami Council, stresses the importance of looking at how to live with such changes.¹⁷³

At a recent address at the University of Edinburgh, Aqqaluk Lynge concluded saying, “it is my belief that many things have helped strengthen us... much of it has been adversity that tested our culture, our way of life, over the centuries. The attack on our seals is yet another one. The thinning ice I talked about earlier will indeed also contribute to Inuit traditions changing. But it is my hope that through the process of fighting for mitigation and developing the best adaptation mechanisms possible, our Inuit culture will not only survive, but thrive.”¹⁷⁴

The indigenous people of the Arctic are resilient and adaptable. Everything in their history, culture and traditional knowledge is focused on their ability and long history of adapting. Building resilience through use of indigenous knowledge should be a top priority of all initiatives addressing climate change.

¹⁷² Sakakibara Quoted in: McLean, “Land Use, Climate Change Adaptation and Indigenous Peoples.”

¹⁷³ Report of the Indigenous Peoples’ Global Summit on Climate Change, Para 73, page 25.

¹⁷⁴ Aqqaluk Lynge, “Strengthen Culture through Change: Will Climate Change Strengthen or Destroys US?” Luncheon Address at University of Edinburgh, Scotland, Inuit Circumpolar Council, <http://inuit.org/en/climate-change/aqqaluk-lynges-speech-at-edinburgh-university.html>.

4 THE ROLE OF INDIGENOUS KNOWLEDGE

*“Through our knowledge, spirituality, sciences, practices, experiences and relationships with our traditional lands, territories, waters, air, forests, oceans, sea ice, other natural resources and all life, Indigenous Peoples have a vital role in defending and healing Mother Earth. The future of Indigenous Peoples lies in the wisdom of our elders, the restoration of the sacred position of women, the youth of today and in the generations of tomorrow.”*¹⁷⁵

Indigenous groups have been utilizing their knowledge at the local level through cooperating with scientists in initiatives aimed towards adapting to and mitigating the effects of climate change. Within the past decade there has been an emergence of the presence and recognition of traditional knowledge at the global stage. This section examines the application of indigenous knowledge at the local level through the bridging of Western Scientific Knowledge (WSK) with Traditional Ecological Knowledge (TEK). It will look at how science and indigenous knowledge can find solutions for ecosystems threatened by climate change. Although locally specific, the sharing of perspectives and values from indigenous knowledge is extremely valuable. It can teach sustainable ways to live on our planet. This is also contributing to the greater discussion of how indigenous peoples across the world are using and sharing their knowledge to confront climate change.

4.1 Bridging Scientific Knowledge and Indigenous Knowledge

Indigenous knowledge has often been dismissed by logo-centric Western knowledge and “often viewed as primitive, folklore, anecdotal, unscientific, and insignificant.”¹⁷⁶ Only within the past few decades has it been considered as essential in Western studies of indigenous cultures, literatures and histories. More recently, with the growing

¹⁷⁵ The Anchorage Declaration, Indigenous Peoples’ Global Summit on Climate Change, United Nations Framework Convention for Climate Change, Anchorage, 24 April 2009, unfccc.int/resource/docs/2009/smsn/ngo/168.pdf

¹⁷⁶ Kerstin Knopf, *Including Indigenous Knowledge* (paper presented at the annual Grainau Canadian Studies Conference 2014, Grainau, Germany, 6-8 February 2014)

concern of climate change on ecosystems, TEK is being paired with WSK. Instead of being dismissed as irrelevant or a less valuable form of knowing, new perspectives acknowledge its value with its strengths that can be complementary to western science.¹⁷⁷

Around the world, indigenous and non-indigenous scholars are calling for, “Indigenizing the Academy.”^{178,179,180} Indigenizing the Academy is about re-shaping the “Western understanding of Indigenous knowledge on many different levels and carving an academic and scientific space where Indigenous values and knowledge are respected and supported.”¹⁸¹

When traditional knowledge is paired with science for the purpose of adaptation projects a common term used is, ‘knowledge co-production,’ which refers to a, “mechanism to enable learning and adaptation to environmental change.”¹⁸² Co-production is proving a catalyst to positive social and ecological outcomes over time.¹⁸³ Regardless of the term used to describe it, the coupling of the two ways of knowing is infused in most climate change initiatives in the Arctic involving indigenous peoples, and thus deserves adequate attention.

TEK and WSK together are able to provide a wholistic approach to studying indigenous environments. They are incompatible in some ways, in particular the way knowledge is acquired and transmitted, but that can be complementary too.

Traditional Ecological Knowledge accumulates in a local setting with an oral history of knowledge that is passed on through generations and accumulated locally over time. The scientific method, on the other hand, develops relatively quickly by the posing and testing of hypotheses through experiments and is most often passed on through

¹⁷⁷ Ibid.

¹⁷⁸ Linda Tuhiwai Smith, *Decolonizing Methodologies: Research and Indigenous Peoples* (London and New York: Zed Books, 2002).

¹⁷⁹ Devon Abbot Mihesuah and Angela Cavender Wilson (eds.), *Indigenizing the Academy: Transforming Scholarship and Empowering Communities* (Lincoln and London: U of Nebraska P, 2004)

¹⁸⁰ Rauna Kuokkanen, *Reshaping the University: Responsibility, Indigenous Epistemes, and the Logic of the Gift* (Vancouver: UBC Press, 2007)

¹⁸¹ Knopf, *Including Indigenous Knowledge*.

¹⁸² Armitage et al, “Co-management and the co-production of knowledge: Learning to adapt in Canada's Arctic.”

¹⁸³ Ibid.

academic literature.¹⁸⁴

TEK and WSK also share similarities. Both are based on observations and the critical evaluation of phenomena or processes. They both: “rely on empirical observation in natural settings and on pattern recognition to refine their knowledge base.”¹⁸⁵ Both are subject to change as facts and assumptions are disproven and both use repetition to facts.¹⁸⁶ The key differences and similarities between the two systems are highlighted in Table 1.

TABLE 1: Comparisons between Indigenous and Scientific Knowledge¹⁸⁷

Indigenous Knowledge	Scientific Knowledge
Lengthy Acquisition	Rapid Acquisition
Long-term wisdom	Short-term prediction
Powerful prediction in local areas	Power predictability in natural principles
Weak in predictive principles in distant areas	Weak in local areas of knowledge
Models based on cycles	Linear modelling as first approximation
Explanations based on examples, anecdotes, parables	Explanations based on hypothesis, theories, laws

* Modified from Alaska Native Science Commission 2011a

In understanding climate change both knowledge systems are very important. TEK identifies local climate-related changes and in addition provide traditional management practices proven to work over time.¹⁸⁸ Moreover, as ecosystems are affected with

¹⁸⁴ Kirsten Vinyeta and Kathy Lynn, “Exploring the role of traditional ecological knowledge in climate change initiatives,” (Portland: U.S. Department of Agriculture, Forest Service, Pacific Northwest, 2013), 14.

¹⁸⁵ Ibid.

¹⁸⁶ Ibid.

¹⁸⁷ Alaska Native Science Commission, *Comparisons between traditional and scientific knowledge*, 2011, <http://www.nativescience.org/issues/tk.html>. Accessed 17 May 2014.

¹⁸⁸ Vinyeta and Lynn, “Exploring the role of traditional ecological knowledge in climate change initiatives,” 14.

increased changes and extremes in variability become more common, “TEK of the ‘extreme’ or ‘atypical’ can be used to increase predictability of current and future change.”¹⁸⁹ The western science method is very useful in documenting and quantifying the ecological changes “that are occurring and test the validity of assumptions and potential solutions.”¹⁹⁰

An international program at McGill University, sponsored by the Centre for Indigenous Peoples’ Nutrition and Environment, is an example of TEK and WSK working together to study indigenous peoples’ food systems for health and nutrition. It was created to address concerns among the indigenous about their food systems. Their security and health were in danger due to rapid socioeconomic and environmental change, including climate change.

Case studies were conducted, representing collaborations between communities and academic partners in a number of different indigenous areas. Methods were established to document and assess indigenous food systems.¹⁹¹ The overall study focused on developing techniques for health promotion incorporating local indigenous foods in the areas where the participating people lived. Ultimately the study promotes evidence informing, “global policies and interventions to protect traditional food resources for Indigenous Peoples’ health.”¹⁹² Although the benefits of this original collaborative project are evident, “new concerns such as impacts of climate change on Indigenous Peoples food systems are now looming.”¹⁹³

Gaining access to and using indigenous knowledge must employ ethical methods and cultural awareness, respecting community rights and interests. There are risks involved when including IK into Western-dominated academies. Transforming an oral episteme into a written episteme and, “validating Indigenous knowledges and methodologies

¹⁸⁹ Ibid.

¹⁹⁰ Ibid.

¹⁹¹ Turner and Clifton, “It’s so different today: Climate Change and Indigenous Lifeways in British Columbia, Canada,” 29.

¹⁹² Ibid., 26.

¹⁹³ Ibid., 26.

solely according to Western standards,” is a challenging undertaking.¹⁹⁴ Extracting indigenous knowledge and placing it into an academic discourse can be problematic, often leading to intellectual property rights issues.¹⁹⁵

In the past some researchers have learned TEK information and published it as their own research, which was then used by private corporations making profits, “without benefitting the indigenous community that contributed the TEK.”¹⁹⁶ Unscrupulous scientists and corporations have violated Indigenous TEK holders and made some of them reluctant to share their TEK for fear of future misuse.¹⁹⁷

Knowledge holders are wary of sharing what they know for the fear that it might be used against them, misinterpreted, or misunderstood:

“Many Natives view the extraction of their traditional knowledge from its broader cultural context as a form of theft and, understandably, have been reluctant to share the depth and breadth of what they know with outside interests. They also fear that, because many wildlife managers and decision-makers do not understand their culture, customs or values, their traditional knowledge will somehow be used against them (e.g., setting quotas and other hunting regulations). At best, piecemeal extraction of traditional knowledge from its larger cultural context invites misrepresentation and misinterpretation. At worst, it represents a form of misappropriation and cultural exploitation.”¹⁹⁸

A critical component of any projects success will be the inclusion and respect for all types of knowledge, both scientific and indigenous. David Mate from Natural Resources Canada who participated in the Nunavut Climate Change Partnership Adaptation Project in Atuliquq, states that “Respect for other peoples’ cultures and skills is an important aspect of working in such a diverse group, and that seemed to go a long way in making

¹⁹⁴ Margaret Kovavh, *Indigenous Methodologies: Characteristics, Conversations, and Contexts*. (Toronto: U of Toronto Press, 2009), 12. Cited in: Knopf, *Including Indigenous Knowledge*.

¹⁹⁵ *Ibid.*

¹⁹⁶ Vinyeta and Lynn, “Exploring the role of traditional ecological knowledge in climate change initiatives,” 15.

¹⁹⁷ Mason, L.; White, G.; Morishima, G.; Alvarado, E.; Andrew, L.; Clark, F.; Durglo, M.; Durglo, J.; Eneas, J.; Erickson, J.; “Listening and learning from traditional knowledge and Western science: a dialogue on contemporary challenges of forest health and wildfire,” *Journal of Forestry* 110, no. 4 (2012), 187–193. Cited in: Vinyeta and Lynn, “Exploring the role of traditional ecological knowledge in climate change initiatives,” 16.

¹⁹⁸ Alaska Native Science Commission, *Comparisons between traditional and scientific knowledge*. Quoted in: Vinyeta and Lynn, “Exploring the role of traditional ecological knowledge in climate change initiatives,” 15.

this partnership work. People took the time to listen to each other.”¹⁹⁹ The project combined the scientific assessment of drinking water supply and sea level rise, while working with local elders to identify climate change adaptations projects. It prioritized the projects and formed a working group to support community-based initiatives.

Respectful methods to ensure the protection of knowledge systems and cultural practices are imperative in the ethical use of IK. Methods must, “proceed along the principles of respect, recognition, reciprocity, and responsibility.”²⁰⁰ TEK knowledge holders need to be able to trust western researchers and the researchers need to understand and know how to interpret what they are shown. Both need to comprehend how and why TEK is useful in a given field.²⁰¹

TEK and WSK should both be valued and one not favoured over the other. This is achieved by, “equally including Indigenous epistemes, discourses, practices, and methodologies and interweaving Indigenous and Western knowledges [...] with the aim to combine their respective competencies.”²⁰² For some scholars, “indigenous knowledge provides a counter discourse that completes and fills in the gaps of Western knowledge(s).”²⁰³

“Indigenous scholars discovered that Indigenous knowledge is far more than the binary opposition of western knowledge. As a concept, Indigenous knowledge benchmarks the limitations of Eurocentric theory — its methodology, evidence, and conclusions — reconceptualizes the resilience and self-reliance of Indigenous peoples, and underscores the importance of their own philosophies, heritages, and educational processes. Indigenous knowledge fills the ethical and knowledge gaps in Eurocentric education, research and scholarship.”²⁰⁴

Seeking the TEK of indigenous peoples in climate change research and policies is advantageous, both for practical knowledge and also for inclusiveness of the people on the frontlines of climate change.

¹⁹⁹ Indian and Northern Affairs Canada, *Sharing Knowledge for a Better Future*, (Ottawa: Minister of Public Works and Government Services Canada, 2010), 28.

²⁰⁰ Knopf, *Including Indigenous Knowledge*.

²⁰¹ ACIA, 65.

²⁰² Knopf, *Including Indigenous Knowledge*.

²⁰³ Patricia D. McGuire - Kishbakabaykwe, “Exploring Resilience and Indigenous Ways of Knowing” *A Journal of Aboriginal and Indigenous Community Health* 8, no. 2 (2010), 126.

²⁰⁴ *Ibid.*

4.2 The Role of Indigenous Knowledge in Adaptation Initiatives

Adaptation to climate change is defined as, “anticipating the adverse effects of climate change and taking appropriate action to prevent or minimise the damage they can cause, or taking advantage of opportunities that may arise.”²⁰⁵ The European Commission has claimed that well planned, early adaptation action saves money and lives.²⁰⁶ Arctic indigenous peoples are taking action to mitigate negative effects and find proactive solutions to live with certain change. Several adaptation projects have shown how the coupling of ‘two ways of knowing’ is an essential feature towards successful adaptation.

A leader in this field is the Inter Polar Year (IPY) scientific program. In 2007-2008 IPY developed a new concept that “altered the position of social research within the broader polar science.”²⁰⁷ The IPYs former approach, based heavily on geophysics, oceanography, and ice-sheets, excluded socio-economic disciplines and left no place for polar indigenous people in their research. The new concept, however, allows for the program to feature a, “special field focused on local communities and human wellbeing in the polar region.”²⁰⁸ IPY fosters collaborative international research between a wide range of stakeholders, including partners from several nations, local communities, and organizations of polar indigenous peoples. The IPY also supports ‘Community Adaptation and Vulnerability in Arctic Regions’ (CAVIAR), a project that conducted nine Arctic case studies in community vulnerability and adaptation. ‘*Community-based vulnerability assessment*,’ an approach employed by CAVIAR, begins, “with the interests and observations originating from local communities, not from physical scientists and their complex projected models, and it proceeds bottom-up to identify potential future exposures.”²⁰⁹ This means that communities can propose new projects to address new risks they are facing. The project is designed to identify vulnerabilities,

²⁰⁵ European Commission, “Adaptation to Climate Change,” Climate Action, http://ec.europa.eu/clima/policies/adaptation/index_en.htm. Last modified 26 June 2014.

²⁰⁶ Ibid.

²⁰⁷ Grete K. Hovelsrud, G.K. and Barry Smit (eds.), *Community Adaptation and Vulnerability in Arctic Regions*, (London, Springer, 2010), Preface.

²⁰⁸ Ibid.

²⁰⁹ Ibid.

assess potential strategies, evaluate and facilitate the adaptive capacity and resilience of communities, and combine information from both local indigenous knowledge and scientific knowledge to better understand the opportunities to deal with climate change conditions.²¹⁰

Recognition of the importance of indigenous knowledge to climate change and adaptation initiatives is steadily increasing in local communities, academia, and policy. In 2010, the IPCC stated, “indigenous or traditional knowledge may prove useful for understanding the potential of certain adaptation strategies that are cost-effective, participatory and sustainable.”²¹¹ This was reaffirmed in the 2014 IPCC report in which IK is, “increasingly emerging as an important knowledge base for more comprehensively addressing the impacts of environmental and other changes as well as development of appropriate adaptation strategies for indigenous communities.”²¹²

IPCC examples of adaptation strategies include changing settlement areas, combining technologies with traditional knowledge, changing the timing of and areas for hunting, gathering, herding, improving education, and the protection of grazing land for herders.²¹³

A thorough assessment determines what kinds of adaptation techniques and approaches will best serve a community. This first step is often termed, ‘impact assessment,’ with a ‘vulnerability-based approach.’ CAVIAR states that the use of the term ‘vulnerability’ here does not presume that communities are particularly vulnerable, but it rather refers to “the manner and degree to which a community is susceptible to conditions that directly or indirectly affect the wellbeing or sustainability of the community,” including sensitivities of the ecosystem upon which communities depend.²¹⁴ The assessment is the most important step to collect indigenous knowledge in. It assembles indigenous knowledge, experience and observations in order to identify current exposures and

²¹⁰ Hovelsrud and Smit, *Community Adaptation and Vulnerability in Arctic Regions*, 2.

²¹¹ InterAcademy Council, “Climate change assessments: Review of the processes and procedures of the IPCC,” (InterAcademy Council, 2010), 16. Available at: http://www.ipcc.ch/pdf/IAC_report/IAC%20Report.pdf.

²¹² IPCC, Working Group II Contribution to the IPCC Fifth Assessment Report on Climate Change 2014: Chapter 28, Polar Regions, 18.

²¹³ *Ibid.*, 32.

²¹⁴ Hovelsrud and Smit, *Community Adaptation and Vulnerability in Arctic Regions*, 5.

potential adaptation strategies, enabling all stakeholders to assess futures risks and adaptation needs.

In Ulukhaktok, Northwest Territories, Canada, scholars have researched Inuit vulnerability and adaptive capacity and concluded, “that an assessment of community vulnerability to climate change requires knowledge of past experience with climate conditions, responses to climatic variations, future climate change projections, and non-climate factors that influence people’s susceptibility and adaptive capacity.”²¹⁵

After the assessment and documentation stages, attention is placed on finding solutions. Potential solutions include learning new ways to live with changes or taking action to prepare for and mitigate future changes. Figure 3 illustrates the general steps of an adaptation process. IK is important to each step. The use of IK in future planning and early warning detections are illustrated through an examination of the two following adaptation projects.

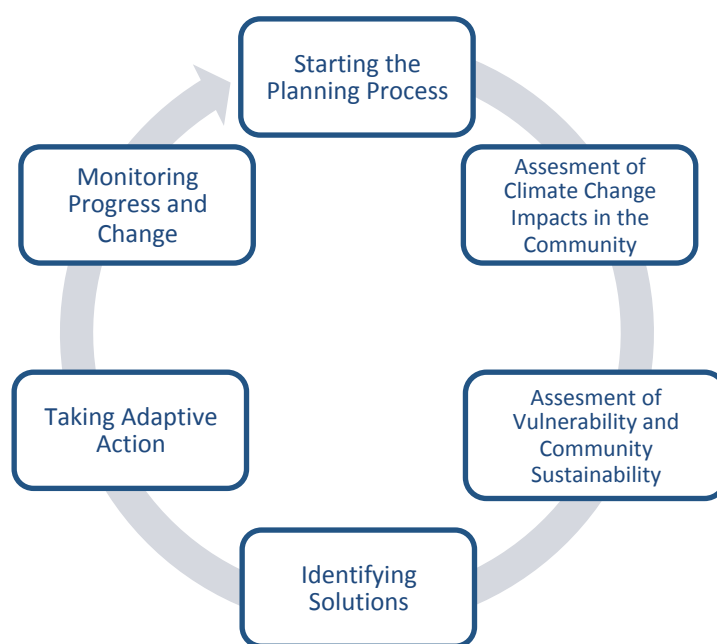


FIGURE 3: Standard Adaptation Project Process²¹⁶

²¹⁵ Tristan Pearce, Barry Smit, Frank Duerden, James D. Ford, Annie Goose, Fred Kataoyak. “Inuit vulnerability and adaptive capacity to climate change in Ulukhaktok, Northwest Territories, Canada,” *Polar Record* 46, no. 237 (2010): 157–177, Abstract. DOI:10.1017/S0032247409008602.

²¹⁶ Modified from Centre for Indigenous Environmental Resources. Available in: Indian and Northern Affairs Canada, *Sharing Knowledge for a Better Future*, 27.

4.2.1 Eurasian Reindeer Pastoralism: Indigenous Knowledge and NASA Remote Sensing

The reindeer herding community has taken leadership, moving in a bold new direction to developing local adaptation strategies based upon their traditional knowledge of the land and its uses.²¹⁷ They are collaborating with the scientific community using co-production knowledge techniques to minimize the impacts of climate change. The IPY EALAT project ‘Reindeer Herding in a Changing Climate’ was initiated by the Association of World Reindeer Herders, a circumpolar indigenous peoples’ organization with observer status in the Arctic Council.²¹⁸ The project studies the Saami and the Nenets reindeer herders. The name EALÁT is from the word ‘pasture’ in the Saami language, reflecting the emphasis of the close connection of indigenous cultures to nature.²¹⁹ The project focuses on the adaptive capacity of reindeer pastoralism to climate variability and change, and integrates reindeer herders’ knowledge into scientific research and analysis.²²⁰ A special feature of this project mentioned by the IPY project partners is that empowerment of indigenous peoples is critical in these partnerships. They are not research subjects as they were in the past, but instead the, “indigenous herders are leading this study and have invited other scientists and their colleagues to collaborate.”²²¹

Reindeer herders and their reindeer live for eight to nine months of the year in snow-covered areas. The conditions are constantly changing and the reindeer herding cultures reflect an adaptation to extreme climate variability.²²² For this reason, “often, the best knowledge is the experienced-based knowledge of the herders themselves.”²²³ Johan Mathis Turi, a senior Saami reindeer herder and Secretary General of the Association of World Reindeer Herders, describes adaptation as follows:

²¹⁷ Maynard, N.G., Burgess, P., Oskal, A. Turi, J.M., Mathiesen, S.D., Gaup, I.G.E., Yurchak, B., Etylin, V., Gebelein, J. “Eurasian Reindeer Pastoralism in a Changing Climate: Indigenous Knowledge and NASA Remote Sensing,” 1. Available at: <http://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/20080041555.pdf>. Accessed 10 June 2014.

²¹⁸ Ibid., 2.

²¹⁹ Ibid., 2.

²²⁰ Ibid., 2.

²²¹ Ibid., 2.

²²² Ibid., 7.

²²³ Ibid., 7.

“... We have some knowledge about how to live in a changing environment. The term ‘stability’ is a foreign word in our language. Our search for adaptation strategies is therefore not connected to ‘stability’ in any form, but is instead focused on constant adaptation to changing conditions.”²²⁴

Reindeer herders are facing conditions that lead to the ‘lock out’ or loss of winter grazing pastures.²²⁵ Indigenous knowledge is being used to predict when adverse winter grazing conditions will happen so that a warning service can help herders know how they can avoid them.²²⁶ The Norwegian Meteorological Institute uses models and NASA satellite technologies to predict snow conditions, and these models are being combined with “real-time field observations” by herders in order to verify predictions.²²⁷ Data from the snow study will then be integrated by the reindeer herders into a system that will predict whether certain pastures will be locked out due to ice in the snow pack. This initiative constitutes the first “adaptation early warning system” created by and for reindeer herders.²²⁸

In addition to prediction and verification, “ground truth data” (indigenous knowledge) is being used to increase the accuracy of final map products.²²⁹ Spatial data analysis from Geographical Information Systems (GIS) is combined with IK local knowledge and GPS units in the field to help verify and classify land cover maps. The increased intel from these methods helps establish the accuracy of the data and results. This co-production with ground-truth data from the herders improves accuracy to already existing GIS data and helps locate errors in the original data.²³⁰ Moreover, IK is able to assist in the identification and prioritization of areas of concern, such as the interruption of migration routes from melting lakes and rivers.²³¹

Herders benefit from satellite and GIS data. It is an efficient way to manage the migrations of their herds, enabling them to make, “adjustments to herd movements to avoid problems such as changing weather/climate conditions, freeze-thaw ‘lock-out’

²²⁴ Ibid., 7.

²²⁵ Ibid., 11.

²²⁶ Ibid., 11.

²²⁷ Ibid., 11.

²²⁸ Ibid., 11.

²²⁹ Ibid., 18.

²³⁰ Ibid., 19.

²³¹ Ibid., 18.

problems, or take advantage of availability of better pasture lands along migration roots.”²³² The data will show the climate and environmental changes in the region.

In other projects, reindeer herders have used other adaptation strategies in response to changing pasture conditions. These include, moving herds to better pastures,²³³ supplemental feeding,²³⁴ keeping a few castrated reindeer males for breaking through the heavy ice crust,²³⁵ and culling the herd for optimal herd size.²³⁶

Reindeer herders are improving their herd management decisions by developing preventative measures against pasture loss and other damages caused by climate change. New weather science technologies that monitor local communities with NASA satellites are combined with IK to address the issues of pastures, snow, reindeer moss, weather and other parameters in reindeer lands. IK proves as an invaluable resource for defining and anticipating risks, setting priorities and adding value to scientific knowledge. This collaboration is a crucial step as herders increase their capacities and prepare themselves, their societies, and management authorities to deal with climate change. The combining of indigenous knowledge and ingenuity has been coined “indigenuity.” It highlights the success of co-produced knowledge and equal partnerships with indigenous peoples in the process.²³⁷

²³² Ibid., 22.

²³³ Bartsch A., Kumpula T., Forbes B.C., and Stammler F. “Detection of snow surface thawing and refreezing using QuikScat: implications for reindeer herding,” *Ecological Applications* 20 (2010) 2346-2358. Accessed 10 June 10 2014.

²³⁴ Jaakkola, L., and Helle, T., “Transitions in herd management of semi-domesticated reindeer in northern Finland,” *Annales Zoologici Fennici* 45, no. 2 (2008), 81-101. Available at: <http://www.sekj.org/PDF/anz45-free/anz45-081.pdf>. Accessed 10 June 2014.

²³⁵ Anders Oskal, “Old Livelihoods In New Weather: Arctic Indigenous Reindeer Herders Face The Challenges Of Climate Change,” *Development Outreach* 10 (2008) 22-25. Accessed 10 June 2014.

²³⁶ Bruce C. Forbes, Florian Stammler, Timo Kumpulac, Nina Meschtybd, Anu Pajunena and Elina Kaarlejärvi. “High resilience in the Yamal-Nenets social-ecological system, West Siberian Arctic, Russia,” *Proceedings of the National Academy of Sciences of the United States of America* 106, no. 52 (2009): 22041-22048.

²³⁷ McLean, “Land Use, Climate Change Adaptation and Indigenous Peoples.”

4.2.2 Aklavik Climate Change Adaptation Action Plan

Adaptation concerns current and future strategies for adapting to climate changes and preparing communities. The youth of indigenous communities are critical to future planning, as they will carry the burden of responding to climate change. Equipping youth with the proper knowledge and skills to adapt is the main goal of many adaptation projects in northern Canada.^{238,239} The Aklavik Adaptation Plan²⁴⁰ demonstrates the fundamental role traditional knowledge plays in both culture and learning, which are identified as key ‘actions’ of adapting to climate change. Some of the actions described below are already underway. Others will take additional resources and long-term implementation. The community of Aklavik, located in the Inuvik Region of the Northwest Territories, Canada, is taking steps now, “responding to changes that will continue in the future, demonstrating flexibility, innovation, and resilience.”²⁴¹

One issue for the Aklavik community is unpredictable weather conditions, which require people to develop strong navigation and weather prediction skills. ‘Reading the land’ is essential for hunting and travel safety and youth are identified as the most at risk group in this category.²⁴² High fuel costs are a barrier preventing many from travelling far distances or even going out on the land at all. This is causing limited participation in subsistence activities and is ultimately leading to the loss of traditional culture. Other aspects of life including language, oral history, and cultural values are being lost. The loss of language and erosion of gender roles also impede the transmission of subsistence traditional knowledge (including knowledge related to traditional medicines) between generations.²⁴³

The Action Plan addresses these changes and outlines several important ‘actions.’ The following will focus on those actions related to indigenous knowledge.

²³⁸ Katelyn Friendship and Community of Aklavik, “Climate Change Adaptation Action Plan,” March 2011. Available at: http://arctic-north.com/wp-content/uploads/pdfs/Aklavik/Aklavik_Adaptation_Plan.pdf.

²³⁹ Indian and Northern Affairs Canada, *Sharing Knowledge for a Better Future*, 20.

²⁴⁰ The initiative is based in Aklavik, Northwest Territories, Canada. Compiled by Katelyn Friendship and Community of Aklavik and in collaboration with ArcticNorth and RavenQuest. Cfr. *Supra* footnote 226, p. 67.

²⁴¹ Friendship, “Climate Change Adaptation Action Plan,” 66.

²⁴² *Ibid.*, 11.

²⁴³ *Ibid.*, 15.

The promotion of sharing of knowledge between Elders and younger generations is listed as a high priority.²⁴⁴ Camps for youth and young adults are set up as a space where this sharing can take place. School safety awareness programs are held in spring and fall when the climate conditions are most unstable. Other safety initiatives involve promoting GPS and spot locators and the use of PDFs (lifejackets) and emergency packages. Travel routes must change and traditional knowledge coupled with modern scientific technology is being used to accomplish this.

Increased cooperation is encouraged with other communities in the Inuvialuit Settlement Region (ISR) to share ideas and knowledge around adaptation. In Aklavik, the reintroduction traditional modes of transport such as the use of dog teams were identified as a high priority alternative to rising fuel costs.²⁴⁵ Traditional knowledge is at the foundation of such an initiative. Elders are part of a language program at schools providing youth with diverse learning opportunities. Students and community members are empowered to learn and use traditional languages such as Inuvialuktun and Gwich'in dialects. The promotion of Elders and their knowledge is intended make people more knowledgeable about their traditions, fostering a strong sense of cultural identity, ultimately enabling them to better cope with climate change.²⁴⁶

TEK is at the core of the opportunities organized for Aklavik youth and young adults to learn the traditional skills needed to hunt and travel safely in a changing climate. Harvests, sharing and trading among ISR communities gives all community members access to traditional foods. A fur and art co-operative is giving women, men, Elders, and youth a chance to work together and share their knowledge.²⁴⁷ These actions are proposed by residents of Aklavik as ways that their community can deal with climate change now, and prepare for the future.

Funding for this Action Plan is primarily provided by The Department of Indian and Northern Affairs Canada - Climate Change Adaptation Program.²⁴⁸ Some of the listed organizations and groups providing resources and leadership for the various actions are:

²⁴⁴ Ibid., 13.

²⁴⁵ Ibid., 13.

²⁴⁶ Ibid., 15.

²⁴⁷ Ibid., 66.

²⁴⁸ Ibid.

GNWT-Health and Social Services, Aurora College, GCT-Gwich'in Social and Cultural Institute, Government of Canada's Search and Rescue Secretariat, RCMP, ISR Youth and Elders, Elders Committee, Moose Kerr School, and Health Canada (brighter Futures program.)²⁴⁹ Evidently it takes a large group of actors working together to make initiatives like these successful. Financial resources are a major determinant on whether a project or adaptation plan develops and succeeds.

Sometimes funding is not available. Residents from Kivalina, Alaska, have wanted to relocate as an adaptation response since 1992. Government support is not always easy to acquire, even for communities like Kivalina that are recognized to be in dire circumstances. However, with the growing recognition of the value of traditional knowledge in government and policy, as evidenced by the most recent IPCC report, there is hope that there will be an increase of government resources supporting indigenous communities in their adaptation efforts.

The 'Eurasian Reindeer Pastoralism: Indigenous Knowledge and NASA Remote Sensing' and the 'Aklavik Climate Change Adaptation Action Plan' are only two among a plethora of initiatives undertaken by communities with the assistance of researchers, scientists, local organizations, schools, NGOs, governments and other stakeholders.

While climate change adaptation initiatives that incorporate indigenous knowledge can be found globally, the Arctic indigenous peoples are leaders in this area. Other noteworthy projects addressing climate change in the Arctic include: the Skolt Sámi Survival Project,²⁵⁰ Inuit Traditional Knowledge for Adapting to the Health Effects of Climate Change project,²⁵¹ the many CAVIAR projects addressing vulnerability and

²⁴⁹ Ibid., 10-24.

²⁵⁰ "Adaptation and survival mechanisms for the Sevetijärvi Skolt Sámi community in the middle of rapid weather, climate, social and cultural change by employing documentation of oral histories, land use and occupancy mapping, alternative reindeer herding solutions as well as pilot tools such as possible establishment of reindeer nomadic schools and solar electrification of the wilderness cabins and indigenous use areas of the Skolt Sámi." See: Indigenous Peoples' Biocultural Climate Change Assessment Initiative (IPCCA), "Skolt Sámi Survival In the Middle of Rapid Changes," <http://ipcca.info/about-skolt-sami>.

²⁵¹ "(IK-ADAPT) is a multi-year, community-based initiative that combines scientific research and Inuit knowledge (IK) to develop an evidentiary base to inform policy and programming needed to assist Inuit communities in adapting to the health effects of climate change." See: IK-ADAPT, "Inuit Knowledge for a rapidly changing climate," <http://www.ikadapt.ca>.

adaptive capacity,²⁵² the Ulukhaktok Adaptation Action Plan,²⁵³ and the Atuliqtuq Action and Adaptation Project²⁵⁴.

Most adaptation projects include three major themes. They are the building of partnerships, community planning and decision making, and community engagement. Building of partnerships means including all of the stakeholders to improve communication and ensure all are working towards a common goal. Gathering a wide audience creates meaningful community involvement and a better overall understanding of climate change and what is to come.

Planning and decision making fosters a community led research approach in which indigenous peoples themselves are the main actors. Community engagement empowers local stakeholders through outreach strategies such as the creation of ‘toolkits’, and participatory forums for Elders and youth. Many projects share results, plans, and knowledge with other indigenous and non-indigenous communities. Adaptation efforts are particular to a certain region, species, and location, however they are a model for groups of peoples around the world, demonstrating how traditional knowledge can be used as a crucial tool to combat climate change.

4.2.3 Local to Global Initiatives

*“This is our home, our backyard, all of us, we need to ensure that we all work together to understand what is happening to it. We need to coordinate our efforts for future projects. Having local people, managers and political leaders all under the same roof will add clarity.”*²⁵⁵

While fundamentally a grassroots movement, ‘Think Global, Act Local,’ is gaining attention as a global solution as corporations, government officials, education systems and local communities are working to find individual approaches to lessen the impacts

²⁵² Hovelsrud and Smit, Community Adaptation and Vulnerability in Arctic Regions.

²⁵³ Community of Ulukhatok and partners, “Ulukhaktok Adaptation Action Plan,” March 2011. Available at http://arctic-north.com/wp-content/uploads/pdfs/Ulukhaktok/Ulukhaktok_Adaptation_Plan.pdf.

²⁵⁴ The project involves the creation of several community adaptation plans, adaptation planning tools, and the collection of regional and local scientific knowledge. Source: Indian and Northern Affairs Canada, *Sharing Knowledge for a Better Future*, 30.

²⁵⁵ Rose Kushniruk, Champagne & Aishihik First Nations Community Lands Officer. Quoted in: Indian and Northern Affairs Canada, *Sharing Knowledge for a Better Future*, 21.

of climate change. Indigenous communities on the frontlines of climate change are doing this. They are acting locally by contributing their knowledge to research and adaptation initiatives, and teaching and preparing youth for the future. As the amount of initiatives addressing climate change in the Arctic grows in local settings, indigenous peoples are simultaneously collaborating with others around the world to share their knowledge and to learn from others. They are also working globally to get their voices heard in international political and human rights spheres.

On a global level we see how the UN plays an important role bringing a multiplicity of actors together to promote world-wide learning through the United Nations University Traditional Knowledge Initiative (UNU-TKI). The UNU-TKI builds understanding and facilitates awareness of traditional knowledge (TK). It seeks to inform action by indigenous peoples, local communities and domestic and international policy makers through research activities, policy studies, and online learning and dissemination.²⁵⁶

From 2011-2012 the UNU-TKI and the IPCC partnered together in organizing a series of collaborative workshops, in an effort to “ensure that the experience of indigenous and traditional peoples of climate change impacts and their adaptation and mitigation strategies are fully integrated.”²⁵⁷

Some of the significant points of this collaboration are as follows:

- The need to promote an understanding of climate change vulnerability, adaptation and mitigation.
- The collecting of regional and local data for understanding local-scale climate change and involving indigenous knowledge holders.
- Engaging indigenous peoples in climate debates.
- “Providing policymakers with relevant information on the vulnerabilities, knowledge and adaptive capacity of indigenous peoples.”²⁵⁸

Representatives of indigenous peoples, as well as indigenous peoples themselves

²⁵⁶ United Nations University, “Traditional Knowledge Initiative,” <http://unu.edu/research/traditional-knowledge-initiative.html#outline>.

²⁵⁷ Gleb Raygorodetsky, “Why Traditional Knowledge Holds the Key to Climate Change,” United Nations University, 13 December 2011, <http://unu.edu/publications/articles/why-traditional-knowledge-holds-the-key-to-climate-change.html>.

²⁵⁸ Ibid.

attended the workshops and met with experts in the field. The workshops were an important opportunity for people from across the world to share knowledge and experience.

The goal of the workshops including contributions from several other partners (including the United Nations Development Programme, United Nations Educational Scientific and Cultural Organization, and the Convention on Biological Diversity) was to promote respect for the local and traditional knowledge. The aim was to empower indigenous peoples in developing global, regional and local policies to address climate change while being supportive of their culture, knowledge and self-determined development.²⁵⁹ For indigenous peoples, it was an opportunity to share their knowledge and gain information on global climate processes. Moreover, “indigenous peoples learn[ed] about other indigenous climate change-related experiences, while scientists gain[ed] opportunities to ground-truth (field check) climate models and scenarios.”²⁶⁰

The UNU-TKI is exemplary of how international bodies can serve as a space or forum for other actors to meet, often through hosting workshops or conferences. The United Nations has provided such a space for a wide range of actors from across the world to meet, engage, and discuss traditional knowledge initiatives to address climate change. This valuable work should be encouraged and the UN should continue with their contributions to this area as they have established a good working model.

Another example of working locally but thinking globally is the Finnish based, Snowchange Cooperative that works with local communities, supporting their wishes to address climate change, especially through the use of traditional knowledge. The Snowchange Cooperative is a non-profit educational, scientific, and environmental independent organization. They document traditional and indigenous knowledge in order to record observations of cultural, climatic and ecological changes.²⁶¹

Snowchange is also a network of local and indigenous cultures around the world.²⁶²

Snowchange also works to advance the role of traditional knowledge in environmental

²⁵⁹ Ibid.

²⁶⁰ Ibid.

²⁶¹ Snowchange Cooperative, 2014, <http://www.snowchange.org/>.

²⁶² Ibid.

policy. They have collaborated with the Arctic Council, the IPCC, Indigenous Peoples Climate Change Assessment, National Science Foundation of USA and several universities and partners regarding biodiversity, climate change and local communities.²⁶³ Through the documented stories Snowchange has become a major force in indigenous policy research and international climate change; “Our stories bring the land alive – they are very powerful stories.”²⁶⁴

Snowchange is a significant participant in international conferences and forums but remains dedicated to creating change at the local level. The Cooperative plays an important role in bridging the gap between the local and global spheres. Through electronic references and web-access, the Snowchange Cooperative Archive compiles collections and recordings of traditional knowledge, which is accessible to researchers, students and the public around the world.²⁶⁵

Many local projects around the world happen because of cooperation with other stakeholders. CAVIAR, with its almost, “two dozen teams partnered with communities across eight polar nations, is a model of such collaboration.” The projects stress the importance of understanding local and global forces that make communities both vulnerable and resilient at both levels.²⁶⁶ Focusing on long-lasting well-being and sustainability at local levels, the projects emphasize the importance of addressing the questions, “How do social, cultural, economic, and political processes operating at multiple scales affect sensitivity to climate change and adaptive capacity?” and “How can lessons be shared among Arctic communities?”²⁶⁷ To address these, CAVIAR has set goals to compare results among Arctic communities, “to identify commonalities and transferable lessons,” and to improve, “understanding of interrelations between local vulnerability and decision-making related to adaptation, across multiple scales from local to international.”²⁶⁸ CAVIAR is an example of frontline collaboration combating climate change in the Arctic.

²⁶³ Ibid.

²⁶⁴ Ibid.

²⁶⁵ Ibid.

²⁶⁶ Hovelsrud and Smit, *Community Adaptation and Vulnerability in Arctic Regions*, 3.

²⁶⁷ Ibid.

²⁶⁸ Ibid., 4.

The greatest obstacle in moving forward with projects large and small is funding. Where you would expect government funding, it is often unavailable, and most of the movement forward is from institutions, NGOs or private sources. Getting one government's support is hard enough, but in the Arctic there are seven sovereign states that do not always have the same interests or motivation when it comes to Arctic matters and in particular climate change. The Kyoto protocol is an example of how sovereign states do not agree on combating anthropogenic climate change. The most significant carbon emitting states wouldn't sign.

4.3 The Indigenous Paradigm

“Inuit have lived here in the Arctic for millennia. Our culture and economy reflect the land and all that it gives. We are connected to the land. Our understanding of who we are – our age-old knowledge and wisdom – comes from the land. It is our struggle to thrive in the harshest environment that has given us the answers we need to survive in the modern world. That outlook, a respectful human outlook that sees connection to everything, should inform the debate on climate change.”²⁶⁹

For indigenous peoples, ecological knowledge is a precondition for survival.²⁷⁰ As multiple factors threaten the existence of indigenous cultures and indigenous ways of life, using traditional knowledge in addressing climate change can help support the continuity of that knowledge and culture, as revealed through the Aklavik Adaptation Project.

Indigenous knowledge embodies worldviews and philosophical perspectives that have core values, “consisting of inextricably integrated observation, experience, beliefs and philosophies.”²⁷¹ This differs from scientific knowledge in which objectivity, empirical study and hypotheses are key components. Beliefs, values, experiences, and philosophies, however, affect human behaviour and therefore they have a role to play in

²⁶⁹ Watt-Cloutier, “Climate Change in the Arctic,” 87.

²⁷⁰ ACIA, 93.

²⁷¹ Turner and Clifton, “It’s so different today: Climate Change and Indigenous Lifeways in British Columbia, Canada,” 5.

response to climate change.²⁷²

This knowledge benefits indigenous peoples and non-indigenous peoples. Cultural perspectives and values different from Western societies are what are necessary for an environmental, “paradigm shift.”²⁷³ Western ideas value industry and productivity over natural concerns. Indigenous perspectives relevant to this discourse include: the *interconnectedness of life*; the importance of a *long-term view of the future and future generations*; and the linking of *human health and well-being to the health of the environment* as a whole.²⁷⁴

The question is, in what ways can these perspectives be integrated into western (urbanized) society, allowing understanding and consideration?

Incorporating indigenous perspectives is achieved through a consultative and collaborative process and with research methods that respect both academic and indigenous ways of knowing.

“Indigenous knowledge and perspectives, and the needs of indigenous peoples, matter significantly in our considerations of what climate change is, its effects, and ways to adapt to and remediate its impacts.”²⁷⁵

Despite widespread recognition, there is little research and fewer examples of the practical application of indigenous world-views and how they contribute to the climate change discourse. The following analysis also draws from indigenous examples beyond the Arctic, which are indicative of this way of knowing at a global level.

The Interconnectedness of Life refers to the connections and interdependency between all living species on earth. This deep understanding and respect for nature is inherently interlinked with subsistence living.

“The indigenous understanding has its basis of spirituality in a recognition of the interconnectedness and interdependence of all living things, a holistic and balanced view of the world. All things are bound together. All things connect. What happens to the Earth happens to the children of the earth. Humankind has not woven the

²⁷² Ibid.

²⁷³ The Paradigm shift as discussed here refers to a societal re-thinking the basic assumptions that govern our relationship with the environment, including approaches to political and economic decision making.

²⁷⁴ Turner and Clifton, “It’s so different today: Climate Change and Indigenous Lifeways in British Columbia, Canada,” 28.

²⁷⁵ Ibid., 29.

web of life; we are but one thread. Whatever we do to the web, we do to ourselves.”²⁷⁶

Anthropogenic climate change is a result of humans venturing too far away from a holistic understanding of our relation to the earth. The Wagmatcook First Nation in Canada have initiated a Climate Change and Adaptation Project, in an early attempt to understand how a small community prepares for and adapts to the changing climate cycles of the planet. They address climate change from an indigenous perspective through ‘restoring balance’ of earth’s four elements: fire, earth, air and water. The aim is to teach these values and lessons to First Nations children, so they are prepared for future changes.²⁷⁷ Creation stories and the role of fire are discussed and connected to the current extensive production of carbon in today’s society. In order to balance the four elements they believe in a reduction of the use of fire element, which translates to reducing carbon emissions. The project addresses these issues holistically and begs the question as to what should we all be doing as a society to reduce CO₂ emissions? Members of this small reservation in Canada discuss ways to become more energy efficient, and lessening our use of fossil fuels through sustainable sources of energy.²⁷⁸ A philosophy of ‘taking only what one needs’ is described by a community member, and that human excess and greed are making it difficult for the Earth to heal.

Similar to Elders in Aklavik teaching youth about traditional subsistence methods to obtain food, members of the Wagmatcook First Nation believe in teaching children how to grow their own food to live sustainably. Terminology used to describe other natural elements of the earth and reveal familial ties between the earth and human beings; “trees are grandmothers, rocks are grandfathers, and the Earth is our mother.”²⁷⁹ In the indigenous view all elements are connected, and in order to restore balance we must acknowledge and respect these connections.

²⁷⁶ Rebecca Adamson, American Indian Rights Activist, Founder, First Nations Development Institute & First Peoples Worldwide. See: “Do one thing: Heroes for a better world,” <http://www.doonething.org/heroes/pages-a/adamson-quotes.htm>. Accessed 7 June 2014.

²⁷⁷ “The Four Elements: A return to balance,” YouTube video, 0:25, Posted by Wagmatcook Culture and Heritage Centre, November, 2009, Available at: <http://www.earthprotect.com/index.php/media-gallery/mediaitem/389-the-four-elements-a-return-to-balance>.

²⁷⁸ Ibid., 5:45.

²⁷⁹ Ibid., 28:00

Societal awareness on global warming has been increasing since the late 1980's and has precipitated a changing consciousness, as many people become more concerned with how they can be more sustainable. From recycling, to rooftop gardening, the 'sustainability movement' of the past few decades has created a process of 'whole system thinking'²⁸⁰ akin to indigenous philosophy of interconnections of life.²⁸¹ Just as TEK can contribute to the science of adapting to climate change, IK philosophies of holistic living offer a perspective in tune with a changing consciousness. The world can only benefit by the inclusion of indigenous philosophies and approaches toward a more sustainable planet. Are we at the beginning of a paradigm shift in western consciousness?

The Inuit have knowledge they refer to as Inuit Qaujimajatuqangit (IQ), "a body of knowledge and unique cultural insights of Inuit into the workings of nature, humans and animals."²⁸² IQ combines Inuit Traditional Knowledge, Traditional Institutions, and Traditional Technology and its verb root 'qaujima'-, meaning to know, "translates literally as 'that which has long been known by Inuit.'"²⁸³ This knowledge transmits values of collaborative relationship, working together for a common purpose, respecting others and treating others equally, and "Avatimik Kamattiarniq": The concept of Environmental Stewardship.²⁸⁴

IQ is a knowledge that is structured in a way to promote learning from its concepts. It has practical and epistemological aspects that stem from a basic principle that human beings are rational beings capable of learning, "with an infinite potential for problem-solving within the dictates of nature and technology."²⁸⁵

The concept of Environmental Stewardship stresses the close relationship the Inuit have

²⁸⁰ "Whole-systems thinking is defined as a keen awareness of the importance of interconnections, relationships, consequences, and feedback loops. It involves a willingness to consider all significant aspects of an issue, and not to jump to appealing (but usually wrong) simplifications." Source: Robert Gilman, "Sustainability: The State of the Movement," Context Institute, 1996, Available at: <http://www.context.org/iclib/ic25/gilman/>.

²⁸¹ Robert Gilman, "Sustainability: The State of the Movement," Context Institute, (1996), Available at: <http://www.context.org/iclib/ic25/gilman/>.

²⁸² Qikiqtani Inuit Association, "Inuit Qaujimajatuqangit."

²⁸³ Ibid.

²⁸⁴ Ibid.

²⁸⁵ Ibid.

with their environment and with the world in which they live. Students are expected to “articulate respect for this mutually interdependent relationship and to demonstrate responsible behaviors that seek to improve and protect the relationship in ways that meet global challenges to environmental wellness.”²⁸⁶ In this way, IQ demonstrates how indigenous epistemologies have been transformed into tangible learning tools, which guide both individuals and decision makers towards finding more sustainable solutions to climate change. The Government of Nunavut, Canada, is working to incorporate IQ into its policies.²⁸⁷

Between 2001 and 2005, the government conducted a series of interviews and workshops on IQ and climate change. At an Elders conference on Climate Change, Norman Attungalak from Baker Lake, Nunavut, expressed, “Our lives as Inuit have been affected by this climate change. We have to prepare for the upcoming changes so that our youth can have a fighting chance.”²⁸⁸

A similar point was made in a 2005 workshop titled “What if the Winter Doesn’t Come: Inuit Perspectives on Climate Change Adaptation Challenges in Nunavut.”²⁸⁹ The workshop report concluded, “Inuit are concerned for the well-being of future generations whereas science is project-driven and government is mandate-driven. The challenge therefore lies in focusing research on the challenges that tomorrow’s youth will be facing because of climate change.”²⁹⁰ The report also states that youth, “need to be trained and taught the skills that they will need to successfully adapt to their changing environment without relinquishing their culture in doing so.”²⁹¹ This value of focusing on the challenges of tomorrow’s youth and future generations resonates within many indigenous cultures. The Iroquois have a ‘seven-generations’ belief regarding the future: Oren Lyons, Chief of the Onondaga Nation, wrote, “We are looking ahead, as is

²⁸⁶ Ibid.

²⁸⁷ Ibid.

²⁸⁸ Nunavut Tunngavik, “What if the Winter doesn’t come? Indigenous Perspectives on Climate Change Adaptation Challenges in Nunavut,” Summary Workshop Report, Iqaluit, 15-17 March 2005. Available at: http://www.climatechangenunavut.ca/sites/default/files/nti_inuit-perspectives-on-climate-change-adaptation-challenges-in-nunavut-english_2005.pdf. Accessed 16 June 2014.

²⁸⁹ Ibid.

²⁹⁰ Ibid.

²⁹¹ Ibid.

one of the first mandates given to us as chiefs, to make sure and to make every decision that we make relate to the welfare and well-being of the seventh generation to come... What about the seventh generation? Where are you taking them? What will they have?"²⁹²

A new understanding of the global problem of climate change that goes beyond current economic and political paradigms is needed. There is a strong link between indigenous values for future generations and current social justice and moral ethics discourses. This can enhance the current climate change debate, which is, "so tangled in politics and ideology, [and] has reduced the paramount issues of our time to a partisan standstill."²⁹³

Several scholars are beginning to address climate change with moral and ethical dimensions. In his book 'Climate Matters: Ethics in a Warming World,' John Broome²⁹⁴ addresses what he considers one of the most important questions raised by climate change: how to account for uncertainty, future generations, the value of human lives, and growing populations?²⁹⁵

University of Oxford academics are exploring questions regarding human rights of future generations and theories of justice to address climate change. They are, "designing a new framework for human rights to deal with the unprecedented and unpredictable factors affecting the welfare of future generations."²⁹⁶ They are calling for a renewed moral approach that indigenous peoples already have at the foundation of their knowledge. As researchers move forward with these efforts, and find 'new approaches' to deal with climate change and the law, they would be wise to include the value-laden knowledge of indigenous peoples.

"Indigenous people invite us all to understand the root causes of past and present problems and to take an active role in the healing process. They also define what

²⁹² Oren Lyons, "An Iroquois Perspective," 173-174, in *American Indian Environments: Ecological Issues in Native American History*, Vecsey C, Venables RW (eds.), (New York: Syracuse University Press, 1980).

²⁹³ John Broome, *Climate Matters: Ethics in a warming world* (New York: W. W. Norton & Company Inc., 2012) Inside Cover.

²⁹⁴ John Broome is the White's Professor of Moral Philosophy at the University of Oxford. He is also a lead author on Working Group III of the IPCC

²⁹⁵ Broome, *Climate Matters: Ethics in a warming world*, Inside Cover.

²⁹⁶ Oxford Martin School, "Human Rights: Oxford Martin Programme on Human Rights for Future Generations," http://www.oxfordmartin.ox.ac.uk/institutes/human_rights/.

should be a caring social organization based on the principles of collective ownership and sharing, mutual respect and helping within the extended family system and community, the acceptance of diversity, and collective responsibility for the well-being of all members of society, of future generations and for the maintenance of all parts of Creation. This approach calls for orienting much of our attention to the needs of women and youth.”²⁹⁷

Until the social consciousness of the western industrialized world changes and accepts the values closer to that of the Indigenous paradigm the assistance offered to indigenous people by their own governments is likely to be limited and piecemeal. Governments are not inclined to change until they feel pressure from the majority of their constituents. For the indigenous of the Arctic, the question is will climate change outpace western consciousness?

²⁹⁷ Linda Clarkson, Vern Morrisette, Gabriel Régallet. “Our Responsibility to The Seventh Generation: Indigenous Peoples and Sustainable Development,” International Institute for Sustainable Development, Winnipeg, 1992. Available at: http://www.iisd.org/pdf/seventh_gen.pdf.

5 INDIGENOUS KNOWLEDGE IN POLICY: A CASE STUDY

The climate change debate is highly politicized. Those who frame the debate are the ones who have the power to take action. The indigenous movement to stop human-induced climate change “has grown into a major civil society voice and force, both within the United Nations climate conferences as well as in parallel and autonomous spaces.”²⁹⁸ Yet, for indigenous groups to achieve political change, their recommendations need to be communicated in a form that policy-makers can act on. Bodies such as the Arctic Council, relevant UN agencies, and most importantly national governments can and must respond. Initiatives fail when indigenous groups produce declarations and reports that are usually only read by other indigenous groups and human rights advocates.

Acknowledgment of the role of traditional knowledge in adapting to climate change has been expressed throughout the most reputable and well-established institutions. In 2010 the UNFCCC’s sixteenth conference of the parties resulted in a document titled “Decisions Adopted by the Parties.” Section two of paragraph 12:

“Affirms that enhanced action on adaptation should be undertaken in accordance with the Convention, should follow a country-driven, gender-sensitive, participatory and fully transparent approach, taking into consideration vulnerable groups, communities and ecosystems, and should be based on and guided by the best available science and, as appropriate, traditional and indigenous knowledge, with a view to integrating adaptation into relevant social, economic and environmental policies and actions, where appropriate.”²⁹⁹

More recently, Working Group Two of the IPCC’s fifth assessment report published their 2014 report on Climate Change Impacts, Adaptation, and Vulnerability. The ‘Summary for Policy Makers’ document titled ‘Principles for Effective Adaptation’ states:

“Adaptation planning and implementation at all levels of governance are contingent on societal values, objectives, and risk perceptions (high confidence). Recognition of diverse interests, circumstances, social-cultural contexts, and

²⁹⁸ Powless, “An Indigenous Movement to Confront Climate Change,” Abstract.

²⁹⁹ UNFCCC, Decisions Adopted by the COP, *Report of the Conference of the Parties on its sixteenth session*, Cancun, 2011, 4.

expectations can benefit decision-making processes. Indigenous, local, and traditional knowledge systems and practices, including indigenous peoples' holistic view of community and environment, are a major resource for adapting to climate change but these have not been used consistently in existing adaptation efforts. Integrating such forms of knowledge with existing practices increases the effectiveness of adaptation.”³⁰⁰

The IPCC partnered with the UNU-TKI in order to make TEK a more prominent component of its fifth assessment.³⁰¹ The growing recognition of TEK in policy is a positive step forward for indigenous peoples, and is, “indicative of the momentum that TEK is gaining as a knowledge system that has much to contribute to climate change research and political initiatives.”³⁰²

Despite this, there are claims that IPCC has not gone far enough to include indigenous knowledge as a significant part of its publication. The concern is that IPCC failed to include a chapter dedicated to indigenous peoples even though there is recognition the importance of the human dimension in climate change. There is limited indication that at an institutional level, “this is a priority area for improvement and development.”³⁰³

Widespread acknowledgment of the value of TK in policy and decision making came with the publication of the Arctic Climate Impact Assessment (ACIA) in 2004. There is growing acknowledgment and recognition yet climate change bodies continue to fall short on the inclusion of indigenous knowledge in their assessments. Many believe that this is an important gap that needs to be addressed. Indigenous populations have been identified as a valuable subgroup and, “their accumulated knowledge can help us understand how the climate is changing, characterize impacts, and provide valuable lessons for adaptation.”³⁰⁴

³⁰⁰ IPCC, Working Group II Contribution to the IPCC Fifth Assessment Report on Climate Change 2014: Impacts, Adaptation, and Vulnerability, Summary for Policy Makers, 26.

³⁰¹ Vinyeta and Lynn, “Exploring the role of traditional ecological knowledge in climate change initiatives,” 7.

³⁰² Ibid.

³⁰³ James D. Ford, Will Vanderbilt, and Lea Berrang-Ford, “Authorship in IPCC AR5 and its implications for content: climate change and indigenous populations in WGII,” *Climate Change* 133, no.2 (2011): 201-213. Available at: <http://www.springerlink.com/content/g473nu2t72615640/fulltext.pdf>. Quoted in: Vinyeta and Lynn, “Exploring the role of traditional ecological knowledge in climate change initiatives,” 7.

³⁰⁴ Ibid.

5.1 Background

This case study uncovers some of the underlying causes for the gap between acknowledgement and implementation within institutions. The Arctic Climate Impact Assessment (ACIA) was published in 2004. It was ground-breaking in that it was the first assessment to include both natural and social science research. It set a precedent as the first peer reviewed official public document,³⁰⁵ accepted by governments, to recognize the value of indigenous traditional knowledge for understanding and addressing climate change. Over 250 scientists were consulted during the period of 2000-2004.³⁰⁶

The Snowchange Cooperative carried out a shadow project, during the exact same four-year period, which sought to, “document and work with local communities and indigenous peoples to present their findings of climate and ecological change in a way that would offer new environmental education to all stakeholders.”³⁰⁷

Thus there were two simultaneous initiatives: The ACIA studied all areas of the Arctic and compiled the results of scientists and researchers. The Snowchange initiative documented indigenous voices on climate change in Arctic communities and heard their concerns, observations, and stories in person. Some of the work compiled by Snowchange during these meetings is included in an abbreviated version within the ACIA report. Other documented engagement with communities, and the results of this shadow project have been published in a book called *Snowscapes, Dreamscapes*, which is a compilation of indigenous perspectives on climate change through interviews, stories, poems, and artwork.³⁰⁸

Enhanced by field research in Finland, the focus is narrowed to Part 4 of *Snowscapes, Dreamscapes*. This includes Saami voices from communities in the Swedish, Finnish

³⁰⁵ Peer reviewed can be defined as the evaluation of scientific, academic, or professional work by others working in the same field. *See: Merriam Webster*, s.v. “peer review.” Available at: <http://www.merriam-webster.com/dictionary/peer%20review>.

³⁰⁶ Arctic Monitoring and Assessment Program, “Arctic Climate Impact Assessment,” <http://www.amap.no/arctic-climate-impact-assessment-acia>.

³⁰⁷ Mustonen and Helander, *Snowscapes, Dreamscapes*, 12.

³⁰⁸ Mustonen and Helander, *Snowscapes, Dreamscapes*.

and Russian parts of Sápmi. The analysis demonstrates some differences between how indigenous voices on climate change are authentically recorded at the local level and how they are presented at the scientific publication level. Moreover, as the ACIA document is widely recognized by both governments and indigenous groups, it is interesting to see where any discrepancies lie between the two sources.

In order to shed light on how indigenous knowledge is received by governments subsequent to its acknowledgment in scientific publications, the analysis concludes with a brief examination of the political response to the ACIA by the government representatives of the Arctic Council.

The purpose of this case study is to examine how traditional knowledge manifests in scientific documents intended to inform policy and subsequently how governments and decision makers receive this information. The two published works, ‘The Arctic Climate Impact Assessment’ (ACIA), and ‘*Snowscapes, Dreamscapes,*’ will be reviewed followed by an analysis of the Arctic Council’s response to the ACIA. Figure 5 shows the progression of IK from: a compilation of direct interaction with Elders and indigenous peoples in their communities; to the ACIA study comprised of work from hundreds of scientists over the course of four years; to a policy document produced by the Arctic Council.

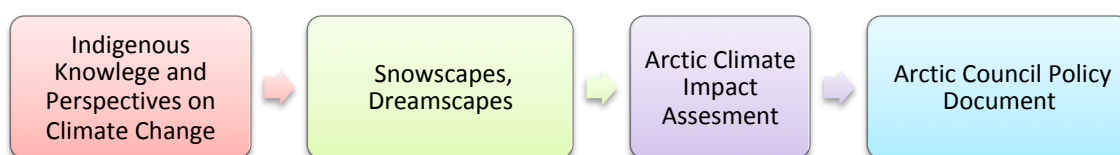


FIGURE 4: Progression of Indigenous Knowledge from local level to policy level

Due to economic and political interests of states, there is a risk that assessments created to inform policy will misrepresent or dilute the authentic indigenous voice. Even in the ACIA, the indigenous voice is subject to interpretive analysis. Is what is in *Snowscapes, Dreamscapes*, authentically conveyed in the ACIA document? Does the interpretation

include important themes stressed by indigenous peoples at the local level?

The findings highlight some of the risks and challenges that indigenous peoples face trying to have their voices heard in scientific and political arenas. This analysis is not meant to judge the value of these documents, but rather to illuminate some of the difficulties encountered when discussing indigenous knowledge in a western science and policy paradigm.

Terms used in the case study are defined below:

Paradigm definition³⁰⁹:

A set of assumptions, concepts, values, and practices that constitutes a way of viewing reality for the community that shares them, especially in an intellectual discipline.

Frame of reference³¹⁰:

A structure of concepts, values, customs, or views by means of which an individual or group perceives or evaluates data, communicates ideas, and regulates behavior.

Indigenous Voice:

An expression of indigenous thoughts, perceptions and opinions that stem from an indigenous frame of reference and are representative of an indigenous paradigm. The term does not insinuate a singular voice, but rather various indigenous voices that may not be in conformity with one another.

5.2 Findings

The findings of this study are divided into three sections: ‘Snowscapes, Dreamscapes’, the ‘Arctic Climate Impact Assessment’, and the ‘Response of the Arctic Council’.

³⁰⁹ *The Free Dictionary*, Farlex, s.v. “Paradigm.” Available at: <http://www.thefreedictionary.com/paradigm>

³¹⁰ *The Free Dictionary*, Farlex, s.v. “Frame of Reference.” Available at: <http://www.thefreedictionary.com/paradigm> <http://www.thefreedictionary.com/frame+of+reference>

5.2.1 Snowscapes, Dreamscapes

The following content contains selections of themes and perspectives from *Snowscapes, Dreamscapes* Part 4 which are chosen for their relevance in the context of this case study.

The implications of industrialization, interconnected with climate change, are described by indigenous voices and include comments on difficulties of traveling by snowmobile, quality of air and water due to pollution, especially the suffering fish species, and the changing of rivers from blue to brown.³¹¹ Mikaelsson, former vice president of the Saami Council and current president of the Swedish Saami Parliament, states that the only positive outcome of industrialization is the fact that Saami people are becoming united in their resistance to it and are thus stronger in their identity than before. This statement exudes pride and indigenous agency, and is exemplary of the indigenous voice that seeks to preserve and develop culture in the face of change.

In other accounts Saami communities describe the implications of the forest industry. Mikaelsson says that the forest industry and pollution “are to blame” for the worsening circumstances for reindeer husbandry.³¹²

The implications of modernization are framed in terms of future sustainable development. Regarding the positive impacts of laws that protect areas of old forests, “This is, of course, very good, but I think we need to increase our efforts to rescue what is left and make sure that profits of today will not lead to great losses tomorrow.”³¹³ The indigenous viewpoint is that these old forests are an integral part of their life and deforestation is greatly affecting their lives.

Similar concerns about the impact of the forest industry and hydroelectric energy on the Saami homeland are reiterated by many others interviewed, like Per Ola Utsi who states:

“They say that the waterpower is environmentally friendly energy, but I say that stands for those that don’t live there. For those of us that live next to a big reservoir

³¹¹ Mustonen and Helander, *Snowscapes, Dreamscapes*, 262.

³¹² Ibid.

³¹³ Ibid., 263.

it isn't environmentally friendly. It is inflicting damage. My way of living is damaged. My environment is damaged. My source of livelihood is damaged. You have to take another perspective. You cannot say that waterpower is green energy. It is a lie. It is green for some, but not for me. This point is easily forgotten."³¹⁴

Per Ola Utsi, a reindeer herder in Sirges Sameby, the largest Saami village in Sweden, poignantly represents a perspective that seems to be lost as it leaves the local level. The perspective of the Western world on the environment is not the same as the indigenous perspectives of the environment.

With a frame of reference that includes a holistic worldview, indigenous voices tell us that that climate change is linked with self-determination; it is linked with pollution and industrialization; and with post-colonialism. They see it all as part of a large problem.

Industrialization is also discussed within the context of colonization.

"They [state officials] said they owned the land now, without any documents to show this. These areas where we are living are the richest areas in Europe right now. Rich in natural sources. We thought we could get rid of them [state officials] since they've already taken away so much, like land and spirituality. But they are back again, this time for oil, gas and minerals."³¹⁵

Encounters with Christianity and the impacts of colonization are inter-twined in indigenous oral histories. This continues to have implications on traditional knowledge education. Niillas Somby explains how indigenous ceremonies were not acceptable to governments and Christianity, and consequently there are few left today: "I can tell you about the Sámi joihkis, the Sámi way of singing. They were an important part in the spiritual culture, out in the nature and in everyday Sámi life. They were forbidden during the Christian system, it was believed to be sin to sing the songs."³¹⁶

Another important representation of traditional knowledge is the relationship between descriptions of weather and the people and animals. Lars Anders Baer described changing wind patterns: "In my lifetime there has been less wind from the west in the

³¹⁴ Ibid., 263.

³¹⁵ Ibid., 299.

³¹⁶ Ibid., 299.

mountains. From the reindeer herder's point of view that was a good wind."³¹⁷ Elli-Karin Pavval describes how one, "can still see the weather from the reindeers; if it is windy the reindeer flits here and there. It predicts the weather."³¹⁸ Pavval also tells of traditional knowledge she heard when she was a young girl:

"You could foresee what kind of flood there would be in the summer. People caught a big pike and took the liver out of the pike, and looked what the liver looked like. From the liver they saw if there's going to be a lot of water, if there is a lot of heavy rain in the summer. That's what the pike's liver told."³¹⁹

Bertil Kielatis tells how her "parents taught [her] to use the nature, not to disturb it, to try to be careful with it. It is the interest rate we live on – leaving the capital untouched, so to speak, and living on the interest that nature gives. And that is how we hopefully can go on living."³²⁰

These are a few examples of many that demonstrate the linkages between animals, weather and knowledge. It all belongs to the indigenous frame of reference in which all things are connected, which is inherently different than Western thought.

The importance of knowledge is stressed by Per Ola Utsi:

"We cannot put it into words, but we know how the weather works. We know when it pays off to gather the reindeer and we know when it's suitable not to. [...] We are very skillful in binding our knowledge of nature and the weather together, because with it we are nothing."³²¹

Traditional practices are changing as climate change re-shapes the landscape and alters ecosystems. In some ways climate change is speeding up modernization. Isak Pålve comments on how old place names in local topography are disappearing due to modernization (caused in part by climate change). He states that "Knowledge exists, we live it. But I do not think about that ever. It is just there. [...] This is our way."³²² Indigenous knowledge is accumulated and variable; some things might be lost but other knowledge is added. Indigenous knowledge continues to be used and Saami culture is still very much alive, contrary to the common arguments of this knowledge being

³¹⁷ Ibid., 263.

³¹⁸ Ibid., 266.

³¹⁹ Ibid., 268.

³²⁰ Ibid., 268-269.

³²¹ Ibid., 269.

³²² Ibid., 269.

substantially lost.

Modernization has created current world condition, “a world characterized by war, poverty, the threat of nuclear disaster, pollution, advanced endangerment of biodiversity and life, the ‘death of god’, and other factors both caused and experienced by modern man.”³²³ Elina Helander also explains that the ‘epistemology of modern man’ is one that separates man from nature, and that many indigenous people hope that “myths will give answer to questions that are troubling them during these late-modern days of turmoil and change.”³²⁴

According to Anna-Leena Siikala, “the border line between myth and reality in traditional cultures is unclear, especially in comparison with the picture of reality found in the modern Western mind.”³²⁵ This exemplifies the stark contrast between indigenous and western frames of reference. These fundamental components of the indigenous paradigm are lost in western interpretation.

Particularly for the Saami, myths help to establish a “new epistemological paradigm intrinsic to the development of the contemporary human mind and the world situation at large.”³²⁶

The section in *Snowscapes, Dreamscapes* titled “Myths, Shamans and Epistemologies from an indigenous vantage point,”³²⁷ points to indigenous spirituality, through Shamanic knowledge, the power of dreams, and healing traditions:

“It has become obvious that the existing worldview of modernity is self-destructive, mechanic, anti-ecological, severed from nature, rational, oppressive, plundering, and capitalist based on masculine thought. These aspects of modern man’s condition function as the powers of chaos, threatening the maintenance of life on earth, and threatening the cultures and epistemologies of indigenous peoples. Many ask questions [...]. How do we find the dark within and transform it, own it as our own power? How do we dream it into a new image, dream it into actions that will change the world into a place where no more horror stories

³²³ Ibid., 552.

³²⁴ Ibid., 552.

³²⁵ Ibid., 552.

³²⁶ Ibid., 554.

³²⁷ Ibid., 552.

happen, where there are no more victims?”³²⁸

The pages of *Snowscapes, Dreamscapes* contain indigenous suggestions for the future. Rune Stokke discusses making the reindeer herding trade more attractive for young people and for the participation of women. He sees education as the hope for the future, and stresses the importance of language revitalisation.³²⁹

Mikaëlsson proposes ‘green tourism’ and gives suggestions for alternative energy sources.³³⁰ He also discusses personal responsibility; “It is very easy to put demands on the society and other people but do nothing yourself, but you can only be counted credible when you practice what you preach.”³³¹ Essentially it takes a personal responsibility to stop polluting the world; this is the indigenous view. This resonates with the message of acting locally.

These suggestions illustrate that indigenous peoples have culturally and environmentally sustainable ideas for the future. Sápmi self-determination of their lands is discussed and assertions are made regarding tourism and the role that Saami want to play in guiding progress. The dream of a shared land between Saami territories without borders is also described.³³² It is not about going back in time to traditional ways, but moving forward in modern society and maintaining a traditional culture. Indigenous peoples of the Arctic are leaders in acting locally, asserting what they want and need in terms of development and adjusting to new changes.

All of the selected quotes and themes presented are in reference to the Saami’s expression of their concerns over climate change. In the Saami paradigm, they are all connected.

³²⁸ Ibid., 554.

³²⁹ Ibid., 270.

³³⁰ Ibid., 269.

³³¹ Ibid., 271.

³³² Ibid., 271.

5.2.2 Arctic Climate Impact Assessment

This case study examined Chapter three, titled ‘Indigenous Perspectives,’ of the ACIA. Some of the authors’ views on the contributions of indigenous knowledge in chapter three are highlighted below:

1. Indigenous observations offer insights into not only the nature and extent of climate change but also the importance of such change for the people whose lives have an intimate relationship with the Arctic landscape.³³³
2. Case studies in the chapter attempt to convey the real sentiments of the individuals on how they see climate change.³³⁴
3. The interconnectedness of climate change with other change factors is emphasized: “Climate change is not an isolated phenomenon, but one that is connected to the web of activities and life surrounding indigenous peoples.” Other factors must be considered and the interaction with other current and future societal and environmental changes should be understood and assessed.³³⁵
4. The authors state that consideration should be given as to how indigenous residents “observe and feel about the changes that are occurring.” Altogether, their observations will help peoples around the world, “understand what is at stake in a changing Arctic.”³³⁶
5. They also attempt to incorporate what climate change means to the local communities within the framework of all the forces, “affecting their lives and cultures.”³³⁷

Additionally, the assessment goes so far as to distinguish an indigenous frame of reference in section 3.2.2., ‘The development and nature of indigenous knowledge’ is described as:

6. “... far more than a collection of facts. It is an understanding of the world and of the human place in the world. From observations, people everywhere find patterns and similarities and associations, from which they develop a view of how the world works...”³³⁸

³³³ ACIA, 62.

³³⁴ Ibid.

³³⁵ Ibid.

³³⁶ Ibid.

³³⁷ Ibid., 62-63.

³³⁸ Ibid., 64-65.

As the ACIA argues, examples from local communities provided in the case studies of Chapter three understandably, “cannot reflect all the views held within arctic communities.”³³⁹ It should not be expected that this one chapter on indigenous perspectives could provide an all-encompassing view on how climate change is perceived by Arctic peoples. As explained in the ACIA report, the case studies, “by themselves they are simplistic and inaccurate portrayals.”³⁴⁰

This report reveals that although containing many quotes and statements outlining an intimate indigenous relationship with nature, flaws exist regarding the content. The considerations of residents’ feelings regarding climate change and the understanding of the indigenous world, and their human place in it, are given inadequate recognition. The bulk of the report remains factual. Consequently, the indigenous voices speaking from indigenous references (that include a holistic view of all elements of life, including weather, dreams, livelihoods and world views being connected) are filtered through Western science interpretation, and are in an altered form in the assessment. Essential themes in *Snowscapes*, *Dreamscapes* representing the indigenous voice find little or no space in the ACIA.

Hydropower, forestry, and other industrialization concerns are mentioned as a change factor in combination with climate change identified by the Saami, yet the voice of injustice described as a ‘lie’ by Per Ola Utsi is lost. In fact, the attitude and voice of indigenous peoples that is ever so present in the material of *Snowscapes*, is difficult to understand in the ACIA.

Suggestions from indigenous peoples regarding present and future challenges that naturally belong to indigenous perspectives seem to be left out of the ACIA document as it focuses solely on indigenous ‘observations’ in the literal Western scientific method. In this way the indigenous voice of resilience and agency is lost.

As stated in the ACIA (number three above), the important consideration of other factors that are interconnected with indigenous peoples’ experience of climate change,

³³⁹ Ibid., 63.

³⁴⁰ Ibid., 90.

need to be understood and assessed. This is one area that the ACIA, despite mentioning it, fails to adequately include in their assessment. Although industrialization and post colonialist topics are directly related to climate change and indigenous voices stress the inherent links, they find little to no space in ACIA Chapter 3 ‘Indigenous Perspectives’.

The observations and *feelings* will provide a better understanding of their experiences (number four above). What indigenous peoples observe is given much more space in the chapter than how they feel. *Snowscapes* presents real stories of how they feel. This is fundamentally lost from the ACIA.

Although the ACIA was well-intentioned in their approach, they left out essential perspectives of the authentic indigenous voice. The most plausible explanation for this omission is that western science interpretation is highly based on facts, in which concrete observations are accepted. Emotions and feelings, part of the human dimension of climate change, are naturally more difficult to include into a scientific document.

ACIA section 3.4.7 includes a case study based on projects conducted by Snowchange. It is analyzed in depth, and much of the same material is present in both *Snowscapes*, and the case studies in Chapter 3 of the ACIA. There are three chapters of *Snowscapes*, *Dreamscapes* in particular that were provided to the writers of the ACIA to use, and one can find several direct quotes regarding observations included from members of the Saami communities of Purnumukka, Ochejohka, and Nuorgam. Despite the inclusion of these selected quotes, the omission of certain other quotes creates a different impression of the material as compared to the full version in *Snowscapes*.

For example in the section, “Traditional Calendar and Knowledge,” the ACIA section paints a much more depressing picture and outlook on the subject, than the sections regarding the same topic in *Snowscapes*, *Dreamscapes*. The quotes that the authors of the ACIA chose to include focus solely on the negative impacts to traditional knowledge, yet fail to mention some of the more positive voices that are quoted in *Snowscapes*, *Dreamscapes*.

One of the more positive stories regarding the traditional calendar in *Snowscapes*, demonstrates that it is still being used and refers to the connection and relationship to

the moon.

Veli-Matti Mutenija, Sakari Keskitalo and Iisakki Magga discuss how old knowledge is truthful:

“When the moon has a big ring around it, yeah, for sure that meant a terrible blizzard within two days. It is still like that. [...] If the moon was sort of hanging on its sharp edges it meant snow to come, and if it was all straight up; there was no snow in that month. And it was so. It still is, I’ve been watching it.”³⁴¹

Representations such as this reveal indigenous peoples traditional knowledge at use in their lives, and shows them currently using their traditional knowledge. This is an example of an omission in the ACIA document.

In another example, indigenous voices on perspectives of self-determination and pollution do not find a strong voice in the ACIA. Ilmari Tapiola gives her thoughts on self governance: “To my mind there should be Sámi lands given to Sámi people for governing within the national borders I see that as the only choice.”

Hans Kitti also voices a need for change:

“in order to redirect the poor state of the earth [...] It is depending greatly on the world situation. Instead of lots of talking, the whole attitude in the world should change, totally. We can see the results of poisoning the nature in countries where forests have perished. I see that the forest is the lung that breathes and balances this interaction between the atmosphere and the earth. People don’t understand [what they are ruining]. It would be much richer to live in a nature that has not been burdened and exploited.”³⁴²

The tone of these voices, the call for self-determination and the resentment of industrial growth destroying nature are not represented in the ACIA document.

The omission of a history of colonialism is another significant shortcoming. This should this be included, as it remains a large part of indigenous perspectives and the way they relate to their land. At the community level colonialism and the impacts of the past are topics brought up by many indigenous peoples in all regions of the Arctic.

Continuing, this section provides a bleak outlook for the future, by stating that, “the sheer magnitude of the projected impacts resulting from climate change raises questions

³⁴¹ Mustonen and Helander, *Snowscapes, Dreamscapes*, 280.

³⁴² *Ibid.*, 301.

of whether many of the links between arctic indigenous peoples and the land and all it provides will be eroded or severed [...] it is important to note that the projected magnitude of change in the Arctic may, eventually overwhelm adaptive capacity no matter what policies and programs are in place.”³⁴³

This perspective discounts that indigenous peoples have abilities and suggestions for their future. Instead it implies that the benevolent protector State should help these vulnerable peoples. What is more, the quote also implies that it might be a hopeless cause, as climate change may simply be too strong a force for indigenous peoples to cope with. This attitude reflects a neo-colonial perspective in which the indigenous capabilities and agency play no role. The ACIA doesn't adequately address the impact of new technologies, modernization, relocations, self-determination and the connection to colonialism.

The ACIA does mention some important facts regarding observations as well as climate change impacts, such as the changing of animal migration routes makes hunting more expensive.³⁴⁴ Yet, excludes why hunting is now so expensive and how it has come to be so due to colonialism and industrialization and climate change.

Why the ACIA includes topics or not, such as colonialism or self-determination is beyond the scope of this work. They are but examples of how the voices of the Indigenous peoples are not always accurately represented when moving from direct interviews to a scientific assessment.

5.2.3 Response from the Arctic Council

The Arctic Council had the task of responding to the ACIA through policy recommendations, which had to be agreed on by all governments. Despite the drastic effects of climate change detailed by the authors in the over one thousand page ACIA document, the Council failed to make any strong policy recommendations. Following negotiations, the results of the response exist in a seven-page document consisting of

³⁴³ Ibid.

³⁴⁴ Ibid., 93.

platitudes and vagaries with no commitment to specific action.³⁴⁵ General recommendations were made for both mitigation and adaptation and the Council recognized the need for further research to extend the findings of the ACIA. Reactions from environmentalist and indigenous groups were of disappointment, especially due to the severity of the predicted results of global warming and the consequences it brings to Arctic residents. The report has been characterized as a ‘modest document’ and a missed opportunity for the Arctic Council to demonstrate leadership in their response to the ACIA.³⁴⁶

The six indigenous groups that hold Permanent Participant status in the Arctic Council felt that the model of cooperation and political legitimacy of the Council for indigenous peoples in the Arctic region was at stake.³⁴⁷ One of the representatives of the Permanent Participants explained how indigenous peoples cooperation was compromised, by situations giving them less access to meetings (i.e. meeting rooms were too small or there were not enough seats booked on a flight).³⁴⁸ One participant explained: “We were ill treated during the negotiation. It was obvious that it was more important that the seven other states had an opportunity to discuss [issues] with the United States. If we had something to add, it was seen as monkey wrenching.”³⁴⁹ The United States government at the time purportedly attempted to delay the release so as to delay addressing politically thorny issues before the 2004 presidential election.³⁵⁰

Although a decade ago, this response continues to be indicative of politics hampering cooperation with indigenous peoples and the lack of commitment from governments regarding climate change issues.

³⁴⁵ Arctic Council, *Arctic Climate Impact Assessment Policy Document*, Issued by the Fourth Arctic Council Ministerial Meeting Reykjavik, 24 November 2004, http://www.acia.uaf.edu/PDFs/ACIA_Policy_Document.pdf.

³⁴⁶ CBC Canada, “Arctic nations react to climate change with 'modest document',” 25 November 2004. Available at: <http://agonist.org/30-950/>. Accessed 26 June 2014.

³⁴⁷ Annika E. Nilsson, “A Changing Arctic Climate: Science and Policy in the Arctic Climate Impact Assessment,” (Linköping: Department of Water and Environmental Studies, 2007), 137. Available at: <http://www.diva-portal.org/smash/get/diva2:23295/FULLTEXT01.pdf>. Accessed 26 June 2013.

³⁴⁸ Ibid.

³⁴⁹ Ibid.

³⁵⁰ Ibid., 138.

5.3 Discussion

Indigenous peoples are not only observing changes in their environments but are proposing solutions and offering approaches and suggestions to address change. The ACIA included indigenous observations but didn't include the nuances of the Arctic Voice, which convey the feelings and belief-structure of the indigenous peoples. Many authentic perspectives are excluded altogether. There are various explanations as to why the indigenous voice has been filtered so much. The first is provided to us in *Snowscapes*, telling that it is difficult for the Western paradigm to understand the indigenous one.³⁵¹

While the ACIA recognizes that indigenous peoples need to maintain their cultural identity in face of change, the notions of culture and what the impact of a changing climate truly means, is not understood in the same way. Arctic Voices assert this in so many ways, yet they are not being listened to. The Saami concept of the environment consists of many different components, including natural, cultural, social and linguistic environments. The Saami have sought to live in harmony with nature and to not disrupt its delicate balance.³⁵² Indigenous peoples want their paradigm to be seen as it is, along with its value. Attempts to synthesize and interpret indigenous perspective through a Western paradigm diminish the indigenous voice from its source.

However, another approach, which involves opening up space for interpretation and learning from another paradigm, is absolutely possible. Although these two paradigms may seem contradictory in ideology, a "paradigm shift" (a fundamental change in approach or underlying assumptions) may be the answer.³⁵³ Society as a whole can learn from indigenous peoples values and approaches and this is actually what many think we need in order to combat and repair climate change on the earth.

The Indigenous experience of human-induced climate change is linked to a postcolonial

³⁵¹ Ibid., 556.

³⁵² Ibid., 305.

³⁵³ Turner and Clifton, *It's so different today*, 28.

context:

“Peoples often focus on the impact potential changes in climatic conditions will have on Indigenous lifestyles over the next two centuries. Scientists and activists alike are eager to document these potentially devastating impacts by recording the Traditional Knowledge of Indigenous Peoples, and while this may prove to be an effective strategy to awakening the policy makers in the south to the catastrophe of climate change, it is also important to examine this issue within the framework of the larger colonial project. The worldview that rendered Indigenous Peoples and their lands as disposable is also the worldview responsible for the holocaust of the Americas and for the present day climate change Indigenous Peoples are already witnessing.”³⁵⁴

Climate change for the Arctic indigenous peoples is intrinsically linked to land rights, self-determination, sovereignty and the past. As evidenced in the ACIA document and then confirmed in the Arctic Council response to the assessment, an ever-present colonialist structure remains a major obstacle in policy regarding indigenous rights and climate change. This was blatantly revealed in 2007 when New Zealand, Australia, the USA, and Canada opposed the passing of the United Nations Declaration on the Rights of Indigenous Peoples, with the argument that it was incompatible with their domestic legislation.³⁵⁵ A western paradigm is observed in the case study and is evidenced by neo-colonial attitudes and approaches to indigenous perspectives of climate change. This paradigm is formed from a society that remains, in many ways, colonial.

“Human-induced climate change (HICC) is the direct result of the globalization of the European industrial revolution, a revolution that was quickened by the flow of stolen raw materials from the Americas, achieved through the invasion and occupation of independent and sovereign Indigenous nations. [...] Imprisoning Indigenous nations in the grips of colonialism in essence accelerated the production of greenhouse gases generated by industrialization and the violent globalization of the western world- view.”³⁵⁶

Human-induced climate change is caused by the pollution from industrialized countries that are mostly the same countries that pursued a worldwide colonialist policy. Although we have seen much social progress, the essence of a colonial mindset still persists. We are still looking to the underdeveloped region of the Arctic to supply the raw materials

³⁵⁴ Leanne Simpson, “The Colonial Context for the Indigenous Experience of Human-Induced Climate Change,” in *Snowscapes, Dreamscapes*, Mustonen and Helander (eds.), 25.

³⁵⁵ BBC News, “Indigenous Rights Outlined by UN,” Last modified 13 September 2007, http://news.bbc.co.uk/go/pr/fr/-/2/hi/in_depth/6993776.stm. Accessed 26 June 2014.

³⁵⁶ Mustonen and Helander, *Snowscapes, Dreamscapes*, 26.

to keep our industrialized world working.

Many indigenous peoples are concerned with the way in which colonization in the Arctic has introduced new technologies that threaten their way of life, and that these modern technologies (mining, oil, hydroelectric dams) are no longer suitable in a changing Arctic. They are also concerned that a shift to new forms of 'green energy' will not in and of itself solve the problem:

“[C]ontemporary societies of the world must learn how to build cultures and civilizations based on sustainability, justice and peaceful coexistence with Indigenous Peoples and the land, rather than relationships continued to be based on exploitation and conquest.”³⁵⁷

Although this case study uses the Saami people as an example, this is not just a northern European problem. Canada's indigenous rights claims over the past decades are an example of a government's delay over settling indigenous issues, while moving ahead with economic development. The extraction of resources perpetuates the fear in many people of an uncertain future. Even in semi-autonomous indigenous regions of Canada, the indigenous people lack the ability to make land use decisions and they have little control over the mining, logging, and oil exploration.³⁵⁸

Land claims and various forms of industrialisation for economic growth, continue to constitute some of the greatest tensions between Arctic indigenous peoples and state officials. Development and tourism in the Arctic are bound to grow and the indigenous peoples know this and they want to be included in the future economics of it. They see ways to adjust to the modern world while keeping their cultures strong.

The Western paradigm that fosters a neo-colonialist approach to addressing the human impacts of climate change is evident through the progression of the knowledge from *Snowscapes, Dreamscapes* to the ACIA and then to the Arctic Council report. An exploitive attitude persists regarding governments treatment of indigenous peoples while exploiting the natural resources under their land. It is difficult for Indigenous People to participate and contribute when their ways of knowing and their perspectives are misrepresented, misunderstood, or disregarded.

³⁵⁷ Ibid.

³⁵⁸ Ibid.

A failure to create meaningful policy change to combat climate change in the Arctic is a result of economic concerns of the governments and their lack of the ability to listen to the voices of the Arctic indigenous people. There is a wide gulf between these supposedly democratic states and their willingness to provide responsible government for their indigenous Arctic constituents. The prevalent economic priorities of extracting resources, conflict with ethical and honest cooperation with indigenous peoples. There is not likely to be any significant state policy to address climate change issues in the Arctic until peoples' lives become more important than economic enrichment.

Policy documents and scientific studies often require peer review and proper documentation while TEK remains in 'grey literature,' outside the scientific realm.³⁵⁹ The IPCC, for example requires peer-reviewed material. This academic structure excludes indigenous knowledge that manifests in forms outside of western science, such as oral histories; the indigenous are not getting a proper opportunity to contribute their share in the way we try to understand climate change.³⁶⁰ Due to this challenge, Mustonen states that there is a need to, "reframe the way we understand climate change and science, in a way that would include and welcome the aboriginal peoples' views and cosmologies."³⁶¹

Part of the solution is to find a way to build an understanding within large institutions, of what climate change topics mean to indigenous peoples. Mustonen explains that in order to address this issue within large institutions such as the UNFCCC and the IPCC, an understanding of 'what weather is' or 'what climate is' to indigenous peoples is needed, and these institutions need to foster good relations (ethical and respectful) with the indigenous; "That is what is missing from all these debates."³⁶²

³⁵⁹ Gleb Raygorodetsky, "The Key to Addressing Climate Change – Indigenous Knowledge," National Geographic, 6 February 2012, <http://newswatch.nationalgeographic.com/2012/02/06/theclimate-change-indigenous-knowledge/>.

³⁶⁰ Tero Mustonen, "Reframing Climate Change Science to Include Indigenous and Local Knowledge," YouTube video, 0:40, Posted by "UNUChannel," 9 April 2012, http://www.youtube.com/watch?v=fCo77PW2G6Y&list=PLTRJP3fLL6sj1_kqkUBmIhWcEysD-v_zf&index=4.

³⁶¹ Ibid.

³⁶² Ibid.

Another problem is that authors of indigenous reports and assessments are not always experts or scientists.³⁶³ Nor are there many indigenous people who would qualify as scientific experts, so the peer review scientific world does not see their contributions at a scientific (meaningful) level. The bridging of these differences is at an infancy level. More research and promotion of the value of indigenous perspectives is required.

Sarah James, a Gwich'in spokesperson, states, "There is a solution. It's not the end of the world yet. One thing we have to do is gain back respect for the animals, for all nature. We pray and give thanks to everything that we use. But if it's going to work, it has to be both Western and traditional. We have to meet halfway—and we need to find balance."³⁶⁴

A balance of knowledge is that in which TEK is incorporated into scientific measures and, "in political and administrative decision-making in relation to different programs with the aim to safeguard nature for future generations according to the sustainable principles."³⁶⁵

This paper puts forward that the Arctic Voices are not being fully or carefully listened to and that the inclusion of indigenous perspectives in further research is essential.

³⁶³ James D. Ford, et al., "Authorship in IPCC AR5 and its implications for content: climate change and indigenous populations in WGII," 211.

³⁶⁴ Sarah James, quoted in, "Indigenous Voices on Climate Change: Caribou People," *Conversations with the Earth*, <http://stories.conversationearth.org/portfolio/caribou-people>. Accessed 19 June 2014.

³⁶⁵ Mustonen and Helander, *Snowscapes, Dreamscapes*, 305.

6 CONCLUSION

Anthropogenic climate change is threatening Arctic indigenous peoples' territories, rights, and cultural survival. This paper has identified how indigenous knowledge can provide solutions to addressing climate change from local to global levels. Various examples reveal the many ways in which indigenous peoples are taking action to address this threat. The challenges to indigenous peoples' subsistence lifestyles analysed in this paper, illustrate some of the socio-economic impacts of climate change in the Arctic. The acknowledgement of the value of indigenous knowledge in political deliberations is expanding and becoming recognized by prominent climate change bodies such as the UNFCCC and the IPCC. However, the conclusion drawn here is that, in addition to a serious lack of political will, filtering indigenous knowledge through Western scientific interpretation and understanding remains a major impediment. Even this paper is written from a western point of reference and thus has limitations of understanding. Recognizing this, extra effort must always be made, to listen to the authentic indigenous voices.

Arctic Voices are calling for national, regional, and international action to ensure the full realization of their rights as enshrined in the UNDRIP. They are framing climate change as a human rights issue, intrinsically linked to self-determination. As the consequences of climate change become more severe, the interrelationship between indigenous human rights and climate change will be propelled to the foreground of the debate and will be central in future deliberations. Arctic indigenous peoples should continue to strengthen their arguments through existing human rights instruments (as some of the Inuit have attempted) by making reference to existing international frameworks.³⁶⁶ Furthermore, invoking a human rights approach is a proven advocacy tool. Support may also be broadened if indigenous rights are presented as issues of development, calling for a humanitarian response.³⁶⁷

Numerous scientists and researchers recognize the value of indigenous knowledge.

³⁶⁶ Ferris, *A Complex Constellation: Displacement, Climate Change and Arctic Peoples*, 27.

³⁶⁷ *Ibid.*

They have been actively working with indigenous knowledge holders to help address human-induced climate change in the Arctic and are finding that strategies have both local and global application. The importance of traditional approaches and the mechanisms to cope with and adapt to change have been identified as essential to the success of indigenous cultures in the Arctic.

Several community projects have demonstrated that IK and WSK can be combined to produce favourable and sustainable solutions to climate change. IK in particular, delivers ‘in situ’ solutions on how to proactively adapt to changes; local solutions that are now accepted to have global application. It has also proven to provide an early warning system protecting people and animals from harm.

Additionally, indigenous worldviews consider the well-being of the whole world and seek to protect future generations. This offers a new paradigm for western thinking that with enough attention might come to influence an overall societal shift in social consciousness. IK is more than just usable knowledge; it is a different paradigm of how to live. Incorporating IK into current research and discussions on climate change provides insight into the ways in which both indigenous and non-indigenous peoples alike can understand and address our changing planet.

The indigenous movement to confront human-induced climate change is interconnected with societal choices that are informed by many other political, economical, environmental and social concerns:³⁶⁸

“Global climate change has catapulted the Arctic into the centre of geopolitics, as melting Arctic ice transforms the region from one of primarily scientific interest into a maelstrom of competing commercial, national security and environmental concerns, with profound implications for the international legal and political system.”³⁶⁹

The Arctic is transforming; the opening up of ocean routes, increased shipping and tourism, and the consequent risks of maritime environmental disasters, all bring new variables that will exacerbate climate change implications on Arctic indigenous lives.

The recognition of indigenous knowledge and its incorporation into future planning and

³⁶⁸ Ibid., 25.

³⁶⁹ Charles K. Ebinger and Evie Zambetakis, “The Geopolitics of Arctic Melt,” *International Affairs* 85, no. 6, (2009): 1215-1232, 1215.

governance structure is needed. Yet in practice, this is difficult. In order to hear the diverse indigenous voices, political structures must be receptive. That includes more seats at the table on these discussions. Furthermore, in order to ensure that indigenous presence in such discussions is, ‘more than a token presence,’ political structures need to change the way they work and how they make decisions.³⁷⁰ This also means that policy makers must be, “open to understanding indigenous peoples’ worldview, including rights and value systems...”³⁷¹

Indigenous perspectives must be communicated to policy makers in a way that retains as much of the original indigenous meaning as possible. Recommendations need to be in a form that policy makers can respond to. The Arctic Council in particular should implement greater cooperation between indigenous groups and governments or governmental bodies, (e.g. real inclusion of indigenous Permanent Participants and observer members in AC meetings, even if it requires renting larger rooms and paying for travel expenses.)

Greater national and international financial support for indigenous groups working at the local level is needed to encourage and sustain community adaptation planning. New policies could address how the financial gain from Arctic natural resources can play a role in financial assistance for the local communities.

The stakes will get higher for control of territory in the Arctic. Indigenous peoples’ rights should be included in meaningful discussions and decisions.³⁷² As enshrined in the UNDRIP, indigenous peoples have the right to own, develop and control the lands they have traditionally occupied. National governments that have not yet recognized the UNDRIP should be pressured to do.

Addressing the issue of climate change from a post-colonial perspective is important to the indigenous people of the Arctic. This is a concern, evident in their oral responses, but not as yet addressed by governments. Climate change is occurring while mining, deforestation, pollution, hydroelectric development, oil-drilling and other environmental

³⁷⁰ Ferris, *A Complex Constellation: Displacement, Climate Change and Arctic Peoples*, 26.

³⁷¹ *Ibid.*

³⁷² *Ibid.*, 25.

problems continue. These will be issues, “until Indigenous Peoples are able to disentangle themselves from the web of colonial oppression and establish a new relationship with settler governments.”³⁷³ Many indigenous people feel this issue is not being communicated to governments.

Growing recognition of the value of IK in prominent institutions is indicative of a broadening support network, which will continue and ideally lead to an increase in government resources and more support for local level initiatives. Research and increased participation are continuously cited as preferred methods to deal with climate change yet this needs to translate into proper policies and measures within government and institutional structures. In order to reform the ways in which institutions like the IPCC include indigenous knowledge, Mustonen proposes a, “respectful and well guided dialogue,” which would provide a space for Elders from a, “vast range of aboriginal nations around the world,” to submit directly to the IPCC.³⁷⁴

It would be valuable to extend this discourse into the realm of Loss and Damage.³⁷⁵ More specifically, the loss of cultural heritage, identity, traditional knowledge, and languages are, among others, representations of non-economic Loss and Damage,³⁷⁶ an emerging field that has the potential to shape high-level climate policy.³⁷⁷

More research is needed towards finding ways in which traditional knowledge can be implemented alongside scientific knowledge. Research should also extend to include the effects of broader change, such as the on-going impact of economic development in the Arctic.

³⁷³ Leanne Simpson, “The Colonial Context for Human Induced Climate Change,” in *Snowscapes, Dreamscapes*, Mustonen and Helander, 28.

³⁷⁴ Tero Mustonen, “Reframing Climate Change Science to Include Indigenous and Local Knowledge,” 2:00.

³⁷⁵ The term *Loss and Damage* denotes the climate-related impacts that have already occurred.

³⁷⁶ See: James Morrissey and Anthony Oliver-Smith, “Perspectives on Non-Economic Loss and Damage: Understanding values at risk from climate change.” Available at: <http://www.lossanddamage.net/download/7213.pdf>. Accessed 7 May 2015. Also see policy paper produced for UNFCCC: Sam Fankhauser, Simon Dietz and Phillip Gradwell, “Non-economic losses in the context of the UNFCCC work programme on loss and damage,” *Centre for Climate Change Economic and Policy and Grantham Research Institute on Climate Change and the Environment* (2014)

³⁷⁷ Understanding the value of non-economic losses can play a crucial role in our collective success or failure in combating climate change impacts. See: United Nations University Institute for Environment and Security, “Bonn Dialogues – Climate Change: non-economic loss and damage.” Available at: <https://www.ehs.unu.edu/article/read/bonn-dialogues-climate-change-non-economic-loss-and>. Accessed 7 May 2015.

Indigenous peoples refuse to be victims of this crisis. They are active agents of change and participants in finding and implementing solutions. By using their indigenous knowledge to find local solutions they are demonstrating ingenuity and resilience. Indigenous knowledge is at the centre of local adaptation initiatives, and is essential for the continuity of traditional ways of life.

Through the sharing of their knowledge, Arctic peoples can provide valuable approaches and solutions for others around the world facing this common threat. Their perspectives and knowledge are crucial to better understand the human experience of climate change and to address the threats it poses. As the reality of anthropogenic climate change rapidly proceeds, the rest of the world would be wise to learn from and support Arctic indigenous solutions to climate change.

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