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Adaptation to Climate Change in the Arctic

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The Thematic Network on Global Change in the Arctic is a network consisting of experts from various UArctic member institutions. The main goal of this network is to strengthen the delivery of higher education in areas related to global change, and its aim is to increase the capacity of UArctic member institutions and indigenous peoples to participate in the knowledge generation and knowledge transfer on issues related to global change in the Arctic. The authors are members of the thematic network (www.uarctic.org/thematic).

Introduction

Recent regional and global assessments (e.g. most notably, the Arctic Climate Impact Assessment, the IPCC 4th Assessment, the Millennium Ecosystem Assessment, and the national Canadian assessment of climate change) show how the Arctic has emerged as a region of dramatic environmental change. Global climate change is being felt first and foremost in the Arctic, and the peoples and communities there are already witnessing and experiencing the effects of these changes. Understanding the human dimensions of current and future global climate change, and thinking about appropriate adaptive strategies, means understanding past climate change, and how human societies have responded to, coped with and negotiated change.

As indigenous and local peoples perceive and experience it, the Arctic is becoming both an environment of risk and an environment at risk. Sea ice is now unstable where Inuit hunters previously knew it to be safe, more dramatic weather events such as floods are occurring, vegetation cover is changing and impacting reindeer herding in northern Fennoscandia and Russia, coastal areas face the threat of erosion which will affect fishing and hunting communities in Alaska and Canada, and around the Arctic people report that particular animals are no longer found in traditional hunting and fishing areas during specific seasons. Climate change impacts are also affecting formal economic activities in the region, namely tourism and various natural resource management activities. The weather is becoming increasingly unpredictable and people are concerned that local landscapes, seascapes and icescapes are changing under their feet. As the earth's climate is inextricably linked to the Arctic climate system, Arctic climate research is essential for our understanding and increased knowledge of global changes. In addition to the scientific evidence, the peoples of the region are witness to a range of effects on landscapes, ecosystems and on their livelihoods: but in this they are not alone and they have much in common with how peoples in other parts of the world experience environmental change, and how they are confronted with the challenge of responding to it.

• **As global discussion turns to the critical issue of adaptation, what challenges are there for the Arctic and its peoples, and what global lessons are there that can be drawn from Arctic adaptive strategies and constraints?**

It is argued that research projects and policy responses need to be generic in their applicability to and relevance for the wider circumpolar North, as well as for other regions of the world most vulnerable to climate change.

Being Resilient in the Face of Change

Resilience (both social and ecological) is a crucial aspect of the sustainability of local livelihoods and resource utilisation, thus there is a need for greater understanding of how societies build adaptive capacity in the face of climate change. However, there is also a need to be attentive to the reality that communities differ in the ways they perceive risk, in the ways they utilise strategies for mitigating negative change, and in the effectiveness of local adaptive capacity. Policy responses need to be informed by a greater understanding of how potential impacts of climate change are distributed across different regions and populations. Policy responses should also recognise climate change impacts within the broader context of rapid social and economic change and, in their implementation, should underscore the reality that climate change is but one of several problems affecting people and their livelihoods in the Arctic today.

As chairman of the International Centre for Reindeer Husbandry (ICR), Johan Mathis Turi said on the UN environmental day in Tromsø, in June 2007,

"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."

Learning about Past Adaptive Capacity

The archaeological record, ice cores, ethno-historical accounts and the memories of elders provide

detailed accounts of how human life in the Arctic has always been dominated and influenced by periodic, irregular and often dramatic ecosystem changes, triggered by periods of warming and cooling, extreme weather events and fluctuations in animal populations. The successful long-term occupation of the Arctic by indigenous peoples has been possible, in part, because of their profound respect and understanding of their environmental surroundings, and subsequently to their adaptive capacity (in social, economic and cultural practices) to adjust to climate variation and change.

• **How did past human communities adapt to and recover from an ever-moving and frequently harmful natural background?**

For example, circumpolar reindeer herders and their reindeer live for 8-9 months a year in a world of snow, in relatively extreme environments with changing climatic conditions. Reindeer herding represents an adaptive sustainable model for management that has been developed through generations based on accumulated practical knowledge. Through the year, weather and climate conditions change continuously and these are circumstances to which both reindeer and herders are adapted. Reindeer herding cultures, like Arctic hunting and fishing cultures, represent an adaptation to extreme climate and variability. So while climate change could have serious effects on such livelihoods, people also have unique knowledge about adapting to change.

• **Therefore, what lessons are there from the past to aid future adaptation to rapid change?**

• **And, most critically, how can we disentangle the environmental and cultural consequences of natural change from those of human actions?**

Contemporary Adaptive Capacity

• **What is the hallmark of successful indigenous and local resource use within a contemporary context of climate change?**

• **What kinds of flexibility in technology and social organization do people need to cope with climate change now and in the future, flexibility that will allow them to respond both to its associated risks and to seize its opportunities?**

To answer these questions we need to understand cultural and ecological diversity within the context of innovation, flexibility and resilient coping strategies used during periods of extreme change. Indigenous production systems in extreme, highly variable, and unpredictable climates are often based on the se-

quential utilization of a large number of ecological or climatic niches. The essence of such systems is being highly adaptable, flexible and knowing how to distribute risk through diversity. Circumpolar reindeer herders for example maintain high levels of phenotypic diversity in their herds with respect, to the age, sex, size, colour and temperament of their animals. This is the antithesis of a pure bred herd of livestock of the kind developed by careful selection to suit the requirements of a modern, high yielding agricultural ruminant production system. The ability to adapt to change, which reindeer herding has demonstrated repeatedly, is based on knowledge embodied in the language, the institutions of herding, the knowledge, and the actions of individual herders and herders' experiences.

Yet not all Arctic resource use systems have this inherent ability for change. Arctic fisheries present a good example of how the effects and influences of global processes are increasingly felt in all aspects of social, cultural and economic life in the Arctic today. The Arctic is one of the most important fisheries regions in the world. Viewed in relation to the relatively sparse population of the Arctic, fisheries is one of the major economic sectors and export earners for the region. In a number of circumpolar coastal areas, fishing is the mainstay of local economies. However, local fisheries are being transformed through changes to the ways of life or through industry changes that are subject to the control and regulation by local, regional and national authorities or global enterprise dominated by a handful of transnational corporations (e.g. the impacts of sending fish caught in the Barents Sea to China for processing, only to be imported back to the area). Another example is the tourism sector, which in many communities across the circumpolar Arctic, is also impacted by the effects of climate change. As external markets respond to these impacts, the security of this activity as a means of income generation is reduced. As a consequence, such global economic restructuring and the disembedded nature of resource use diminishes local adaptive capacity.

Institutional and Legal Barriers to Adaptation

Arctic hunters, herders and fishers have always lived with and adapted to shifts and changes in the size, distribution, range, and availability of animal populations. They have dealt with flux and change by developing significant flexibility in resource procurement techniques and in social organization. However, the ecological and social relations between indigenous peoples and animals are not just affected by climate-induced disruption, changing habitats and migration routes, or new technology. The livelihoods of the indigenous peoples and

local communities of the Arctic are subject both to the historical development and the contemporary influences of markets and to the implementation of government policy and resource management that either contributes to a redefinition of hunting, herding, and fishing, or threatens to subvert subsistence lifestyles and indigenous ideologies of human–animal relationships.

Today, arctic peoples cannot adapt, relocate, or change resource use activities as easily as they may have been able to do in the past, because most now live in permanent communities and have to negotiate greatly circumscribed social and economic situations. The majority of indigenous peoples live in planned settlements with elaborate infrastructures, and their resource activities are determined to a large extent by strict resource management regimes, regulatory and legal regimes, land use and land ownership regulations, quotas and local and global markets. Furthermore, if Arctic Ocean ice disappears for most of the year with the projected warming of the Arctic, we may soon experience an explosion of human industrial activities going north. In advance, this activity will have to be regulated in a way that respects local arctic societies and indigenous peoples' natural resource use rights. While local people may benefit from the opportunities such development could bring, reindeer herders in Fennoscandia and Russia, and hunters and fishers in Alaska and Canada could experience loss of grazing land and hunting and fishing areas to industrial development, reducing their flexibility to respond to change and constraining their ability to adapt to warming of the Arctic. The contemporary reality for many people is that they are placed in very inflexible situations.

• **How do commercial, political, economic, legal, and conservation interests have reduced the abilities of Arctic indigenous peoples to adapt and be flexible in coping with climate variability and change?**

Adaptation as a Human Rights Issue

Climate changes, as well as other global change related impacts (economic globalisation, environmental degradation) pose not only significant threats to human health and food security, but also legal and human rights challenges. Maintaining cultural diversity and recognising indigenous livelihood rights are prerequisites for successful adaptation in the face of change.

Environmental conditions clearly help to determine the extent to which people enjoy their basic rights to life, health, adequate food and shelter, and traditional livelihood and culture. However, more often than not, the most vulnerable members of society

are those who suffer most from environmental problems. In this respect the indigenous peoples of the Arctic are in a central position, since they typically depend on their relationship with a sound environment not only for subsistence but also for the very basis of their cultures.

Although most major human rights treaties contain provisions with obvious environmental dimensions, universal recognition and protection of environmental or ecological rights continues to be a great challenge for international human rights law.

• **However, since human rights cannot be secured in a degraded or polluted environment, then the question is whether we are interested in finding solutions for the environment or should concern for human well-being become paramount?**

Socio-economic adaptation to warming of the Arctic includes development of robust local economies based on the customary rights and traditional knowledge to produce local food for human consumption. The diversity of the food cultures of Arctic societies are rich, and based on local natural resources of high nutritional values. Constraining local food production by not respecting indigenous peoples' traditional food cultures and rights to produce their own food is also a serious threat to the ability of Arctic local societies to adapt to change.

The Governance of Adaptation

• **What are the political aspects of responding to climate change?**

Parts of the Arctic are unique in terms of the political settlements and land claims that have been achieved over the last thirty years or so. The extent of vulnerability and resilience to climate change not only depends on cultural aspects and ecosystem diversity, but on the political, legal and institutional rules which govern social-economic systems and social-ecological systems.

On the one hand, climate change has the potential to enhance economic development, but with further climate change, the climate in the Arctic is predicted to become more variable and extreme weather events more frequent and severe, which on the other hand can undermine economic activities. Thus it seems particularly important that attention be given to the management of resources and to the effectiveness of governance institutions, and critical questions must be asked as to whether they can create additional opportunities to increase resilience, flexibility and the ability to deal with change.

• How can, for example, new governance mechanisms developed under Home Rule in Greenland or public government in Nunavut, help (or perhaps hinder) people to negotiate and manage the impacts of climate change?

• In Greenland, Alaska, and northern Canada, are the political and management systems already in place that are able to assess the impacts of climate change, allowing local and regional authorities to act on policy recommendations to deal with the consequences, and improve the chances for local communities to deal successfully with climate change?

• How can an assessment and evaluation of past climate change – and the social, economic and political responses (e.g. in the early 20th century) help in understanding current perspectives and policy responses?

• Although migration and resettlement has long been a core survival strategy for peoples of the circumpolar north, how are such experiences perceived today and who should be involved in the planning and initiation of such a strategy?

Conclusion

This short paper has outlined several of the ways that climate change threatens individuals, communities and livelihoods in the Arctic. However, if effective policy responses are to be developed, then the answers to the many questions highlighted in this paper will depend on a range of factors, including the importance of understanding the nature of the relationships between people, communities and institutions.

Since adaptation to climate change is something that primarily takes place on the local level, it is important that indigenous peoples and local societies themselves define the risks related to rapid change. Circumpolar peoples and communities have to prepare themselves, their society and management authorities for change, and reduce their vulnerability to effects of climatic change. Thus, adaptation to climate change will demand the training of local arctic leaders in long term sustainable thinking, based on the best available adaptation knowledge, both scientific and experienced-based traditional and local knowledge.

However, to succeed in developing preparedness and building competencies in local Arctic societies, adaptation to climate change must therefore be priorities for national and regional governments and indigenous people's institutions and organizations. In addition, national adaptation strategies must recognise minorities, indigenous peoples' traditional knowledge, cultural and linguistics rights.

Over the past couple of years, a number of Aboriginal and Northern communities and organisations in the Arctic have initiated activities on the subject of climate change and adaptation. See for example:

Environmental Protection Division, Government of Nunavut <http://www.gov.nu.ca/env/environment.shtml>

Centre for Indigenous Environmental Resources (CIER), First Nations. <http://www.cier.ca/default.aspx>

Community Adaptation and Vulnerability in Arctic Regions (CAVIAR) <http://classic.ipy.org/development/eoi/proposal-details.php?id=157>

Environmental and Social Impacts of Industrial Development in Northern Russia (ENSINOR) <http://www.arcticcentre.org/?deptid=15989>

Moved: Perspectives on Relocation and Resettlement in the Circumpolar North <http://www.alaska.edu/boreas/move/>

Reindeer Herding and Climate Change (EALAT) <http://arcticportal.org/en/icr/ealat>

Although these and other initiatives are clearly addressing a need, what has not yet taken place in many northern communities is the systematic planning and analysis effort towards this issue.

Conversely, it must also be said that the development and through understanding of adaptation alternatives (and related consequences) requires a considerable amount of time. Be it for the collection of additional data, or for the challenging re-assessment of needs and values to be done on both an individual and collective basis.

In conclusion, it is important to highlight the need to link research to policy-making, by placing an emphasis on getting research messages to appropriate target groups, linking research to existing local knowledge of climate related hazards and involving local communities in adaptation decision making. In turn, education and awareness creation on climate change among governments, institutions, communities and individuals should be viewed as a necessary step in promoting adaptation to climate change in the Arctic, a region that is already under pressure from climate stresses which increase vulnerability to further climate change and reduce adaptive capacity.

Only though collaborative efforts between all parties involved will adaptive capacities be created and sustained.