Responding to Climate Change in Northern Communities: Impacts and Adaptations

by Dyanna Riedlinger

SUBSTANTIAL efforts are being directed at predicting the impacts of climate change on Arctic resources. However, less research has extended the discussion of impact assessment to address the sensitivities of the communities that rely on these resources. How are Inuit communities responding to change, and how will they adapt to future changes? Environmental change is expected in the North, and a capacity to adapt is a part of Inuit livelihood systems. However, increased variability, extreme events, and unusual fluctuations create adaptation problems by interfering with the ability of people to access the various resources on the land and making resource availability itself less predictable (Fast and Berkes, 1998).

Human adaptation to climate change is poorly understood, though trying to understand and plan for it is an important aspect of current research. Little is known about the cultural, social, and economic limits to adaptation in Inuit communities (Fast and Berkes, 1998). Humans and the environment are closely linked in the Arctic, and societies dependent on Arctic resources are more sensitive than other societies to environmental change. Despite the resilience and adaptability that have characterized much of Inuit history, some aspects of the Inuit way of life may be at considerable risk if subjected to a rapidly changing system (Peterson and Johnson, 1995).

My approach to the issue of adaptation in northern communities is based on my experience working with the community of Sachs Harbour, Northwest Territories, and the project *Inuit Observations of Climate Change* (Riedlinger, 1999). The project is a collaborative research effort documenting Inuvialuit knowledge of climate change and the contributions of this knowledge to climate change research. A secondary goal is to understand adaptive strategies used by the community to respond to climate change phenomena. Here, I describe how current climate-related environmental changes are affecting seasonal subsistence activity in Sachs Harbour and discuss how Inuvialuit are coping with such impacts.

IMPACTS OF CLIMATE CHANGE ON SUBSISTENCE ACTIVITY

While the community of Sachs Harbour describes a general warming trend in the region, what is most noticeable is increased variability associated with the weather. Most people feel current changes are beyond natural or expected variability and fluctuation. There are more extremes, and changes in the weather are more frequent, sudden, and intense. The weather and seasons are more unpredictable, as are phenomena such as sea ice conditions. Taken together, these changes are affecting community activity, most noticeably hunting, fishing, travelling, and other subsistence activity. The impacts can be described in the context of four interrelated themes: access to resources (the ability to travel on the land or sea ice), safety, predictability, and species availability.

Fig. 1. Thaw slumping at Angus Lake near the community of Sachs Harbour, Northwest Territories. People in the community believe that the rate and extent of slumping and erosion have increased. Photo by Dyanna Riedlinger.

For example, in recent years, changes in the rate of spring melt and increased variability of spring weather conditions have affected community access to hunting and fishing camps. In May, much of the community goes out to camps at inland lakes to ice fish and wait for the geese to arrive for the spring goose hunt. They travel by ski-doo, pulling a *qamutik* (sled), staying on snow-covered areas, and often using the coastal sea ice and frozen rivers to access the camps. However, warmer springs have resulted in earlier, faster snowmelt and breakup of the rivers, making access to camps difficult and shortening the time

Fig. 2. Rosemarie Kuptana, Yvonne Elias, and Dyanna Riedlinger fishing at Middle Lake in May 2000, while waiting for the geese to arrive on the island. Photo by Graham Ashford, International Institute for Sustainable Development.

people can spend out on the land. In many areas, more deep, soft snow is making travel more difficult than it was on hard-packed, "good-for-travelling" snow.

The second theme, safety, is most obvious in conversations about the sea ice environment. The sea ice in the coastal vicinity of the community is used for travel, fishing, and seal and polar bear hunting. Ice conditions are less reliable now than in the past. In the last decade, people in Sachs Harbour have observed increased ice movement in winter and spring and changes in the distribution of leads, cracks, and pressure ridges, as well as overall thinning of the ice. People say that in the past, they rarely had to worry about ice conditions the way they do now. Now, you really need experience to travel because the ice is not as safe.

Inuvialuit rely on the ability to predict phenomena such as snow and ice conditions, the weather, or the timing of wildlife migration and movement. In recent years, they have been finding that climate-related change has made conditions unpredictable. For many, weather patterns and events are happening "at the wrong time now." For example, as one Elder pointed out, the weather now changes more often:

> The weather never changed that much years ago…it was always cold. Not like today. You can't even tell when the weather is going to change. Years ago we knew when the weather was going to change – [in] mild weather, a storm was going to come, we [could] get ready for it even. But today it changes so much: we are expecting a big storm – next day, clear as can be. I can't predict the weather anymore like we used to years ago. I used to predict weather when I could see it…coming. (P. Esau, Sachs Harbour, 2000)

The final theme describing impacts on subsistence activity relates to species availability, particularly of fish and wildlife. Arctic wildlife will feel the indirect effects of climate change, such as changes to the timing and abundance of forage and water availability, or parasite infections. The distribution, abundance, and movement of other species in the region may also change: for example, ringed seal abundance has been observed to vary with changing sea ice conditions, and certain fish species have been found in increasing numbers in summer nets. Warmer temperatures and higher amounts of rainfall have increased summer forage availability for caribou and musk-ox, but have also increased the autumn risk of freezing rain that covers the ground with a layer of ice, making forage unavailable. The impacts of climate change on wildlife availability and health may have consequences for community health, as country foods make up a substantial portion of the household food intake and are a key factor in maintaining physical and cultural health.

RESPONDING TO CHANGE

The climate-related changes experienced by the community of Sachs Harbour are relatively recent, having occurred largely in the last decade. The experience of the *Inuit Observations of Climate Change* project indicates that these changes are having an impact on subsistence activity. However, at this time the community is successfully coping. Many changes in the weather, on the land, and in the sea ice have been absorbed through the flexibility of the seasonal cycle of activity and the Inuvialuit way of life. For the most part, coping strategies relate to adjusting or modifying subsistence activity—changing when, where, or how seasonal hunting and fishing occur. These kinds of responses to environmental change and fluctuation can be considered in five categories: 1) modifying the timing of harvest activity; 2) modifying the location of harvest activity; 3) modifying the method of harvest activity; 4) adjusting the species harvested; and 5) minimizing risk and uncertainty.

Of the five coping strategies identified, changes to when harvesting activities take place are most noticeable. Increased seasonal variability is forcing people to adjust the timing of their "seasonal calendar." For example, warmer temperatures and unpredictable ice conditions mean hunters go out earlier for polar bear. In the spring, people describe not going out on the land for as long, in response to shorter, warmer springs and increased rates of snow and ice melt. They return to the community after the goose hunt, rather than returning to the lakes for ice fishing. Waiting is a coping strategy; people wait for the geese to arrive, the land to dry, the weather to improve, or the rain to end.

People also adjust subsistence activity in response to climate-related change by modifying where harvest activity occurs. For example, erosion and slumping at one fishing lake near the community have caused people to fish at other lakes instead. More bare ground and unreliable snow

conditions mean that families are travelling along the coastal sea ice rather than along inland routes. Recent changes to the sea ice have made hunters stay close to the community because of safety concerns, while the animals they hunt remain farther out. Permafrost thaw in many areas has forced travelers to make new trails and routes to avoid slumps, mudslides, and erosion.

A third coping strategy is to modify how harvesting is done. Community members describe using all-terrain vehicles instead of skidoos to travel in spring camps when there is not enough snow. They also describe hunting seals from boats in the open water, an adjustment necessitated by the lack of ice floes in summer months in recent years.

The community may also modify what species are harvested. People in Sachs Harbour are reporting catching more *qaaqtaq* (least cisco) in nets at the mouth of the Sachs River. In spring 2000, one result of the lack of open water and bare ground was that the geese arrived late and produced few eggs. Thus, the community collected almost no eggs. Pintail ducks and mallard ducks, considered mainland ducks, have been observed in the community, and there are also higher numbers of yellowlegs, swans, and guillemots, birds that are historically not abundant on Banks Island.

Finally, people in Sachs Harbour cope with environmental change through minimizing risk and uncertainty. In response to increased variability and unpredictability associated with the weather and other environmental phenomena, Inuvialuit describe the need to monitor conditions, such as the rivers in the spring, more closely. There is a heightened risk of being stranded on the far side of the river because it is more difficult to tell when the ice will break. People report that you really need to have experience to travel on the sea ice now. They also describe being more careful when they travel.

Inuvialuit draw on accumulated knowledge and experience to address climate change. People in Sachs Harbour are clear in stating that they have always adjusted and adapted to changes—social, political, and economic changes as well as environmental change. People may now use ATVs more than dog teams, but as one man stated, "It is pretty well the same, how we do things" (J. Lucas Sr., Sachs Harbour, 2000). When asked about the impact of changes on hunting, trapping or fishing, most people were quick to point out: "We always find some way of getting something." Some people described how in some instances it might be easier to cope with environmental change now than in the past, since the community does not rely exclusively on country foods.

Different kinds of changes have different degrees of impact, and require different kinds of responses. While this essay focuses on impacts and adaptations associated with harvest and subsistence activity, climate change will also have other economic and cultural consequences. Such impacts are more difficult for the community to address, as they may be unable to address them through modifying or adjusting harvest activity and resource use. For example, while recent changes to the sea ice environment are making travel dangerous and wildlife less accessible, the lack of sea ice also makes some people "lonely for the ice." Other environmental changes, such as those related to permafrost, may not pose a direct threat to the subsistence lifestyle of the Inuvialuit, but do directly affect other aspects of community life, such as the maintenance of buildings and roads.

THE FUTURE: ADAPTATION AND CHANGE

Climate change is affecting both the community of Sachs Harbour and the relationship of the community to the Arctic environment. The climate change phenomena observed and experienced by the community of Sachs Harbour in recent years are substantial, both in scale and in scope. However, these changes are not beyond the range of the community's ability to respond and cope, predominately through adjusting subsistence activities to react to increased seasonal fluctuation and variability. Importantly, these changes to the sea ice, the weather, and the land are *recent* events, and thus the way that the community has coped and responded up to now may not be a reliable indication of its ability to adapt in the future.

Are the strategies that Inuit used in the past still applicable today? What are the social and cultural limits to adaptability? These questions will become increasingly important if current environmental changes continue or accelerate and can no longer be addressed within the existing community and resource-use frameworks.

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Dyanna Riedlinger is the recipient of the Lorraine Allison Scholarship for the second year in a row. She recently completed her Master's degree at the Natural Resources Institute, University of Manitoba.