

Arctic Environmental Challenges

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As is well-known across the circumpolar North, environmental challenges are nothing new for the Arctic. People living here have always related to the natural environment, its variability and its unpredictability, and have found various social and cultural strategies for learning to live with change. Even human-made environmental change has a long history in many parts of the Arctic, with major impacts from resource extraction and colonization going back more than a century.

Some strategies for living with environmental change are old and deeply embedded in various indigenous cultures whereas others are newer. One of the case studies that were written for the Arctic Resilience Interim Report 2013 presented examples from the southwest Yukon of how people have created resilience as well as capacity for transformation to capture new opportunities in the face of such changes. They have done so by learning to live with change, by nurturing diversity, combining different types of knowledge for learning, and using opportunities for self-organization (Clark and Workman 2013).

Yet something is new. And we know it, even if the implications are only starting to become apparent. We know without doubt that the impacts of climate change go beyond what could be expected from past experiences of natural variability. It is not only the declining sea ice in the Arctic Ocean, vividly portrayed by images that we tend to pay attention to at this time of the year when the sea ice reaches its yearly minimum. It is also a greening of the Arctic, as shrubs, small trees and grasses expand their range, while lichen and mosses become less abundant. About one third of the Arctic has become substantially greener since the early 1980s (Larsen et al. 2014). New species are also arriving in the North, and others are becoming more abundant, such as the spruce bark beetle. The permafrost is getting warmer and less stable, making some of the Arctic coasts prone to erosion, forcing villages to consider relocation. Both the duration and the quality of ice on lakes are changing, and the same can be said about the snow cover. Change is not necessarily gradual. Events such as a thaw in the middle of the winter, fires, insect outbreaks, and landslides can have dramatic immediate and long-term effects as they break up old structures and ease the way for new ones to become established – new structures that may or may not be desirable for human well-being.

We know about the major cause of these changes – the increasing emissions of greenhouse gases from the use of fossil fuels. Historically those emissions have come mainly from countries that industrialized relatively early, but they come increasingly also from other parts of the world as the fossil-fuel-based industrial economy has spread to regions such as Asia, partly driven by exports and partly by increasing living standards in these densely populated parts of the world. As economies grow, environmental footprints are also expanding, and these regions have become important sources not only for greenhouse gases, but also for mercury and some persistent pesticides that

travel over long distances. Some of these contaminants end up in Arctic wildlife and people. Both trade and pollution cross national boundaries.

The on-the-ground changes that are becoming visible locally and regionally in the Arctic are linked to this global context. It is not just the climate system as such or the long-distance transport of pollutants. It is also a global economic, social and political system based on a development path that depends on energy sources that contribute to further global and Arctic warming. It is unfortunately a development path in which protection of the environment has not been the central priority it needs to be when sustainable development is our goal. The environmental challenge of climate change is thus not environmental only in the sense that it affects the natural environment and its ecosystems but more importantly in the broader sense of being an integrated part of the environment as a global social-ecological system. Or more correctly: an economic, political, technological and cultural system that is global in character with various expressions and impacts at each and every scale, from the very local to the global. We often use the term “globalization” as a short-hand expression for the increasing interconnectedness across the world that also affects the Arctic, both through the impacts of pollution and global warming and through the impacts of increasing demand for non-renewable resources, such as hydrocarbons and metals.

This global system is in a state of rapid change, and has been since the beginning of the industrial revolution, but at an accelerating pace since 1950. The implications go far beyond climate change. They include major increases in the use of most natural resources, in land use, and in the production of substances that have toxic properties, some of which break down very slowly once they are released into the environment. The global impacts are large enough that human civilization is now considered a geological force of a magnitude that can affect the whole Earth system. We talk about the Anthropocene.

The local expressions of the Anthropocene Earth, and its accompanying system changes, vary from place to place. The Arctic is especially prone to rapid climate change because of various feedback mechanisms. It is warming more and faster than the rest of the world. The Arctic is also especially vulnerable to the chemical intensification of the economy because many of the chemicals that do not break down easily tend to accumulate where it is cold and in food chains where fat is an important energy source. That is why marine mammals in the Arctic have higher levels of toxic chemicals in their bodies. That is also why people who rely on those animals as important food items have faced new unwelcome choices about what they can eat and still avoid health risks to themselves or their children. In addition to this long distance pollution, there are local pollution concerns related to industrial activities. Both climate change and pollution issues have been discussed thoroughly in Arctic Council assessments.

An issue that has not received as much attention yet is the increasing competition for water and land. However, competition for land is becoming a political challenge also in the sparsely populated areas of the circumpolar North. Land might appear vast but activities are often concentrated in certain areas, not least along the coasts and waterways, where landscape features provide protection and migration paths, or where the ecosystems are unusually productive. The result is an increase in conflicting interests between traditional land use, new industrial development, and ambitions to protect certain areas for nature conservation. Added to that is the need to leave space for adaptation to climate change, as well as adaptation to other environmental changes, caused either by global

industrialization or by local activities. Mining, reindeer herding, tourism and wind energy production are examples of activities competing for space in northern Sweden. In Norway, interest clashes are real between fisheries and off-shore hydrocarbon extraction. In Russia, reindeer herding and gas exploitation and pipelines occur in the same areas.

People living in the Arctic will no doubt adapt to the combined pressures from climate change and globalization, in one way or another, but with varying consequences for human well-being. Such adaptation to a large extent takes place at the local scale or even through individual decisions. But the context in which choices are made is broader. Parliamentarians active at the national level are placed at the interface between the local and the global and thereby have some obvious tasks: taking part in decisions about supporting various local adaptation efforts, taking part in decisions that affect national contributions to environmental challenges, and taking part in decisions about the national stance in international political discussions and negotiations. These issues are most likely part of normal political life of most parliamentarians.

I want to highlight a new issue that has not yet received as much attention – the challenge of dealing with rapid change in complex systems.

We know that climate change is real and happening now, yet we repeatedly get caught by surprise about the implications. The paramount example was the rapid decline in sea ice that became apparent in 2007, which even the most advanced science had not foreseen. Surprises tend to trigger responses with ripple effects way beyond the initial event. The sea ice minimum of 2007 contributed to a new way of seeing the Arctic (Christensen, Nilsson, and Wormbs 2013). Various social actors began to draw lines on maps showing new shipping lanes and highlighting new industrial opportunities. Over just a few years, the media picture of climate change as a threat and challenge became one of economic development and global geopolitics. New political discourses have gained momentum, including increasing attention to security and sovereignty.

There are many other *events* where climate change plays a role as a factor that places human activities and environmental variability into a new context, and which can cause ripple effects in both natural and social environments. Examples include forest fires and landslides. In Sweden, this summer brought the largest forest fire in modern times, and initially there was a lack of adequate resources to fight the fire because the known risks for such a fire had not warranted the investments. This fire was not in the Arctic, but could have been. In fact, boreal forests have not burned at today's high rates at least over the past 10,000 years, and climate change projections show that even more wildfire activity may be ahead (Kelly et al. 2013). Sometimes it is heavy rains accompanied by flooding and landslides. Or landslides caused by warming permafrost. Other times it is lack of snow and ice in places where we have learned to rely on these elements of nature. Some of the implications of climate change go beyond what we could have anticipated even if we had read every scientific paper on Arctic change. We are increasingly dealing with the unknown unknowns. They cannot be predicted and are therefore difficult to plan for, in the way that we have historically planned and managed known and anticipated risks in society.

One way of approaching this challenge is to look at resilience: What are the features of a society and ecosystems – or rather of a social-ecological system – that provide the capacity to handle rapid change and surprises? What ensures the capacity to bounce back in ways that allow us to maintain a

good life or transform without losing attention to essential values such as human well-being (Arctic Council 2013)?

In the Arctic Resilience Interim Report 2013, one chapter discusses seven types of capital that are essential for adaptive and transformative capacity (Kofinas, Clark, and Hovelsrud 2013). They include **natural capital**, which are structures and processes in ecosystems that support a range of functions that we depend on as human societies, such as food, clean water, fiber and fuel; regulation of water flows, climate and diseases; and the role of nature for cultural, spiritual and aesthetic benefits. The political question in relation to resilience is how to go about protecting ecosystem processes in such a way that they continue to provide for us, even if the climate changes radically and even if we need to meet unforeseen environmental challenges.

Unfortunately, some ecological resilience is already eroded in the Arctic and elsewhere. An example is that the chemical contamination of the environment has made many species more vulnerable to additional stresses. We also need to keep in mind that once we have polluted one source of drinking water, we have one source less in reserve, in case our wells dry up or water bodies become infested by disease-causing organisms. Moreover, resilience is eroded when we build infrastructure on land that might otherwise have been able to absorb the consequences of extreme weather events or provide alternative hunting, gathering and fishing grounds as species change their range due to climate change. Resilience is also affected when we harvest resources to the point that the population has no buffering capacity left when the environment changes, for either natural or human causes. We need to be aware that new industrial activities bring more potential erosion of ecosystem resilience and ensure that we safeguard the adaptive capacity of ecosystems so that they can continue to serve as a fundamental base for human well-being.

The second feature of adaptive and transformative capacity is **social capital**, which is essential for societies to be able to work collectively in solving problems. In contrast to the past, where global connectivity was more limited, social capital today has to be adequate for collective decision-making across scales, from the local to the global. National parliaments are parts of the social capital, as is the Arctic Council at the international level, in addition to various forms of local governance arrangements. Social capital is not only networks or organizational settings as such, but also the trust among various actors and the ability to communicate and learn from each other.

A third aspect is **human capital**, such as skills, competences and education of individuals, which is in turn also linked to a fourth aspect – **knowledge assets**, which play a key role for our collective ability to perceive and understand change and translate it into action. Fifth is the role of **cultural capital**, which is a broad category that partially overlaps with both social capital and knowledge assets, and in many cases also with natural capital. Sixth is **financial capital** – having the money to make necessary investments. However, financial capital alone would not make up for the other sources of adaptive capacity. Seventh in this list of sources of adaptive capacity is **infrastructure**.

Sources of resilience are to a large extent shared resources. As a bundle of resources, adaptive and transformative capacity cannot be owned. They are our common responsibility. Investments in sources of resilience can be seen as a collective insurance in light of having to expect the unexpected. It also becomes increasingly important to monitor the status of resilience to ensure that it is in good enough shape for society – at all levels – to handle rapid change and surprises and still be able to bounce back.

Often, we do not start evaluating the capacity to deal with emergencies until after we have had a crisis. I suggest that we need to evaluate not only emergency preparedness in relation to increasing economic activity in the Arctic, but also adaptive capacity at a more general level to deal with both gradual changes and surprises. Such monitoring would complement and should be linked to environmental monitoring and also to the on-going efforts to develop indicators for human development in the Arctic.

Some efforts have been put into improving various aspects of adaptive and transformative capacity in the Arctic, such as investments in education and investments in strengthening sources of social capital by various collaborative arrangements. But there are also obvious challenges. The colonial history of the Arctic has created a situation where lack of trust often affects social capital. Moreover, traditional sources of resilience have eroded due to past decisions that resulted in loss of cultural capital and knowledge connected with languages and traditional practices among indigenous peoples. In some places on-going erosion of natural capital is also a real issue. Understanding our sources of resilience and safeguarding them is key to meeting the challenge of learning to live with rapid change, and is an exercise that benefits from co-learning across knowledge traditions. Because the environmental challenges facing the Arctic region are real and will increase with further climate change and globalization, there is a political obligation to actively strengthen the adaptive and transformative capacity of Arctic social-ecological systems. Because the Arctic is part of a complex global system, this strengthening has to take into account the need to build capacity to learn across scales.

One important conclusion from the Arctic Resilience Interim Report 2013 is that dealing with surprises requires strategies for adaptation and transformation that include sharing knowledge and creating dialogue and deliberation among a range of different actors in ways where we sometimes have to reevaluate old assumptions. In a rapidly changing Arctic we need many fora for such processes, especially bridging organizations that can serve as spaces in which it is possible to communicate across different levels of governance from the very local to the global. National parliaments ideally serve such a role, but equally important are various networks that work both on the ground and in the international political sphere, and which can include various NGOs as well as researchers and businesses, along with representatives of formal governments. A question to discuss is what role Parliamentarians of the Arctic Region could play for supporting such learning and for strengthening different aspects of adaptive and transformative capacity.

As a final remark, I want to emphasize that we also need to prepare for transformation – globally and locally. Today's global development path is not sustainable. If we are serious about sustainable development as a normative goal, we also have to consider how to change the current trajectory. It will involve choices both in what we want for the future and how to handle more immediate needs and conflicting interests. Space for productive deliberation will play an essential role for carrying such discussions forward and for building the social capital that we need in a rapidly changing world. Science can contribute with knowledge and analysis but political leaders have a much more important role to play. As Parliamentarians of the Arctic region and elected representatives, you have the political responsibility for nurturing the shared resources that make up adaptive and transformative capacity.

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