

Indigenous communities are facing major economic and cultural impacts.



The Arctic is home to numerous Indigenous Peoples whose cultures and activities are shaped by the arctic environment. They have interacted with their environment over generations through careful observations and skillful adjustments in traditional food-harvesting activities and lifestyles. Through ways of life closely linked to their surroundings, these peoples have developed uniquely insightful ways of observing, interpreting, and responding to the impacts of environmental change.

Indigenous observations and perspectives are therefore of special value in understanding the processes and impacts of arctic climate change. There is a rich body of knowledge based on their careful observations of and interactions with their environment. Holders of this knowledge use it to make decisions and set priorities. The ACIA has attempted to combine knowledge and insights from indigenous people with data from scientific research, bringing together these complementary perspectives on arctic climate change.

Flexibility and adaptability have been key to the way arctic Indigenous Peoples have accommodated environmental changes over many generations. Current social, economic, political, and institutional changes play a part in enabling or constraining the capacity of peoples to adapt. The rapid climate change of recent decades, combined with other ongoing alterations in the world around them, presents new challenges.

Across the Arctic, indigenous people are already reporting the effects of climate change. In Canada's Nunavut Territory, Inuit hunters have noticed the thinning of sea ice, a reduction in the numbers of ringed seals in some areas, and the appearance of insects and birds not usually found in their region. Inuvialuit in the western Canadian Arctic are observing an increase in thunderstorms and lightning, previously a very rare occurrence in the region. Athabaskan people in Alaska and Canada have witnessed dramatic changes in weather, vegetation, and animal distribution patterns over the last 50 years. Saami reindeer herders in Norway observe that prevailing winds relied upon for navigation have shifted and become more variable, forcing changes in traditional travel routes. Indigenous Peoples who are accustomed to a wide range of natural climate variations are now noticing changes that are unique in the long experience of their peoples.



Compiling indigenous knowledge from across the Arctic, a number of common themes clearly emerge, though there are regional and local variations in these observations.

- The weather seems unstable and less predictable by traditional methods.
- Snow quality and characteristics are changing.
- There is more rain in winter.
- Seasonal weather patterns are changing.
- Water levels in many lakes are dropping.
- Species not seen before are now appearing in the Arctic.
- Sea ice is declining, and its quality and timing are changing.
- Storm surges are causing increased erosion in coastal areas.
- The sun feels “stronger, stinging, sharp”. Sunburn and strange skin rashes, never experienced before, are becoming common.
- Climate change is occurring faster than people can adapt.
- Climate change is strongly affecting people in many communities, in some cases, threatening their cultural survival.

Many indigenous communities of the Arctic depend primarily on harvesting and using living resources from the land and sea. The species most commonly harvested are marine mammals such as seals, walrus, polar bears, and narwhals, and beluga, fin, bowhead, and minke whales; land mammals such as caribou, reindeer, moose, and musk ox; fish such as salmon, Arctic char, and northern pike, and a variety of birds, including ducks, geese, and ptarmigan.



“The river Virma grows shallower every year. Now there is hardly any water left and it can freeze all the way to the bottom. There used to be a lot of fish, but now they are almost all gone. I think it is due to the drying of the bogs and marshes.”

*Vasily Lukov
Lovozero, Russia*



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Indigenous Peoples throughout the Arctic maintain a strong connection to the environment through hunting, herding, fishing, and gathering. The living resources of the Arctic not only sustain Indigenous Peoples in an economic and nutritional sense, but also provide a fundamental basis for social identity, spiritual life, and cultural survival. Rich mythologies, vivid oral histories, festivals, and animal ceremonies illustrate the social, economic, and spiritual relationships that Indigenous Peoples have with the arctic environment. These traditions distinguish the food harvesting practices of Indigenous Peoples from conventional hunting.

Access to food resources is often related to travel access and safety. For example, changes in the rate of spring melt and increased variability associated with spring weather conditions have affected access to hunting and fishing camps. For example, when Inuit families in the western Canadian Arctic go out to camps at lakes for ice fishing and goose hunting in May, they travel by snowmobile, pulling a sled, staying on snow-covered areas or using coastal sea-ice and frozen rivers. However, warmer springs have resulted in earlier, faster snowmelt and river break-up, making access difficult. The availability of some species has changed due to the inability of people to hunt them under changing environmental conditions. For example, the reduction in summer sea ice makes ringed seals harder to find. Climate-related changes in animal distributions are occurring, and larger changes are projected. For example, northward movement of the pack-ice edge is expected to reduce the availability of seabirds as food resources to many arctic communities.

As Indigenous Peoples perceive it, the Arctic is becoming an environment at risk in the sense that sea ice is less stable, unusual weather patterns are occurring, vegetation cover is changing, and particular animals are no longer found in traditional hunting areas during specific seasons. Local landscapes, seascapes, and icescapes are becoming unfamiliar, making people feel like strangers in their own land.

Seals Become Elusive for Inuit in Nunavut, Canada

The ringed seal is the single most important food source for the Inuit, representing the majority of the food supply in all seasons. No other species is present on the land or in the waters of Nunavut in the quantities needed to sustain the dietary requirements of the Inuit. In recent decades, local people have observed that ringed seal pup production has suffered as increased temperatures have led to a reduction and destabilization of the sea ice. These ice changes have also affected the harvest of polar bear, another important food source, because ringed seals are central to a polar bear's diet and the bears are also directly affected by the observed changes in snow and ice.

To hunt, catch, and share these foods is the essence of Inuit culture. Thus, a decline in ringed seals and polar bears threatens not only the dietary requirements of the Inuit, but also their very way of life. Projections of sea-ice decline in the future spell further trouble. Forecasts of summer sea ice from climate models suggest reductions of 50% or more during this century, with some models projecting the complete disappearance of summer sea ice. Because ringed seals and polar bears are very unlikely to survive in the absence of summer sea ice, the impact on indigenous communities that depend upon these species is likely to be enormous.



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Observed Climate Change Impacts in Sachs Harbour, Canada

The community of Sachs Harbour is located on Banks Island in the Canadian western Arctic. Climate change impacts on this community have been studied intensively through the Inuit Observations of Climate Change project, undertaken by the Community of Sachs Harbour and the International Institute for Sustainable Development. The Inuvialuit (the Inuit of the Canadian western Arctic) initiated this study because they wanted to document the severe environmental changes they are witnessing as a result of climate change and to disseminate this information to the world. A brief summary of some of their findings follows.

1. Physical Environmental Changes

- Multiyear ice no longer comes close to Sachs Harbour in summer.
- Less sea ice in summer means that water is rougher.
- Open water is now closer to land in winter.
- More rain in summer and autumn makes travel difficult.
- Permafrost is no longer solid in places.
- Lakes are draining into the sea from permafrost thawing and ground slumping.
- Loose, soft snow (as opposed to hard-packed snow) makes it harder to travel.

2. Predictability of the Environment

- It has become difficult to tell when ice is going to break-up on rivers.
- Arrival of spring has become unpredictable.
- It is difficult to predict weather and storms.
- There are "wrong" winds sometimes.
- There is more snow, blowing snow, and whiteouts.

3. Travel Safety on Sea Ice

- Too much broken ice in winter makes travel dangerous.
- Unpredictable sea-ice conditions make travel dangerous.
- Less multiyear ice means traveling on first-year ice all winter; this is less safe.
- Less ice cover in summer means rougher, more dangerous storms at sea.

4. Access to Resources

- It is more difficult to hunt seals because of a lack of multiyear ice.
- Hunters cannot go out as far in winter because of a lack of firm ice cover.
- It is harder to hunt geese because the spring melt occurs so fast.
- Warmer summers and more rain mean more vegetation and food for animals.

5. Changes in Animal Distributions and Condition

- There is less fat on the seals.
- Fish and bird species are observed that have never been seen before.
- There is an increase in biting flies; never had mosquitoes before but do now.
- Fewer polar bears are seen in the autumn because of lack of ice.
- The fish "least cisco" is now being caught in greater numbers.



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Climate change is occurring faster than indigenous knowledge can adapt and is strongly affecting people in many communities. Unpredictable weather, snow, and ice conditions make travel hazardous, endangering lives. Impacts of climate change on wildlife, from caribou on land, to fish in the rivers, to seals and polar bears on the sea ice, are having enormous effects, not only for the diets of Indigenous Peoples, but also for their cultures.



The weather seems less stable and predictable.

From sources of indigenous knowledge across the Arctic come reports that the weather seems more variable, unfamiliar, and is behaving unexpectedly and outside the norm. Experienced hunters and elders who could predict the weather using traditional techniques are now frequently unable to do so. Storms often occur without warning. Wind direction changes suddenly. In many places it is increasingly cloudy. Storms bringing high winds and lightning occur with increasing frequency in some locations. As noted by several elders, “the weather today is harder to know”. This presents problems for many activities, from hunting to drying fish, on which Indigenous Peoples depend.

“Right now the weather is unpredictable. In the older days, the elders used to predict the weather and they were always right, but right now, when they try to predict the weather, it’s always something different.”

- Z. Aqqiaruq, Igloodik, Canada, 2000

“The periods of weather are no longer the norm. We had certain stable decisive periods of the year that formed the traditional norms. These are no longer at their places... Nowadays the traditional weather forecasting cannot be done anymore as I could before... For the markers in the sky we look now in vain...”

- Heikki Hirvasvuopio, Kakslauttanen, Finland, 2002



Snow characteristics are changing, and there is more freezing rain.

Changes in snow and ice characteristics are widely reported. Changing wind patterns cause the snow to be hard packed; hunters and travel parties are thus unable to build igloos, which are still commonly relied upon for temporary and emergency shelters. Injuries and deaths have been attributed to sudden storms and those involved not being able to find good snow with which to build shelters. More freezing rain and increasing frequency of freeze-thaw cycles are affecting the ability of reindeer, caribou, musk ox, and other wildlife to find food in winter, which in turn affects the Indigenous Peoples who depend upon these animals.

“There used to be different layers of snow back then. The wind would not blow as hard, not make the snow as hard as it is now... It’s really hard to make shelters with that kind of snow because it’s usually way too hard right down to the ground.”

- T. Qaqimat, Baker Lake, Canada, 2001

“Change has been so dramatic that during the coldest month of the year, the month of December 2001, torrential rains have fallen in the Thule region so much that there appeared a thick layer of solid ice on top of the sea ice and the surface of the land... which was very bad for the paws of our sled dogs.”

- Uusaqqak Qujaukitsoq, Qaanaaq, Greenland, 2002

“It used to be that there would be proper freezing which would dry the lichen and the snow would fall on top. There would be rain that would form the bottom, which would then freeze properly. Now it rains, and the bottom freezes wet, and this is bad for the reindeers. It ruins the lichen. Ice is everywhere and the reindeer cannot get through. This has meant death to a number of reindeers because they cannot get to the lichen.”

- Niila Nikodemus, 86, the oldest reindeer herder in Purnumukka, Finland, 2002

“First it snows, then it melts, like it would be summertime. And this all over again. First there is a big snowfall, then it warms up and then it freezes. During winter now it can rain, as happened last New Year. Before it never rained during wintertime. Rain in the middle of winter? To the extent that snow disappears? Yes, it is true. Rain, and snow melts!”

- Vladimir Lifov, Lovozero, Russia, 2002

The Kalaallisut (Greenlandic) word for weather and climate is sila. Sila is also the word for the universal consciousness, the all-pervading, life-giving force that is manifest in each and every person. Sila integrates and connects a person with the rhythms of the natural world.

Sea ice is declining, and its quality and timing are changing, with important repercussions for marine hunters.

Sea ice is declining markedly, both in extent and thickness. The pack ice is further from shore and often too thin to allow safe travel. Less sea ice makes stormy seas more violent and dangerous for hunters. Marine mammals whose habitat is sea ice, including walrus, polar bear, and ice-associated seals are very likely to experience major population declines in this century and could be threatened with extinction.

"Long ago, there was always ice all summer. You would see the [multiyear ice] all summer. Ice was moving back and forth this time of year. Now, no ice. Should be [multiyear]. You used to see that old ice coming from the west side of Sachs. No more. Now between Victoria Island and Banks Island, there is open water. Shouldn't be that way."

- Frank Kudlak, Sachs Harbour, Canada, 1999

"I know that today that seals, it might be because of early spring break-up or that they are out on the ice floes, that the seals are nowhere."

Man age 62, Kuujuaq, Canada,

"When there is lots of ice, you don't worry too much about storms. You get out there and travel in between the ice [floes]. But last few years there has been no ice. So if it storms, you can't get out..."

- Andy Carpenter, Sachs Harbour, Canada, 1999

Seasonal weather patterns are changing.

Peoples across the Arctic report changes in the timing, length, and character of the seasons, including more rain in autumn and winter, and more extreme heat in summer.

"Sila [the weather and climate] has changed alright. It is a really late falltime now, and really fast and early springtime. Long ago the summer was short, but not anymore."

- Sarah Kuptana, Sachs Harbour, Canada, 1999

"It used to be really nice weather long ago when I was a kid. Bad weather now. So many mosquitoes. Sometimes it was hot, sometimes cold - not like now. [Things happen at the] wrong time now, it is way different now. August used to be cool-off time, now it is hot. It is really short in the winter now."

- Edith Haogak, Sachs Harbour, Canada, 2000

"The weather has changed to worse and to us it is a bad thing. It affects mobility at work. In the olden days the permanent ice cover came in October... These days you can venture to the ice only beginning in December. This is how things have changed."

- Arkady Khodzinsky, Lovozero, Russia, 2002



I think over again
My small adventures
My fears
Those small ones that seemed so big
For all the vital things
I had to get and to reach
And yet there is only one great thing
To live to see the great day that dawns
And the light that fills the world.

- Inuit Poem