

# Inuit perceptions of climate change in East Greenland

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### Article abstract

Global warming and climate change are important topics of debate in Greenland. This paper examines how the Tunumiit of East Greenland perceive the weather, the changing climate, and the local environment. It also discusses how their perceptions have been influenced by political debates on global warming, sustainable development, and wildlife management since the 1950s. In the past, if some animal species disappeared from a specific area, or if the weather turned bad, the Tunumiit would attribute this misfortune to human transgressions of rules of respect. Today, they often connect the increasingly unpredictable weather to their reduced access to natural resources and greater difficulties in travelling. Some hunters speak of a shift from seal hunting to cod fishing in East Greenland, although fishing is still perceived as a vulnerable source of income with low status. Nowadays, older methods of navigation and orientation coexist with such new technologies as GPS and mobile telephones. Some local hunters and villagers feel unfairly accused of increases in CO2 emissions and pollution from their motorboats and generators. Tunumiit hunting communities are facing increasing uncertainty on all levels of their existence, and their hunters are turning to the growing tourism industry—a side effect of global warming—and other coping strategies to maintain their local subsistence activities and to reinforce their own culture.

# Inuit perceptions of climate change in East Greenland

Cunera Buijs\*

**Résumé:** Perceptions inuit du changement climatique dans l'Est du Groenland

Le réchauffement planétaire et le changement climatique font l'objet d'importantes discussions au Groenland. Cet article examine de quelle manière les Tunumiit de l'Est du Groenland perçoivent les conditions atmosphériques, le changement climatique et l'environnement local. On y discute aussi de la façon dont leurs perceptions ont été influencées par les débats politiques sur le changement climatique, le développement durable et la gestion de la faune depuis les années 1950. Autrefois, si une espèce animale disparaissait d'un lieu particulier, ou si le mauvais temps durait trop, les Tunumiit attribuaient ces phénomènes à des transgressions des règles de respect par les humains. Aujourd'hui, l'accès limité aux ressources naturelles et les difficultés de déplacement sont souvent mentionnés en relation avec des conditions atmosphériques de plus en plus imprévisibles. Certains chasseurs pensent que la pêche à la morue a remplacé la chasse au phoque dans l'Est du Groenland, bien que la pêche soit toujours perçue comme une source de revenus fragile et une activité déconsidérée. De nos jours, les anciennes méthodes de navigation et d'orientation coexistent avec de nouvelles technologies telles que le GPS et les téléphones portables. Certains chasseurs et villageois locaux se sentent injustement accusés de produire des émissions de CO<sub>2</sub> à cause de leurs bateaux à moteur et de leurs génératrices. Les communautés de chasseurs tunumiit sont confrontées à une incertitude grandissante dans tous les aspects de leur existence. Elles intègrent un tourisme en forte croissance — effet secondaire du réchauffement planétaire — et d'autres stratégies d'adaptation afin de perpétuer leurs activités locales de subsistance et de renforcer leur propre culture.

**Abstract:** Inuit perceptions of climate change in East Greenland

Global warming and climate change are important topics of debate in Greenland. This paper examines how the Tunumiit of East Greenland perceive the weather, the changing climate, and the local environment. It also discusses how their perceptions have been influenced by political debates on global warming, sustainable development, and wildlife management since the 1950s. In the past, if some animal species disappeared from a specific area, or if the weather turned bad, the Tunumiit would attribute this misfortune to human transgressions of rules of respect. Today, they often connect the increasingly unpredictable weather to their reduced access to natural resources and greater difficulties in travelling. Some hunters speak of a shift from seal hunting to cod fishing in East Greenland, although fishing is still perceived as a vulnerable source of income with low status. Nowadays, older methods of navigation and orientation coexist with such new technologies as GPS and mobile telephones. Some local hunters and villagers feel unfairly accused of increases in CO<sub>2</sub> emissions and pollution from their motorboats and

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generators. Tunumiit hunting communities are facing increasing uncertainty on all levels of their existence, and their hunters are turning to the growing tourism industry—a side effect of global warming—and other coping strategies to maintain their local subsistence activities and to reinforce their own culture.

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## Introduction

East Greenland was “discovered” in 1884 when its population numbered about 400 people (Thalbitzer 1914: 27). In 1894, the first Danish trading post and missionary station was established in Tasiilaq (Ammassalik) (Eistrup 1989: 97). Today the Tasiilaq District has ca. 3,000 inhabitants. The municipalities of Nuuk, Tasiilaq, and Ittoqqortoormiit merged in 2010 to become Sermersooq Municipality. During the 1960s, Tunumiit<sup>1</sup> families still spent their summers in tents scattered in small groups along the fjord. A nuclear or extended family inhabited each tent, and several families formed compounds of up to five tents. They moved along the coast, forming ever-changing groups that gathered together in winter in relatively big winter dwellings and at midsummer for summer fishing. They exchanged news and shared meals. Men went out hunting together, and people celebrated with drum dances, games, and other festivities (Nooter 1976; Petersen 2003; Robbe 1994; Robert-Lamblin 1986; Rosing 1957).

This lifestyle was changed during the second half of the 20th century by the Danish government’s centralisation policy (G60). New settlements were built along the fjords. Danish workers constructed prefabricated two-room wooden houses and the Inuit were advised to settle in permanent villages. Centralisation was intended as a means to provide social services, schools, churches, small stores, and local medical stations. The result was abandonment of the smaller settlements in East Greenland. The population had to be concentrated as a prerequisite for the introduction of large-scale fishing techniques, fishing vessels, and fisheries. The East Greenland economy shifted from subsistence hunting, fishing, and gathering to a cash economy. Hunters’ families began to augment hunting yields with other sources of income, and many East Greenlanders found paid employment. Strong cultural continuity continued into the second half of the 20th century and, even today, several families camp on the land during the summer months. The summer migration now takes place during school holidays and still involves subsistence activities on the land, such as fishing and

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<sup>1</sup> The Tunumiit include the Tiilerilaarmiit and the Tasiilarmiit. In this article I will follow the orthography of Tunumiisut, the East Greenlandic language, provided by Robbe and Dorais (1981) as there is still no fixed modern spelling. The original orthography is used in citations that I have translated from Dutch, Danish, and East Greenlandic.

hunting. It is still important to the economic and social life of the Tunumiit in small settlements (Dahl 2000; Petersen 2003).

Even today, although many people have paid jobs and scheduled working hours, the pace of life is different during winter and summer. The winter solstice coincides with the celebration of Christmas and New Year's Day, and the summer solstice with the National Holiday of Greenland, on June 21. Climate change has not affected the summer and winter pattern of the Tunumiit, although summers and winters are now somewhat warmer on average.<sup>2</sup> Summers are a bit longer and winters somewhat shorter. The changes are most obvious during autumn, which now lasts longer, and spring, which comes earlier.<sup>3</sup>

Global warming and climate change are major topics of debate in Greenland. Greenlanders are aware of climate changes and global warming discourse. For more than a decade, several studies have thoroughly examined Inuit perspectives on the environment (e.g., MacDonald 1998; Sejersen 2002, 2003) and on climate change (e.g., Berkes and Jolly 2001; Krupnik and Jolly 2002). However, it was the 2007-2008 International Polar Year that generated the most research on Arctic communities and their strategies for adapting to the changing climate (e.g., Smit et al. 2008). Nonetheless, the political elites usually ignore Inuit perceptions of climate change, and Indigenous knowledge is often looked down upon by the policy-makers and natural scientists. This article explores how the Tunumiit now interpret climate change in East Greenland and the rapid developments in their environment. I gathered the data from the hunting communities of Tasiilaq and Tiilerilaq in 2007 and 2008, via participant observation and 25 open interviews with 14 men and 11 women, 41 to 82 years old.

### **Changes in the weather**

The climate has never been stable in East Greenland. During the 1960s, the temperature of the seawater off the East Greenland coast changed, and when the Dutch anthropologist Nooter began to study the hunting culture of the Tiilerilaarmiit in 1965 hunting conditions had changed, too. During a relatively warm period between 1930 and the 1960s, the cod population increased and subsistence activities in East Greenland shifted from a predominance of hunting to more profitable fishing. When Nooter returned to the same area in 1967 the situation had changed again: water temperatures had dropped and people in Tiilerilaq had returned to a predominantly seal-hunting economy. Greenlanders are used to adapting to their changeable environment.

East Greenlanders informed us in 2007 and 2008 that in 1985 the Sermilik fjord was still covered with a solid layer of ice during the winter, unlike winters in the 1970s

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<sup>2</sup> The average temperatures in East Greenland are -7.5 degrees C in winter and 5.5 degrees C in summer. The average annual temperature is -1.7 degrees C, measured during the period 1961-1990 (Box 2002).

<sup>3</sup> This information comes from participant observation and open interviews.

and 1980s when the ice was often blown away. East Greenland is known for heavy storms called *neqqajaaq* and *pilarngaaq*. The ice on the fjord would disappear after the storms and then build back up. After a few days, there would be a resumption of seal hunting at the breathing holes and on *qatsimalit* ('seals basking in the sun on the ice'), as well as dogsledding (cf. Poort 2007: 93ff.). Although the climate has never been stable, it is now described as "not normal" by Marius Nakinge:

The last winter that the ice on the Sermilik fjord was still closed predominantly during the winter was in 1982. From that year onwards we have now become aware of a trend toward open water during the winters. Nowadays, the Sermilik fjord has open water until February, and for many winters from ca. 1997 onwards it has been possible to sail by motorboat the entire winter. This was not normal in the past. We used to drive much more by dogsled. The situation is very unusual. *Sila*<sup>4</sup>, the weather, is unpredictable nowadays (Marius Nakinge, 2007).

The Tunumit observe that sea ice now appears later in winter and disappears earlier in spring. They see that fjords previously covered with ice in October or November may nowadays not freeze before December, or even as late as January or February. Until about 1982, the ice used to break up in the month of May. Hunters relate that nowadays it breaks up a few weeks earlier, and is already unreliable in March. Ice on the fjords is thinner than in the past, and there are winters with unusual amounts of snow. This combination is dangerous as people in Tasiilaq and Tiilerilaq explained:

There is nowadays more snow than in the past. Sometimes two metres or more. Thin ice covered with a thick layer of snow is very unreliable. Just going out on the ice to go ice fishing for *suluppaavaq* ('ocean perch,' *Sebastes marinus*) is not possible anymore (Paulus Larsen, 2008).

One person takes the lead and the others follow him at a safe distance (Augo Kristiansen in Sjouwerman 2009).

Some dogsled and snowmobile routes have changed because of bad ice conditions. People often say that the weather has become unpredictable with more storms and rain, and this perception is corroborated by data from the Tasiilaq weather station.

Perceptions are also being influenced by modern communication technology. The local radio station broadcasts weather reports and predictions hourly. Hunters and fishers in motorboats have since the 1980s used radio equipment to listen to the weather broadcasts. They communicate by mobile or radio telephones. Some East Greenlanders also use GPS nowadays when travelling by boat, but not all of them can afford it. Older systems to indicate direction and position still exist and even today

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<sup>4</sup> The word *Sila* is a commonly used Tunumiisut word for 'weather' and 'universe' (Robbe and Dorais 1981: 103, 125-126; Thalbitzer and Holm 1914). It also means 'outdoors,' while *silami* is 'being outside,' and *silamu* 'going out.' *Silaanaq* means 'air' and 'atmosphere.' *Sila* also refers to intelligence and mind (synonymous with *iisimmaseq*). A person said to be *silalivoq* is perceived as intelligent. Losing one's reason is *silaarnigippoq*.

Tunumiit are very specific in indicating where a person, a boat, or an animal is (*cf.* Robbe 1977: 74-77). East Greenlanders travelling in small motorboats often only have a mobile telephone, while owners of bigger motorboats (*poortuleerngat*) and cutters, which are less used nowadays, have radio equipment. There is less use of modern communication technology during winter snowmobile or dogsled journeys, due to a limited range of service.<sup>5</sup> However, use of modern communication technology is rapidly developing (e.g., Dahl 2000), and the Greenland Self-Government is also investing in Internet communication.

There is still extensive traditional knowledge of the weather, sailing routes, sea currents, tides, ice conditions, and iceberg movements, as expressed by this woman:

Kangeqlusuaq fjord is a long strait through which we sail along the way from Tasiilaq to Tiilerilaq. The route is situated to the east. Here it is always blowing. Storms are so heavy here that usually Kangeqlusuaq does not freeze in winter. There is always open water here. We now have heavy storms, *nerqqajaaq*, during September and October. We had that in the past, too. East Greenland is known for its stormy weather, but during the last few years there have been more storms and heavier wind. So often we cannot sail through Kangerlusuaq [...]. The current is heavy during strong wind. Because of the long distance of this strait, the wind creates long bulges. Our motorboats go up and down a lot and we take on much water. In an open motorboat, we get wet entirely. For us women and children in the boat, it is too much. We become cold and frightened and it hurts because you are thrown upward and smashed back in the boat again. *Aqa*, it hurts! Sometimes it is really dangerous and it is not possible to travel by boat. So now we cannot go through Kangerlusuaq but we cannot go back either. We will try to reach Kulusuk. Here my husband has family and we can stay overnight (Silipa Ignatiussen, 2008).

Traditional knowledge is combined with modern technology and scientific knowledge. Many Tunumiit referred to the retreat of glaciers in the area. Pointing out the window to a glacier that is part of the inland ice, Sakaeus Taunajik (2007) stated: "Now the glacier is small, you can see it. In the past the glacier was much bigger and came all along that spot over there. You can see it every year, the ice is melting and the glacier becomes smaller and smaller. The glacier will soon disappear."

### **Animals, subsistence activities, and climate change**

Several types of marine mammals frequent Greenland's East Coast. Ringed seals prevail in the Tasiilaq area and are found all year-round. Bearded, hooded, and harp seals, as well as narwhals are common from early summer to autumn. Polar bears roam around a large area and are seen occasionally. Walrus and minke whales are scarce, with only a few individuals seen every year. Arctic foxes are the only land animals seen frequently. Caribou were still seen in the 1980s but have since disappeared. Birds such as fulmar, eider, ivory gull, and black guillemot are seen in relatively large numbers (Glahder 1995: 74; Hovelrud-Broda 1997; Robert-Lamblin 1986; our 2007 and 2008

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<sup>5</sup> Tasiilaq Municipal Weather and Radio Station (pers. comm. 2007).

interviews). People in East Greenland informed us that they had witnessed climate changes and their effects on animals living in and migrating to their environment.

Hunting and fishing costs have escalated with the introduction of Western technology. Cash income, required to meet these needs, comes from hunting, fishing and, increasingly, paid jobs.<sup>6</sup> To obtain hunting licences, hunters must apply to the municipality, which decides on the applications in cooperation with the association of fishers and hunters (KNAPK). Each year, it is necessary to renew the two types of licences—one for professional hunters (*piniarteq*), usually full-time hunters, and the other for recreational hunters (*sunngiffimi aallaniarteq*), usually part-time (weekend) hunters who combine hunting with a paid job.<sup>7</sup>

Hunting families currently sell most of their sealskins to the Pilersuisoq A/S trading company. Only a small portion is still used for domestic purposes, such as making garments (Buijs 2004: 245-246). In East Greenland the majority of seals are ring seals.<sup>8</sup> The seal hunt is still of economic and cultural importance, especially to families living in small settlements such as Tiilerilaaq, where almost every household has at least one hunter. Each household is connected by family ties to other households who still depend partly on hunting and fishing for their income. Sealskin prices depend on size and quality. The skins are measured and judged by local officials at the small Pilersuisoq offices in the settlements and at the Pilersuisoq office in the district capital, Tasiilaq. Because of the difficult position of sealskin on world markets, the Greenland trading company has developed strict quality standards for sealskins. Skins of poor quality, such as those of moulting seals, have not been accepted since the early 1990s. Skins with many scratches or mended bullet holes are assessed as low-quality and fetch a lower price (Buijs 1986, 2004: 246; Hovelsrud-Broda 1997; Robbe 1975). Pilersuisoq does not sell these skins on the open market, but delivers them to the private company Great Greenland in Qaqortoq, South Greenland. The majority are processed by the Great Greenland tannery, which then sells tanned and painted sealskins to sewing workshops all over Greenland, and some to Denmark.

World market prices for sealskins fluctuate. Actions against seal hunting and boycotts of the sealskin trade by animal welfare organisations such as the WWF (World Wildlife Fund) and Greenpeace have hurt the prices of commodities produced by Greenlanders. After intensive anti-fur campaigns in 1967, 1977-1978, and again in 1982, sealskin prices dropped dramatically (Wenzel 1991). The Greenland Home-Rule Government decided to keep sealskin prices artificially high, so hunting was and still is subsidised (Buijs and Nooter 1987; Lynge 1992; Nooter 1984). In 2001, hunters were

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<sup>6</sup> In 1994, 23% of the income in the village of Isertoq came from hunting; 35% from institutional transfers, and 42% from wages (Hovelsrud-Broda 1997: 85, 100).

<sup>7</sup> In 2000, East Greenland had about 400 registered hunters, 141 full-time hunters, and 254 part-time hunters; in Tasiilaq there were 45 full-time hunters and 133 part-time hunters registered; in Tiilerilaaq respectively 16 and 17 (Tasiilaq Municipality, pers. comm. 2001).

<sup>8</sup> The number of sealskins at Pilersuisoq increased between 1995 and 1999, decreased a little in 2001 and 2002 and has been stable since 2003 (Buijs 2004: 245-247; Grønland Kalaallit Nunaat 2003: 471; Hovelsrud-Broda 1997).

paid an average of Dkr 297 for a sealskin (Grønland Kalaallit Nunaat 2003: 471, tables 5.5 and 5.6; Hovelsrud-Broda 1997, 2000).

If the seal species depends on the ice to rest or to make dens for its young in spring, it is especially affected by climate change in East Greenland:

Thin ice has consequences for some of the seals. When the female seals have to give birth, they make a den in the snow on the ice. Here the baby seals have a safe and warm place. During the first period they cannot swim and the water is too cold. Often the young seals fall through the thin ice. In spring I see young baby seals swimming, squeaking for their mother, while they should still lie in their dens. Their woolly down soaks up the water and they become too heavy and drown (Augo Kristiansen in Sjouwerman 2009).

A hunter from Tiilerilaaq explains that the yields from seal hunting are decreasing: “Usually, I catch about 200 seals a year. There are not as many seals anymore. Last year I caught only 100 seals” (Marius Nakinge, 2007). However, many hunters report an increase in seals “due to change in the amount of pack ice coming into the Sermilik fjord from the south” (Poort 2007: 93, 98ff). Cod has come back to the fjords of the Tasiilaq district, and some of the hunters now catch more fish and fewer seals: “Cod fishing and salmon and trout fishing are becoming more profitable. The water is warmer nowadays and there is more fish, and the fish are bigger. The cod has come back. I think I will shift to fishing instead of hunting. The Europeans do not want our sealskins any more. So maybe it is better to fish” (Paulus Larsen, 2008).

Polar-bear hunting also has always been economically important to the Tunumiit. The number hunted in East Greenland is quite low and regulated by means of a quota set nationally by the Self-Government (about 10 to 15 polar-bear skins are sold annually to Pilersuisoq). The value of polar-bear pelts has always been considerable.<sup>9</sup> Since this population is under pressure by the retreat of the pack ice along Greenland’s East Coast, the polar-bear hunt has become highly controversial.<sup>10</sup> The WWF and Greenpeace are striving for a total ban. They are also targeting trophy hunting by American tourists who are willing to pay high prices to hunt with a local hunting guide. They hire an acknowledged full-time hunter with a green full-time hunting licence to find polar bears and to escort the tourist on the hunt. Tourists are officially forbidden to shoot polar bears without special permission. Trophy hunting is not practised in East Greenland, and is debated among the hunters and their families in Tiilerilaaq and

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<sup>9</sup> One metre of best-quality polar-bear skin costs Dkr 3,465. For a ca. 2.5 metre polar bear this makes ca. Dkr 8,663 (Pilersuisoq 2001; cf., Grønland Kalaallit Nunaat 1996: 462, tables 5.3 and 5.4; Robert-Lamblin 1983: 320).

<sup>10</sup> According to studies by biologists, the sea ice is increasing and retreating from the coast. Polar bears can no longer swim to the ice sheets drifting in the sea and are stuck on the land and in the fjord areas. Therefore they have fewer opportunities to hunt seals. Many polar bears are losing weight and part of the population probably produces fewer offspring. The *Landstinglov nr 11 and 12 om fangst og jagt* (‘Parliament’s laws 11 and 12 on catch and hunt’) were revised in 2001 and are more restrictive for hunting of animal species under quota (endangered species). Hunters must be registered in Greenland for the last 10 years, be connected to Greenlandic society, have paid taxes for the last two years, and have a gross income from hunting/fishing of at least 50% (Grønland Kalaallit Nunaat 2003: 111).



Tasiilaq. Some hunters stress the advantages of earning “big money” and their vulnerable economic position as hunters. Others maintain that hunting polar bear is part of the culture and tradition, and only great hunters, *piniarteqsuaq*, are able to hunt a polar bear. “These Americans have no rights to be here. Full-time hunters themselves need the polar-bear hides to earn money and make a living” (Sakaeus Taunajik, 2007).

Like the biologists, some hunters report that the number of polar bears is decreasing (Poort 2007: 68-69), while others state that they have seen more of them lately:

Probably polar bears now come close to the villages because they are hungry. A polar bear was seen at the garbage dump the year before. In the newspapers there was mentioned this case on the West Coast, when a child was approached by a polar bear near the coast. The infant’s mother could not reach her child. Fortunately the polar bear was shot in time (Aviaja Philbert, 2008).

In general, however, the biologists differ with the Tunumiit on the sizes of animal populations,<sup>11</sup> and the two parties have different views of nature. One hunter in Tiilerilaq stated:

The Danish biologists come here and they count the animals, but they only visit the area one summer. Sometimes they fly around in a helicopter and count narwhals from the air. They say that the population is declining. But we see that there are still many narwhals. It is the same with the polar bears. We do not see fewer polar bears around here; we only catch fewer due to the reduced quota. I do not know, maybe we are wrong, maybe the biologists are wrong. They do not listen to us and they never ask us about the animals. They respect neither our culture nor us. They never ask us about the animals and we are the ones going out every day, living here the whole year. When they do listen, they do not take our answers seriously. Even our politicians in Nuuk listen more to the biologists than to their own Greenlandic hunters (Hans Jonathansen, 2008).

When outsiders such as Danish employees, scientists, journalists, tourists, NGOs, wildlife management organisations, and environmentalists apply their Western norms and values to Greenland’s situation, they are insufficiently aware that they stem from a different culture. Sometimes their calculations and opinions do not differ so much from Indigenous observations (see Poort 2007: 93). But local opinion is being ignored. Tunumiit want to be heard and participate in research and debate. More outsiders now travel to Greenland, since the country has attracted so much attention in the climate change debate:

The entire world is looking at Greenland nowadays, because the ice and glaciers are melting. We are fed up with them, especially with Greenpeace. We don’t want them here. Why are these people coming? Let them stay at home in their country. [...] It is not their country. We want to live in peace and live our lives as we always have done. We want to make our own decisions. We do not impose our ideas on them. We are not that kind of people (Sakaeus Taunajik, 2008).

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<sup>11</sup> Animal species in East Greenland and their changing migration routes were studied by Glahder (1995).

Another impact of climate change is that travel is more difficult. This affects daily life as well as hunting and fishing:

When winter comes, we sail with our boats through 10 centimetres of ice. Greenlandic boats are reinforced but they are not designed as icebreakers. Sometimes the ice causes holes in our boats. Therefore, I prefer to drive a dogsled in winter. Because of the thin ice, hunting by dogsled is more dangerous. Now we have to struggle with our boats through the ice. This is difficult and takes a lot of time while the winter days are short (Julius Nielsen in Sjouwerman 2009).

Some routes can no longer be traversed by boat, dogsled, or snowmobile:

In the past, my daughter and son-in-law came by snowmobile from Tasiilaq to visit me [in Tiilerilaaq]. They always took lots of bags with them with shopping for me. I got bread, apples, potatoes, onions, and other things that are rapidly sold out or not available here at the village shop. But the snowmobiles can no longer cross the ice just outside Sarpak. And also the other way round is not reliable anymore. There is hardly any winter when the ice is strong enough for the snowmobiles. I do not see my daughter from town often anymore. The helicopter is too expensive to take regularly (Domilia Kristiansen, 2007).

It takes longer to manoeuvre a boat through the ice and to find new safe routes by snowmobile. Hunters complain of longer travelling distances, which raise their expenditures on fuel for motorboats and snowmobiles. Hunting yields are decreasing, whereas those for fishing are increasing. Some Tunumiit hunters have shifted from seal hunting to cod fishing. Fishing, however, is perceived as a hazardous source of income and a low-status activity.

### **Local and governmental views about climate change in East Greenland**

Today, when the Tunumiit meet—at home, at the local store, during hunting trips, or at work—they talk about climate change. Greenland's newspapers provide information on the weather, as well as on long-term predictions for climate change and global warming. Greenlandic and foreign television programs broadcast information on melting glaciers, the decreasing size of Greenland's ice cap, changing patterns of wind and sea currents, and developments with the ozone layer and other atmospheric phenomena. Greenlanders follow the news on expanding deserts in Africa and on rising sea levels that may cause serious problems in such low-lying coastal areas as Bangladesh and the Netherlands.

However, East Greenlanders wonder about the accuracy of information on climate change. Although some people doubt that the climate is warming up, the majority acknowledge changes in the environment. They see transformations in weather patterns, snow and ice formation, and sea currents off East Greenland's coast. Some people in Tiilerilaaq state that climate change is caused not by humans, but by the will of God. Others mention the natural processes of *Sila* as the main reason and are not certain about human influences.

Some Tunumiit see climate change as a consequence of human pollution. Exploration for gold, platinum, and palladium started in 1986, and the hunters north of Tasiilaq discuss its impact on wildlife. They also refer to pollution caused by the American military base established at Ikkatteq in 1942 and abandoned in the 1950s, which left corroded metal containers that are still scattered around. The effects of pollution of the seawater are also often mentioned, especially near the harbours of Tasiilaq and Tiilerilaq, and the coastal waters off Tasiilaq. Hunters complain of a “plastic soup” drifting up and down the coast with the tide. They relate that seals and narwhals are scared off by motorboats, ships, low-flying helicopters, and noises from the land, such as car traffic, drilling, and explosions from building activities in the town of Tasiilaq. Paradoxically, some local hunters and villagers feel unfairly accused of increases in CO<sub>2</sub> emissions and pollution from their motorboats and generators:

We travel by motorboat and snowmobile. Every village has its own generator and every single house is heated privately. In the settlements you still find oil-heated stoves, which are said to be extremely polluting. This is not true. We live with so few in the settlements. The 150 people in Tiilerilaq are not extremely negative (*ajerpoq*) about climate change (Paulus Larsen, 2008).

Greenland’s government stresses climate change as a challenge with new possibilities for the country. Plans to reopen some of Greenland’s mines will increase CO<sub>2</sub> emissions, whereas Denmark’s policy is to decrease the use of fossil fuels and greenhouse gases. The last few years have seen increased regulation to ensure sustainable use of Greenland’s natural resources and wildlife (e.g., Sejersen 2002). Hunters are affected by the many new regulations, quotas, and laws on wildlife management for more than 10 species:

We are no longer allowed to shoot eider ducks. However, there are lots in the area. The government is preventing us from hunting. They want us to move to town, to leave the villages. They want us to be modern. The small settlements are too expensive, the government says. The politicians are making our lives difficult (Tobias Ignatiussen, 2008).

To make a living from hunting and fishing, many now choose to combine traditional subsistence activities with being a tourist guide.

I ask tourists who sail with me if they will allow me to shoot a seal. Some tourists are scared of that. Some people feel sorry for the seals to be killed. They don’t like hunting. Many tourists are Ok; they say it is OK. They are really nice people who want to see how the life of a real Greenlander is,—we are Eskimo, you know—they want to experience it (Gerti Jonathansen, 2007).

With growing concern over the impact of climate change in the Arctic, there has been an increase in tourism in East Greenland. Tourists come from Europe and America to witness the melting ice and disappearing glaciers. Journalists increasingly visit Greenland to report on the impact of climate change and global warming on sea ice, glaciers, sea level, ocean currents, wildlife, and so on.

## Effects of climate change on the roles of men and women

Climate change means less access to animals and forces hunters' families to find new sources of income. Also, modernisation is marginalising the place of hunting in the economy. Some women prefer to move to town and find jobs, while some hunters want to keep their wives in their home villages, where their assistance is needed (Van Voorst 2008). As many families find it hard to make ends meet in the small villages, women often look for opportunities to earn extra money. Some women sell homemade souvenirs to tourists, such as miniature sealskin boats as key rings. Other women, especially those with some education, persuade their husbands to move to Tasiilaq, where there are more employment opportunities. However, their husbands, hunters by training, often lack the necessary education to find a proper job in an urban environment. Sometimes they find a job as a carpenter or cleaner. They often stop hunting when they move to Tasiilaq and their economic position remains precarious. Women seem to be doing better in an urban environment, and traditional gender patterns are consequently strained (Dahl 2000; Van Voorst 2008: 58-64). Being a hunter's wife has always been an honourable position. An interviewed woman was proud to be the wife of a very successful hunter, tourist guide, and partner in a joint venture:

I earn money as an extra income, but we earn also a lot of money from the tourists. And my husband is really a *piniarteqsuaq* ('great hunter'). He knows where the animals are. He has a very fast motorboat, so he can reach the very distant places where he expects seals to be around. He decides where to go and he decides when we leave. We have a lot of money. [...] I stopped working at the children's home. Having a paid job and preparing sealskins and helping my husband, travelling with him, taking care of the children, it is too complicated, it is too much work. I am happy being a hunter's wife (Silipa Ignatiussen, 2008).

One talented Tunumiit artist, who knows East Greenland's culture and history, sees the position of hunters' wives differently and emphasises their hard lives: physically heavy tasks, too much work, coping with housekeeping, raising children, cooking, preparing skins, and butchering the seals their husbands bring in (Gideon Qeqe, 2008).

## Conclusion

There is a wide spectrum of scientific data, ideological arguments, and positions in the debate on climate change. Much attention has been paid to adaptation and coping strategies, alternative resources, and changes in regional and national economies. Specific analyses, like this qualitative case study on values and norms related to climate change in East Greenland, can help us understand its impact on the local level. This article discussed how the Tunumiit have perceived the weather, climate change, and the local environment since the 1950s, and how their perspectives have been influenced by scientific and political debates on global warming, sustainable development, and

wildlife management. Some Tunumiit speak of the direct impact of changes in resource access on their subsistence economy. Difficulties in travelling, safety issues, and accidents often result from increasingly unpredictable weather. Tunumiit observe the influences of climate change on wildlife, as well as alterations in hunting and fishing conditions. Some hunters speak of a shift from seal hunting to cod fishing in East Greenland, although fishing is still perceived as a vulnerable source of income with low status. Others expect fewer seals in a future with less ice.

Indigenous knowledge is often said to be under pressure. Hunting success in the Tasiilaq and Tiilerilaaq communities previously depended on experience, skills, and good relationships with the spirits and the game. The rules had to be observed and the game respected to ensure a proper distribution of animals and to bring good weather. Above all, the environment and humans had to be in balance. More people nowadays work in paid office jobs and fewer travel by dogsled or snowmobile; they are thus more limited in traditional knowledge, while a younger generation has learned to use new technology, the Internet, and GPS. Older ways of travel, navigation, and orientation are being combined with new technology and scientific knowledge.

Climate change and the perceptions of its effects on animal life are highly politicised. International cultural politics is influencing the situation in East Greenland in the seal-hunt debate. According to the Tunumiit, Greenpeace's involvement as their main antagonist exemplifies this politicised external influence on the local level. There is a growing demand among Tunumiit to make their own choices and to take a stand against Euro-American dominance. It found its apotheosis in the election and realisation of Self-Government in Greenland in 2009. There is also tension in Greenland politics between the centre and the periphery. Tunumiit hunters experience more rules and regulations to protect wildlife species (quotas) and limitations on hunters (more restrictions on granting of hunting licences). The costs of sustaining the settlements, an ongoing debate in Greenland politics, are a cause for concern, as people fear that their villages are going to be closed in the future.

Climate change can hardly be separated from its effects on everyday life in the social, economic, and political domains. This interconnectedness has also arisen during the anti-sealskin campaigns of the last few decades. The most economically vulnerable areas are the ones most threatened by climate change, whereas the more successful areas and prosperous segments of society are better positioned to adapt to changes. On the national level, climate change probably means future economic opportunities. In this fast-changing environment, a new balance between "inside" and "outside," between Greenlandness and globalisation, is developing. The Tunumiit hunters are well aware of being literally and metaphorically on thin ice.

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