

Climate change and consequences in the Arctic: perception of climate change by the Nenets people of Vaigach Island

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Background: Arctic climate change is already having a significant impact on the environment, economic activity, and public health. For the northern peoples, traditions and cultural identity are closely related to the natural environment so any change will have consequences for society in several ways.

Methods: A questionnaire was given to the population on the Vaigach island, the Nenets who rely to a large degree on hunting, fishing and reindeer herding for survival. Semi-structured interviews were also conducted about perception of climate change.

Results: Climate change is observed and has already had an impact on daily life according to more than 50% of the respondents. The winter season is now colder and longer and the summer season colder and shorter. A decrease in standard of living was noticeable but few were planning to leave.

Conclusion: Climate change has been noticed in the region and it has a negative impact on the standard of living for the Nenets. However, as of yet they do not want to leave as cultural identity is important for their overall well-being.

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The social consequences of climate change are one of the most pressing global problems. Climate change was included for the first time this year in the agenda of the BRICS (Brazil, Russia, India, China, and South Africa) summit. BRICS leaders considered it as a global threat and agreed to strengthen practical cooperation in the economies of the five countries to adapt to climate change (1). The concept of long-term socio-economic development of the Russian Federation in 2020 specifies the objectives of development of economic sectors and territories, taking into account climate change, for example, in changes of infrastructure in the Arctic region to handle the projected climate change (2).

As the results of sociological ‘measuring’ of public opinion show, the problem of climate change concerns an increasing number of people around the world (3). The poll of Russians held in March 2007 by VTSIOM (All-Russian Sociological Questioning Center) showed that

more than 90% of respondents are aware of global warming. The vast majority of them (59%) believe that the impact of global warming will ‘probably be negative,’ 18% expressed the opposite point of view, and 23% found it as ‘difficult to forecast’(4).

For Russia, the economic costs of climate changes are most consistently and fully explored in the works of Porfiriev. In his opinion, the changes in climate can have negative impacts such as creating special ‘climate zones,’ thus risking expected economic growth. Among the risks Porfiriev mentions are permafrost degradation and melting of ice in the seas surrounding Russia in the Arctic Ocean which increases the risks of flooding, storms, hurricanes, etc., and the emergence of ‘climate zones’ for economic development and individual industries. At the same time, melting of ice in the Arctic Ocean can lead to the revitalization of maritime transport: even a partial unblocking of the Northern Sea Route rapidly increases the duration of the period when navigation is possible

and the capacity of the major trans-continental (Eurasian) transport corridor with all the positive implications for transportation in the country(5, 6).

Climatic change in the Arctic causes diverse health risks for indigenous and endemic populations. Some risks are caused by the northward propagation of ‘southern’ infections, whereas others are related to deformations of the permafrost zone that brings about breakdowns in infrastructure, sanitary functions, etc. Ice thinning and difficult conditions for the sea-hunting industry (sealing) may lead to increased incidence of injuries among the small populations of indigenous peoples of the North. Today, the mortality rate among these groups significantly exceeds the average mortality rate in the RF (7).

Methods, model area and population

Vaigach Island (3,383 sq km) was chosen as a model area for the study of climate change and its impacts in the Arctic. Vaigach is the one of the keypoints of the North Sea Route because ships can reach the seas of Siberia from the West only by two straits: Karskiye Vorota (to the North of Vaigach) and Yugorsky Shar (to the South of Vaigach). This island is visited by helicopter twice a month. It is located between the archipelago of Novaya Zemlya and the mainland in the subarctic natural area on the border of the Arctic- European and Arctic- Asian island provinces of the Arctic Ocean. The climatic conditions of Vaigach are more severe than in the South Island of Novaya Zemlya that is located to the north of it, as the southwestern part of Novaya Zemlya is affected by the warm Western Novaya Zemlya current and the East Novaya Zemlya current during the cold season. This brings ice from the Kara Sea, clogging the Karskiye Vorota, and Yugorsky Shar straits. The grass cover of Vaigach is peculiar to northern arctic tundra, there are

many small lakes and marshes, and rivers – the rapids are deeply cut into the surface (8).

In August 2010, an expedition was organized to Vaigach island run by Barentsevomorskoe branch of the World Wildlife Fund (WWF), led by Oleg K. Sutkaitis. Along with the biological research into changes to the bird and sea-mammal populations, there was an attempt to study the perception of climate change by the indigenous people, namely the Nenets of Varnek, who have the only settlement on this island. The authors designed a questionnaire used during the survey and which residents of the settlement Varnek answered. Some questions were explored in detail through interviews with the local people. The results were compared with historic data, archive materials, and more broad topics, connected with recent developments in the Arctic.

Varnek today is the only settlement on Vaigach Island. The adult Nenets population originates from the adjacent mainland tundra and from Novaya Zemlya. Varnek was listed as having 101 people in August 2011 (see Table 1).

In Varnek, there are 16 buildings, and 24 families live there. Coal for heating is delivered right into the backyard of houses. In front of the buildings, there are garages for ‘Buran’ (winter motor sledges) and dog huts (insulated buildings for hunting and sled dogs). The village has a shop, club, medical-obstetric stations, and a bakery. The village is lit by electricity from 7.00 am to 2.00 am by a diesel generator.

The traditional economic complex of the Nenets of Vaigach Island

The presence of tundra, the large numbers of marine animals (seals, walrus), and birds (geese) have shaped the features of the traditional economic system of the Nenets living on Vaigach.



Map. Vaigach on the map of the Barents Euro-Arctic Region

Table 1. Age-sex structure of population of Varnek (compiled from the household books)

Years of birth	1931–1940	1941–1950	1951–1960	1961–1970	1971–1980	1981–1990	1991–2000	2001–2010	Total
Men	0	3	7	8	5	9	5	11	48
Women	2	1	3	6	3	11	12	15	53
Total	2	4	10	14	8	20	17	26	101

Reindeer husbandry plays a lesser role on Vaigach Island compared with the continental tundra Nenets.

There are only three men working with reindeer on Vaigach Island: the foreman and two herders. There are about 1,000 reindeer in a herd (in the 1970s the herd was up to 1,700 reindeer). Free pasture is practiced throughout the island (wolves are rare on the island). The herders use both reindeer and dogs as a traditional means of transport.

Hunting and fishing play a very significant role in the economic activity of the Nenets people on Vaigach Island.

All the men of the village are hunters (the boys start hunting at the age of seven). Every family has a gun. They hunt for geese, eider, and swans. The most popular hunting season is the spring hunt for the arriving birds and then the summer/autumn hunt – for molting birds. A family prepares annually about 100–120 ‘cans’ of bird meat (for their own use). The family collects about 100–120 eider eggs annually (in this case one egg is usually left in the nest) in the spring season. The Nenets store foods at home in iceboxes.

The winter hunt is for marine animals: usually seals (to feed the dogs). In Varnek, there are only nine dog teams. To feed 8–12 dogs over the winter, it is necessary to catch about 30–40 seals.

Many men are engaged in coastal fishing (but there are only a few ‘professional fishermen’ in the village) and catch *omul* (*Arctic cisco*), trout, cod, and smelt. In the village, there are about a dozen nets and one traditional *ryuzha* (fishing trap) used for many centuries.

There is one Nenets master making boats (in the old so-called Pomor fashion) from wood and metal from crashed military aircraft.

In summer, the Nenets of Varnek collect Russian root, Snowdon roses, or rosewort (*Rhodiola rosea*) known in Russian as *zolotoy koren* (‘gold root’), mushrooms, and cloudberry. A family can collect up to 50 litres of cloudberry that are stored in wooden barrels.

In general, at the present time, the village of Varnek constitutes a special kind of Nenets Port economy with elements of the influence of the culture of the Russian Pomors (the original settlers on the White Sea Coast) and the preservation of traditional attitudes toward reindeer.

The activities on the North Sea Route have a great impact on the economic activities and the household life of the Varnek Nenets population as an important

segment of this is the Yugosky Shar strait. For the period of 10 days that our expedition stayed in Varnek, the settlement was visited by a barge with two tugs, the ship of the Moscow State University scientific expedition, a trimaran from the Norwegian Circumpolar Expedition, a tanker, and two vessels. Excluding the trimaran from Norway, all the visitors brought alcohol. Fish catch (*omul*, *char*), and reindeer and polar fox skins (and illegally harvested skins of polar bears), and cloudberry are collected in exchange for alcohol.

Such an exchange has negative social consequences for the village, transforming the economic direction and nature of the environmental population. Natural resources are exploited not only for local consumption but also in such quantities that they are capable of damaging the life of the Nenets community on the island. Under market conditions, the traditional nature management is transformed according to the demands of the visitors and the Nenets sometimes even break the hunting rules and become poachers.

Study of public opinion of Varnek residents

The inhabitants of the village of Varnek comprise 101 persons, including 59 adults, 42 children, and 18 students (studying at a boarding school in the mainland village of Karatayka). During the survey in the village, there were some people who did not participate: about 20 adults were absent and 6 other adults refused to take part in the survey. The survey involved all the socially active population of the village. The sample consisted of 30 people (10 men and 20 women).

Results

The respondents believed that the most important activities for their own survival were traditional nature use fishing (14 persons), hunting (12 persons), and reindeer breeding (11 persons). In addition, the villagers described trade and exchange (six persons), picking berries and mushrooms (four persons) as essential for their survival.

Climate changes by the observations of the local residents of Varnek settlement during 5 years (2005–2010)

According to respondents’ answers, climate changes had been on Vaigach Island.

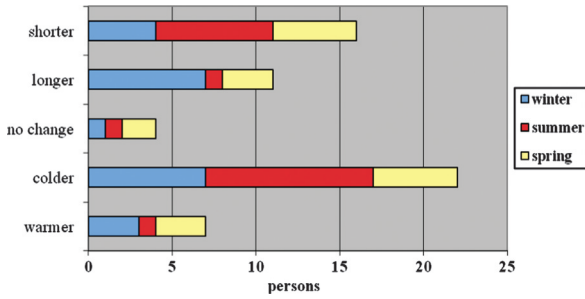


Fig. 1. The evaluation of seasonal climate changes.

Most respondents said that over the past 5 years, the climate had become colder, but two men involved in fishing, however, had noticed ‘warming.’ (see Fig. 1)

Seasonal climate changes according to the respondents’ evaluation were as follows: winter was colder and longer, and summer colder and shorter. With respect to changes in the spring period, the respondents had different, even sometimes contradictory opinions. Obviously, the growing season had become longer because more southern species of plants were now able to survive on Vaigach. However, the human impressions of the seasons were different because the spring time started earlier, but the spring itself seems colder (comments by L.R.Lukin, Institute of Ecological Problems of the North, UB RAS).

The island’s inhabitants estimated climate change by observing the melting snow, the arrival, and disappearance of birds (including geese), and the change in vegetation.

Respondents noted the emergence of new species on the island of animals, plants, insects that they could not identify (‘I can not call them anything,’ ‘do not know the name’). Among the known species were crows, whereas ‘before there were none,’ and an increase in wasps. Residents have noted changes in vegetation, it ‘has more flowers,’ ‘the bushes spread,’ and pointed out that the ‘lakes dried.’

Climate change has affected the lives of the islanders, in the opinion of half of respondents (16 persons), others do not notice this effect (9 persons), or found it ‘difficult to give an answer’ (5 persons).

Migratory behavior: opinion of the Nenets people of Vaigach

Despite the fact that the survey results indicate a decrease in the standard of living on the island, the majority of respondents do not intend to leave (Fig. 2). Nevertheless, a more pronounced desire to leave can be seen among women.

The sacred characteristics of the Island of Vaigach

Historically, Vaigach is a holy land of the Nenets people: in the Nenets language, the island’s name is: *Hehe Ya* or *Hebidya Ya*. It contains many sites, sacred places of tribal and personal shamanic significance (9). Since ancient times, the Nenets from the continental tundra have gone on pilgrimages to Vaigach. They gathered their reindeer that then crossed the Yugorsky Shar Strait by walking across the ice or by swimming. The sledges with a passenger were tied to the reindeer that swam across the strait pulling them. They did this to make a vow or make sacrifices.

The sacred status of Vaigach has limited economic significance for the Nenets on the island. However, the appearance of the *Hebidya Ya*, the Russian fishermen, who hunted sea mammals and molting birds initially caused conflict with the Nenets. R. Jones, a member of S. Borrough’s expedition in 1556 wrote about Vaigach: ‘wild Samoyeds live there, not allowing Russians to land’ (10).

Vaigach Island is now a sanctuary and operates as a place of worship for Nenets living in the Far North. In the Nenets’ beliefs, weather events are managed by the

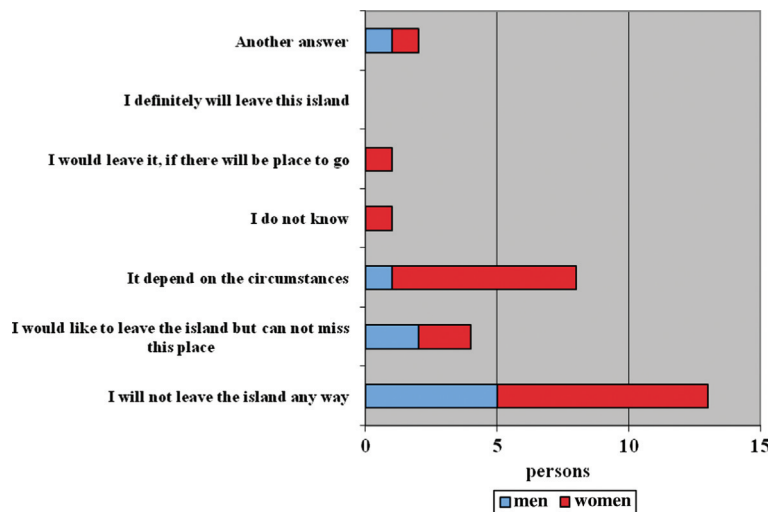


Fig. 2. Migratory behavior: opinion of the Nenets people of Vaigach.

spirits. Fog, wind, rainfall are a form of manifestation of the spirits' relationship to actions: people's behavior. Below is a fragment of one of the legends of Vaigach, as submitted by residents of the island:

I learned that there is an inscription on the Semiliky Idol (Spirit with Seven Faces) – translated into Russian: 'In 1988, six grandchildren will be born of Vesako Idol.' There should be six boys in one family line... According to the belief of the villagers of Varnek and my own observations, one of those six grandchildren controls the weather. (...)... Archaeologists took the idol to one of the museums in Moscow... During this time, while Vesako was absent, on Vaigach there were strong blizzards, hurricanes, sweeping everything in their path, but when he was brought back, the weather calmed down.'(11)

Discussion

The nature of climate changes is still not completely understood and no single scenario of the situation exists. However, the observed Arctic climate change is already having a significant impact on the environment and on economic activity. For the northern indigenous peoples, whose traditions and cultural identity are closely related to the natural environment, any change is of great importance. In addition to the natural transformations, the projected increased economic activity in the Arctic will be another factor, 'channeling' the pressure of civilization onto their distinctive way of life. Confronting them is the need to cope not only with changes in the environment but also the need to adapt to life in the context of expanding industrial activity and the overall anthropogenic impact on the Arctic nature.

It should be noted that a person's experience of air temperature depends not only on the temperature itself but also on the combination of temperature, humidity, and wind speed. For example, a temperature of 0°C experienced at a wind speed of 5 m per second corresponds to -5°C and no wind. So, the subjective impression of the climate changes has to be taken into consideration, as an important characteristic of environmental comfort for human beings on the given territory.

The specifics of the worship of the Nenets people should be taken into consideration, (as an analysis of the answers on the questionnaires shows), although they are in contrast to the ordinary Western way of thinking and analysis of situations. Climate and weather events in some cases depend on human behavior, according to the evaluation of climate changes also in the frame of traditional beliefs. This 'binary approach' could be the topic of further study and discussion.

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