Social adaptation of the indigenous peoples of the Russian North to the changing ice environment

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The indigenous peoples of the Russian North live in extreme natural and climatic conditions, in places where the ice cover remains for a considerable part of the year. These people are more dependent on the environment than most, and as a result over the centuries they have been adapting to extreme environmental conditions and developing elaborate methods of protection to deal with the unfavorable climatic conditions.

Recent changes in ice cover conditions have influenced some of traditional economic pursuits of the indigenous peoples (i.e. seal-hunting industry, fishing, reindeer husbandry). This not only affects the culture and social structure of communities but also causes significant hardships for indigenous peoples who must adapt to the new environmental conditions.

This paper examines some of the work undertaken at the Institute of the Peoples of the North in Herzen State Pedagogical University of Russia. Of particular note is that much of the research and education programs at the Institute arise from the fact that an overwhelming majority of the students, teachers and professors at the Institute are also representatives of the indigenous peoples of the North. Before training at the Institute, most of the students lived in the Arctic and maintain a traditional indigenous lifestyle (i.e. reindeer husbandry, hunting, sealing, traditional handicraft, etc.), and after graduating from the Institute they return home. Both students and teachers stay in close contact with the indigenous communities, creating favorable conditions for ongoing, iterative field research of indigenous cultures. The research methodology used at the Institute is primarily based on

an interdisciplinary approach, which broadens the field of observational data. One such field of research deals with the human dimension of climate change.

The significance of ice conditions for the lifestyle of the people of the North has been examined in different contexts. Philological investigation deals with the different words, for example the different states of snow and ice. According to Ida V. Kulikova's data[1], the Chukchi language has more than a hundred such words for snow and ice. Anatoly Mukhachev, Galina Kharyuchi and Alexander Yuzhakov affirm that "nowadays the anthropologists view culture not only as a product of history and human biological development, but also as a main mechanism of human adaptation to the environment, to the outer space". (Mukhachev 2010: 4). Accordingly culture is interpreted as a system of symbols with the function of adaptation, which is repeated not only in certain forms of the economy, but also in language and mythology. Numerous myths of indigenous peoples of the north interpret the essence of different natural phenomena. For example, according to Nenets and Enets' one such mythological idea is that frost is sent by the huge bull of the North, who lives in the Arctic Ocean near the northern edge of the sky. In winter, his breath becomes visible in the flames of the northern lights, but in summer it appears as cumulonimbus clouds. When the bull sheds its faded fur, it begins snowing. Its puffing causes cold wind, when the bull stands still frost reigns, and the more the bull moves the warmer it becomes.

The pedagogical aspect of traditional indigenous culture is also connected to ecology, and the training at the Institute continues the traditions of native pedagogy by studying natural conditions as an essential part of the Institute's research and education programs. In traditional society, an integral part of the education of children was training them to observe nature and weather conditions. Chukchi writer Yuri Rytkheu, describing his childhood in Chukotka, recollecting that in the traditional society it was the children's duty to go out early in the morning and assess the weather conditions, determine wind direction, snow and ice characteristics, and afterwards report their findings to the adults. The children's data helped adults choose the type of activity for the forthcoming day, and the correctness of their observations could determine the adults' success in hunting or sealing.

[1] Ida V. Kulikova teaches Chukchi language in the Institute of the Peoples of the North.

Dealing with nuances of seasonal cycles of sea, river, and lake ice has always been a reality for the community, and knowledge about the environment was vitally important for surviving in the severe conditions in the North. Specialized skills, such as recognizing ice conditions, were taught at a very early age, and failure to follow the advice of experienced people could have dramatic consequences. Anna Stammler-Grossman tells of an accident on the Pechora River with a "passenger tank" filled with people that broke thru the ice and sank into the river because «as the residents said; the driver did not follow the safe route advised by the local expert, which contributed to the sinking of the loaded vehicle». (Stammler-Grossman 2010: 148).

In classes at the Institute of the Peoples of the North, practical knowledge, connected with ecology and climate are analyzed in the context of both traditional and contemporary life support systems. One of the educational topics linked to the research of nature and climate is the folk calendar. Students examine the correlation between the natural seasonal changes and the change in the timing of months according to the native calendar in different years. The date of beginning or ending of different months in the folk calendar are movable, because they are not positioned chronologically but rather according to the observed conditions and changes in nature in certain regions.

The Nenets linked the idea of seasons and a year divided into months with seasonal changes in nature, which in turn determined the rhythm of their life and coincided with their economic activities. In the traditional chronology a year is divided in two sub-years: a cold and snowy one and a warm one. The significant events, which signify change of seasons, were first snowfall, freezing-over of rivers, lakes and sea, spring drifting of ice, water released from ice, and the birth of calves. (Mukhachev 2010: 57).

In connection with the recent climate change, the time the month begins is shifting. For example, the northern group of Selkup, who lives in Jamal, calls the month corresponding to September the month of defoliation. Its beginning is determined by the natural event – falling leaves. In 2010 the leaves started falling two weeks later than usual. Accordingly, the Selkup autumn month began much later than the beginning of September.

The effects of climate change on the traditional management practices of the indigenous peoples of the north and the way they are adapting to these changes were also investigated

as part of the CAVIAR project "Community Adaptation and Vulnerability in Arctic Regions".[2] The phenological shift examined biological phenomena that are relatively constant, and their adaptation to climate change which is based on long-term trends that over long periods of time can cause a reorientation of the eco-system. Our observations show that climate change causes non-coincidence of the shifting natural seasonal cycle in the stable well-established reindeer life cycle (i.e. time of migration, calving, etc.), and impacts considerably on the native economy and especially reindeer husbandry. «Climate warming's impact on reindeer husbandry; weather instability and sudden changes cause phenological shifts that can lead to loss of reindeer, and finally the demise of herders. As a result the herders leave the nomadic life and join the Nenets settled population. The unsuccessful herders form the most marginal group in Jamal settlements because of their lack of proper housing and jobs. Loss of reindeer, caused by climatic factors, contributes to the establishment of a new social stratum that lies between the settled and nomadic groups of Nenets. It consists of former herders, who continue living on the tundra in chums, but do not graze reindeer anymore, restricting themselves to fishing. (Bulgakova 2010: 83).

Another impact of climate change[3] was the increased duration of ice-free seas. For the Jamal region the early warming was a natural anomaly, which impacted the entire eco-system and affected the economic activity of the indigenous peoples of the region. In 2011 ice started drifting in the Taz river and its tributaries in late April, and in May the river was completely free from ice, usually ice remained until late May. Early ice drift affected the entire eco-system of the Taz river basin. Leaves appeared in trees earlier than usual, the time of spawning in the rivers shifted and fish were confused as they prepare to head to their traditional spawning beds. Because of the rapid warming, and early ice disappearance, the stable rhythm of economic activity was disrupted: hunters and reindeer herders could not change their customs of ice fishing to the spring ones. They did not have enough time to return by reindeer and/or snowmobiles from the places of hunting and winter pastures to the places intended for spring activities.

[2] Center for International Climate and Environmental Research – Oslo, Norway

[3] Increase of temperatures in winter became warmer exceeded increase temperatures in summer. Duration of freezing of rivers became shorter. During the recent thirty years the snow cover was shortened at the average on two weeks. (Rossia, 2008: 19).

Recent change of the ice cover conditions impacted negatively on some traditional methods of reindeer husbandry. For example, to protect the reindeer herds from mosquitoes, blackflies, horseflies and other bloodsucking insects in summer, the Chukchi herders usually drove the animals to the land ice. Recently it is more and more difficult to find a large enough sheet of ice for such a purpose. In addition this practice turns out to be unsafe. According to the local inhabitants' observations, "the ice has broken up on the rivers much earlier than usually, around 25 of May -15 of June. Summer temperatures became very hot, and the sea ice cover became unreliable. Previously ice drift began in the middle of May, but land ice remained during the entire summer, it was firm and it was possible to seal on it" (Nabludenie 2006). Anna Stammler-Grossman reports that "some years ago a large slab of sea-ice near the shore bearing around 1000 reindeer had broken loose from land off the island of Sengeyskii, and floated northeast to Tapseda Peninsula". (Stammler-Grossman 2010: 140). According to the information, given by residents of the Chukchi village of Ryrkapiy to Victoria Sharakhmatova, "previously it was possible to hunt seals on ice until late June, but now it becomes dangerous to walk on ice even in mid-May". (Sharakhmatova 2011, 11).

Large ice sheets which unexpectedly break from the whole ice field, give rise to surprising changes in the fauna of certain regions. The inhabitants of Amderma village in Nenets Autonomous Okrug ran into polar bears, which came to the village on a drifting ice block. Sometimes animals perish because ice break-up and ice freeze-up occur at unusual times. These sudden phenological shifts do not allow some animals to adapt to climate change. In autumn 1999, partridges had changed their feathering from gray to white, preparing for winter. But because of warming at the beginning of winter this process was delayed. During the autumn the partridges' transmigration from Taimyr towards the Gulf of Taz, was affected by a strong storm. On the beach, a layer of foam appeared. The white birds usually try to alight on white objects, this time the discolored partridges alighted on the foam, which quickly turned to ice. As a result a large number of the birds were frozen into the forming "ice foam" and perished.[4]

[4] These data are contained in the research of Veniamin Salinder, the student of Institute of the peoples of the North.

Climate change influences the conditions of ice roads which are important to the traditional economy. Because of the late formation of ice roads in autumn and inadequate measures to deal with the situation by the population, the consequences can be quite grave if thin ice is used as an ice road. “The residents of the Nenets Autonomous Area are hardly able to remember another year, when it was possible to boat down the Pechora River”. (Kiselev 2007: 4). At the end of November 2007 the same newspaper wrote: “It is really dangerous to walk out to the Pechora River ice. From the beginning of its freezing-over already two people have drown in the river”. (Tonkiy liod 2007). People perished because they underestimated the extent of the warming, and did not believe that in November river-ice at such high latitude can still be very thin. In the same publication the Department of the State Inspectorate of small-size ships warned people: “The thickness of the river ice is minimal now. Because of temperature drop and current warmth, the ice freezes on the river very unevenly, and is not strong enough”. The newspaper gave advice to its readers not to go out on to the river ice until mid-December. (Tonkiy liod 2007). Sudden warming in spring can cause certain sections of the ice to break or give way during a river or lake crossing. This situation worsens when using motorized equipment. “The replacement of dog teams with snowmobiles, beginning in the 1960^{s} has increased the dangers of travelling on ice: snowmobiles, unlike dog teams, cannot sense dangerous ice, they break down, run out of fuel, and can’t travel over very thin ice. Snowmobile travel is particularly dangerous in fall when the thin ice is snow covered. (Ford 2010: 116).

Rising temperatures in regions of permafrost increases a depth of ground melting in summer and decreases the depth of freezing in winter. Swamps cover most of Jamal region; but permafrost causes these swamps to be shallow and easily passable. Climate warming worsens the condition of the roads in the summer, they become boggy and impassable. The reindeer herders worry that if warming continues and permafrost degradation increases the access routes for herds to get to and from one area to another will be greatly reduced.

Melting permafrost also threatens the very existence of several cities, which are located in areas of permafrost. (Magadan, Yarutsk, Norilsk, Mirnyi, etc.). There are now many cases where houses have been destroyed. Because of permafrost melting some villages have been abandoned. In the village of Starij Varandei, in the Nenets Autonomous Okrug, the entire

population of the village was evacuated by helicopters to the city of Naryan-Mar in 2001, because the seashore, where the village was situated, was being washed away.

Another example of a village being evacuated is the village of Antipayuta in the Taz district of Jamal. The village was flooded and ice began drifting right through the village. The ice blocks began demolishing some houses and pylons, which resulted in cables breaking. During the spring flood people who did not abandon such villages had to go by boats to work, school and for shopping.

A change in ice conditions affects the migration route of reindeer. Early in spring, ice break-up and late ice freeze-up leads to disruptions in the traditional migration routes between winter and summer pastures. In the spring herders usually build storage structures for seasonal equipment that are located along the migration route. In the case of an early spring and early ice drift they find themselves cut-off from the stored summer equipment and unable to move the herd closer to summer grazing areas. Trying to avoid such a situation the herders force the reindeer to cover more kilometers then usual each day. This has a harmful effect on the reindeer herd. Newborn calves do not have time to get stronger and are liable to perish in such hasty and hard travel. There is no time to wait for the calves; they fall behind, because any delay in getting to summer pastures may result in the loss of adult reindeer. It is clear that "tundra reindeer husbandry is greatly influenced by the ecological situation in the Arctic" and "the most ecologically adverse conditions for reindeer husbandry were warm winters with changeable weather and hot fair weather in summer. (Krupnik 1989: 150-151).

The effects of climate warming upon reindeer husbandry encompass such factors as weather instability, phenological shifts, and prolonged ice free seas. The decrease in the extent of sea ice area and ice thickness adversely affects the health of the reindeer and increases mortality rates, consequently diminishing indigenous traditional trade and the herders' financial viability.

Failure to protect reindeer husbandry and sealing is fraught with serious social consequences. Recent climate changes, and associated threats to reindeer husbandry, result in declining numbers of people participating in reindeer husbandry. This situation has resulted in an increase in the proportion of the settled Nenets population vis-a-vis the

nomadic population. Bankrupt herders comprise the most marginalized group within the settled population due to the lack of proper housing and employment opportunities.

Climate driven reindeer mortality, has contributed to the establishment of a new social strata between the settled and nomadic groups, consisting of former herders, who continue living on the tundra in chums but no longer graze reindeer, rather supporting themselves through fishing activity. At the same time, traditional trade such as reindeer husbandry, as Yuzhakov defined it, is unique in natural management practices not only because of its ethnic economic characteristics, but also because it must bear some of the most powerful ecological impacts. (Yuzhakov 2005: 31).

The educational programs at the Institute of the Peoples of the North study indigenous customs and traditional knowledge, two fields of research that are not part of any curriculum anywhere else in Russia. The necessity to adapt courses dealing with contemporary climate, cultural and social changes allow for the educational process to be more flexible and open to modification. The study of how the changing climate and ice conditions impact socio-cultural dynamics of indigenous peoples is especially important to the Institute's graduates, who are returning to the North to deal with these new challenges, and will hopefully find some solutions. To this end, the Institute's teachers together with the students are looking for ways of preserving the unique indigenous cultures of the North given the conditions of global warming and social change.

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