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THE KETS ETHNOS AND ITS "FEEDING LANDSCAPE": ECOLOGICAL-GEOGRAPHICAL AND SOCIO-ECOLOGICAL PROBLEMS UNDER GLOBALIZATION AND CHANGING CLIMATE

ABSTRACT. The paper discusses the modern state of the Kets ethnos, its cultural heritage, and existing problems. The paper analyzes the role of social factors in the transformation of traditional economy and the Kets philosophy at the modern stage. Using analysis of the data collected, the climatic impact on the traditional resource use of the Kets people has been identified. The paper suggests possible ways of diversification of traditional Kets economy under the existing organization of economy in the remote regions of the country. Global climate warming increases the dependency of traditional Kets economy on the environmental and geographical factors (natural-environmental resources of the taiga, natural disasters, natural risks of different origin, etc.).

KEY WORDS: Kets ethnicity, "feeding landscape", geographical environment, traditional economy, changing climate, natural and environmental resources of the taiga, cultural heritage and globalization.

INTRODUCTION

At present, the processes of globalization and global warming make a quite pronounced impact on the lives of indigenous people in the northern regions of the country, e.g., Nenets, Chukchi, Kets, etc. For them, fishing, hunting, herding, and natural landscapes are not only a source of livelihood resource, but also part of their traditional culture. Climate change (impact on productivity of "feeding landscapes," increase of natural hazards, etc.), social factors (alcoholism, loss of the Kets language, poaching, etc.), and new worldviews that have emerged and have been growing in the post-perestroika period are the main causes that threaten the well-being, livelihoods, and the preservation of cultural traditions of the Kets ethnos and its identity. The issues of developing appropriate measures and strategies for adaptation of the traditional economy and way of life of Kets and other ethnic groups to a changing climate and market economy become extremely relevant.

The Kets is one of the smaller nations of Central Siberia that consists of dispersed groups mainly in the middle and lower reaches of the Yenisei River, as well as in the lower reaches of the Podkamennaya Tunguska River (Yenisei Ostiak, Yenisei). They became known in the XVIIth century through the first Russian Yenisei explorers. The modern name of the people – Kets – appeared in the 1920s. This is not a self-ethnic name; it was imposed superiorly. This was due to the fact that the Khunt (with whom Ket were in contact in the upper reaches of the Taz River) and the Kets immediate

neighbors – the Selkup – continued to be called Ostyak. The total number of the Kets is close to 1,200 people. There are three large groups of Kets with the names of the rivers along which they settled: Yelogui, Kureyka, and Podkamennaya Tunguska. The traditional territory of their settlement is the Turukhansk and Evenk Municipal Districts of the Krasnoyarsk Kray (Fig. 1). In terms of the linguistic and national characteristics,

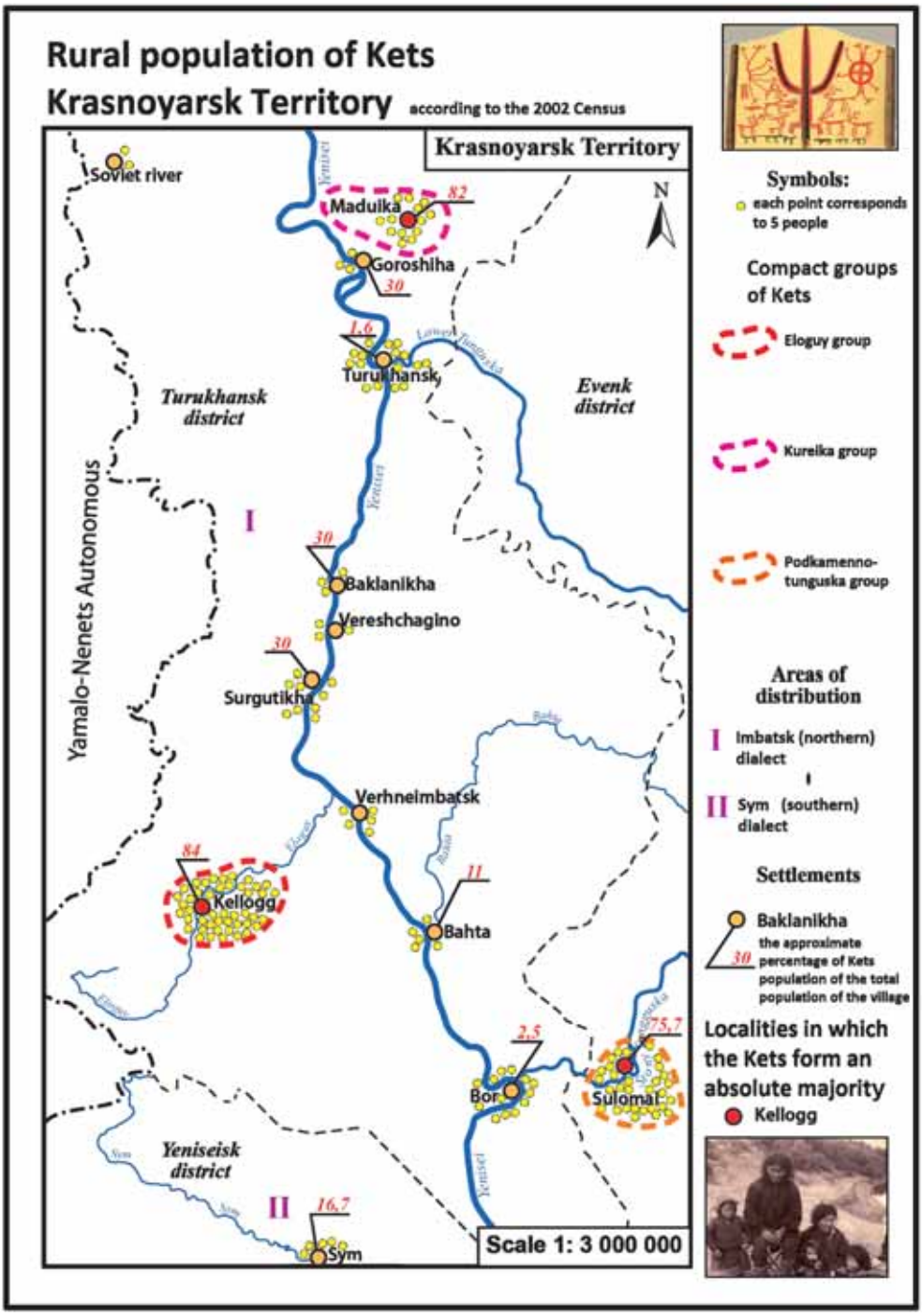

Fig. 1. Settlement and the numbers of the Kets in the Krasnoyarsk Kray. Compiled by the author

the Kets are classified as the most unique ethnic group not only in Russia, but in the world. The uniqueness of the Kets is evident in the fact that their language has a distinctive formation that has no analogues among the neighboring nations. The Kets language (now the relic) is the last of the living languages of the big family of the Yenisei people. The Kets culture has being adapted well to the riverine conditions. This includes experience in economic activity, the means of material life support, and many skills and knowledge necessary for the development of the riverine areas. The basis of the traditional life support prior to the arrival of the Russian people on the Yenisei North was fishing (especially in summer) and hunting on large ungulates (moose, caribou) and waterfowl. With the arrival of Russians and the introduction of the ***yasak*** (tribute paid off as furs) and then with the development of trade relations in the region, trapping has spread (hunting a squirrel, sable, etc.). Reindeer herding has always had a secondary role for the Kets because of the late migration of deer and small feed resources for the development of reindeer herding. Deer was used solely for transportation purposes; to date, the Kets reindeer has completely disappeared.

MATERIALS AND METHODS

Hydro-meteorological data of the local weather stations and the general Russian reference sources were processed to identify fluctuations of the temperature and precipitation parameters in the Central-Siberian region in the XXth century. The monitoring data based on the surveys of the Kets families were used to assess changes of environmental parameters and the fodder value of the natural systems of the middle taiga (at the level of complex natural boundaries) under climate warming. The traditional economy is "rigidly" tied to the landscape and all the stressful situations in the natural complex are immediately reflected in their self-sufficiency and social well-being, which suggests a high degree of reliability of the information we have collected. The total number of households surveyed is 25 (the number of hunting areas within the hunting community Sulomai); 57 respondents represent about half of the residents of the village Sulomai. All respondents pointed the declining yields of berries (especially blueberry and bilberry), and during dry summer – of rowan and cranberry; there are fewer mushrooms. One of the examples identified during the Sulomai survey is especially revealing: a woman noted that prior to the 1990s, she could gather and hand over 30 pails of cranberries and now she can hardly gather 2 pails. There are similar examples for other berries. The respondents noted an increase in the number of "sick" (rotten) berries, increasing the probability of its abscission in the last 15–20 years. They associate the increase in the number of bears attacks on people with low berries yields.

The Kets families that have their own hunting areas transferred through inheritance have important information about the dynamics of the production of any type of animal or berry crop over rather long period, i.e., a few decades. Many Kets have their own environmental calendars that mark important hydro-meteorological and phenological events. In the absence of the established system of monitoring in the taiga zone of Central Siberia such data have an important scientific value for identification of the response of natural and environmental resources of the taiga and the traditional economy of the indigenous population to climate warming. The author has also conducted field surveys (over 5 field seasons since 2008) during which he recorded the yield and percentage of flowering berry and estimated resources of commercial plants in different types of natural systems.

RESULTS AND DISCUSSION

The cultural-economic type of Kets (resident anglers and hunters) continue to exist. Modern Kets still fish, hunt elk and forest reindeer, gather mushrooms, berries, and nuts, and procure furs (sable, squirrel). Some

families grow potatoes and vegetables. On average, a hunter produces 60–70 skins in a season. There was an abundance of squirrel earlier and in some areas they are at the heart of the hunting. However, in recent years, their production fell (300-400 skins to 100). Today, the main source of income for the majority of the Kets is the sale of sable skins. The cost of a sable skin ranges from an average of 3 thousand rubles to 4.5 thousand rubles. The darker the sable skin, the more expensive it is. A big family, i.e., a father and two – three adult sons, can get from 40 to 60 sable skins in a year. Since 2012, there is practice of transporting Kets by helicopter to their hunting areas. In the past, the flight cost was 6–7 churns of grayling on average.

Fishing also plays an important role. There are several species of commercial importance: grayling, lenok, burbot, tugun (of the primary importance), Yenisei omul, and Yenisei sturgeon (to much lesser extent because of depletion and environmental degradation in the Yenisei basin). The price of one (10-liter) pail of tugun is 2.0–2.5 thousand rubles. In the past, this valuable whitefish was available for fishing throughout the entire Yenisei. After the construction of the dams in the Angara-Yenisei cascade, tugun on the Yenisei River is only in its upper and lower reaches. Tugun is delicacy and is practically never caught for sale; its consumption is localized to the fishing areas in small towns. Tugun is usually not salted; this delicate and rich fish does not last – it is either immediately frozen or smoked. The tugun trade is done through commercial helicopter flights Baikit-Sulomai-Bor-Baikit. It is only available to acquaintances after agreeing the terms over the phone. Such trade relations are not widespread and residents of the mono-ethnic Kets village Sulomai complain about problems with the sale of these products. In the past, before the mid-1990s, the fish was procured on the site.

The problem of employment of the local population is quite urgent in the ethnic villages. In the post-perestroika times, a motivation to enrichment emerged, which is not typical to the traditional Kets culture. Meanwhile, the preservation of the traditional foundations of nature management and of "feeding landscapes" is a matter of survival for the Kets. This also contributes to the preservation of their traditional culture. The main ways of transfer of the spiritual foundations of the environmental culture and its most important elements are the historical memory and traditional knowledge.

In the Central Yenisei region, the modern climate change has been registered since the 1980s, which is clearly seen in Fig. 2. Analysis indicates that all 4 stations have observed a positive trend of changes in the annual air temperature. The annual average temperature grew by 1–2°C and greater compared with the previous period of cooling. Winter became warmer; spring and fall are longer than in 1959–1970. However, periodically, there are years with shorter summers.

The warming waves appear to be associated with increased western convection from the Atlantic (this is especially evident in the winter season due to the influx of "warm" air masses)_and, accordingly, the weakening of the Asian anticyclone (its western branch, or the Voyeikov axis) because of the large loss of ice cover in the Arctic. Most of warming is during the winter period.

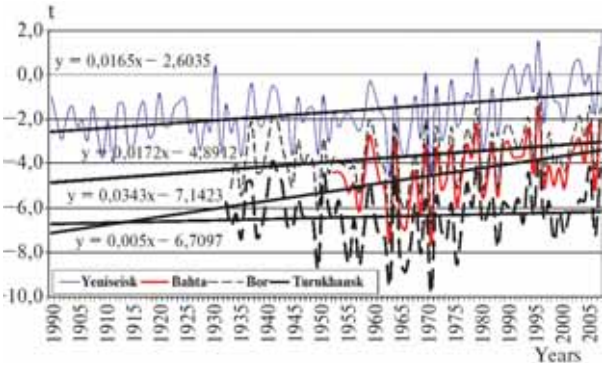

Fig. 2. Fluctuations in mean annual air temperature in the Central Yenisei region in 1900–2009. Compiled by the author

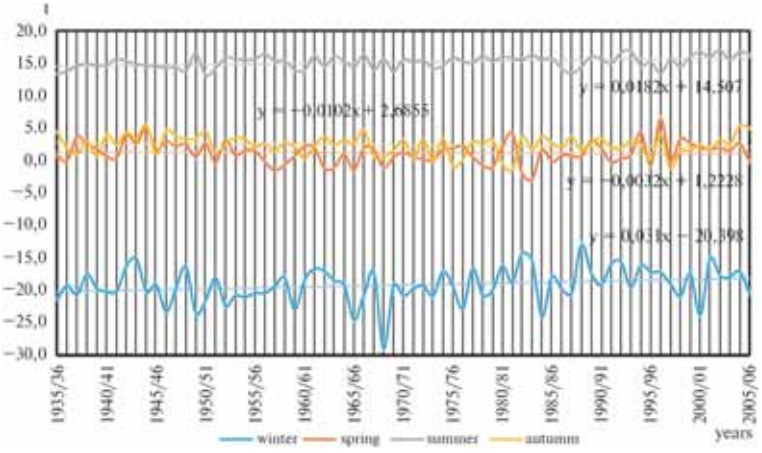

Fig. 3. The seasonal distribution of the average air temperatures measured at the Bor station in 1900–2009. Compiled by the author

The growth of climate variability can be seen in Fig. 3. The curve of winter temperatures is very indicative. As in the second quarter of the XXth century, the period from the beginning of the 1980s is characterized by mostly mild winters; very cold winters happen only occasionally. Against this background, the first and third quarter of the XXth century look less contrasting.

Warming of the climate, characterized by frequent mild winters and longer springs and falls, affects feed resources of the taiga. Famine years became more frequent. Thus, in 1997 and 1998, in the Central Siberian Reserve (one of the largest reserves of the planet with the size of the territory of Lebanon or Jamaica), blueberry, huckleberry, bilberry, honeysuckle, and red and black currant were almost completely absent. Their meager harvests were also in 1999; a similar situation persists to the present day, which is confirmed by the data of monitoring studies in the Reserve and surveys of local residents. The locals say that in the years with cool summers and mild winters, there are few places where pine nuts can be found, despite the widespread availability of cedar pine in the dark taiga. Such changes are especially important to the traditional nature management of the Kets since they do not have a well-developed subsidiary farming.

The Yelogui Kets. Their ancestral territory is located in the middle taiga, in the basin of the Yelogui River – the left tributary of the Yenisei River (Fig.1). The territory is dominated by the spruce – cedar pine and pine forest, interspersed with wetland areas; there are quite a number of burnt sites. The rivers do not have high fish productivity, but at the depth of the taiga, there are a few rich fishing lakes. There are deer-lichen pine forests that are good pastures for forest caribou, but they suffered from the fires. It is known that lichen pine forests is the type of forest mostly prone to forest fires in the taiga zone, and in the fire season in the summer of 2012, they were the main centers of large forest fires. Hunting resources include sable, squirrel, elk, upland game, mink, muskrat, and reindeer.

According to B.O. Dolgykh [1972], the Yelogui Kets had a well developed economy. Hunting, primarily squirrel with reindeer sleds, played a prominent role. In the Yenisei taiga, it allowed covering large areas. Another important sector of the economy

Photo by the author. Lichen pine forest after a ground fire on the left bank of the Yenisei River. These complexes are characterized by skeletal sandy soils, depletion of ground cover, and the lack of berry-beds

was fishing. Kets families covered distant, tens and hundreds of kilometers of travel, areas to places of fishing, which was possible due to their use of ilimka, i.e., a large (about 8 m long) boat with a cabin made of birch bark [Alekseyenko, 1968]. Eight out of ten Yelogui Ket's families had ilimkas. In summer, the families descended on them right up to the mouth of the Yelogui River. They almost never went to Yenisei. There, the fishing sites were used by Russians.

The first offender of the Kets lifestyle was the Abakan Expedition that conducted exploratory drilling for oil in the 1950s in the Yelogui River basin. According to K.B. Klokov [1999], old-timers told that many of its employees had shot a lot of domesticated reindeer. And since that time in the forest, there began frequent persecuting moss fires. By the end of 1970s, there were no reindeer left on the Yelogui [1].

From 1970–1980s, the population of Kellog – the largest Kets settlemet – grew due to the inflow of immigrants [Klokov, 1999]. This was promoted by growing hunting of sable, whose number had increased by that time, and income grew for everyone who hunted. The immigrants started families, established household farms, obtained hunting sites, and felt independent. The newcomers were filling the state farm procurement quota and its management depended on them as much as they depended on it.

The state farm was not interested in developing the economy of the periphery settlement; it was in the state of degradation. After the collapse of reindeer husbandry, the fur farm was closed, the cows of the state farm were liquidated, gardens were abandoned, and commercial fishing was phased out. Only gathering of cranberry and hunting remained. Fishing only provided food for the citizens themselves.

In the period of perestroika, the settlement was separated from the state farm and reformed into an individual «family farm.» Removed from the Yenisei River, the economy faced serious difficulties in selling the products, which caused the farm closure. Its former employees, left alone, have switched to self-procurement, felt more independent, and began to spend more time in the forest. However, the freedom had another side. The villagers began engaged in continues drinking. The number of crimes significantly increased.

The Kureyka Kets. This group of Kets lives in the Kureyka River basin that is in the northern taiga, on the border with forest-tundra (Fig. 1). The territory is dominated by sparse spruce and larch forests in the valleys and foothills adjacent to the tundra on the flat tops of the ridges of the Putorana Plateau. There are many large lakes rich in fish and good pasture for reindeer. However, nevertheless, according to the local residents and hunters, the number of game animals per unit area is not high. The main target species is sable; reindeer, squirrel, muskrat, elk, ermine, and ptarmigan are less important. In some years, there is arctic fox migrating from the north. The leading sector of the Kureyka Kets economy was hunting followed by fishing and reindeer husbandry for transportation – they used reindeer sleds for commercial hunting too. Now, the bulk of revenues are brought by the first two sectors.

The Podkamennaya Tunguska Kets. They live in the lower reaches of the Podkamennaya Tunguska River (Fig. 1). The hunting grounds are located in pine-fir taiga, rich in game animals, especially sable. Squirrel, elk, mink, and upland game have commercial importance. Fish resources are limited. These Kets were not engaged in reindeer husbandry. The village Sulomai became the central location of this group.

Modern Sulomai is the only settlement with the compactly living Kets population of about 200 people outside the Turukhansky area. The village is located in the territory of the Evenk Municipal District (former Evenk AO). According to the B.O. Dolgykh [1972], in the early 1930s, the Podkamennaya Tunguska Kets spent summer on the Yenisei River fishing; in fall, having stocked the essential goods, they went by ilimkas upstream the Podkamennaya Tunguska, sometimes more

Photo by the author. Fragments of the high (up to 60–70 m) red dene – the outcropping of the Evenk Suite of the Middle-Late Cambrian composed of cherry-red and, sometimes, light-green argellites and aleurites interbedded with gypsum and stromatolite limestone. In the Kets language, Sulenkhai or Sulemkai mean "red mount"

than 200 km from the Yenisei Range. Fur hunting was their primary occupation since it made up for over 90% of their total income.

In the 1930s, 80 km from the mouth of the Tunguska River, a field-hunting station was organized specifically for the Kets, where a settlement was founded with its present-day name Staryi Sulomai [Klokov, 1999]. There was a collective farm specializing in fur hunting. The second position in the economy was occupied by fishing, which after the loss of ilimkas (plank boats with a sharp beak and a cut aft), was centered on a small area of the Podkamennaya Tunguska River and its tributaries.

Unlike many other ethnic communities of northern Central Siberia, where in the 1960s the collective farms and non-traditional sectors of the economy began to actively develop along with the traditional natural resource use, the Sulomai economy for a long time remained completely traditional.

In the early 1990s, logging was severely limited and fishing trade ceased. Only consumer fishing and hunting remained. As long as a promhoz (a local industrial facility) provided helicopter transport of the Kets to the hunting grounds, they provided fur at a low price. In the perestroika, the promhoz went bankrupt and the furs were sold to dealers at their prices.

Nowadays, the economy of the village and its revenues are primarily associated with hunting and, to a lesser extent, with fishing and gathering of berries and mushrooms. Today, about half of the male population of Sulomai has their own hunting sites. Sable is the main commercial species. A small number of the female population of the village is occupied in the social sector – health and education, while the rest are engaged in housekeeping.

Photo by the author. Dorozhkina, Tatiana Orlovna is a member of the Kets small ethnic group, a resident of the village Sulomai. She is estimating the evening catch of tugun, i.e., a valuable whitefish

Photo by the author. Tyganovs – a typical Ket family from the village Sulomai, i.e., the Kets "Petersburg" (the second largest mono-ethnic Kets settlement)

Photo by the author. The Kets at their hunting site in the middle reaches of the Bolshaya Chernaya River

Photo with the author. Collection of tugun on the bank of the Podkamennaya Tunguska River. Seine fishing is done in the areas of fish concentration. Such places are called "tanyas." When a seine is unfolded, two people ("berezhnyk" – a shore-person and "begun" – a runner) take two ends of the seine and drag it at the bottom. The seine with small mesh (as in the photo) is called "chastyak." Such seine is used to catch chastyk (small mesh fish). One casting of the seine returns a pail of tugun

PROBLEMS OF PRESERVATION OF THE KETS ETHNIC AND CULTURAL TRADITIONS

The main problems of the Kets are alcoholism, unemployment, unfavorable demographic situation (increased mortality in middle age, the younger generation leaving for cities in more populated areas), and the loss of the Kets language. Penetration of Baptism plays a certain positive role in the fight against alcoholism. Having become Baptists, the Kets stop drinking alcohol, become more economically and socially active. However, with acceptance of the evangelical faith, the Kets have to pay 1/10 of their meager incomes: fish, furs, or cash. These processes lead to the transformation of some elements of the traditional worldview of their pagan religious system, culture, and ritual practice. The Orthodox Christianity "combined," as a rule, with the traditional beliefs and cults, never behaved as aggressively as evangelism.

Along with the gradual disappearance of traditions and the assimilation processes in relation to Kets, the Kets language is dissapearing too. In elementary school, the Kets language is now taught and a primeir and other tutorials have been created. However, this is not sufficient to revive the language of indigenous people and this does not always find understanding and support even among the Kets themselves. Today, education remains the only area of the use of the Kets language. The students of senior classes, who studied the Kets language in the first three classes of elementary school, do not remember its basics. This is due to three main reasons.First, in the vast majority of settlements, there are only elementary schools, while students can continue their studies only in the regional centers and in larger towns where the Kets language is not included in the curricula and there is lack of qualified teachers on the subject. Therefore, unfortunately, the effectiveness of teaching the Kets language in school is extremely low. Given the specificity of the region and of its transport and remoteness, there are good prospects for the development of distance education.

Second, in daily communication the younger generation of Kets do not speak their language in their national settlements with parents, friends, and peers.

Third, the attempts to revive the Kets language are not always understood, even among the members of the ethnic group, not to mention the district-level authorities. For a long time, the language has been transmitted only from parents to children. In the period from the 1920s to present, the Kets language has not been widely used. Today's young generation and their parents do not know their language, perhaps only a few words. According to various estimates, only 15% of the aboriginal population has command of the Kets language. It indicates the widespread destruction of the process of natural language transmission within families from parents to children. Some even claim that the Kets language is not needed for communicate either for themselves or for their children. We have identified such trends through surveys of the local population even in mono-ethnic villages.

LIFE SUPPORT SYSTEMS UNDER CHANGING CLIMATE

The Kets life-style is based on the traditional methods of economy and the use of a wide spectrum of the bio-resource component of the environment. Today, the land of their traditional habitation is widely used by poachers; management of the hunting sector began to

transition to entrepreneurs who are removed from the interests of the Kets ethnos. Through the present day, there has been the process of alienation of the Kets from their resource base.

In the modern period of impoverishment of indigenous peoples, the use of bioresource potential often takes a variety of forms of poaching. In order to preserve and restore the natural resources, it is necessary to allocate territories of the traditional natural resources use (TTU), establish the rules of their use, and create federal stimuli for external and internal sources of the economic development of these peoples.

Due to climatic changes (Fig. 2 and 3), there is a reduction of productivity of natural systems: reduced yields of berries, pine nuts, and mushrooms (the impact of short strong frosts in the spring, during the flowering, and of dry heat), reduced number of sable and other game animals because of poor food supply, increase of the number and extent of forest fires due to lower water content and reduction of water logging of permafrost landscapes, as in many of them according to our observations, the roof of permafrost went down 1–2 m and, sometimes, deeper.

The years of low reproduction of game resources became the rule rather than the exception, especially in the areas east of the Yenisei River. This can be explained by a greater degree of frost-danger in the right-bank areas compared to the left bank because of the geomorphologic features of the area: the higher degree of dissection of the relief, presence of deep valleys, higher altitudes, etc. Cold air flows into the valleys causing more frequent frosts in the spring. It is important to note the smaller depth of the snow cover on the right bank, compared to the left. In the era of global warming, there has been observed increased frequency of thaws. For example, the Kets pointed out that 20 to 25 years ago, cold weather lasted at least one month, and now, it is no more than 2 or 3 weeks. These observations of Kets are supported by the weather stations in the region, indicating more frequent thaws and warming in winter. As a result, the depth of the snow cover is lower, which impacts the productivity of berries. It is known that the reduction of snow cover increases the likelihood of freezing of billberry and blueberry. Many Kets note that a decrease in snow cover makes it more difficult to hunt moose. The result of these processes is the phenomenon of "hungry taiga" inherent in the last two decades.

There are marked changes in the habitat of tick-borne encephalitis; the tick is now detected around the 63°N. The ixodes ticks (*Ixodes persulcatus*), over the past 25 years, have moved 250 km to the north and now occupy the middle taiga subzone of our research area. The likelihood of tick-borne infections has increased. The activity of the ticks has been especially strong in the last 10 years. According to our surveys, it affects the population of the local villages Vorogovo, Bor, Sulomai, Kuzmovka, and other settlements; there, people have been frequently requesting vaccination against tick-borne encephalitis.

In the third quarter of the XXth century, during the stable cold winters, vipers (*Vipera berus L.*) were virtually absent in the middle-taiga geosystems at the right-bank of the Yenisei River. The local population began noticing the expansion of poisonous snakes after the abnormally warm years of the second half of the 1990s, which coincided with the time of the mass melting of ice in the rock glaciers (kurums). Now snakes are everywehre on the melted kurums.

Kurums is a type of the permafrost landscapes of the Yenisei Siberia that was the least stable in the era of global warming. Within kurums, even on slopes with poor heat-supply, the goltsy ice thawed, small depressions formed, and cold streams disappeared. They were overgrown with lichen, shrubs, and scattered trees. Pika, which plays an important role in the diet of sable, is abandoning kurums. These processes are promoted by late spring frosts and the loss of underground water resources at the base of kurums.

Due to the reduction of food resources, the number of sable and other game animals is decreasing. The increase in the share of

Photo by the author. A kurum overgrown with lichen and young birch in the Bolshaya Chernaya River valley (the left tributary of the Podkamennaya Tunguska River in its lower reaches)

birch and aspen in the dark taiga contributes to this process. At the stage of modern warming, it is harder for dark-needled species to maintain their dominant position in the tree layer; they are being replaced with the pioneer-species, which leads to worsening of forest and food resources.

Instances of hydrological anomalies also increased. A sharp warming in early spring and existing frozen impervious layer cause high and even catostrophic flooding that coincides with melting and drifting of ice. For example, in the snowless winter of 2001, an ice dam 30 m high formed, which caused serious flooding. As a result, the Kets settlement on the Podkamennaya Tunguska River was completely destroyed. The old-timers do not recall floods of such magnitude. Now, due to the increased frequency of floods of ice-dammed origin, the Kets are forced to move their homes to the watershed areas. After 2001, the regional services has been conducting blasts of ice dams.

CONCLUSION

We can assume that the trophic pyramid of the middle taiga has been significantly disrupted due to global warming and the growth of climate instability. Naturally, these changes adversely affect the traditional natural resource use of the Kets who cannot meet their growing material needs. The issue of development of appropriate measures and strategies is becoming increasingly relevant; they should become the leading adaptation basis of the traditional economy and way of life of the local population to a changing climate.

The reduced life-support functions of the «feeding landscape» (in the terminology of L.N. Gumilev) requires a focus on the comprehensive development of the traditional forms of natural resource use and their diversification, support of their resource and manufacturing base, and the organization of processing of raw materials and products. At the present stage, the Kets subsidiary farms are weak, though, they could become an important sector of food self-sufficiency of the local population. It is possible to establish plantations growing valuable species of mushrooms, berries, and herbs to increase the volume of commodity production. This would create additional incentives for the traditional Kets natural resource use. The creation of local plantations of medicinal plants would contribute to the formation of the region's production of environmentally friendly raw materials for medicines. These resources are available in the Kets TTU, where gathering of medicinal plants was carried out in the Soviet time. The volume of such procurement has been identified for some species of medicinal plants. Some Siberian regions have a successful experience with the use of non-timber forest resources.

Currently, a concept of creation of market for non-timber resources for 2005-2015 has been developed in the Krasnoyarsk Kray with the efforts of two administrations; this concept is focused on developing the competitive conditions for the buyers of mushrooms, berries, and medicinal plants who come from the neighboring Russian regions. In addition, non-timber forest management is rightly seen as a way to preserve the most valuable land from logging, primarily of the dark coniferous taiga. It is also necessary to set up small processing facilities that could receive caught fish and gathered wild plants from the local population and process and sell these products, thus increasing the employment in the taiga settlements.

The way out of large-scale poaching and logging could be the creation of the ethnic

cultural natural protection complexes, for example, the environmental-ethnographic parks, reserves, etc., where the priority rights to land and economy of the indigenous people are realized. Our surveys of the Kets population confirm our views on the significance of this strategy. According to the residents of the village Sulomai, if the Central Siberian Reserve receives the environmental-ethnic status and the hunting and fishing grounds of Kets are included in it this could protect against poaching and would strengthen the Kets right to the TTU. Such experience exists in other countries, where the creation of biosphere reserves meets the objective of preservation of both natural and cultural environment and support of traditional forms of the natural resource use and of landscapes with the balanced resource use. It is apparent that government handouts in the form of small payments that promote social anemia in mono-ethnic villages should be replaced with support for their quality work and traditional crafts.

The use of renewable bio-resource potential and diversification of the traditional economy on its basis is environmentally acceptable and economically feasible and represents an adaptation of the traditional natural resource use of the local population to the new social and natural environment.

It seems that in the context of global warming and growth of climate instability, a close relationship between the traditional economy of indigenous peoples, the natural resources, and environmental, and geographical factors of the environment becomes even more pronounced.

Similar processes in a changing climate require serious comprehensive research on various aspects of the relationship between the geographical environment and the indigenous population that use environmental resources and services as a life-support system. ■

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