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Article abstract

An analysis of changing diet patterns during the Soviet and post-Soviet periods was carried out among sea mammal hunters (villages of Lorino and Lavrentiya) and reindeer herders (village of Vaegi) of Chukotka. Economic and ethnic factors in the choice of food were investigated. The results show that both studied groups are developing diets that substantially differ from both the traditional and the "Soviet" ones.

Changes in Soviet and post-Soviet Indigenous diets in Chukotka

Andrew Kozlov*, Vladislav Nuvano**, Galina Vershubsky***

Résumé: Changements dans les régimes alimentaires des autochtones de la Tchoukotka pendant les périodes soviétique et post-soviétique

Une analyse des changements des régimes alimentaires durant les périodes soviétique et post-soviétique fut effectuée parmi les chasseurs de mammifères marins (villages de Lorino et Lavrentiya) et les éleveurs de rennes (village de Vaegi) de la Tchoukotka. Les facteurs économiques et ethniques dans le choix de la nourriture furent examinés. Les résultats démontrent que les groupes étudiés sont en train de développer une alimentation qui diffère considérablement de celles des périodes traditionnelle et soviétique.

Abstract: Changes in Soviet and post-Soviet Indigenous diets in Chukotka

An analysis of changing diet patterns during the Soviet and post-Soviet periods was carried out among sea mammal hunters (villages of Lorino and Lavrentiya) and reindeer herders (village of Vaegi) of Chukotka. Economic and ethnic factors in the choice of food were investigated. The results show that both studied groups are developing diets that substantially differ from both the traditional and the "Soviet" ones.

Introduction

While easily assimilated carbohydrates are difficult to find in high latitudes, animal fat and protein are rather abundant. Consequently, Arctic peoples have developed a unique example of polar diet and adaptation. Compared to the nutrition and metabolism

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of people living in temperate regions, those of Arctic peoples are characterized by the particularly high role of fat and protein at the expense of carbohydrate consumption.

Although there is a vast literature on the nutritional ecology and anthropology of high-latitude populations, the differences in the various traditional food of the circumpolar area have been neglected. As a result, a persistent representation has been perpetuated in the scientific literature according to which the typical Arctic food would be that of the Inuit. However, while most traditional Inuit diet is mainly based on sea mammal hunting, in Chukotka, as well as everywhere in Northern Russia, the diet of practitioners of subsistence activities is less represented than that of reindeer herders whose diet is significantly different (Funk and Sillanpää 1999; Kozlov et al. 2007; Krupnik 1993).

Coastal populations have been securing food by efficiently using the small-size but highly productive territories in water areas. For centuries, the diet of Chukchi and Yupik populations in Chukotka was closely related to the Arctic ecological conditions. While Yupik food may have been one of the most varied among Arctic cultures, with up to 100 animal and plant species used traditionally (Kozlov 2002a), it looks meagre when compared to the variety in temperate regions. Yet, reindeer herders' diet has been even less varied than the Yupik one, being constituted from no more than some tens of resources based on reindeer, river and anadromous fish. Furthermore, there is less fat in the reindeer herders' diet than in the one of sea mammal hunters since Arctic ungulates are rather poor in fat. But in either case, every traditional food played an important role in people's diet insomuch as the removal of even one item was susceptible to seriously harm human health as there were no local alternative to replace it.

The importance of the differences between various circumpolar traditional food goes even beyond the historic and ethnological aspects. Soviet and post-soviet shifts in diet have affected at different levels the Indigenous population in Chukotka that is historically related to sea mammal hunting and reindeer herding. The analysis of these changes and their causes is the overall aim of our study and its results will be presented in this article.

Methodology

We used the results from questionnaires on food consumption administered in 1985 by Volfson et al. (1985) and by the Department of Agriculture of Chukotka in 2000 (Litovka 2001). As both questionnaires used identical methods, we could compare some quantitative features in the food consumption.

We also collected our own data during interviews with targeted Indigenous groups. In November 2002, we conducted interviews with sea mammal hunters in Lorino, Lavrentiya and Anadyr, the administrative centre of Chukotka (Kozlov 2004; Kozlov and Zdor 2003). Each group consisted of 16 to 38 informants for a total of 78 people. In 2003, 91 informants were interviewed in Vaegi. This village is located inland and its

Indigenous population traditionally herds reindeer. For this interview we used a modified version of the questionnaire "Eskimo Cohort Study," developed edited by P. Bjerregaard and T. Curtis of the National Institute of Public Health in Denmark. We also integrated official statistics regarding the size of sea mammal livestock, and the use and purchase of their products by the Indigenous population (Ainana et al. 2002; Podgany and Zdor 2001).

Social reasons for diet change in the Soviet period

Changes in Chukchi and Yupik lifestyles started in the 1930s and gained in magnitude through the 1950s-1970s. These changes also affected the traditional Indigenous diet for a number of reasons that will be discussed below.

Boarding schools

Boarding schools played a huge role in training Indigenous children to get used to the new Russian food for seven or eight months every year, as they were fed with European (or more precisely, Soviet) food. Officially approved diets for northern boarding schools were similar to the ones in central Russia. Regional differences concern mainly caloric content and vitamins, and the partial inclusion of some local resources (mainly reindeer meat) but not the local ways of processing them. School children were taught that only the Soviet ways of processing resources and meals were the genuine expression of one's culture. Pasta, sweetened condensed milk and sausages were opposed to reindeer, seal and whale meat in order to emphasize the prestige of the former.

Boarding schools were instrumental in reshaping people's taste. Traditional Arctic diet differs from the "European" one by the almost total absence of spices and salts. Thus school residents had to get used to new tastes, which were quickly acquired and eventually would lead to the new ways in which even local resources were processed and cooked. For instance, in Chukotka salting became a new common way of processing fish and caviar just as it was in Soviet food, while neither Chukchi nor Yupik peoples had used salt prior to the 20th century. In boarding schools, children got used to carbohydrate food with high sugar content. Sweet tea, candies, jam, pastry as well as one of the most appreciated delicacies of Soviet time—tinned condensed milk with sugar—were some invariable components of the school diet.

These food habits acquired during childhood quickly led to an increasing volume of sugar consumption, yet as late as 1920, the sea mammal hunters in Chukotka were using neither refined sugar nor any sweets. In 1937, Yupik daily intake of sweets per capita was around 40 g (including 30 g of refined sugar) (Kozlov et al. 2005). By 1989, the volume of sugar consumption by the Indigenous peoples in Chukotka was practically equal to the average Russian standards (respectively 58 versus 65 g of refined sugar intake, and 125 versus 129 g of total sweets consumption) (*ibid.*).

Of course, boarding schools are not the only institutions responsible for Chukchi and Yupik diet change. A whole range of Soviet governing features and particularly the way of “resolving social problems” had a huge impact in that respect.

Enforced relocation

Enforced relocation of the Indigenous population from numerous tiny settlements to the consolidated ones heavily affected their access to local foods. Out of 16 Yupik settlements that existed in Southeast Chukotka at the turn of the 20th century, only three have survived (Uel’kal’, Sireniki and Novoe Chaplino). Furthermore Novoe Chaplino is a new settlement as it was founded in Tkachen Bay in the late 1950s and Yupik people from Cape Chaplin and its neighbourhoods were relocated there in 1958-1959 (Krupnik 1983; Krupnik and Chlenov in this issue).

The so-called “consolidation” (*ukruplenie*) policy aimed to facilitate the administration and the distribution of supplies and health services. Although these were well-intentioned projects, they were ignoring the cultural habits, traditions, and needs of the Aboriginal communities. As a result, a large number of hunters and reindeer herders were resettled in few consolidated villages from where they were no more able to reach their traditional hunting or herding territories. This dramatically increased pressure on the new, limited in size, hunting and herding territories so their productivity progressively deteriorated. Even a successful hunt would not result in exchange of stocks with other settlements as distances were great and roads absent.

The traditional way of territorial occupancy had always enhanced Indigenous peoples’ diet with additional resources through individual fishing, plants gathering, and birds and small mammals hunting. The new demographic concentration reduced access to this type of local resources, so the portion of eggs, seaweed, seafood, and edible plants in the Indigenous diet started to fell. Thus, what was initially looking like a purely administrative measure had an unexpected negative influence on availability of local resources.

Parallel to the above described relocation, Soviet power introduced a new agricultural production of industrial type in the North in order to enhance the employment of the Indigenous population. Poultry farms producing eggs and chicken meat as well as pig and dairy farms appeared in the northern villages. It was considered that the Indigenous population, and particularly their children, should learn to consume milk. However, the centrally-managed recommendations on boarding school catering never even mentioned the genetically attributed lactose malabsorption which affects 87% of the Indigenous peoples of Chukotka and hence the inappropriateness of whole milk for them (Borinskaya et al. 2006). As a consequence, the compulsory milk consumption in boarding school often led to diarrhoea. While boarding school pupils could not refuse milk, Aboriginal adults did not use it, so dairy farms ended up over producing milk. By the mid-1980s even officials had no choice but to acknowledge this

problem, though the government was still keeping plans on increasing milk production in the North (Solomakha 1987).

Furthermore, meat produced by the village farms had negative effects on the reindeer herding production and even more so on sea mammal hunting. By 1985, state-produced beef, pork and canned food represented almost half (45%) of all meat purchased by the traditionally sea mammal oriented Yupik and coastal Chukchi populations (Volfson et al. 1985). In Soviet official circles, whales, walruses and seals were not considered as a necessary source of food for the inhabitants of coastal settlements. Instead, sea mammal hunting was considered as a kind of secondary economic activity necessary only for the maintenance of animals in fur farms. Such policies resulted not only in the shortage of sea mammal meat and fat for coastal residents but also in the deterioration of the traditional exchange of resources between sea mammal hunters and reindeer herders in Chukotka. Tundra residents began to compensate the shortage of traditional resources with sweets, flour, and canned meat.

At last, we have to mention one more factor that affected the Indigenous way of life and particularly the access to the local food resources in the Soviet North. This is the relationship between the Indigenous population and military units and detachments of border guards deployed in high-latitude regions. In the process of toughening the border regime in Chukotka, which was situated in immediate proximity to the "probable military enemy," namely the USA, maintaining Indigenous hunting and herding has become a difficult task. Sea mammal hunters were required to obtain licenses from border guards for each of their outings on the sea. Though refusals were rare, the very procedure of application and license attribution was time-consuming, and not coordinated with quick changes in weather conditions, sudden appearances of walrus herds (particularly characteristic for the coastal area near Sireniki), and thus affected the hunt. Furthermore, some not always relevant "nature protection Acts" such as restrictions on fishing, sea mammal hunting quotas, and foraging activities, brought additional obstacles to the local resources' accessibility.

By the end of the 1980s, all these factors led to the forming of different food cultures among the different age groups of Indigenous people in Chukotka. Youth turned to Soviet food; they hardly knew the traditional food and technologies to access and process them. Although Chukchi and Yupik elders were still maintaining some traditional diet, they had included Soviet resources (Fomenko 1990; Pika et al. 1993). One way or another, purchased food had begun to supersede local food in every Indigenous community of the North.

Use of resources in the Soviet period: a nutritional analysis

By the early 1990s, the decrease in the local resources intake and growth of carbohydrates consumption did not yet mean a complete transition to an European diet. Even though the traditional protein-fat diet in Chukotka was significantly misbalanced, the Indigenous diet was still at odds with the "modern" European diet requirements.

Evidence of this is provided by the following nutritional analysis of informants' recollection of 24-hour dietary intake, conducted in the late 1980s and early 1990s (Table 1).

Table 1. Indigenous and Soviet diets in Chukotka from late 1980s to early 1990s.

Ethnic group	Nutrients (% of daily energy)			Source
	Proteins	Fats	Carbohydrates	
Tundra Chukchi	30	32	38	Klochkova et al. (1990)
Yupik and Coastal Chukchi	20	36	44	Shubnikov (1991)
Russians	12	36	52	Martinchik et al. (2002)

While carbohydrate content in the diet of the reindeer herders and sea mammal hunters had already approached the levels shown in European Russia, the protein contribution to the calories was significantly higher in the Indigenous diet than in the Soviet one. Furthermore, the Indigenous diet was still characterized by a very high intake of animal proteins, three to four times higher than the intake of plant proteins (Shubnikov 1991).

Although the intake of proteins and animal fats in the Aboriginal diet was still higher than that of the average Soviet citizen, notable changes had occurred. The portion of meat and fat from sea mammals, reindeer and wild animals in the diet of the Aboriginal coastal communities in Chukotka had decreased to 65% (Volfson et al. 1985). As domestic livestock products contain three to 11 times more saturated fatty acids (SFA) than those of sea mammal hunting (Table 2), such shift had led to some important biochemical deviations in the Arctic diet even though the proportions of proteins, fats and carbohydrates had remained the same.

However, the balance of polyunsaturated versus saturated fatty acids (PUFA/SFA), to which the majority of researchers fairly pays attention is just one part of the problem. In fact, meat and fat of domestic and wild animals differ on the entire complex of parameters, in particular, to their contents of minerals and vitamins. For instance, beef contains 5.5 times less vitamin A than the meat of the white whale (Nutrient Data Laboratory 2004). Hence the risk of hypovitaminose increases during such a transition diet characterized by close to traditional quantitative levels of nutritional elements but coming nearer to the European qualitative food structure.

The decrease in the traditional exchange of resources between Indigenous reindeer herders and sea mammal hunters in Chukotka also resulted in a decline of the polyunsaturated fatty acids in the diets of both groups. Weight surplus and the increase of low-density lipoprotein concentration in the blood were some medical consequences of this tendency that particularly hit the reindeer herders (Klochkova et al. 1990).

Table 2. Polyunsaturated and saturated fatty acids (SFA) in domestic livestock and whale.

Product	PUFA/SFA balance	
	Domestic animals	Gray whale ¹
Fat (pork)	0.41	1.14
Tongue (pork)	0.27	1.11
Meat (beef)	0.08	0.86

Source: Bogoslovskaya et al. (1997)

Changes in diet during the post-Soviet period

Changes in the political, economic and social system after the collapse of the Soviet governing structures also affected the Indigenous peoples' diet. Withdrawal from the state monopoly in foreign trade and the import increase in the Russian Federation in the last decade of the 20th century did not simply fill the consumer markets with new food resources, they also changed the ways people started preparing them. Furthermore, Soviet food itself started to change as a whole cultural phenomenon. Today, the diet of a significant number of citizens in the Russian Federation is in transition to a somewhat "marketed-European" diet.

Against this background, the increasing consumer's demand for local food products in the Russian North might look a bit strange. However, this phenomenon is fully understandable. Various reasons have led to a relatively regular use of traditional food in the North. The main factor is an economic one. Withdrawal from the Soviet redistributive system has led to an impoverishment of a significant part of the population. Rural areas and especially the North have known the most dramatic decrease in consumers' buying power. According to official data (RFSS 2000), the wages in Chukotka were constantly reduced throughout the 1990s, and by 1999 were only 25% from their 1993 level. Even though the average wages increased between 1994 and 2000, their value actually fell if compared to US dollars as the Russian currency suffered high inflation rates in that period. Thus, by 2000, the food-related buying power of the Indigenous population had decreased 12 to 13 times from its 1985 rate (Litovka 2001).

Additional difficulties in the food supply came from the decline or liquidation of almost all Soviet cattle and poultry farms that had been created in the northern consolidated villages. There was also a sharp deterioration of the centrally managed delivery of products from other regions.

Delivery of whale products also sank critically. Since 1968 a modern vessel that was able to catch whales far from coast had served coastal settlements of Chukotka. Though the formal purpose of hunting was to provide forage for the fur farms, inhabitants had received a small part for their own needs. This modern way of hunting

¹ Gray whale (*Eschrichtius robustus*) is also spelled grey whale in the literature.

was kept alive till 1991, when the Indigenous *sovkhoz* (state-owned agricultural farms) were no more able to pay the rent for the whaling vessel. Thus the centrally managed whaling ended and whale meat disappeared from the settlements.

These economic and social changes affected the food contents in the Indigenous diet. A comparison of daily average volumes in the consumption of products belonging to the same classes but with different origins or costs (*e.g.*, purchased meat and sea mammal meat; sugar and sweets, etc.) in studies from 1985 and 2000 (Litovka 2001; Volfson et al. 1985) shows that some rather expensive products tended to be replaced by cheaper ones (Table 3). Thus Indigenous coastal communities started to replace the food they used to purchase in the market by local resources. It is obvious that such a shift reflects a lack of financial means to buy store goods.

Table 3. Shift in food consumption in Chukotka, 1985-2000 (g per capita per day).

Nature of the shift	Products	Difference in consumption (2000 compared to 1985)
Related to the product's origin	Purchased (including canned) meat	-193
	Sea mammal meat	+115
	Fat (including plant-extracted) from purchased products	-18
	Fat from sea mammals	+21
Cost-related	Bread and pastries	-62
	Flour	+146
	Sweets/candies and jam	-26
	Sugar	+24

During the post-Soviet era, industrial fresh water fishing sharply decreased. According to official data, in 2000 the centrally managed fishing provided 4.4 kg of fish per capita/per year to the Chukotka Indigenous population (RFSS 2000). This was 10 times less than in 1985. The decrease in goods delivery forced Northerners to turn to individual hunting and fishing for subsistence (formally designated as "amateur hunting"). The percentage of Indigenous people engaged in full-time fishing for subsistence has increased twice between 1985 and 2000, passing from 15.7% to 30.3% (Litovka 2001). This means 23.6 kg more fish for each Aboriginal individual (Ainana et al. 2002). Even though individual fishing cannot always endow Northerners with the necessary amount of food, it nonetheless provides an important input in the family's diet.

As for the reindeer herding products, their situation is no better. Although the situation differs from one northern region to another, one can roughly indicate that those Indigenous communities whose traditional economy was primarily focused on reindeer were able to keep and eventually increase their herds. This happened, for instance, in the Nenets communities in Yamal. In some districts of Chukotka, conversely, the privatisation of the herds initially led to a sharp decrease of the reindeer population. Here a combination of factors such as bad weather conditions in the mid-1990s; the economic decline in the region; and the deterioration of the reindeer

herding's management structure, played a negative role. As a result there were six times less reindeer cooperatives and 1.6 less private ones throughout Chukotka in 2000 than there were in 1985.

In the 2000s, the situation started to improve. Our field study, conducted in 2003 in Vaegi, central Chukotka, shows that 80% of our Indigenous informants had been eating local resources, and especially reindeer meat, at least four days per week. Being a traditional northern activity, reindeer herding was a viable basis that helped people overcome the food crisis. Aboriginal sea mammal hunting also started to revive, and now its basic purpose is to provide the local inhabitants with meat. In 1993, only one year after the end of the centrally managed whaling, the coastal population revived the gray whale hunt with their traditional wooden whaleboats and skin crafts (*baydara* of the *umiaq* type). In 2000, the number of hunted animals reached 67% of its 1985 level. Still, as hunting was directed towards young and small animals, the actual volume of whale meat was considerably smaller: only 45% of the 1985's level. In general, the annual per capita consumption of whale meat by the Indigenous population in the coastal regions of Chukotka decreased from 83.6 kg in 1985 to 52 kg in 2000.

The lack of whale products was compensated by the hunt of other sea mammals. The sharp decline in whaling in the late 1980s was followed by a steady increase so that since 1998 it remains stable. The increase was mainly accounted for by the intensification of small seals harvest which was conducted by local people, both in teams and individually. While in 1985 sea mammals provided 65% of all meat in the diet of the coastal population in Chukotka, by 2000 the proportion rose to 89%. One can conclude that the economic crisis made the Indigenous communities in the Russian North turn to subsistence food as well as to the cheapest products on the market.

Food choice: ethnic or accessible food?

As determinative as the economy could be in the reasons for food choices, when it comes to traditional diet, one must not forget the ethnic factor. Traditional food culture gets a special role during periods of identity crisis related to ethnic self-ascription. This is the kind of period Aboriginal and non-aboriginal peoples of Russia are going through nowadays. The affective relation to one or another ethnic marker becomes very visible when some cultural elements are suddenly "liberated" (*i.e.* from the Soviet directives). This psychosocial aspect can be noticed when we compare the food behaviours of the reindeer herders to those of the sea mammal hunters in Chukotka.

A majority of our Indigenous informants, both from inland (64%) and the coast (70%) declare preferring their own ethnic food to the "Russian" one. In the 40+ age group, there are few significant differences between reindeer herders and sea mammal hunters: 80% of the former and 66% of the latter prefer the ethnic food. But when it comes to the youth, opinions clearly differ. While only 40% of the young inhabitants of reindeer herding districts declare preferring ethnic food, this rate is almost double

(76%) in the coastal settlements that have seen the recent revival of sea mammal hunting.

One reason for this discrepancy might be found in the “traditionalist” longings. Soviet power did not consider sea mammal hunting as a serious food source. Moreover, dishes from meat and fat of sea mammals were considered as an attribute of “backwardness.” A great deal of our informants told us stories about Yupik and coastal Chukchi living in towns and eating these traditional products in secrecy, too shy to be seen by their neighbours, especially by their Russian neighbours. After the revival of the sea mammal hunting, many Yupik and coastal Chukchi today consider the traditional dishes from whale, walrus, and seal, a symbol of their ethnic identity. Also, the Soviet-era artificial obstacles to access traditional food make coastal Indigenous peoples today express a negative attitude toward the westernised products and food. While all young (less than 40 year old) inland Indigenous informants would like to combine to some extent traditional and “Soviet” food, this rate drops to 26% (for women) and 12% (for men) in the coastal Indigenous communities.

The corresponding reaction concerning reindeer meat was less strong. The latter was accessible during Soviet time as it was on sale in shops and regularly used in not only in the Indigenous diet but also in that of the newcomers. Dishes from reindeer were perceived as “ordinary stuff” and therefore attracted less attention. Nowadays, 88% of the older (40+) and 72% of the younger Chukchi women from Vaegi eat reindeer at least four days in a week; hence the age group does not play a significant role here. Yet senior women confirm using ethnic instead of Russian food almost six times more often than the young ones. Available on everyday basis, reindeer meat is now perceived by the young generation as a daily product at the same level as the purchased food has become. For elders though, a reindeer dish remains an ethnic symbol like before.

This orientation of Yupik and coastal Chukchi towards traditional food is not typical of the contemporary Russian Arctic. In general, it is the availability of different products that is more important for the northern residents and that defines the way to prepare those (Kozlov et al. 2007). In northern Russia, local food is kept alive in those ethnic groups whose way of life remains close to traditional, as well as by unemployed persons who have to turn to a subsistence economy. The Arctic Indigenous diet of village residents essentially differs from that of reindeer herders and sea mammal hunters. Cultural behaviour and food culture are interconnected. This does not mean any purposeful preference or denying of traditional food culture. Rather, the choice of accessible products and ways of their preparation prevails in this case.

Chukchi sea mammal hunters: traditional food versus local resources

What we now observe in northern Russia is not a return to traditional food, but a shift to local resources. This change is a cultural phenomenon well represented in the case of the Chukchi sea hunters. The food crisis in Chukotka was the reason for the revival of the millennial Indigenous sea mammal hunting. Sea mammal fat replaced the

purchased fats and oils, and the meat of whales, walrus and seals replaced the canned meat, sausages and all other products of the cattle and poultry farms. Furthermore, different types of meat products were not equally accessible to Indigenous peoples. Whaling, for example, is not only a dangerous occupation, it also requires special equipment (whaleboats, powerful motors, gasoline, specialized weapons and ammunitions) for at least two or three whaleboat teams hunting together. Hunting walrus in open sea is another dangerous activity. Unlike whaling, the hunting brigade, equipped with the usual rifles, requires no more than one whaleboat. As for sealing, it can be practised by a single hunter. Equipment cost and availability, hunting licenses, and plenty of other management and financial issues have led to some important changes in proportions of consumed meat and fat from different sea animals in the last 15-20 years.

The general increase in sea mammal consumption shown in Table 3 does not reflect the structure of the sea mammal harvesting. In fact, only the seal harvest has really increased (+192 g per capita per day). Walrus consumption has remained constant (+9 g), while the use of whale meat has considerably decreased (-86 g). However, one should consider that sea mammal species differ from another both in structure and energy values, as shown in compared values regarding gray whale, walrus, and ringed seal (Table 4). Calories, fat and proteins can vary from single to double in volume in similar products. Yet the product is far more than just proteins, fat and carbohydrates. Each sea mammal product also contains different levels of microcells, vitamins, saturated and unsaturated fats (Nutrient Data Laboratory 2004). Calculations also have shown that the replacement of some gray whale meat by seal can change the daily energy balance up to 10% (Table 5).

Table 4. Energy value and nutrition facts per 100 g of sea mammals' portion.

Product	Source	Energy value (kcal)	proteins (g)	fat (g)	carbohydrates (g)
Skin with hypodermic fat (as the whale's <i>mattak</i>)	Gray whale	470	12.6	46.1	1.20
	Walrus	282	16.3	24.1	0
Fresh meat	Beluga whale	111	26.5	0.5	0
	Walrus	199	19.2	13.6	0
	Ringed seal	142	28.4	3.2	0
	Bearded seal	110	26.7	0.4	0

Source: Nutrient Data Laboratory (2004)

By 2000, most general assessments show a 16% decrease in energy value in the diet of Yupik and Coastal Chukchi populations from its 1985 rate (Litovka 2001). Furthermore, the nutrition balance has also changed: while carbohydrates have remained at the same level as before, proteins levels clearly increased at the expense of fat (Table 6). This resulted in an original diet for the coastal residents that have turned

to a subsistence economy. This new diet is equally different from the European, and from the traditional diets.

Table 5. Changes of fat and energy consumption due to a shift in the hunted species.

Source	Difference in volume: (2000 - 1985 =)	Daily consumption balance	
		Energy (kilocalories)	Fat (g)
Gray whale	- 86 g/day	+ 31.7	+ 2.61
Ringed seal	+ 95 g/day		

Table 6. Changes in the diet of Yupik and Coastal Chukchi peoples.

Year of research	Nutrients (% daily energy)			Source
	Proteins	Fat	Carbohydrates	
1985	19	30	51	Volfson et al. (1985)
2000	26	26	48	Litovka (2001)

Furthermore, consumption and culinary processing today differ from the traditional ones. In the middle of the 20th century, sea mammal hunters of Chukotka were sharing the products of a killed animal, and in particular, the whale products. The gray whale was hunted in summer. Yet freezing, the only way to store it, was not always possible during the warm season. Therefore gray whale was traditionally considered as “summer food.” This seasonal food was compensated by the long-term storage capacity of the bowhead whale. However, there was practically no bowhead whale hunting in recent years: for 112 gray whales harvested in 2001 there was only one bowhead whale (Ainana et al. 2002). Even the annual quotas of five bowhead whales established for the period of 2003-2007 for the needs of the Indigenous population of Chukotka were not met. This shift in the hunted species aggravates the problem of the seasonal availability of whale meat.

Processing technologies also affect the nutritional structure of the products. For instance, drying evacuates the water from the meat and thus increases 3-5 times the percentage of proteins, fat, and microelements per mass unit. This also increases its energy value: dried white whale meat is three times more caloric than fresh meat (Nutrient Data Laboratory 2004). Fermentation is another processing technology typical for Arctic food. In popular speech the food prepared this way is called *kvashenymi*. Inhabitants of Chukotka know many similar dishes; however, only few products can be processed that way. This requires meat from either bowhead whale or walrus, while seal and gray whale are not suitable for it. However, bowhead whale is practically not hunted in Chukotka, and the harvest of walrus, which could partially compensate the lack of bowhead whale meat, does not increase. As fermented meat in the traditional diet can to some extent protect from the development of stomach and duodenal ulcer in cases of infections with *Helicobacter pylori*, the decrease in its consumption can have adverse health consequences (Kozlov 2002b).

We can conclude that the return of coastal Indigenous peoples to local food sources does not necessarily mean a revival of the traditional diet. There is an obvious deterioration of both the content and the processing technologies of local foods. It appears that hunting quotas on seal, walrus and whale in Chukotka are far from being reached. In 2000, in particular, the volume of sea mammals harvested was only 61 % of the established quota (Podgany and Zdor 2001), then it slightly rose in the next years, basically due to an increase in small seal hunting. Yet the recent shift to using the greatest possible spectrum of resources extracted from land and sea mammals as well as from birds, fish, and plants, has been a major adaptation strategy for the inhabitants of the Arctic coastal areas. Indigenous people now need to organise sea mammal hunting in a sustainable manner, and to maximise diversity in the harvested resources to diminish the pressure on the environment.

Changes in the reindeer herders diet

Changes also took place in the diet of the reindeer herders in post-Soviet Chukotka. Data reveal a dramatic redistribution of the basic nutrition elements in the diet of Tundra Chukchi in 2001 as compared to 1990 (Table 7). As a matter of fact, the percentage of proteins, fat and carbohydrate was rather similar to that in the diet of Russians during the Soviet period (Martinchik et al. 2002).

As we saw earlier, the reasons behind changes in the diet of sea mammal hunters are basically economic. It appears that the situation in reindeer herding communities followed another scenario. The post-Soviet period made it tougher for inland communities in Chukotka to access local foods. In the village of Kanchalan, reindeer meat accounted for only 43.7 g per capita per day. This is 7.5 times less than in 1985. Still the drop in Indigenous income was lesser in the tundra than on the coasts of Chukotka. Average reindeer herding income was 1.5 times higher than that from sea mammal hunting (Litovka 2001). Thus, inland inhabitants maintained at least a minimal buying power. Accordingly, prices started to play a decisive role in the choice of food products. Thus flour and refined sugar became basic products in the tundra diet. The power to buy them created the illusion that it was still possible to survive on Soviet food.

Such events as the sudden end of centralised whaling affected inland communities in much smaller degrees than the coastal ones. The illusory opportunity to live on purchased food as before considerably slowed down their transition to local food. The consequences were that by 2001 the volume of consumed carbohydrates had increased, while fat and especially protein levels had decreased (Table 7). With a high percentage of carbohydrates (58%), the energy value in the Chukchi diet has even exceeded the "Soviet" levels (52 %). However, it would be a mistake to pretend that reindeer herders have turned to a kind of "super-Soviet" diet as practically all proteins and a great deal of fat in their diet still come from reindeer and fish.

Table 7. Changes in the diet of the Tundra Chukchi.

Year of research	Nutrients (% daily energy)			Source
	Proteins	Fats	Carbohydrates	
1990	30	32	38	Klochkova et al. (1990)
2001	14	28	58	Litovka (2001)

Conclusion

Results from nutritional studies among different Indigenous groups in post-Soviet Chukotka can hardly be arranged to form a uniform picture. Yet one thing is clear: neither sea mammal hunters nor reindeer herders turned back to the past. Sea mammal hunters are developing a new diet that is still to be researched by physicians and nutritionists, as one can hardly find any analogues of this diet in the entire circumpolar area outside Russia. Indigenous diet in the tundra regions is changing in another way. In the reindeer herding communities, the Soviet-era trend to resort to cheap carbohydrates products keeps increasing. Nevertheless, local food is slowly gaining ground at the expense of purchased meat and fish that have been processed in the European way. Therefore reindeer herders, like sea mammal hunters, are far from returning to a Soviet diet. Based on the above, we can conclude that the current diet of Yupik and Chukchi peoples is equally different from the traditional and from the Soviet diets.

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