Diversity of regional trends in traditional reindeer husbandry in the Russian Arctic

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Abstract. Domesticated reindeer livestock is an important resource for traditional economy of the indigenous peoples of the Russian Arctic. The article analyses the variability of the reindeer number trends in different Arctic regions and the reasons why reindeer livestock increases in some areas and decreases in others. The analysis is based on the official statistics data and scientific literature. Author argues that the key condition for the success of traditional reindeer husbandry is the informal economic environment. Due to peculiarities of the regional politics and the ways of adaptation of indigenous communities, such environment have been formed only in four municipal districts in the tundra of Western Siberia. In all other territory of the Russian Arctic the number of domesticated reindeer decreases or fluctuates at about the same level.

1. Introduction

Diversity of regional trends in traditional reindeer husbandry of the Russian Arctic has attracted researchers’ special attention. The issue why the reindeer livestock is decreasing in some regions while in other regions it keeps growing, is important from both theoretical and practical standpoints, as reindeer herding of indigenous communities is supported from federal and regional budgets. Better understanding of the reasons why reindeer livestock changes would allow to spend state funding more efficiently.

Rather a lot of publications are dedicated to the domesticated reindeer livestock dynamics analysis [1], [2], [3], [4], [5], [6], [7], [8], [9]. The dynamics of reindeer livestock in Russia is suggested to be determined on the federal level mainly by the influence of political and macroeconomical factors, and on the local level by social ethnocultural, and ecological ones [9]. The most important political events having impacted reindeer husbandry negatively were collectivization in the 1930s and post-soviet market reforms of the 1990s [2], [5], [6]. In the period between these two events reindeer husbandry was sustainable. The Soviet state established the goal to increase all kinds of the livestock including reindeer, even in the regions with unfavourable environment. On the other hand, legal regulation based on the soviet ideology was aimed at restricting the private sector and controlling privately owned livestock. Additionally, the state governance of agriculture tried to equalize the economic environment of all collective and state farms, and supported farms that were in worse conditions. Such policy resulted in levelling the regional and local factors’ influence on the results of economic activity including reindeer husbandry. After socialism collapsed and the state support was cancelled, reindeer herding became more sensitive to both regional differences and specific ethno-cultural features of herders’ communities. According to A.V. Golovnev [10], “The failure of the Soviet regime caused the crisis of
the social and political environment which indigenous people had been adapting to for decades… In the crisis conditions, the peculiarities which formerly would not be seen, played a decisive role: they helped some communities to overcome the crisis, while others were taken to the edge of catastrophe”.

In the 1990s, during the crisis caused by market reforms the reindeer livestock decreased first of all in the areas with bad conditions for reindeer herding. It resulted in a kind of a bias of the areas with maximum livestock to the districts with more favourable environment [9].

This article is dedicated to the detailed analysis of the reindeer livestock dynamics in the Russian Arctic on the basis of the official statistical data and scientific literature, and the effort is made to determine the main reasons of the diversity of reindeer number trends in different regions.

2. Reindeer livestock dynamics analysis based on the official statistics data

The data on the number of domesticated reindeer in Russia have been more or less exactly known since 1927. The statistical data series on the reindeer livestock per different regions of the Russian Federation were never published in full, but within the past 20 years this information may be found in the Russian Federal State Statistics Service (RFSSS) reference books [11]. Since 2008 the data on the reindeer livestock in each municipal district have been published on the RFSSS website [12].

The author’s personal archive contains the continuous statistical series of the data on domesticated reindeer livestock per each region of the Russian Federation (on January 1), since 1951, per the majority of municipal districts of the Russian Arctic – since 1990, and per some of them – since 1960. The data has been collected by the author together with S.A. Khruschev from the local archives and regional departments for statistics and agriculture. The major part of it has been published [2].

According to the investigations results [2], [4], [5], [6], the districts with different reindeer livestock dynamics often coincide with the areas where different types of traditional reindeer husbandry prevail. There are three such areas in the Russian Arctic. In the tundra to the West of the Yenisei river, mainly the Nenets and Komi-Izhems deal with reindeer herding. Almost everywhere in these areas, except Kola Peninsula, reindeer husbandry is characterised by permanent and strict herders’ control over the herd. Farther to the East, between the Yenisei and the Kolyma rivers, there is an area of the Tungus type of reindeer herding. The Dolgans, Evens, Evenks, Yakuts and Yukagirs deal with pasturing there. The Tungus type of reindeer herding was first formed in the taiga, and its specific feature is semi-free grazing in summer. In tundra environment, reindeer herders have changed the pasturing methods, however they still often leave the herd control-free for a number of days.

The area from the Kolyma river basin and farther to the East up to the Pacific coast is the area of the Chukchis and Koryaks' reindeer husbandry prevailing. Formerly, the Chukchis and Koryaks did not have the tradition of constant herd control. It was innovatively introduced only in the Soviet period [13]. Thus, only the Nenets and Komi-Izhems reindeer herding was historically formed as a more intensive one as compared with the extensive reindeer herding of other peoples living in tundra.

Let us consider now, in what way the number of reindeer has changed in the three abovementioned areas for several past decades (table 1). In the area of the Nenets and Komi-Izhems’ reindeer husbandry, the reindeer livestock increased nearly two-fold from 665,800 in 1959 to 1,239,300 in 2019, though its dynamics varied significantly in different districts.

In the North of the Yamalo-Nenets Autonomous District (hereinafter YNAO), in the Yamal and Taz municipal districts, the continuous growth of the reindeer livestock began in the1950s. For 60 years the number of reindeer increased four-fold there, to 682,300 in 2018. To the East, on the territory of the Yenisei left bank which is included in the Taimyr municipal district of the Krasnoyarsk region, the livestock growth started in the beginning of the 2000s (table 2). For 20 years (1999-2019) the reindeer livestock increased there from 33,700 to 121,200, that is four-fold as well. To the West, in the Ural district of YNAO, the livestock growth started in 2006, and for 13 years the number of reindeer grew from 39,800 to 174,700 (more than four-fold). So, the area where the reindeer livestock increased, has significantly expanded for the past 20 years. Lately, the growth has slowed down due to overpasturing and pastures exhaustion. It is important to mention that the livestock growth occurred at the expense of privately owned animals, while publicly owned reindeer livestock has been decreasing. In 2019 the share
of privately owned reindeer in the Taz district was more that 88%, in the Ural district – 77%, in the Yamal district – 69% [12]. In other tundra regions of Russia the share of privately owned reindeer is within 3–27%, and it consistently decreases in the direction to the East.

In all other tundra and tundra-forest areas of the Nenets-Komi-Izhems, Tungus, and Chukchis-Koryaks reindeer husbandry, the dynamics of the reindeer livestock was of the same type. From the beginning of the 1960s and up to the end of the 1980s, it was characterised by stability and a slight decrease. In the 1990s, after the market reforms, it fell crucially. In Chukotka and Koryak Autonomous Districts the livestock decrease was really dramatic (five-fold), in Tungus type area of reindeer husbandry (northern Yakutia) it was two- or three-fold, and in the European North the decrease was only by 20-30%. Later, in the 2000s the number of domesticated reindeer slightly increased, and then we saw a smooth decrease in the 2010s in the Asian part of Russia. However, in the European North, the reindeer livestock did not decrease in the 2010s.

So, a comparatively small area in West Siberian tundra (4 municipal districts) has singled out in the Russian Arctic, where the rapid growth of reindeer livestock has been observed for the past 60 years, at the expense of the privately owned reindeer. Presently, more than a half of all domesticated reindeer of Russia are accumulated there. In all other Arctic territories, the livestock changed more or less simultaneously with the general tendency to decrease.

**Table 1.** Domesticated reindeer number dynamics in different regions of the Russian Arctic

| Regions | Number of reindeer at 1 January, ths (year) |
|---------|---------------------------------------------|
|         | 1980s (Soviet time) | 1990s (Market reforms time) | 2000s (Post-soviet time) | 2010s (Recent years) |
|         | Max | Min | Max | Min | Max | Min | Max | Min | Max | Min |
| Area of Nenets and Komi-Izhems type or reindeer herding | | | | | | | | | | |
| Murmansk region | Max | 76.2 (1989) | 66.0 (1981) | 126.7 (1988) | 105.9 (1980) | 193.2 (1988) | 132.7 (1989) | 472.7 (1989) | 348.4 (1980) | 384.5 (1980) | 38.5 (1990) |
| Komi Republic | Min | 82.3 (1993) | 62.7 (1999) | 130.9 (1994) | 112.9 (1999) | 191.5 (1990) | 119.1 (1999) | 539.8 (1998) | 477.1 (1990) | 368.1 (1990) | 177.1 (1999) |
| Nenets Autonomous District | Min | 58.0 (2000) | 58.3 (2002) | 166.3 (2007) | 119.4 (2009) | 190.1 (2009) | 134.9 (2009) | 70.0 (2000) | 83.6 (2008) | 51.4 (2010) |
| Yamalo-Nenets Autonomous District | Min | 54.4 (2010) | 54.4 (2015) | 82.0 (2010) | 82.0 (2010) | 82.0 (2010) | 82.0 (2010) | 62.5 (2010) | 82.0 (2010) | 62.5 (2010) |
| Area of Tungus type or reindeer herding | | | | | | | | | | |
| Sakha Republic | Max | 190.1 (2009) | 190.1 (2009) | 190.1 (2009) | 190.1 (2009) | 190.1 (2009) | 190.1 (2009) | 190.1 (2009) | 190.1 (2009) | 190.1 (2009) |
| (Yakutia) | Min | 134.9 (2003) | 134.9 (2003) | 134.9 (2003) | 134.9 (2003) | 134.9 (2003) | 134.9 (2003) | 134.9 (2003) | 134.9 (2003) | 134.9 (2003) |
| Area of Chukchis-Koryaks type or reindeer herding | | | | | | | | | | |
| Chukotka Autonomous District | Max | 499.0 (1990) | 499.0 (1990) | 499.0 (1990) | 499.0 (1990) | 499.0 (1990) | 499.0 (1990) | 197.6 (2010) | 197.6 (2010) | 197.6 (2010) |
| Koriakia Autonomous District | Min | 39.2 (2005) | 39.2 (2005) | 39.2 (2005) | 39.2 (2005) | 39.2 (2005) | 39.2 (2005) | 38.5 (2018) | 38.5 (2018) | 38.5 (2018) |
| Source: [11], [12] |

**Table 2.** Domesticated reindeer number dynamics in Western Siberia tundra districts

| Number of reindeer at 1 January, ths | 1991 | 1996 | 2001 | 2006 | 2011 | 2016 | 2019 |
|-------------------------------------|------|------|------|------|------|------|------|
| Ural municipal district             | 55.4 | 57.5 | 32.7 | 39.8 | 102.3 | 165.4 | 174.7 |
Taz municipal district | 130.9 | 142.5 | 165.4 | 213.8 | 210.9 | 319.1 | 321.1
Yamal municipal district | 175.3 | 186.9 | 205.8 | 191.2 | 301.6 | 291.3 | 303.3

| Taimyr municipal district (left side of Enisey river)* | 44.5 | 19.6 | 19.9 | 34.2 | 47.0 | 104.0 | 121.2 |

Source: [11], [12];
* calculated by author on the base of statistical data [11], [12]

3. Discussion: The reasons of the livestock trends difference in different districts of the Arctic
First, let us focus on the reasons of the fast growth of the reindeer livestock in the Nenets households in Western Siberian tundra.

A.V. Golovnev [10] compared the trends in Nenets and Chukchis reindeer herding and related them to three main reasons: different levels of “self-organisation” of the region, different styles of interrelations between indigenous and non-indigenous population, and different ownership relations in reindeer husbandry.

The first reason may be summarized as follows. Chukotka and YNAO are the two northern regions with different history of the post-soviet reformation. In the result of market reforms, Chukotka fell in deep depression which covered all the economy of the region including reindeer husbandry. YNAO, on the contrary, got a new impulse for development due to the market reforms. Development of the gas extraction industry influenced all the life of the region, and reindeer husbandry as well.

The difference in the style of interrelations with indigenous population outcomes from the different historic background and different governmental policies in the regions. Heavy-handed autocratic leadership style had developed in Chukotka during the years of the Soviet power. It extended to the authorities’ relations to reindeer herders, and consequently to the whole system of reindeer husbandry. In this system, there was no place for individual reindeer herders who could handle their stocks on their own. According to L.N. Khakhovskaya [14], in the 1930s, before the collectivization took place, the Chukotka reindeer husbandry had been possible only due to the existence of two social poles: well-to-do reindeer herders who had a lot of reindeer, and poor herdsmen who had few or no reindeer at all and had to hire out to the rich. This joint between the “kulaks” and their laborers in the Chukchi reindeer herding was so strong that the Soviet power had to spend a lot of effort within two decades to destroy it. Only by 1955 there had been no more independent (having not joined kolkhozes) reindeer owners in Chukotka. However, the struggle against the “private sector” did not cease with it, in the 1950s the kolkhoz authorities actively annexed private reindeer that belonged to the kolkhoz members [14].

When the kolkhozes were reformed to sovkhозes, the reindeer became state property, and a new “war” against reindeer herders started. The local authorities and the sovkhозes’ administration tried to make them change traditional ways of reindeer pasturing and increase the sovkhозes’ reindeer stock. The slogan “Million reindeer now!” appeared [13]. Reindeer herders resisted it by breaking labour discipline and defending their traditions of pasturing. The youth did not want to live nomadic life and work in tundra. The lack of labour power arose in reindeer husbandry [14]. However, the Soviet power, being guided by the principle “Do or die” in Chukotka, still won. The longstanding efforts resulted in the creation of a well-designed model of reindeer husbandry, almost ideally working in the socialist economic conditions, when the state allocated large funding to support it.

The collapse of the Soviet system desorganised the economy in Chukotka region. Privatization as a project actually failed in Chukchi reindeer husbandry. People in villages began to starve, and major part of reindeer were slaughtered and eaten. Only when Roman Abramovich became Governor of Chukotka in 2000, municipal reindeer herding enterprises began to receive donations from the regional budget, reindeer slaughter was forbidden, and the stock started to recover. However, in the 2010s, after the slaughter was restored, the stock began to decrease again.

The YNAO authorities had quite a different attitude towards reindeer husbandry, and the Nenets adaptation strategies turned out to be more flexible than that of the Chukchis’. Here, during the collectivisation, many nomad reindeer owners managed to adapt to the new conditions and saved their
private stocks. In 1939 the norm related to the number of reindeer was established, it allowed to keep 60 does, 40 males, and an unlimited number of young animals in one household [15].

Alongside with collectivisation, taxation and state procurement of venison for cash were introduced. It provided for the development of commodity-money relations in reindeer herding which had not existed before. During the War of 1941-1945 taxes were increased, and reindeer herders had to slaughter more reindeer. The total reindeer stock in the region decreased from 382,300 in 1940 to 226,000 livestock units in 1947. The number of private reindeer decreased to a minimum of 90,800 by 1948, but still it made 39% of the total livestock in the region. After the war, the kolkhoz members were allowed to buy reindeer from kolkhozes for private use and even were provided with long-term credits [15]. So, even within the limitations imposed by the Soviet ideology, the processes of commercialisation were developing in reindeer husbandry in YNAO. Since the 1970s, due to the beginning of industrial development and technical innovations, these processes grew stronger, as the nomadic households became more dependent on bought goods and consequently they needed more money. The income growth was possible only at the expense of reindeer herding extensive development, that is by livestock increase.

Ownership relations in reindeer husbandry are connected with both authorities’ policy and traditional culture values. Unlike other reindeer herding ethnic groups, the Nenets people rather live to breed reindeer than breed reindeer for living. For the nomads, the words “reindeer” and “life” are synonyms [16:156]. Possessing a reindeer means possessing life. For the tundra Nenets, well-being is determined by the number of reindeer, not the amount of money they have. Nomadic families of reindeer herders have a higher social status than sedentary fishermen [17]. Market relations development makes reindeer value even grow. Presently, the reindeer is both the means of transportation, clothing, house, and work, income, “banking deposit”, pension savings, a kind of unvalued currency, dowry, heritage, insurance etc. [15].

Additionally, nomadic reindeer herders are involved in market relations at the level of small-scale trading. Such trading is illegal but it is widespread in tundra. They sell meat and fish to builders and shifters who deal with gas extraction in tundra. Many of them have bought apartments in settlements and travel abroad (to Turkey) for rest [17].

The abovementioned comparison of the Chukchis and Nenets refers only to two types of reindeer husbandry. It helps explain the rapid growth of the number of privately owned reindeer in the Nenets nomadic households on a limited territory. Now, let us consider the property relations in reindeer husbandry in a wider context of the Russian Arctic scale as a whole.

Ownership relations in reindeer husbandry have different institutional forms. The most important forms are self-managing nomadic households (unregistered officially), reindeer herding enterprises which employ herders, and officially registered private reindeer herding economic units.

Privately-operated nomadic family household is a self-managing unit not subordinate to any state authorities. In the tundra of Western Siberia they are several thousand [18]. In other Russian regions they are few. Since the time of collectivisation in the 1930s, the state struggled against such businesses. As the result, they were either destroyed completely, like in Chukotka, or squeezed out into the sphere of informal economy which was out of governmental control and practically invisible for state statistics, like in YNAO.

In the Soviet period, the heads of such households were employed as trappers to reindeer herding sovkhozes, in this way they got freedom for furs. Unlike reindeer herding teams, their migration routes were not controlled. To conceal the real size of their reindeer livestock, they distributed it on paper among their relatives. After the market reforms, these households became informal small businesses not burdened with any bureaucratic formalities, either statistical or tax reporting or banking control, or different kinds of supervising, etc.

Within a few past years active efforts to bring in private reindeer herders from the cold and make them present real data about the reindeer livestock were taken in YNAO. These attempts are prospectively targeted at decreasing their livestock to prevent pastures from exhaustion. The authorities’ attention towards private reindeer owners has been growing these years, as the livestock is growing and
the pasture overload is increasing. However, the key issue of their legalisation is still unsolved, they still do not have any rights for the reindeer pastures being used, as all the land is owned by municipal enterprises [15].

Thus, private reindeer herding is a typical example of informal economy presently. From the point of view of state management, informal economy is bad, although it has always played a significant role of a “silver bullet” when saving the Russian economy from every next crisis [19]. In the 1990s it saved the Nenets reindeer herding. The example of YNAO shows that private herding is the basis and guarantee of the sustainability of reindeer husbandry [20]. A question arises, if it is able to survive under the strict state supervision, like in Chukotka.

The second form is presented by reindeer herding enterprises which own reindeer and employ herders. Formerly, these were kolkhozes and sovkhozes, presently these are municipal enterprises, cooperatives and sometimes obschinas (clan communities). However, in each herd of a municipal enterprise or cooperative, private reindeer belonging to its employees are also grazed. The proportion between public and private reindeer varies. In YNAO, private reindeer constitute major part in the stocks of enterprises, while in Chukotka they make only 2-3%. Economic efficiency of municipal enterprise in YNAO is significantly lower than that of self-managing households. Thus, in Yamal district, the enterprises’ expenses per one reindeer a year made 6,900 roubles, while households’ expenditures were only 1,200 roubles [18].

In this relation, some authors proposed to withdraw from the municipal enterprises in YNAO reindeer pasturing and to focus them on reindeer meat processing and servicing nomadic herders’ households [21:38]. However, in Chukotka and Koryak Autonomous District, municipal reindeer enterprises are the only sustainable form of reindeer husbandry, and the regional authorities support them by all means.

The third institutional form is an officially registered private reindeer herding economic unit. There are few of them in all northern regions of Russia. According to the Russian legislation, they can have different official status and they often change it, adapting to the current changes in laws and taxation. Unlike independent self-managing households, they are strongly dependent on local authorities and cannot do without their constant support. Actually, reindeer owners can legalise their household if they need direct state support or other preferences, e.g. a license for the access to hunting areas or for valuable fish yield. Otherwise, they have no stimulus to become dependent on lots of formal procedures. For example, while in the field expedition in the North of Yamal, I asked a Head of one of the obschinas, why he had registered it. The answer was: “To get state subsidies”. When I asked about the amount of the subsidies, he answered that they are small and are completely spent for taxes and other mandatory for the obschina payments.

It should be mentioned that the Russian word “obschina” can denote the economic units of all three institutional forms mentioned above. Firstly, there are obschinas that were created “on paper” as an association of several self-managing herding households that actually keep on living in their own way (the case of YNAO). Secondly, in the course of market reforms, former sovkhozes were merely renamed into obschinas (mostly in northern Yakutia). Thirdly, an officially registered private reindeer herding units may also be called an obschina (the third institutional form).

Though the first institutional form is more economically efficient, the regional authorities mainly support the second and the third forms which are easier to control. The changes in the reindeer livestock in them depend mainly on governmental protectionism politics. These changes are similar throughout the Russian Arctic, although with different intensity in its different regions. On the contrary, the livestock growth in the herds of unregistered self-managing nomadic households depends on local conditions within limited area.

4. Conclusion

The reindeer livestock trends in different Russian Arctic regions depended on the number of reindeer in different institutional forms of the reindeer husbandry. The rapid growth of the livestock was observed only in the Nenets unregistered self-managing households in Western Siberian tundra, which were out of strict state control in the sphere of informal economy. Another institutional form – the one of reindeer
herding enterprises, developed in all other territories of reindeer husbandry in the Russian Arctic due to historical reasons, regional authorities’ politics, and specific features of indigenous communities’ adaptation. Here, the reindeer husbandry future is determined mainly by state support.

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References
[1] Jernsletten J-L and Klokov K B (eds) 2002 Sustainable Reindeer Husbandry. Artic Council 2000-2002 (Tromso: Centre of Saami Studies University of Tromso) p 158
[2] Klokov K B and Khrushchev S A 2004 Reindeer Husbandry of the Indigenous Peoples of the North (Saint-Petersburg: VVM) p 182
[3] Baskin L M 2005 Number of wild and domesticated reindeer in Russia in the late 20th century Rangifer 25 51-57
[4] Klokov K B 2007 Reindeer husbandry in Russia. Int. Journal of Entrepreneurship and Small Business 4 6 726–84
[5] Klokov K B 2011 National fluctuations and regional variations in domesticated reindeer numbers in the Russian North: Some possible explanations Siberica 10 1 23-47
[6] Klokov K B 2012 Changes in reindeer population numbers in Russia: an effect of the political context or of climate? Rangifer 32 1 19–33
[7] Baskin L M 2016 Modern reindeer husbandry in Russia: state, mobility, property rights, paternalism of the state Etnograficheskoe Obozrenie 2 28–43
[8] Uboni A, Horstkotte T, Kaarlejärvi E, Sévêque A, Stammler F, Olofsson J, Forbes B and Moen J 2016 Long-term trends and role of climate in the population dynamics of Eurasian reindeer. PloS One 11 6 e0158359
[9] Antonov E V, Litvinenko T V and Nuvano V N 2019 Multiscale analysis of the dynamics in reindeer herding in Arctic Regions: Geographical shifts and intraregional and local differences Regional Research of Russia 9 1 53–65
[10] Golovnev A V 2013 Peoples and borders in the north of Eurasia Etnographic Bureau Electronic Materials Available from: http://ethnobs.ru/library/237/_aview_b18268 [Accessed 12 February 2020]
[11] Russian Federal State Statistics Service reference books Electronic source Available from: https://www.gks.ru/compendium [Accessed 12 February 2020]
[12] Russian Federal State Statistics Service data base of municipal districts Electronic source Available from: https://www.gks.ru/databases [Accessed 12 February 2020]
[13] Khakhovskaya L N 2019 The interaction of people and animals in the Chukchi reindeer husbandry of modern times (anthropological aspect) Bull. of archeology, anthropology and ethnography 1(44) 98-107
[14] Khakhovskaya L N 2011 Soviet modernization of reindeer husbandry in remote northern regions (on the example of the Anadyr district of Chukotka) Etnograficheskoe Obozrenie 6 112–27
[15] Filant K G 2017 Features of the legal regulation of reindeer herding Scientific Bull. of the Yamalo-Nenets Autonomous Okrug 4(97) 17-27
[16] Yaptik E S 2019 The quality of life in the Nenets (a look from inside the culture) Bul. of Ugric Studies 9(1) 153-65
[17] Martynova E P 2015 Yamal Nenets and industrial development: innovations in reindeer husbandry and fishing Ural Historical Bulletin 2 (47) 90-97
[18] Detter G F 2017 Economics of the reindeer husbandry of Yamal: problems and opportunities Scientific Bull. of the Yamalo-Nenets Autonomous Okrug 4(97) 4-16
[19] Shanin T 2000 Why the Russian people did not die Expert 1-2 214 7
[20] Yuzhakov A A 2007 Personal reindeer as a basis for the conservation of reindeer husbandry // Scientific Bull. of the Yamalo-Nenets Autonomous Okrug 4(97) 28-31
[21] Zuev S M, Kibenko V A and Sukhova E A 2017 Social and economic factors of the life-sustaining activity of the nomadic population in Yamalo-Nenets Autonomous District Bull. of the Tyumen State University Social and economic studies 3 33-44