

Tamara Litvinenko^{1*}, Kazuhiro Kumo²

¹Institute of Geography RAS

²Hitotsubashi University, Institute of Economic Research

***Corresponding author;** e-mail: tamaralit@bk.ru

POST-SOVIET PERIOD CHANGES IN RESOURCE UTILIZATION AND THEIR IMPACT ON POPULATION DYNAMICS IN CHUKOTKA AUTONOMOUS OKRUG (RUSSIA)

ABSTRACT. This study examines changes that have occurred in the resource utilization sector and the impact of these changes on population dynamics in the Chukotka Autonomous Okrug (Russia) during the post-Soviet period. This paper discusses topics of population-dynamics-related differences that have emerged in the region and impacts of these differences on the use of natural resources and the ethnic composition of the population. Through this study, it was shown that changes have tended to be small in local areas where indigenous peoples who have engaged in traditional natural resource use for a large proportion of the population, while changes have been relatively large in areas where the proportion of non-indigenous people is high and the mining industry has developed.

KEY WORDS: Chukotka Autonomous Okrug, indigenous people, non-indigenous people, population dynamics, natural resource utilization, human settlements, intra-regional differences, non-renewable mineral resources, renewable natural resources.

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INTRODUCTION

The demographic economic systems in the North are extremely unstable. The reasons for this are the region's dependence on the extraction of mineral resources, the fact that most human settlements are company towns, and the extremely high mobility of northern labour forces (Heleniak 1999; Motrich 2006; Petrov 2010). On the other hand, some researchers believe that the presence of northern indigenous peoples who continue to utilize resources in

traditional ways has maintained local stability (Mulvihill and Jacobs 1991; Duerden 1992; Khaknazarov 2013). Nevertheless, it is not yet fully clear what characteristics make the local demo-economic systems and settlements in the North stable on the whole, and what kinds of factors have affected this stability. The question of what differences exist at the regional or intra-regional level in terms of instability/stability also remains unanswered. Societal changes in the post-Soviet period, which followed the collapse of the Soviet Union and has seen the implementation of

market reforms, have resulted in clear and widening differences between regions in the North, within individual regions, and at the local level (Pilyasov 1996). Because the demo-economic system in the North is dependent on firms that utilize natural resources (Petrov 2010), to understand the aforementioned issues, it is necessary to identify spatial regularities concerning the ways that resource utilization affects population. Furthermore, with regard to ethnic regions, it is also essential to clarify what sort of roles ethnic factors have played in this process of societal change.

STUDY SUBJECTS, METHODS, AND DATA

This study covers the Chukotskii Autonomous Okrug (Chukotka). Chukotka is located in the far northeast of Eurasia, and juts out between the Pacific Ocean and the Arctic Sea. Around half of the Okrug is located north of the Arctic Circle, and the climate is harsh. Chukotka contains 10% of Russia's estimated gold reserves, 16% of its estimated tin reserves, and unique biological resources. It also Russia's most sparsely populated region. Besides non-indigenous people, most of whom are Russian, the region is also home to 16 indigenous minorities of the North, who possess distinctive cultures and use the resources in a traditional way that has remained unchanged for centuries (www.chukotka.org 2014).

The objectives of the study are to shed light on (1) the characteristics of changes in population dynamics in the entire Chukotka region and at the intra-regional level that have occurred as a result of transformation of natural resource utilization in the post-Soviet period and are due to the impact of existing objective and subjective factors, (2) the roles that ethnic factors have played in this process, and (3) conditions that have caused stability and instability of local socioeconomic systems and settlements.

The Far-Eastern economists and economic geographers have conducted various studies. These include studies on the natural resource development process in north-eastern Russia during the 1990s reform period (Pilyasov 1996), the development

of the mineral resource industry in Chukotka (Lomakina 2002; Minakir 2006; Lomakina 2009), and characteristics of the development of Chukotka from a sociodemographic perspective and compared with other Far Eastern regions (Zheleznov-Chukotskiy et al. 2005; Motrich 2006; Sidorkina 2014). Despite the existence of such studies, Chukotka remains the Arctic region on which the least research has been conducted (Arctic Council 2013). This study, therefore, is aimed at understanding what sort of interrelationships exist between the transformation of nature resource utilization at different local areas and population dynamics. In this respect, it supplements previous research by classifying transformation in settlements from the impact of resource utilization and listing up criteria that constitute causes of stability and instability of local systems and human settlements. Preliminary survey results from the study have already been published (Litvinenko and Murota 2008; Litvinenko 2013). The goal of this paper is to analyze the empirical data obtained in more detail and draw out general rules and scientific interpretations from the data.

Besides official statistics, this study also employs, as its data, documents in the possession of regional or local government bodies, archives from companies and other sources, and interviews carried out during on-site surveys of regional and local experts and corporate representatives. The authors carried out on-site surveys in August 2007 in the Iultinskiy district and in August 2007 and June 2016 in the town of Anadyr and Anadyrskiy district.

Our method to study the interrelationships between resource utilization and population dynamics at the intra-regional and local levels consisted of several steps (stages):

1) Stage 1: Statistical survey. Included in this stage is the analysis of official statistics for the purpose of shedding light on the interrelationships between population dynamics at the regional, intra-regional, and local levels and ethnic composition (indigenous peoples as a percentage of the total population) during the post-Soviet

period. At this stage, the post-Soviet time periods were determined (economic-crisis period, economic-growth period, and period from 2009 until now), and the development of resource utilization sector was investigated statistically.

2) Stage 2: On-site survey of human settlements and dominant companies in company towns. The purpose of this survey was to shed light on the impact that changes in resource-utilizing enterprises have on population dynamics and residential dynamics. Another objective was to show that there are differences in impact depending on the form of resource utilization (whether based on traditional industries that utilize renewable bioresources, or the mining sector which uses exhaustible mineral resources) and ethnic composition (whether non-indigenous or indigenous peoples are dominant).

At this stage, we identify settlements that have been abandoned by surveying regional or local experts and comparing maps of settlements from the Soviet era with modern maps, identify the reasons why these settlements have been abandoned. Here, in addition to performing a questionnaire survey of the aforementioned regional and local experts and company representatives, we analyzed the company materials to find out new temporary workers' settlements emerged in

conjunction with the establishment of new resource-utilizing enterprises and labour migration during the post-Soviet period.

3) Stage 3: The survey data are processed and generalization of the research findings from Stage 1 and Stage 2 is performed. Here we produced a map showing differences in population dynamics that occurred within the region. We also classified changes in human settlements during the post-Soviet period and produced lists concerning the following points: (1) settlement status, (2) characteristics of population dynamics including the population migration process, (3) ethnic composition, (4) interrelationship between resource utilization and employment. By generalizing the results of the investigations, we present criteria that constitute causes of stability and instability in local socioeconomic systems and human settlements.

DEVELOPMENT OF CHUKOTKA DURING THE SOVIET ERA: OVERVIEW

It was during the 1920s that the Soviet government and the Soviet-style management system was established in Chukotka. Later, the sedentary and nomadic economies practiced by the indigenous peoples were gradually combined into state-run cooperatives, a process that was already completed by 1950 (Vasil'ev et al. 1996). According to a population census carried out in 1939, 69% of the total populace were Chukchi, Evens, and Eskimo peoples (Fig. 1).

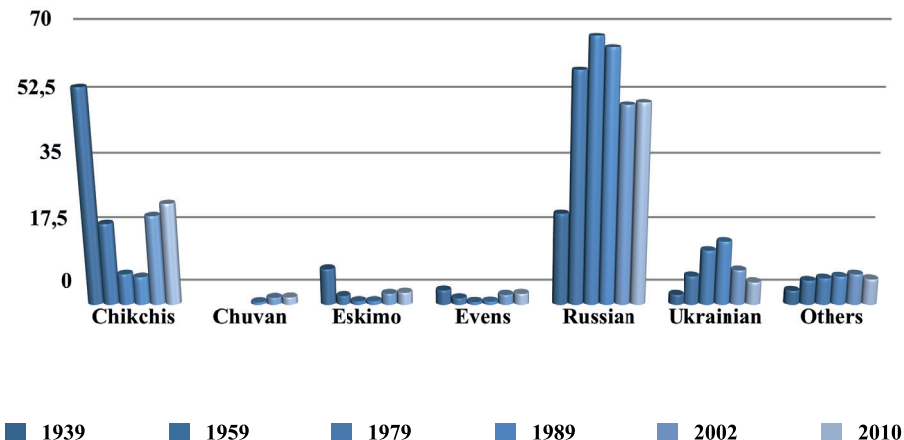


Fig. 1. Ethnic composition of Chukotka: population census data for each year, %

Between 1934 and 1937, vast deposits of tin were discovered on the Pevek Peninsula. Tin and tungsten deposits were also found in Iultin. Industry then began to be developed in Chukotka, with prisoners from the gulags constructed in Chukotka during the 1950s providing the main source of labour. During the Second World War, the region supplied metals and other resources to the military industry, and mining continued to be the region's main industry even after the war.

In 1958, the first gold was produced for industrial purposes, and a gold-mining industry emerged. But it was not until the 1960s that the core components of industry, namely GOKs (mining and processing complexes), industrial firms, power stations, power transmission cables, and transportation infrastructure, were completed. After the gulags were dismantled and their inmates pardoned in 1953, physical measures to encourage people to work in various districts of the Far North were adopted as a means of attracting workers, particularly skilled ones. The construction of new human settlements and the growth of the urban population gave a huge boost to the development of the regional economy and resulted in an inflow of people (Fig. 2). Widespread industrial development in Chukotka continued from the 1970s until the 1980s.

The period from the 1960s until the early 1970s marked the peak in the number of domesticated reindeer (Fig. 3). This was also a time during which the state was active in

constructing housing for Chukchi, Eskimo, and Evens people after they settled (Vasil'ev et al. 1966).

During the Soviet era, the population of Chukotka, and the urban population, in particular, climbed as a result of both population inflow and natural increase (because the age structure of the population was relatively young, the rate of natural increase was higher than that of other regions), and reached a peak of 158,000 people in 1990 (Fig. 5 later in this paper). With the influx of non-indigenous people, the ethnic composition the population changed. According to the 1979 population census, Russians as a proportion of the population had risen to 68% (the highest percentage in the history of Chukotka), while the 1989 census put the figure at 66%. At the same time, the increase in Russians coincided with a decline in the Chukchi and other indigenous peoples as a proportion of the population (see Fig. 1).

NATURAL RESOURCE UTILIZATION AND POPULATION DYNAMICS OF THE CHUKOTKA AUTONOMOUS OKRUG DURING THE POST-SOVIET PERIOD

The economic-crisis period: 1990–1998

The transition to a market economy proved to be a painful experience for Chukotka. This was because the situation in the region was wholly and directly dependent

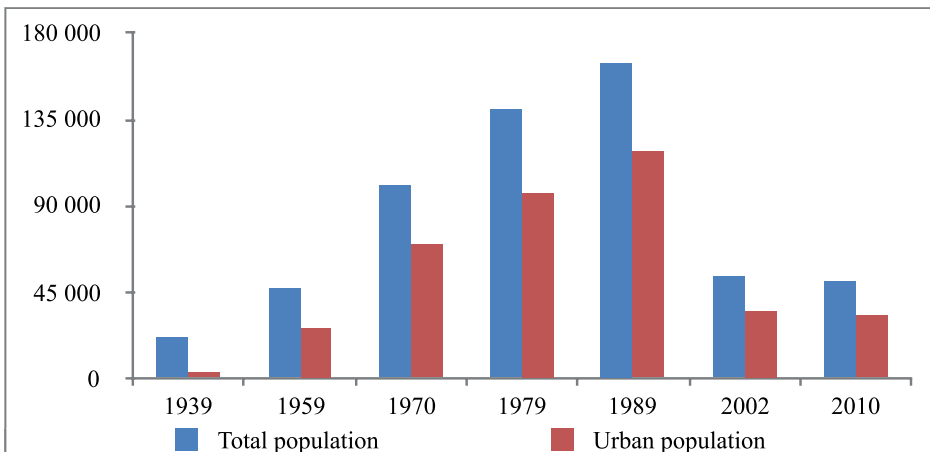


Fig. 2. Total population and urban population of Chukotka: population census data, people

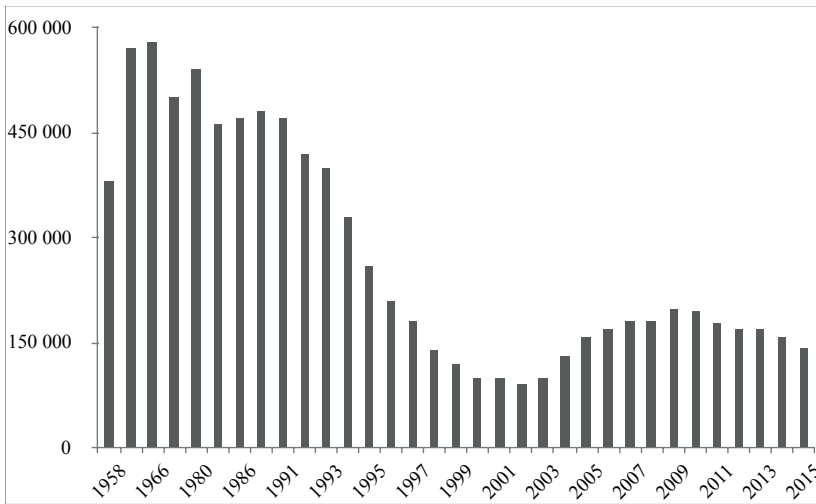


Fig. 3. Number of domesticated reindeer in the Chukotka Autonomous Okrug: 1958–2015

Source: Prepared by the authors based on (Gray 2000) and official statistics. Figures for 2013–2015 are based on the official data from the Government of the Chukotka Autonomous Okrug.

Natural resource utilization and population dynamics of the Chukotka Autonomous Okrug during the post-Soviet period

on the circumstances in Russia. The crisis that swept the region became even more severe as a result of a decline in output from major sectors such as gold and tin mining. As a consequence of the shift to market economics, these industries were no longer profitable, and as a result, operations at the GOKs in Pevek and Iultin, which had been the largest in Chukotka, were suspended during the 1990s, and more than half of the gold mining companies were shut down. During the period from 1990 to 1998, the decline in production in the region was much greater than the Russian average and other eastern regions (Eastern Siberia and the Far East) (Litvinenko 2013), with power production and the output of coal and gold mines plunging by over 50%.

At the time of the economic crisis, traditional forms of economic activity also declined as they no longer benefitted from state support. Fishing catch dropped by 80% (Table 1). To make matters worse, economic conditions in Russia as a whole were worse than ever (Litvinenko 2013), and because support from the regional government was unavailable, the decline

in the number of domesticated reindeer was more marked in Chukotka than in any other region of Russia. By 2002, the number of domesticated reindeer had plummeted to less than a fifth of the figure in 1991, to just 90,000. The number of reindeer in Chukotka had never been as low as this during the entire post-war period (Fig. 3).

According to official statistics, by 2000 the average number of people working in the mineral resource mining sector had dropped to 11.5% of the figure in 1992. During the 1990s, the economic crisis rippled out the Chukotka Autonomous Okrug, and due to the absence of state support, many non-indigenous people left in droves for European Russia and other parts of the CIS (Fig. 4).

This massive population outflow was the primary factor behind the fact that the population of the Chukotka Autonomous Okrug declined by more than half between 1990 and 1998 (Fig. 5). On the other hand, between the censuses of 1989 and 2002, the indigenous population increased

Table 1. Trend of natural resources production in the Chukotka Autonomous Okrug, 1990–2015

Year	Output						Change in output			Growth rate (%)		
	1990	1998	1999	2008	2009	2015	1990–1998	1999–2008	2009–2015	1990–1998	1999–2008	2009–2015
Power output, bn kw/h	1,2	0,6	0,6	0,5	0,5	0,6	-0,6	-0,1	0,1	-50	-17	20
Coal mined, 1,000t	1222	333	304	447	346	233	-889	-143	7	-73	47	-32,7
Natural gas extracted, million m3	0	0	0	26,3	25,0	25,4	0	26,3	0,40	0	26,3 times	1.60
Gold mined, 1,000t	17000	6000	4700	20100	31200	31999	-11000	15400	799	-65	4 times	2.6
Fish and other marine products caught, 1,000t	5,1	1	5,7	50,1	38,7	9,4	-4,1	44,4	-28,3	-80	8.8 times	-76
Marine mammals hunted, t	0	0	0	2265	1955	2060	0	2265	10,5	0	2265 times	5.3

Source: Prepared by the authors based on official statistics. 2015 figures and 1999–2015 data for catches of fish and marine mammals are based on information from the Chukotka Autonomous Okrug’s Department of Industrial and Agricultural Policy.

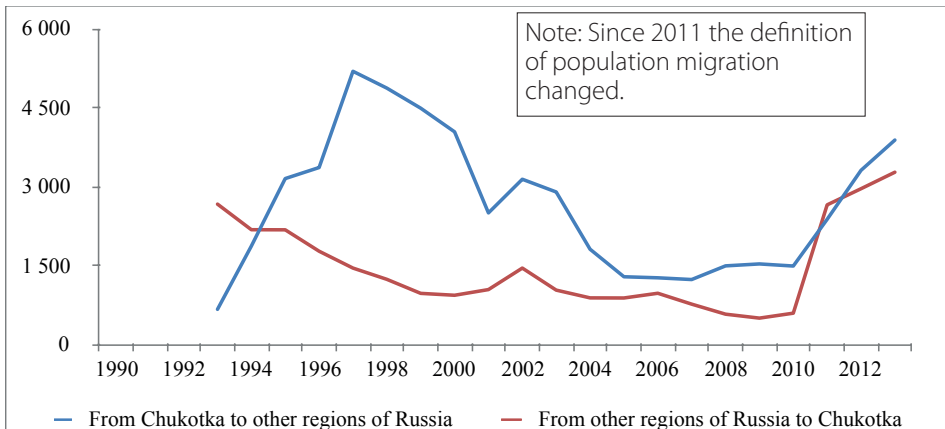


Fig. 4. Population migration to and from Chukotka Autonomous Okrug: post-Soviet period

Source: Internal data supplied by the Russian Federal State Statistics Service

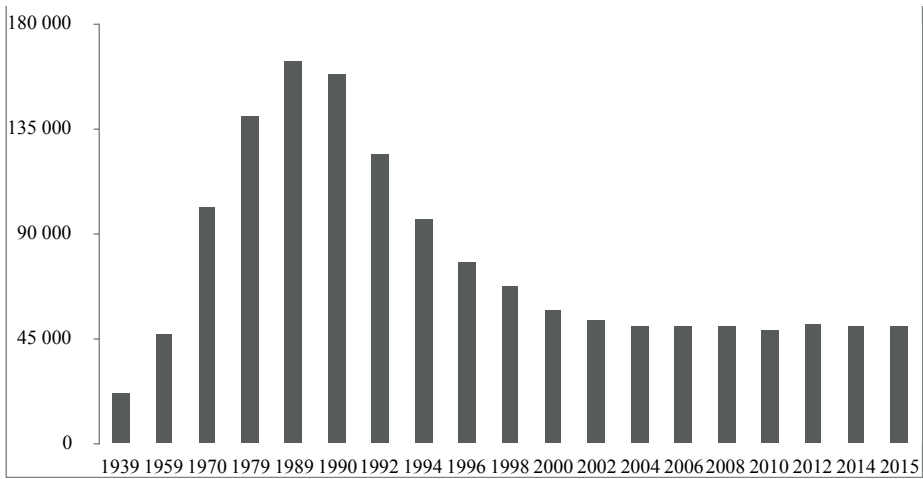


Fig. 5. Population dynamics in the Chukotka Autonomous Okrug: 1939–2015

Source: Official statistics

by 5% to stand at 160,000 at the time of the 2002 census. While the proportion of non-indigenous people such as Russians, Ukrainians, and Tatars dropped, the proportion of Chukchi, Evens, and Eskimo peoples expanded (Motrich 2006).

Here we present insights on the nature of the interrelationships between natural resource utilization, population dynamics, and human settlement during the 1990s, when the economic crisis occurred. These insights were obtained from surveys conducted in the lultinskiy district.

During the Soviet era, the lultin Mining and Processing Complex was a company that mined and refined tin and tungsten ore and dust in that district. In 1953, an urban-type settlement was established in lultin, and in 1954 the lultinskiy district was organized within Chukotka. From 1991 onwards, market economic conditions saw profitability deteriorate and state support came to an end. For these reasons, the output of the Complex dropped. This decline continued, and wages began to be paid late or not at all. As a result, the number of workers fell. The real incomes of residents dropped sharply, and this, coupled with the extremely harsh climate and the fact that the residents were non-indigenous people without strong ties to the region, meant that the population outflow was inevitable.

In 1994, the decision was made by the Russian federal government to suspend the operations of the refinery and the lultin and the Svetly Mines, and the government of the Chukotka Autonomous Okrug was obligated to cover the costs of moving the workers out. In 1995, it was also decided to abandon the lultin urban-type settlement on the grounds that the operations of the lultin Mining and Processing Complex had been suspended and that it was therefore impossible for people to continue to live there. Furthermore, with the closure of the companies that relied on supplying services to the lultin GOK, the settlements of Svetlyy, Tranzitnyy, Geologicheskii, and Vostochnyy were also liquidated (Table 2). The decisions described above were accompanied by the obligation to assist the residents of the settlements with relocating to other parts of Russia. In 1995, the lultin urban-type settlement was officially abandoned, and in 1998 it was removed from the registry of residential areas. The situation at the lultin GOK also affected the population of the district in which it was located. Because a large outflow of people occurred between 1990 and 1998, the total population dropped by 59% and the urban population fell by 61% (see Table 2). The close interrelationship between the lultin Mining and Processing Complex, the populations of the lultin urban-type settlement, and the lultinskiy district can be clearly seen in the fact that the coefficient of correlation between the amount of tin

Table 2. Population of the Iultinskiy district, Chukotka Autonomous Okrug, 1990–2015

Year	Population, people						Change in number of people				Growth rate (%)			
	1990	1998	1999	2008	2009	2015	1990 – 1998	1999 – 2008	2009 – 2015	1990 – 2015	1990 – 1998	1999 – 2008	2009 – 2015	1990 – 2015
Total population	31661	8618	8619	6127	5775	5122	-23043	-2492	-653	-26539	-73	-29	-11	-83,8
Urban population	21212	4912	4931	3559	2841	3200	-16300	-1372	-359	-18012	-77	-28	12	-85
Iultin urban-type settlement	5125	0	0	0	0	0	-5125	–	–	-5125	-100	–	–	-100
Vostochnyy settlement	482	0	0	0	0	0	-234	–	–	-234	-100	–	–	-100
Svetlyy settlement	85	0	0	0	0	0	-85	–	–	-85	-100	–	–	-100
Amguema settlement	729	574	617	⁽¹⁾ 492	492	435	-112	-125	-57	-294	-15	-20	-12	-40
Egvekinot urban-type settlement	5321	2462	2348	2390	2346	3034	-2973	42	688	-2287	-56	1,8	29	-43

Note 1: Figures are for 2009

Source: Prepared by the authors based on official statistics and data from the Iultinskiy District Official Library Management Department

and tungsten mined at the Iultin GOK and the population of Iultin and Iultinskiy district was 0.9 during the economic crisis of 1990–1997 (calculation using the data from the Archive Department, the Iultinskiy District Administration).

Economic-growth period: 1999–2008

During the economic growth period, the output in Chukotka grew faster than the average for eastern Russia. Between 1999 and 2008, the amount of coal mined increased

by 47% (the average rise for eastern Russia was just 3%). The amount of fish caught remained at the same level (but declined by 13% on average in eastern Russia) (Litvinenko 2013). From 2006 onwards, the extraction of natural gas commenced in order to meet local needs (see Table 1). On the other hand, the situation with the amount of gold mined was different. Growth of gold mined in 1999–2006 was much slower than in the Far East and Russia as a whole (Litvinenko 2013). However, with the development of new gold deposits, between 2006 and 2008 the

amount of gold mined more than doubled (see Table 1). Furthermore, according to official statistics, the average number of workers in the mineral resource mining sector climbed by 12% between 2000 and 2006.

Subjective factors played a major role in the invigoration of economic activity, and the election of Roman Abramovich as governor of the Chukotka Autonomous Okrug was particularly significant in this respect. As a result of pseudo market measures (the registration in the Chukotka Autonomous Okrug of several companies that were close to Abramovich (and especially that of a Sibneft subsidiary), the revenues of the Okrug increased dramatically. The Okrug's revenues also rose significantly as a result of the income tax paid personally by the governor (it has been reported that the addition of the governor's income tax to the regional coffers resulted in 5.5-times increase in the tax revenues received from residents in 2000 (Litvinenko 2013).

One example of efficient regional management based on the local natural resources was investment for the purpose of developing the fuel and energy complex made by the government of the Chukotka Autonomous Okrug in 2001–2003. The details of this investment are as follows: First, coal-mining companies were modernized and restructured. Next, a gas pipeline with a total length of 104.2 km was laid between the Zapadno-Ozerny gas field and a gas-turbine power plant in Anadyr. The construction of this pipeline enabled the gas field to be used to operate the power station (<http://www.chukotka.org>, 2014). The construction of wind power stations can also be pointed to as an important component of the investment.

What proved to be effective market policies were, firstly, the development of gold ore deposits (which differed from the placer gold that was almost completely exhausted) based on the prediction that world gold prices would rise and that gold demand would increase in both domestic and foreign markets, and secondly, the luring of domestic and foreign companies to explore

promising mining areas. The agreement to sell 75% of the Kupol gold mine to a Canadian mining company Bema Gold that was reached with the government of the Chukotka Autonomous Okrug in 2002 marked the first attempt to attract Western capital to the Okrug. After mining at Kupol commenced in 2008, the amount of gold and silver produced in the region increased substantially (Table 1).

Furthermore, from 2003 the number of domesticated reindeer began to rise (Fig. 3). And as a result of the implementation of a region-specific program to stabilize and spur the development of reindeer husbandry, the number of domesticated reindeer increased by 82% between 1999 and 2008 (Fig. 3).

Meanwhile, the increases in catches of fish and marine animals (see Table 1) can be explained by the presence of state support from the federal and regional government for the traditional natural resource utilization sector. This support included the expansion of catch quotas and increases in the maximum take of marine animals. In the Anadyrskiy district, two new state-run marine-product processing plants went into operation, and in the coastal ethnic settlements, cooperatives for the hunting of marine mammals were organized. Indigenous residents acquired the right to hunt marine mammals and catch fish without the need to apply for licenses. According to official statistics, the annual average number of people engaged in fishing increased fivefold between 2000 and 2006. Even though the companies and cooperatives in the traditional natural resource utilization sector cannot earn a profit from this industry, success was achieved in raising to 25% the proportion of food consumed that is produced in the region (www.rkopin-chukotka.ru, 2010).

At the beginning of the 2000s, pseudo-market, administrative, and state support for regions was extensive, and the role of markets themselves declined in importance. The main revenue source for the integrated finances of the Chukotka Autonomous Okrug was the tax revenue from the governor himself and companies close to him that were registered there. From 2006,

however, this situation began to change. The market mechanism began to function more effectively in the development of the region's economy, and the fiscal revenue of the Chukotka Autonomous Okrug started to be augmented by taxes collected in conjunction with new gold mining projects.



gold prices in global markets declined, and economic growth in Russia slowed. Despite this, the amount of gold mined in Chukotka remained stable (Table 1). Gold refineries were also constructed at the Kupol, Mayskoe, and Valunistoe mines.



Fig. 6: External appearance of urban streets in Anadyr. Everything has been repainted and roads have been improved. The photos taken by the authors.

When Abramovich was governor, housing was refurbished or replaced, new housing was built, and public infrastructure was reconstructed. The external appearance of residential areas was also improved (Fig. 6). In ethnic settlements, housing was completely rebuilt, and new public infrastructure buildings were constructed.

Despite the success of the resource utilization sector, the population outflow continued (Fig. 4), though at a far slower pace than had been the case in the 1990s. Between 1999 and 2008, the population of the Chukotka Autonomous Okrug dropped by 25%, but this was only half the rate of the decline seen in 1990–1998 (Fig. 5).

From 2009 until now

From 2009 onwards, resource utilization has been developing in two directions. The first was the mining of mineral resources (particularly gold and silver) and the preparation of new mineral resource deposits for development. The development of the largest gold deposits by attracting Russian and foreign capital (Dvoynoy, Kupol, Karal'veem, Mayskoe and Valunistoe) constituted the basic policy for the economic development of the region at this time and remains so today. After 2011,

As a result of the success of the development of the gold-mining sector, from 2010 onwards the Chukotka Autonomous Okrug stood in second or third place in Russia in terms of gold production. The number of indigenous and non-indigenous people of Chukotka working for gold-mining companies more than doubled between 2008 and 2013 (Russia's Arctic... 2016). However, in contrast to the success of the gold-mining industry, the profitability of the Nagonaya mine deteriorated, and the mine was eventually closed in 2015. This caused a decline in the amount of coal mined (Table 1).

Aggressive preparations for the development of new natural-resource-producing areas were made. Among them, priority has been given to the development of the Beringovskiy coal field, which was in a favorable geographic situation as it was located near an unfrozen stretch of the Bering Sea coast. The resources from the Beringovskiy coal field are in demand on world markets and from Asia-Pacific countries. This is because the coal has high calorific value, the reserves are enormous, and most of it is coking coal.

Because of market conditions, there are also plans to resume the mining of tin and tungsten at the Pirkakayskoe deposits in

the Chaunskiy district, which is Russia's largest (in 2008, the license was obtained by Severnoe Olovo, a publicly traded company). According to materials from the government of the Chukotka Autonomous Okrug, design work has already begun on a project to mine copper in the Bilibinskiy district in the Baimka zone (Peschanka copper field), with mining set to commence in 2025. From 2020, meanwhile, there are plans to develop the Klen and Kekura gold deposits in the Bilibinskiy district. It is expected that migrant workers from Chukotka, from other regions of Russia, and from other CIS states will provide the main workforce for the development of new mineral resource deposits and their future extraction.

The other developmental direction is based on the utilization of renewable natural resources to promote independent social, economic, and cultural development by indigenous peoples and support their traditional way of life, i.e., on the sustenance of the traditional natural resources sector. This has become a strategic policy of the government of the Okrug. The reason is that this policy is vital to provide the foundation of a system for enabling indigenous people to become self-reliant, and has a big impact on the regional food safety and security. The federal government and regional governments have adopted a policy of establishing conditions for achieving significant development of this sector regardless of its profitability. An example of state support is two regional programs with specific goals: a 2009–2012 program of state support for marine mammal hunting in the Chukotka Autonomous Okrug and a 2010–2012 program of state support for agriculture. These programs were funded by the federal government and regional governments. The state funding for marine mammal hunting was provided through neighboring-territorial cooperatives for indigenous minorities. According to the data from the government of the Chukotka Autonomous Okrug, in 2015 there were eight marine-mammal-hunting cooperatives in 14 settlements in the Chukotsky, Providenskiy,

and Iultinskiy districts. State support has served to increase marine mammal hunting (Table 1).

In contrast to the situation with marine mammal hunting, fish catches have dropped by 80% (Table 1). An interview conducted in June 2016 with the head of the Chukotka Autonomous Okrug's Department of Industrial and Agricultural Policy revealed that this was due to a decline in the number of coastal fishing companies from four to two and the fact that in 2008 all the companies that had been engaged in fishing were registered in special economic zones in other parts of the Far East.

State support for reindeer herding has been provided through publicly run companies. The amount of state subsidies provided for reindeer herding that are paid out of the finances of the Autonomous Okrug increased until 2012 but declined after that (Russia's Arctic... 2016). Despite the decision to provide state support, the number of domesticated reindeer has declined since 2006 (Fig. 3). There are a number of reasons for this, including the scrapping of the grace period for slaughter and an increase in the amount of reindeer meat produced.

A regional program with specific long-term goals that runs from 2013 to 2020 and is aimed at developing agriculture and regulating the market for agricultural produce and food products in the Chukotka Autonomous Okrug has been adopted, and this indicates that the traditional resource utilization sector remains an important component of the strategic policy for regional development.

The changes in the resource utilization sector that occurred during this period did not have a major impact on population dynamics. Migration within the region has mainly been from villages to the centers of districts or the center of the Okrug. Population outflow to other regions (Fig. 4) has been largely offset by natural increase, with the total population declining only by a small margin (Fig. 5).

INTERRELATIONSHIPS BETWEEN INTRA-REGIONAL DIFFERENTIATION IN POPULATION DYNAMICS, CHANGES IN HUMAN SETTLEMENTS, NATURAL RESOURCE UTILIZATION, AND ETHNIC COMPOSITION

Differentiation in population dynamics

Changes in natural resource utilization and differences in ethnic composition that occurred during the post-Soviet period had an impact on population dynamics at the district level (Table 3 and Fig. 7). Two districts, Chaunskiy in the north of the Chukotka Autonomous Okrug and Iultinskiy in the northeast, saw the maximum depopulation (80% or more). Most of the settlements in these districts came into existence during the 1950s and 1960s in conjunction with the development of the mining (gold and tin) industry. Most of the residents were Russian people. Indigenous peoples as a proportion of the population of the Chaunskiy district remains lower than in

other districts to this day (Table 3 and Fig. 7). The indigenous population of the Iultinskiy district is just over 30% (Table 3). Companies such as the Pevek, Polyarnyy, and Iultin mining and processing complexes closed their doors in the 1990s, and because there were no other places to work, most of the settlements were abandoned between 1995 and 1998, with the remaining residents moving out. In these districts, the population decline was the steepest between 1990 and 2002 (Chaunskiy: 77%, Iultinskiy: 79%). The population outflow continued between 2002 and 2015, and the populations of the districts kept falling, with that of Iultinskiy dropping by 22% and that of Chaunskiy declining by 17%. However, with the creation of new jobs in the energy, gold-mining, and construction sectors, the population became stable compared with the 1990s.

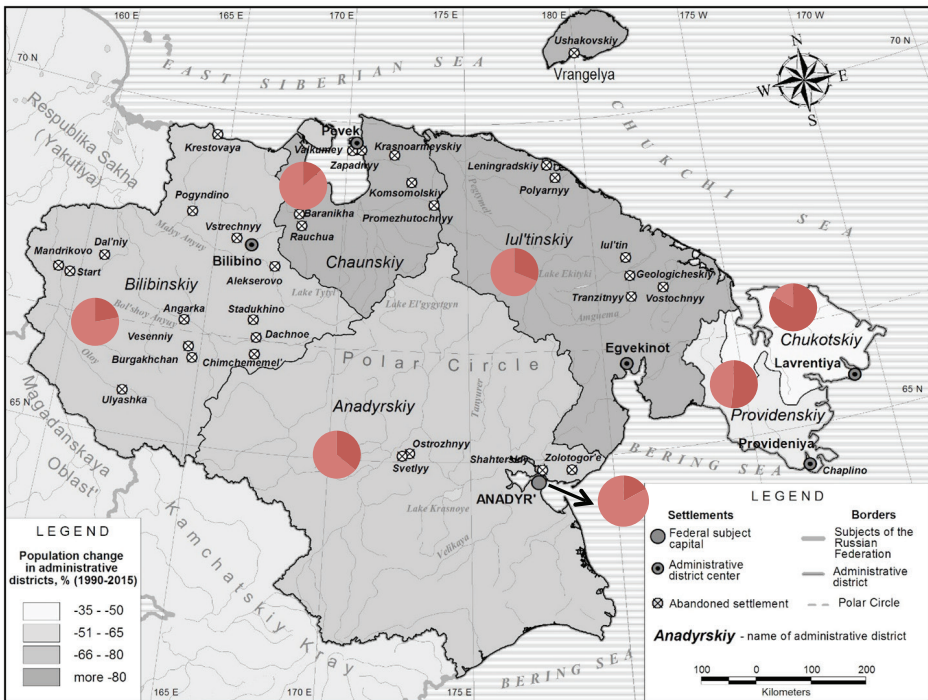
Figure 7 Intra-regional population dynamics and its link to the ethnic breakdown of the population in the Chukotka Autonomous, 1990–2015

Table 3. Population and ethnic composition in the Chukotka Autonomous Okrug, 1990–2015

	Population (number of people)			Population change, %			Indigenous peoples as a proportion of the population, %	
	1990	2002	2015	1990–2002	2002–2015	1990–2015	2002	2010
Chukotka Autonomous Okrug	158056	53824	50759	-66	-5,7	-67,9	31,3	33,4
Anadyr town	17509	11038	14326	-37	29,8	18,2	16,9	17,8
Anadyrskiy district	32609	11169	8788	-65,7	-21,3	-73,1	36,3	39,7
Bilibinskiy district	27956	8820	7825	-68,5	-11,3	-72	21,6	23,3
Iultinskiy district	31661	6634	5122	-79	-22,8	-83,8	30,8	31,2
Providenskiy district	10019	4660	3737	-53,5	-19,8	-62,7	52,2	56,2
Chaunskiy district	31348	6962	5774	-77,8	-17,1	-81,6	13,1	19,4
Chukotskiy district	6954	4541	4510	-34,7	-0,6	-35,1	82,6	80,4

Note 1: Calculated based on the 2015 district borders.

Source: Based on official statistics. Figures for 2002 and 2010 are based on population census data.



Changes in indigenous peoples as a proportion of the population

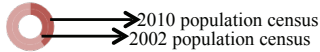


Fig. 7. Intra-regional population dynamics and their link to ethnic breakdown of the population in the Chukotka Autonomous Okrug, 1990–2015

The districts comprising the group in which the population decline was precipitous at 72–73% were the Bilibinskiy and Anadyrskiy districts, which are located in the northwest, west, and south of the Okrug. In these districts, indigenous peoples account for 21–39% of the population (Table 3 and Fig. 7). As a result of the outflow of non-indigenous people and the closure of the settlements for gold miners, the population of the Bilibinskiy and Anadyrskiy districts plunged by over 65% between 1990 and 2002. Although the population decline continued during the 2002–2015 period (see Table 3), the rate of decline fell significantly, and the population stabilized. As was explained earlier, this was due to a drop in population outflow as a result of the development of new gold mines and the subsequent growth in industries supplying power, agricultural products, and food within the region.

In the Providenskiy district, the population decline during the post-Soviet period stayed relatively close to the average. Ten

indigenous small-numbered peoples of the North reside in this district, and they form a relatively high proportion of the population, more than half, in fact (Table 3 and Fig. 7). One characteristic of the population in the district is that the decline in population has been caused by both population outflow and natural decrease (1990–2002: 53% fall, 2002–2015: 19% fall). Although there were no new spurs for economic growth, a large drop in population could be avoided thanks to the population trend among the indigenous peoples working in the traditional natural resource utilization sector.

The districts with the smallest population declines during the post-Soviet period were Anadyr town (37% fall) and the Chukotskiy district (34% fall). In the case of the Chukotskiy district, the fact that indigenous peoples dominate the ethnic structure can be regarded as an explanatory factor. The Chukotskiy district is home to Chukchi, Yukagir, Evens, and Itelmens peoples, and they are engaged in traditional natural

resource management related to utilization of renewable biological resources. The indigenous population of this district is over 80% (Table 3). Furthermore, the district contains no settlements that have been closed and are no longer inhabited. In the case of Anadyr town, on the other hand, there is another factor behind the relatively small population decline (though the population actually increased by 29% between 2002 and 2015). This is that the town is the capital of the Chukotka Autonomous Okrug. Although the indigenous population of the town is not particularly high as a proportion of its total population, the outflow to other regions of Russia has been offset by an inflow from other parts of Chukotka. This influx has probably occurred because of the high likelihood of obtaining employment in the town and because the social infrastructure is of high quality.

Transformation of human settlements




Spatial transformation of natural resource use caused the differentiation of settlements. Currently, five types of transformation of human settlements can be observed in the studied region (Table 4). (1) The first type are ethnic rural settlements (villages) that emerged during the Soviet era as a result of the transition by indigenous peoples from pursuing a nomadic existence to living in a fixed location, and are still inhabited today. The population of these villages changed (declined) as a result of natural decrease, the outflow of minority non-indigenous peoples, and a small outflow of indigenous peoples (mainly young ones) to the centre of the district or Anadyr town. However, compared with settlements where most of the residents were Russian, the rate of decline was low, especially during the 1990s. As they had during the Soviet era, the residents of indigenous settlements mainly worked for companies utilizing renewable bioresources or self-employment utilizing these resources. Despite changes in the form of management of natural-resource-utilizing companies (in the Soviet era they were mainly *sovkhoz* (state-owned farms) whereas now most of them are publicly run single farm enterprises or cooperatives), traditional resource utilization continues to play a

central role in these local areas. Examples of such settlements in the Iultinskiy district are the indigenous settlements of Amguema, Vankarem, Nutepelmen, Konergino, and Uelkal. Indigenous residents typically comprised 74–96% of the residents of these settlements. For example, the population of Amguema village declined by 40% between 1990 and 2015, a rate of decline that was less than half that of the Iultinskiy district as a whole (Table 2). Table 4 Types of post-Soviet transformation of human settlements in the Chukotka Autonomous Okrug

(2) The second type is Soviet-period settlements, mainly enjoying the status of a district or Okrug center, inhabited mostly by the Russians. Their population has declined, but they have been maintained as residential areas. Because they have witnessed large population outflows, mainly by non-indigenous people, the population of such settlements declined during the 1990s. For example, the population of the Egvekinot urban-type settlement, which is the center of the Iultinskiy district, dropped by 56% between 1990 and 1998, yet a look at the entire post-Soviet period reveals that the total decline was only 43%, having been softened by a moderate recovery in population since 2000 (see Table 2). What played an active role in maintaining the Egvekinot urban-type settlement and other district centers was the inflow of people from nearby villages, who were attracted by the possibility of securing jobs created by government-funded organizations. The population of Egvekinot stabilized as a consequence of employment by the sea port, construction, and the mining- and energy-resource-utilizing companies serving the local population.

(3) The third type are settlements inhabited by Russians where the population declined dramatically. These residential areas contain both abandoned and still active subdistricts. One example is the Ugolnye Kopi settlement, which includes a residential zone that has now been abandoned but that used to be home to military families and employees of companies providing services to the military. Because the army was disbanded in the 1990s, a large population outflow occurred, but

Table 4. Types of post-Soviet transformation of human settlements in the Chukotka Autonomous Okrug

	Type of transformation	Status of settlement	Ethnic composition	Characteristics of population migration in the post-Soviet period	Population dynamics in the post-Soviet period	Relation to resource use through employment	Examples	Photographs
I	Soviet-period settlements, inhabited largely by indigenous peoples, whose numbers have not changed very much	Village	Mainly indigenous people	Some non-indigenous peoples left during the 1990s. Some indigenous peoples left for the Okrug or district center.	The population is declining, but the margin of decline is considerably smaller relative to settlements with mainly Russian inhabitants	Mainly work for renewable-resource-utilizing companies (fishing, marine-mammal hunting, reindeer herding, etc.) or utilize these resources on a self-employed basis	Anguema village in the Iultinsky district (photograph)	
II	Soviet-period settlements, considerably depopulated and mainly enjoying the status of a district or Okrug center, inhabited mostly by the Russians	Center of the Okrug or the centers of administrative districts	Mainly Russian people	Significant outflow to other parts of Russia and CIS states during the 1990s	Significant population decline	Mainly work for publicly-financed organizations or companies that utilize non-renewable mineral and energy resources to meet local needs	Anadyr town (photograph), Egvekinot urban-type settlement, center of the Iultinsky district	
III	Considerably depopulated settlements, with essentially Russian population, where there co-exist abandoned and preserved residential neighborhoods	Urban-type settlement with the status of the district center since 1992	Mainly Russian people	Significant outflow to other parts of Russia and CIS states during the 1990s	Significant population decline	During the Soviet era, companies that supplied the army. During the post-Soviet period, publicly-funded organizations, airport services, and lignite-mining company that meets local needs	Ugolnye Kopi urban-type settlement. There was once an army barracks here but it has been abandoned (photograph)	

	Type of transformation	Status of settlement	Ethnic composition	Characteristics of population migration in the post-Soviet period	Population dynamics in the post-Soviet period	Relation to resource use through employment	Examples	Photographs
IV	Abandoned settlements	Settlements, urban-type settlements	Used to be mainly Russian people	Significant outflow to other parts of Russia and CIS states during the 1990s	Significant population decline during the 1990s. Currently no permanent residents.	Before abandonment of the residential areas, the inhabitants worked mainly in the resource-extraction sector	lulin urban-type settlement, lultinskiy district (photograph)	
V	Temporary workers' settlements established in the post-Soviet period (during natural-resource extraction)	None	Mainly Russian people	Temporary inflow of migrant workers from other parts of Russia and CIS states	No permanent residents	Working temporarily mainly for resource-extracting (chiefly gold and silver) companies	Temporary residential area for migrants established near the gold mine in the Valunistoe deposit in the Anadryskiy district (photograph)	

Source: Prepared by the authors

from 1992 onwards it acquired the status as a centre for the Anadyrskiy district. Employment was provided by government-funded organizations, and the settlement managed to survive thanks to employment at the airport and employment by lignite-mining company. (4) The fourth type are settlements that were once mainly inhabited by Russian and other non-indigenous peoples employed in the mineral-resource mining sector, but have been stripped of their status as towns and now have no residents. After the large companies closed down in the 1990s, the residents, who did not have strong ties to the region, moved away, mainly to central Russia, Russian Far East, or countries of the former Soviet Union, and these settlements were officially abandoned by the Russian government. During the process of conducting on-site surveys and performing investigations using the mapping method, it was found that 31 settlements had been liquidated during the post-Soviet period (Fig. 7). These abandoned residential areas are most numerous in the Chaunskiy district and Bilibinskiiy district, where there were numerous settlements that had enterprises involved in the mining of tin and gold and that could be characterized as "company towns." Examples of such settlements would be Iultin, Svetlyy, Tranzitnyy, Geologicheskiiy, and Vostochnyy. These settlements disappeared with the suspension of operations by the Iultin Mining and Processing Complex and related companies. Another example is Polyarnyy, which was abandoned following a 1995 decision by the Russian federal government that was made after the closure of the Polyarninskiiy Mining and Processing Complex (Fig. 7).

(5) The fifth type are temporary workers' settlements, which have been established during the post-Soviet period to house migrant labour (for extraction of mineral resources). Since 2006, such migrant workers' residences have been constructed in areas where new gold and silver mining projects are underway. An example of this type of temporary workers' settlement would be Kupol. Another would be the temporary-worker residence near the Valuninstoe gold mine in the Anadyrskiy district, where mining takes place all year round. This residential area provides comfortable permanent accommodation for

up to 300 people. The number of temporary workers' settlements is on the rise as existing resource-utilization projects continue to be expanded and new ones are launched.

SUMMARY OF THE DISCUSSION

The Chukotka Autonomous Okrug has followed a distinctive process of change during the post-Soviet period. In the 1990s, a large number of mining companies and human settlements were abandoned, and the region's economy suffered the most as a result of the largest population decline of any Russian region. However, it then became an attractive target for investment, with gold mining proving successful. The traditional economic activities of indigenous peoples also underwent development, and their residential areas were completely transformed. The harsh natural conditions, the remote location, the lack of transportation infrastructure, inadequate capital inflows, and weakness in terms of international economic cooperation meant that the profitability of nonferrous-metal and gold mining took a serious hit during the economic crisis of the 1990s. On the other hand, the administration of Roman Abramovich proved successful, and money flowed in for a decade. As a result, new projects to mine gold and silver and extract natural gas were launched, and creation of neighboring-territorial cooperatives and the establishment of publicly run agricultural companies in the traditional resource utilization sector can be identified as providing the sparks for growth.

The post-Soviet period can be summed up by observing the multidirectional changes that occurred in resource utilization at the intra-regional and local levels. The mining of tin and the production of tungsten products ceased completely, coal-mine output shrank to less than a fifth, and power generation for the region halved compared to what it had been initially. Despite the growth that occurred between 2003 and 2009, during the post-Soviet period as a whole, reindeer herding, which forms the basis of traditional natural resource utilization by the Chukchi people, has declined significantly, with the number of domesticated reindeer more

than halving. On the other hand, fish catches and marine-mammal hunting have increased dramatically thanks to state support (Table 1). In 2002, wind power began supplying the local area for the first time, and in 2006, natural gas also started to be used. During the post-Soviet period, new mines have been developed, which has increased the amount of gold and silver being extracted. As a result, precious-metal mining now accounts for around 80% of the total mining output, and has established itself as a key industry for the regional economy. Between 1990 and 2015, the total population declined to a third of its former level (Table 3), while indigenous residents as a proportion of the population increased (Fig. 1). Since 2002, however, there has hardly been any change in the population (Fig. 5). The biggest reason for the population decline was changes in the situation with mining companies, and especially their closure during the economic and political crisis of the 1990s, which precipitated a large drop in incomes. State support was no longer available, and the chances of finding jobs were slim. This made living in this northern region incredibly difficult, and led to a large population outflow.

This study has explored the interrelationships between resource utilization and population dynamics at the local level throughout the post-Soviet period. The interrelationships between the two were particularly close during the 1990s. At this time, the close of a large number of mining companies triggered a population outflow and a decline in the total population. In contrast, the period from 2002 has been marked by the success of the resource utilization sector, and this has played a key role in stabilizing the population of the Chukotka Autonomous Okrug.

Ethnic factors have played an extremely important role in the process of interaction between resource utilization and population. In every administrative district, with the exception of the Okrug's center, population dynamics has been characterized by a strong correlation with indigenous peoples as a proportion of the population (at the time of the economic

crisis, this correlation was 0.9). The higher the proportion of indigenous peoples at the local area, the smaller the population decline has been during the post-Soviet period. The change has been the smallest in local areas where indigenous peoples engaged in traditional resource utilization make up a large proportion of the population, while the rate of population decline has been the highest in local areas where the mining industry is highly developed and non-indigenous people form a large proportion of the population.

During the post-Soviet period, changes in population dynamics have been akin to a mosaic, with some residential areas being completely abandoned and the exteriors of ethnic settlements and the Okrug's and districts' centers being remodeled. Unlike other parts of eastern Russia, where ethnic Russians make up the overwhelming majority of residents, in the Chukotka Autonomous Okrug, differentiation in spatial changes between settlements with mainly indigenous residents (all of them have been maintained) and settlements with mainly Russian residents (most residential areas have either been abandoned or have been maintained but the population has fallen dramatically) were observed.

Examination of changes in population dynamics in the Chukotka Autonomous Okrug at the regional, intra-regional, and local levels that have occurred in conjunction with changes in resource utilization during the post-Soviet period, allowed confirming the conclusions of previous research that has indicated that the demographic and economic systems in the Arctic regions are unstable (Heleniak 1999; Petrov 2010). Factors, such as settlements dependent on a single company, settlements without the status of a district or regional centers, non-indigenous residents with weak ties to the region, and the employment in the non-renewable mineral resource utilization sector under the market economic system, have caused the population outflows and the abandonment of residential areas, and Chukotka's experience makes it clear that this results in the destabilization of the sociodemographic systems and human settlements in the Arctic regions.

More stable are the local systems where the indigenous peoples working in the traditional renewable resource utilization sector make up an overwhelmingly large proportion of the population. The stability in the development of settlements for indigenous peoples who are engaged in traditional natural resource utilization can be explained by natural factors (the presence of renewable resources in the tundra and taiga zones) and ethnocultural factors (ethnic composition and tendency for traditional natural resource utilization) within the region. On the other hand, the instability of the non-indigenous people residential areas can probably be explained not only by natural and ethnocultural factors but also by external factors (especially national-level political and economic factors as well as global economic factors such as demand for natural resources in world markets). What has changed during the post-Soviet period is the geographical structure of the Chukotka's economy and human settlement. During the 1990s, residential areas disappeared along with the mining and processing complexes and the scattered infrastructure that accompanied them. From 2000, however, the development of new,

non-labour-intensive mining technology has led to the birth of new resource-utilizing companies. These companies were not reincarnations of the old ones. They were started from scratch. They also appeared in geographical locations away from the existing residential zones. Temporary settlements for the workers needed now were also constructed. Just as it always has, the geographical structure of Chukotka's economy and human settlement continue to change, this time as a result of the influence of the new projects to extract mineral resources that are currently in progress.

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Tamara Litvinenko (PhD) is a senior researcher at the department of socio-economic geography, Institute of Geography RAS. Her research areas include social problems of natural resource development in Eastern Russia and tourism and environment relationship in Russia and Japan. She is the author of more than 90 scientific publications. Tamara Litvinenko participated as principal investigator or collaborator in numerous national and international projects supported by the Global Ecological Fund, Ministry for Education, Culture, Sports, Sciences and Technology of Japanese Government, Russian Scientific Fund for Human Studies, Russian Foundation for Basic Research, and Presidium of RAS. Tamara Litvinenko was invited research fellow at the Research Institute for Humanity and Nature (2007) and visiting professor at Doshisha university (2010-2016) in Kyoto, Japan. She was awarded by Honored diploma of the Russian Academy of Sciences (1999) and Honored diploma of Plekhanov Russian Academy of Economics (2006).



Kazuhiro Kumo is Professor at the Institute of Economic Research, Hitotsubashi University (Hitotsubashi IER), Tokyo, Japan. He obtained his Doctoral degree in Economics in 2002 from Kyoto University. He has been the Research Director of the Russian Research Center at Hitotsubashi IER since 2014 and that of the Center for Economic Institutions at Hitotsubashi IER since 2016. During his professional career, he engaged in his research at the University of Birmingham, UK in 2007-2008 and at the University of Oxford, UK in 2013-2014 as a visiting scholar. His areas of research are regional economy, economic geography, demography and migration analysis in Russia and the Former Soviet Union. His latest publications are: "Demography of Russia: From the Past to the Present, Palgrave Macmillan, UK, 2017 (co-authored)", "Research on Poverty in Transition Economies: A Meta-analysis on Changes in the Determinants of Poverty, in Transition Studies Review, 2016".