Features of the population settlement system in the regions of the China – Mongolia – Russia economic corridor

P V Osodoev and Y B Zhamyanova
Baikal Institute of Nature Management SB RAS, Ulan-Ude, Russia

E-mail: maksyulia@inbox.ru

Abstract. The article presents an analysis of the existing objective conditions and patterns of population distribution on the territory of the China – Mongolia – Russia economic corridor. The study area covers the Inner Mongolia Autonomous Region of China (Inner Mongolia), the central aimags of Mongolia and the Baikal region (Russia). The settlement system of adjacent regions is highly differentiated in terms of natural and geographical conditions, the level of production development, socioeconomic development, and the state of infrastructure. The average population density of the study area is 10.1 people per km\(^2\); there are relatively low indicators in the Baikal region, 2.8 people per km\(^2\); 4.2 people per km\(^2\) are in the central regions of Mongolia, and 21.2 people per km\(^2\) are in Inner Mongolia. The highest population density is observed in areas where highways and railways pass. During the period under review (from 2000 to 2018), the indices of population change in adjacent regions amounted to 93.7% in Russia, 129.0% in Mongolia and 106.7% in China. In the study regions, the population lives mainly in cities and large settlements. In the Baikal region, the level of urbanization is 68.6%, in Mongolia – 67.8% and in Inner Mongolia – 62.7%. The growth of cities is mainly due to internal migration, especially in the Russian and Mongolian territories; the process of depopulation of the countryside is taking place.

1. Introduction
In recent years, there has been a reorientation of Russia's priorities in international cooperation to the East of the country to the active development and strengthening of ties with Mongolia and China. The border regions are becoming a zone of contact with neighboring countries, outposts for the development of cooperation. The China – Mongolia – Russia economic corridor in the near future may become one of the factors in the development of the economy in our country, an increase in production capacities in the border areas and the attraction of the population to the eastern borders [1]. The Corridor project involves the construction of a cross-border road and railroad, transit transport, close cooperation in the industrial, trade, energy, environmental, scientific, technical and educational sectors. Initially, the project involves the interaction of three countries unequal in terms of primary conditions, in which Mongolia is the smallest in terms of the number of inhabitants and the smallest in the territory. However, Mongolia is the main mediator in cooperation between China and Russia: the main transport and energy links, logistics are concentrated on its territory. Predicted data on the socioeconomic and demographic development of adjacent regions can more clearly determine the prospects for integration into the economic space of Russia – Mongolia – China.
2. Materials and methods
The object of the study is the population of the Russian-Chinese-Mongolian transboundary area that covers the Baikal region (the Irkutsk Oblast, The Republic of Buryatia and Zabaykalsky Krai); the Inner Mongolia Autonomous Region of China (Inner Mongolia); and the central aimags of Mongolia (Dornogov, Dundgov, Umnegov, Tuv, Selenge, Govsumber, Darkhan-Uul, and Ulaanbaatar) (figure 1). The study area is 3217.4 thousand km² with a population of 31.8 million people.

![Figure 1. Study areas.](image-url)

The research materials were scientific works of domestic and foreign scientists on similar issues. The empirical base was statistical compilations and data from national statistics services for 2000-2018 [2-4]. The authors used systemic, statistical, comparative geographical and cartographic methods as research techniques.

3. Results and discussion
The settlement system of adjacent regions is highly differentiated by natural and geographical conditions, the level of production development, socioeconomic development, and the state of infrastructure. The socioeconomic factor is of dominant importance in the location on a particular territory. The level of economic development and production capabilities determine the main features of settlements, their population size, structure, appearance, employment, etc. The presence and development of highways and railways affect the nature and density of the population [5]. In 2016, the countries signed an economic corridor program that includes plans to develop four rail and three road
corridors through Mongolia. The program concerns not only transport infrastructure but also cooperation in energy, industry, agriculture, and environmental protection. Mongolia will become one of the main components of the transit corridor. Among the most significant transport projects currently under construction, the 1,000 km Altanbulag – Ulaanbaatar – Zamyn-Uud highway and the 547 km Erdenet – Ovoot railway are considered critical to linking economic and social opportunities. The estimated cost of the highway is approximately 3.5 billion US dollars and is considered one of Mongolia’s megaprojects under construction, which will create more than 50,000 jobs.

At present, the average population density of the study area is 10.1 people per km²: in the Baikal region, there are comparatively low indicators, 2.8 people per km²; the central aimags of Mongolia account for 4.2 people per km², and Inner Mongolia – 21.2 people per km² (table 1). The zone of the densest settlement in the Baikal region covers the central, southern and southeastern parts of the region. Inner Mongolia of China is located in the north of the country, covers the territory from northeast to southwest, has an extended shape, is included in the central part of the country’s territory, and its southern part is most densely populated [6]. The highest population density is observed in areas where highways and railways pass. On the Russian side, the population lives mainly in the areas of the Trans-Siberian railway, on the Mongolian side – the Sukhe-Bator – Darkhan – Ulaanbaatar – Zamyn-Uud auto and railway, and on the Chinese side – the Ulanchab – Hohhot – Baotou – Bayan-Nur auto and railway.

Table 1. Key demographic indicators of the Economic Corridor regions in 2018 [2-4].

| Economic Corridor regions | Territory, thousand km² | Population, thousand people | Population density, people per km² | Urbanization rate, % |
|--------------------------|-------------------------|-----------------------------|-----------------------------------|---------------------|
| China                    | 9599.0                  | 1395380.0                   | 148.3                             | 59.5                |
| Inner Mongolia           | 1181.1                  | 25340.0                     | 21.4                              | 62.7                |
| Mongolia                 | 1564.1                  | 3028.1                      | 2.1                               | 67.9                |
| Ulaanbaatar              | 4.7                     | 1477.1                      | 317.3                             | 100.0               |
| Central region           | 473.6                   | 508.9                       | 1.1                               | 45.6                |
| Dornogov                 | 109.5                   | 68.7                        | 0.6                               | 63.5                |
| Dundgov                  | 74.7                    | 46.2                        | 0.6                               | 26.6                |
| Umnegov                  | 165.4                   | 66.0                        | 0.4                               | 37.6                |
| Selenge                  | 41.2                    | 110.5                       | 2.7                               | 34.7                |
| Tuv                      | 74.0                    | 94.9                        | 1.3                               | 18.2                |
| Darkhan-Uul              | 3.3                     | 105.0                       | 32.1                              | 81.3                |
| Govsumber                | 5.5                     | 17.6                        | 3.2                               | 59.7                |
| Russia                   | 17125.2                 | 146780.0                    | 8.5                               | 74.6                |
| Baikal region            | 1558.0                  | 4445.0                      | 2.8                               | 68.7                |
| Irkutsk Oblast           | 774.8                   | 2397.0                      | 3.0                               | 78.7                |
| The Republic of Buryatia | 351.3                   | 983.0                       | 2.8                               | 59.1                |
| Zabaykalsky Krai         | 431.9                   | 1065.0                      | 2.4                               | 68.4                |

The demographic situation in any region reflects the level of the socioeconomic situation of the territory, its attractiveness for living and residence. Estimation of the size and distribution of the resident population in the regions under consideration shows multidirectional processes of demographic development. The dynamics of population growth since 2000 is generally characterized by positive indicators. Over the past 18 years, the population growth in the central aimags of Mongolia amounted to 129.0%, and in Inner Mongolia – 106.7%; only the population of the Baikal region had negative growth of 93.7% (figure 2). The high values of population growth in Mongolia are due to the high birth rate in recent years and migration growth throughout its territory. The indices of natural
increase and birth rate of the population in the Central region of Mongolia were almost three times higher than the analogous values of Russian subjects. Natural growth in Mongolia is on average 17.8 per 1000 people, and in Russian regions – 6.2. In 2018, the natural increase at the national level in China was 3.8 per 1000 people, and in Inner Mongolia – 2.4 [2-4].

Migration processes significantly influence the distribution of the population in a particular region. Russian subjects show a migration loss that in the Baikal region is 47.0 per 10 thousand people. Interregional migration flows from the subjects of the Baikal region are directed mainly to the European part of the country. Since 2010, 164.8 thousand people have immigrated from the subjects of the Baikal region to other regions; the average annual losses amount to 18.3 thousand people. Thus, 7706 people migrate from the Irkutsk Oblast annually, 7338 people – from Zabaykalsky Krai, and 3269 people – from the Republic of Buryatia. On Mongolian territory, Ulaanbaatar and the Central Region are objects of attraction for other regions of the country. The growth of Ulaanbaatar since 2010 due to migration amounted to 125.3 thousand people. The central region is an intermediate point for migrants; therefore, annually approximately 13.5 thousand people come mainly from the western and eastern regions, and 12.2 thousand people immigrate to Ulaanbaatar. The main reasons for migration in the Russian and Mongolian regions are high unemployment, underdeveloped socioeconomic infrastructure and low quality of life [7].

In recent years, the study regions have been undergoing a global urbanization process. In the territorial structure of the population, the shares of the urban and rural population in the analyzed regions are the same in percentage terms. However, these processes are incomparable and unequal. At the moment, the level of urbanization in the studied regions is defined as average and characterized by the following indicators: 68.6% in the Baikal region, 67.8% in Mongolia and 62.7% in Inner Mongolia. The population of the studied regions is concentrated mainly in large cities. In Inner Mongolia, the large cities are Hohhot with a population of 2.6 million people and Baotou – 2.1 million people; in Mongolia: Ulaanbaatar – 1.5 million people, Erdenet – 102.2 thousand people and Darkhan – 86.7 thousand people. In the Baikal region, there are such large cities as Irkutsk – 623.9 thousand
people, Ulan-Ude – 434.9 thousand people, Chita – 349.0 thousand people, Bratsk – 229.3 thousand people, and Angarsk – 225.8 thousand people.

The current pattern of urban settlement has a different historical background. In the subjects of the Baikal region, the process of urbanization and industrialization since the second half of the last century has been uneven, spontaneous due to the involvement of rural residents in the development of the economy and production in cities as a labor force. In terms of the size of settlements, cities with a population of 10-20 thousand people prevail in Zabaykalsky Krai, the Irkutsk Region and the Republic of Buryatia, 20-50 thousand people. The network of large cities in the Baikal region is relatively undeveloped. According to the census data, in the past decades, the number of cities does not actually change [8]. At the same time, the largest agglomeration in the Baikal region may be the union of the nearby cities of Irkutsk, Angarsk and Shelekhov.

The demographic policy in Inner Mongolia continues the course of balanced and in-depth demographic development of China; the same dynamic and active population growth rates are observed (table 2). Due to the purposeful policy of the authorities in housing construction and urban development, the share of the urban population of Inner Mongolia since 2000 has grown from 42.6% to 62.7%, whereas in China as a whole – from 36.2 to 59.5%. Local policies facilitate the urbanization processes in China, which include preferential taxation, the establishment of tax standards for land transactions and household per capita taxes. All this contributes to the acceleration of economic development of urban areas, intensive movement of the population and urbanization in China. In China, the number of cities and suburbs is rapidly growing, and the geographical landscapes of territories are changing. The growth of the urban population is due to the transfer of rural settlements to urban ones, the inclusion of closely located settlements in the administrative boundaries of cities. In the middle of the past century, the level of urbanization in China was only 10.0% [9]. Over the past 20 years, the urban population has almost doubled. China has a purposeful administrative policy for the use of land in the construction of cities, taking into account the principle of "a giant city and several small settlements" [10]. Rural settlements are becoming a source of food and labor for the giant city. The number of agglomerations is growing. The Hu-Bao-O-Yu urban agglomeration is one of the dynamically developing agglomerations in Inner Mongolia, consisting of Hohhot – Baotou – Ordos – Yulin. This region includes medium and small cities with a balanced level of the economy, has rich resources for mining production and huge industrial potential.

Table 2. Divisions of Administrative Areas in China (2000-2018).

| Year | Urban population, thousand people | Number of cities at all levels | Cities at county level | Cities at the prefectural level | Population density of urban districts, people per km² |
|------|----------------------------------|------------------------------|-----------------------|--------------------------------|-----------------------------------------------|
| China | 2000                             | 2018                         | 2000                  | 2018                          | 2000                           | 2018                           |
| Inner Mongolia | 10011                           | 15890                        | 20                    | 1024                          | 15                             | 11                             | 5                              | 9                              | 289                           | 1846                          |

In the aimags of the Central region of Mongolia, the level of urbanization has sharp differences in indicators from 18.2% (Tuv) to 100.0% (Ulaanbaatar). The main feature and problem of settlement in Mongolia is the concentration of the population in one city, the Ulaanbaatar capital. In Mongolia, the largest agglomeration consists of Ulaanbaatar and adjacent satellites, Nalaikh, Baganuur and Bagakhangai. The Ulaanbaatar agglomeration is monocentric, consisting in the dominant position of the nucleus over the satellites, and their size is ten times smaller. However, the concentration of the population in one city negatively affects the ecological situation of the city, the provision of electricity, water supply as well as the “pumping out” of labor resources from rural areas. To solve these problems, the government of Mongolia adopted the Ulaanbaatar Development Plan until 2030. Darkhan is also a small agglomeration on the territory of the Corridor on the Mongolian side. The
Darkhan-Uul aimag possesses free territories for the construction of industrial enterprises and organizations, a skilled workforce and a developed system of higher education, which creates conditions for attracting investments from foreign companies. The infrastructure of urban settlements in Mongolia was created during the period of the Soviet-Mongolian twinning; since the “extinction” of close relations, the further development of cities had an inertial character. Much attention is paid to solving housing problems within the borders of Ulaanbaatar; the development of aimag cities is based on the principle of attractiveness for investment in construction. In Mongolia, on the territory under consideration, the cities are regional aimag centers: Darkhan (Darkhan-Uul) – 86.7 thousand people, Dalanzadgad (Umnegov) – 26.1 thousand people, Sainshand – 25.3 thousand people, Zunmod (Tuv) – 17.3 thousand people, Saintsagaan (Dundgov) – 15.8 thousand people, and Sumber (Govsumber) – 12.8 thousand people [3].

Housing construction in Mongolia is an important problem in the development of the country’s national economy. The growth of the urban population in the Baikal region is mainly due to internal migration; the “depopulation” of rural areas is actively taking place. The Baikal region has a large number of rural settlements with a population of 500 to 1000 people. According to statistics, in recent years, there has been a tendency for the growing small the population of the settlement network in the region (table 3).

| Region                  | Total | 0-500 | 500-999 | 1000-1999 | 2000-4999 | 5000-9999 | 10000-19999 |
|-------------------------|-------|-------|---------|-----------|-----------|-----------|-------------|
| Zabaykalsky Krai        | 330   | 100   | 134     | 66        | 23        | 7         | 0           |
| The Republic of Buryatia| 247   | 51    | 82      | 71        | 26        | 13        | 4           |
| Irkutsk Oblast          | 352   | 75    | 107     | 126       | 32        | 8         | 4           |

Overcrowding in cities and a decrease in the number of rural residents is becoming a big problem in China. The share of the rural population in 2018 was 37.2%. The main economy of Inner Mongolia is agriculture that employs over 80.0% of the population. Inner Mongolia is leading in the development of animal husbandry in China, but the economic development of the region is inferior to other provinces. The main problem in the development of the district’s economy is the vastness of the territory and the inaccessibility of some parts of it. To reduce the rate of rural migration, the government is introducing various social programs in the regions. For example, the current government policy, «Development Strategy 8337», promotes development packages, including education and health facilities for peri-urban and rural areas, which improve the living conditions of people.

In the rural settlement of Mongolia, the largest settlements are the centers of the sums [11]. In the Central region of Mongolia, there are 95 sums; thus, in the Tuv aimag – 27, Selenge – 17, Umnegov – 15, Dundgov – 15, Dornogov – 14, Darkhan-Uul – 4, and Govsumber – 3. In comparison with 2000, the number of rural settlements in this part of Mongolia has grown from 362 to 379; the greatest growth is recorded in the border Selenge aimag. A feature of the rural settlement of Mongolia and Inner Mongolia is the nomadic population, who is engaged in grazing livestock and migrates to seasonal pastures several times a year. Livestock nomads make up 20.7% of the rural population of the Central region of Mongolia. The traditional nomadic lifestyle for the inhabitants of Inner Mongolia has largely lost its relevance in recent years; animal husbandry has acquired a sedentary character [12].

In the studied regions, to reduce the migration outflow of the population from rural areas, various government measures are being taken to stimulate local consolidation: tax incentives, methods of monetary incentives, preferential lending conditions, etc.
4. Conclusion
The studied subjects belong to sparsely populated areas; the population density within the region is highly differentiated due to various factors. The settlement of the population in the study area is closely related to the development of transport routes. The levels of urbanization in adjacent regions have similar indicators, but in the regions, they differ in their intensity and quality. The Chinese territory has the predominant characteristics of socioeconomic development: high population density as well as intensive growth of cities and agglomerations.

Changes in the demographic structure of the population of the studied regions are interconnected with the processes of socioeconomic development of countries. In the central aimags of Mongolia, population growth is due to high values of natural and mechanical growth. In contrast to the Mongolian aimags, the demographic potential of the Russian part is formed under conditions of narrowed reproduction of the population and migration loss to the central regions of the country.

In the studied regions, there is a gradual decrease in the number of the rural population due to the unfavorable demographic and migration situation. To solve this problem, significant state and non-state investments are needed to improve the human potential of the region. The strategic objectives of the state are to improve the quality of life, implement projects in the field of economics in adjacent regions to consolidate the population and reduce the migration outflow.

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