CHAPTER I. HUMAN RESOURCES OF FOREST-STEPPE UKRAINE (MID-1840S – EARLY 1860S)

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1. Sources, research history

In the middle of the 19th century in the Russian Empire, three different methods of counting the population were used at the same time: 1) so-called "Revisions"; 2) short-term censuses of the existing population based on the example of Western European countries through statistical institutions with the participation of the population itself; 3) administrative and police methods of population accounting through statistical committees and commissions, police and parish offices.

Revision is a form of population calculation held sporadically by the government exclusively for fiscal purposes under the conditions of a per capita taxation system. It only covered taxable categories of the population, or rather only male "souls", leaving women and representatives of other non-taxable sections of the population on the periphery. Such data were added later and only "for information", as usual. There were no correct methods of counting residents during audits, lists of residents were kept carelessly, and the facts of hiding "souls" were not rare[1] (Semenov, 1866, p. VIII).

The first unsuccessful attempt to conduct a demographic revision was started by Peter I in 1718 and formally continued until 1721. However, Catherine II only stopped various clarifications and checks on this matter. Gradually, nobles, clergy, and military were removed from the list of those to be transcribed, and leaving only taxable classes in it gave the whole event a distinct fiscal character. The Second Revision of 1742 – 1747 (additions were received until 1756) repeated the main shortcomings of the first one. Still, it confirmed Peter's ban on attaching Little Russians to the land and the order to account for them only formally without imposing new taxes. The Third Revision was prepared and carried out during the reign of Catherine II in 1761 – 1765, although it was initially planned to be completed in five months and was accompanied by the Pugachev uprising.

[1] In 1842, N. V. Gogol created his famous prose poem "Dead Souls".

The latter did not contribute to the successful completion of the entire event. The final result of the first three Revisions was the lowering of the social role of the peasantry, its equalization with serfs through the poll tax, and the spread of serfdom. The Fourth Revision (1781 – 1787) was accompanied by the spread of serfdom to a part of the peasants of Slobidska Ukraine and Little Russia; the Fifth Revision lasted from 1791 to 1808 due to huge inconsistencies with the real number of the taxable population in the data of "Revision reports" coming from the governors. For the first time, information on the population of the recently annexed Right-Bank Ukraine was recorded. The Sixth Revision was carried out in 1811 according to the standards of the previous one. The Seventh was started in 1815 and continued until 1822 but was as unsuccessful as the previous ones. The Eighth Revision was scheduled for 1833, with the calculation of its completion in the following year, 1834. The relevant manifesto emphasized that the calculation is subject to "the entire population of taxable categories, of any age, sex, clan or tribe, not excluding those in the service or performing other state duties instead of per capita tax. People are included in the census to pay taxes or perform other duties, or only for counting population". This was the first time the need for full population accounting was expressed, as opposed to the previous system of audits. The Ninth Revision was carried out in 1850 – 1851. In its statutes, for the first time, categories of the population that did not pay taxes and were not subject to accounting were listed: the clergy, nobles, officials, home teachers, military ranks, honorary citizens, children of Protestant-Lutheran priests, retired clerks who retired before 1828, people of postal and theater departments, courtiers and many others. The Tenth Revision was appointed after the Crimean (Eastern) War ended in 1856 and lasted until 1860. The principles of its organization completely repeated the previous one (Statisticheskiye tablitsy Rossiyskoy imperii, 1863, pp. 119–145; Köppen, 1889, pp. 42–45, 92–94). In the process of preparing for the implementation of the peasant reform, a sudden and noticeable increase in the population was observed in some places due to the legalization of a part of runaway peasants, the return of "salaried workers", changes in the departmental subordination of military settlers, etc. Below, we will verify this with specific examples from the demographic history of the Forest-Steppe Ukraine in 1856–1858.

Short-term censuses were introduced in England from 1760, in France from 1791, in Prussia, Belgium, Holland, and Germany from the 1830s, while in the Russian Empire, they were practiced selectively. In particular, at the beginning of the 1860s, such censuses were conducted only in four Russian provinces (S.-Petersburg, Simbirsk, Ufa, Yaroslavl) and several cities, including Ekaterinoslav, Kyiv, Kharkiv, Mykolaiv, Chernihiv, Odesa (Semenov, 1866, pp. IX–XV; Köppen, 1889, p. 115). Difficulties in organizing such a census of the bulk of the rural population of Russia at that time proved insurmountable.

Statistical data obtained from local administrations were considered the most reliable among experts. They were based on yard lists of residents, which were updated annually, taking into account the dead and new arrivals and those absent on long-term passports. In general, population lists in the Russian Empire at that time were divided into three categories: 1) lists determined by state acts, 2) fiscal or payroll lists, and 3) police lists. Lists of the first category were kept for three social groups of the population – the nobility, the clergy, and the bourgeoisie. For hereditary nobles, their role was fulfilled by provincial genealogical books, but they included only those who owned estates or yards in this province with the peasants who inhabited them. Hereditary nobles, by merit, did not always get into such books, and women were not included. The Orthodox clergy were registered according to the consistorial lists; for other denominations, the lists of the Department of Foreign Religions of the Ministry of Internal Affairs were kept. The so-called “citizen's book” was intended for urban dwellers. All city residents were included in it, not only the owners of city real estate but also personal nobles, honorary citizens, guild merchants, guild craftsmen, and those who had their own business in the city but did not live there permanently. Financial lists were represented by “wage books” kept separately for householders, taxable urbaners, and rural taxable estates. Police lists that existed exclusively for cities provided information about the population and its movement, regardless of status (Statisticheskiye tablitsy, 1863, pp. 153–157).

The natural movement of the population (births, deaths, marriages) was reflected by records in metric books kept by representatives of the clergy of all religions. According to the law of February 20, 1784, each parish priest had to have three books according to the established form: about those born,

those who got married, and about the dead. In the first, the year, month, and day of birth, the legality of birth, names, surnames, gender of parents, and name of the midwife was entered. Marriage records included the year, month, and date of the wedding, names, surnames, age, religion, and social status of the young people and witnesses. The time of death, name, religion, sex, age, rank, disease, and type of death of the deceased were recorded in the book about the deceased (Kolokolov, 1852, pp. 365–369). Priests received these books from civil district administrations numbered, laced, with a seal. Both spiritual and secular authorities carried out control over their management. Based on these books, parish priests annually compiled report cards on the population movement according to the established model. No later than October, information from the parishes was sent to the district and recruitment commissions, where it was analyzed, summarized, and sent to the provincial administration and, from there, to the Ministry of Internal Affairs. In addition to metric books, important information about the male part of the population was contained in the recruitment lists, where the entire male population of the recruitment district was entered (Zhuravskiy, 1846, pp. 87–89). Orthodox metric books were kept since 1722, Lutheran since 1764, Catholic since 1826, Muslim since 1828, and Jewish since 1835 (Dementyev, 2015, p. 15). The fixation of representatives of some denominations, in particular Jews, who tried to avoid fiscal auditing, and Old Believers, who did not accept censuses at all, was problematic. The confusion of social status gradation in the Russian Empire also did not contribute to the accuracy of demographic statistics (Semenov, 1866, pp. XIX – XXI).

The gradual accumulation of statistical data required their scientific processing. One of the first to undertake this difficult task was E. Zyablovskiy (1764 – 1846). In the statistical description of the Russian Empire, he, in particular, based on the data of the Sixth Revision (1811 – 1812) and other sources, calculated the total population of the state at 4,548,5712 people, the approximate quantitative ratio of social statuses and groups, population growth, and the density of its settlement. For the first time, he published information on the number of inhabitants of the Ukrainian provinces: Poltava – 1,625,000, Podillia – 1,297,787, Chernihiv – 1,260,000, Slobidska Ukraine (Kharkiv) – 1,030,000, Kyiv – 1,066,198, Volyn – 1212,846, Yekaterinoslav – 666,163, Kherson – 370,430 or 254,931 (Ziyablovskiy, 1815,

pp. 136–148). Almost simultaneously was published the work of the future academician of two Russian academies K. Arsenyev (1789 – 1865), who relied, in particular, on the data of the Seventh National Revision. The author supported E. Zyablovskiy's calculations regarding the total population of the Russian Empire as being close to 45 million, taking into account a decrease of almost 700,000 due to the Napoleonic wars. In general, the data given by K. Arsenyev in this work are close to those submitted by Zyablovsky but are more rounded, considering the inaccuracy of statistical information about the population. Among the nine most populated provinces, the author included three Ukrainian ones – Chernihiv, Poltava, and Podillia. In addition, the statistician scientist proposed a system for classifying cities by the number of inhabitants. Ukrainian provincial cities were distributed as follows: 2nd class – Kyiv, Kharkiv, Poltava (10,000 – 30,000); 3rd grade – Kherson, Yekaterinoslav, Zhytomyr (5 –10 thousand); 4th grade – Chernihiv, Kamianets-Podilskyi (2 – 5 thousand) (Arsenyev, 1818, pp. 47-74). After 30 years, the already well-known researcher resorted to a new generalization of statistical data from the life of the Russian Empire, emphasizing the issues of economic geography and operating mainly with the materials of governors' reports. To them, 9,229,790 people lived in Forest-Steppe Ukraine in 1846 (Arsenyev, 1818, p. 495), or 1,740,000 more than in 1815 – 1818 (see above).

The first attempt to generalize data on the increase (increase in the number) of the population of the Russian Empire during the three decades between 1804 and 1833 was the study of I. Link. Using primarily the lists of Orthodox dioceses, he tried to establish regularities in the ratio of births and deaths and the gender of those registered (Link, 1836). The work in this direction was continued by A. Roslavskiy, who determined the term of the change of demographic generations in the Russian Empire among the Orthodox population at 32 years (39 for France and 46 years for Belgium), calculated the ratio of the working-age population of Belgium, Russia and France in the proportion of 1.29: 1:0.56 (Roslavskiy, 1841, pp. 217, 222, 223, 227).

Interesting data on the growth of the Ukrainian province's population by social groups between the Seventh and Eighth Revisions was processed by S. Korsakov: the population of Ekaterinoslav (by 23%), Podillia, Kharkiv, and Chernihiv (by 18 – 19%) provinces grew the fastest. The population

of Poltava, Volyn, and Kyiv provinces grew more slowly (by 13 – 14%). In Poltava and Podillia provinces, merchants increased by 97 – 100%. The number of state peasants in Volyn (197%) and Podillia (122%) provinces increased significantly due to state confiscations of the estates of active participants in the Polish uprising of 1830 – 1831 (Korsakov, 1839).

A positive role in the accumulation of statistical sources on demography was played by the publication of the results of the Eighth Revision with details by provinces and districts as of 1838, carried out by Academician P. Köppen (1793 – 1864). The most populated districts in the Ukrainian Forest Steppe were Zhytomyrskyi (95,795 people – Volyn pr.[2]), Vasylkivskyi (71,144 – Kyiv pr.), Kamianetskyi (68,345 – Podillia pr.), Starobilskyi (68,359 – Kharkiv pr.), and Novozybkivskyi (50,332 – Chernihiv pr.). The researcher considered the total population of the Russian Empire to be close to 62 million (Köppen, 1840, pp. 4, 6, 10, 14, 16). Subsequently, K. Arsenyev published data on the population of the Russian Empire in 1846 according to the same principle based on the reports of governors (Arsenyev, 1850). This small brochure became the basis for the first monographic analysis of the demographic situation in the Russian Empire in the mid-1840s. Its author was the outstanding philosopher, culturologist, and demographer of the 19th century, N. Danilevsky (1822 – 1885). The program developed by him provided consideration of the following issues: the total population by provinces and districts, population density, the number of male and female residents and the ratio between them, the number and proportion of births, the sex of births, the number and proportion of deaths, the ratio of deaths by sex, the ratio births and deaths (population growth or decline), sexual aspects of population growth or decline, number and share of marriages. In terms of population, the author classified three Ukrainian provinces (Kyiv, Poltava, Podillia) into the 2nd category with a population of 1.5 million or more. Three other Forest-Steppe provinces (Kharkiv, Volyn, Chernihiv) got to the 3rd category with a population of 1.25 – 1.50 million. Only the Kursk province from the Russian Black Earth Belt (1,773,806 inhabitants) was included in the 1st category. The total population of the Empire N. Danilevsky identified as about 65 million, including about 49 million Orthodox, 7.5 million Catholics, 3.5 million Protestants, 2.4 million Muslims, and 1.2 million Jews. In his opinion, the main population groups

[2] pr. – province.

according to linguistic and ethnic characteristics were “Great Russians” (33 million), “Little Russians” (11.2 million), “Belarusians” (3.6 million), “Poles and Lithuanians” (7 million), Jews (1.5 million), ”Finno-Latvians” (3.3 million), “Tatars” (2.4 million), “German colonists” (0.6 million). In terms of population density, the first two positions belonged to the Moscow and Tula provinces, whose population density was four times higher than the average in European Russia; the 4th, 5th, and 6th positions, after the Kursk province, were shared by the Ukrainian Forest-Steppe provinces of Poltava, Podillia and Kyiv (where the population density was three times higher than the average), the 11th and 13th places belonged to the Kharkiv and Chernihiv provinces (the population density was twice the average). The least populated Volyn occupied the 21st position with a density index of 1.84 from the average (Danilevskiy, 1851, pt. 34, pp. 117–119, 121–124, 138 –139). According to the share of births in 1846, the named Ukrainian provinces were distributed as follows: Poltava (5.0%), Kyiv (4.6%), Chernihiv (4.5%), Podillia and Kharkiv (4.3%), Volyn (4 .0%). According to the mortality rate, the same provinces were located in a different order: Podillia (2.8%), Volyn (2.9%), Kyiv and Kharkiv (3.1%), Poltava (3.6%), Chernihiv (4.3%) (Ibid., pp. 203–205, 360–363). According to the income of the population, almost all Forest-Steppe provinces were assigned to the 1st class with indicators higher than the average for European Russia (1.04%): Kyiv 1.5%, Podillia and Poltava 1.4%, Kharkiv 1.2%, Volyn 1.1% Only the Chernihiv province with a population gain of 0.2% got into the II class out of 10 provinces with the minimum positive ratio of the number of births and deaths (Ibid., part 35, p. 4). The advantage of the method used by N. Danilevsky, it should be considered a wide and equal use of statistical data of the provinces and districts' levels of origin, which is being observed for the first time in such an organic form. Understanding the initial limitations of statistical sources, the researcher developed a system of indirect indicators to model the main, in his opinion, patterns of system organization. The work's flaws include the inconsistency of the globality of the author's conclusions with the source base he used, represented by demographic statistics of only one year in 1846, as well as excessive fascination with the ideas of geographic determinism.

The turning point of the 1840s – 1850s became the final stage in understanding the results of the Eighth National Revision. Talented

statistician M. Zablotskiy-Desiatovskiy (1816 – 1858) processed data on the population's social structure based on 1836. For our research, the most helpful feature of this publication is that, for the first time, we find a clear correlation between various social groups of the then-Ukrainian society and the leading legal social categories of the Russian Empire (Zablotsky, 1851, pp. 54–57). At the same time, his brother and an outstanding statistician of his time, A. Zablotskiy-Desiatovskiy (1807 – 1881) traced the demographic movement of the population from 1838 to 1847 based on the reports of Orthodox dioceses and information from the Department of Foreign Religions of the Ministry of Internal Affairs. This case was later continued by Ye. Kaipsha (1858), based on his predecessor's method, proved the calculations until 1852. Both works became an important source in studying fluctuations in population growth in Ukrainian provinces in the late 1830s – early 1850s.

Increasing the role and importance of provincial statistics contributed to the fact that historical and statistical descriptions of some provinces were created on behalf of the Statistical Department of the Ministry of Internal Affairs. The first were descriptions of the Kharkiv and Kherson provinces, prepared according to the same plan: history, geography, administrative division, population, and economy (Passek, 1839; Kiryakov, 1839). Unsurpassed throughout the 19th century was the multi-volume statistical description of the Kyiv province, brought by the creators in the middle of 1848 (Statisticheskoye opisaniye Kiyevskoy gubernii, 1852). This became possible thanks to the lucky combination of talents of the outstanding Ukrainian statistician-economist D. Zhuravskyi (1810 – 1856) with the administrative and financial capabilities of the long-time Kyiv civil governor I. Fundukley (1799 – 1880). Initially, the publication was planned in four parts: I. Overview of the territory, population, inhabited places, and communication routes; II. Review of agriculture and land ownership; III. Review of industry and trade; IV. Review of local administration and government institutions. However, the last part was never prepared for printing, most unlikely due to the transfer of I. Fundukley to another high position in St.-Peterburg. During the work on this regional project, D. Zhuravskyi widely used the method of continuous observation, summarizing indicators, and statistical grouping. He divided the population into groups based on gender, religious affiliation, and social

affiliation (nobility, clergy, urban tax estates, various free estates, and serfs) (Chekotovskiy, 2016, pp. 76– 7).

The "Notes on Poltava Province" was compiled in 1846 in three parts and published in 1849 – 1852 by the then manager of the Poltava Chamber of State Property, and a few years later, the Archangel civil governor N. Arandarenko (1795 – 1867). For our work, the most interesting is the second part, which contains information on the history of the Poltava region, its administrative structure, the social composition of the population, and the economy of the province, as well as the third part with a description of the districts of it (Arandarenko, 1849; 1852). In the South of Ukraine, the head of the statistical committee in Odesa, A. Skalkovsky (1808 – 1898) in 1850 – 1853, began publishing his statistical description of the Novorossiysk region. Of the four parts planned by the author, two came out: "Geography, Ethnography and Population" (1850) and "Economic Statistics of the Novorossiya Territory" (1853) (Skalkovskiy, 1850; 1853).

The results of the Ninth National Revision (1850 – 1851) were elaborated and published by P. Köppen, first as a brochure (Köppen, 1854) and later as a monograph (Köppen, 1857). The latter marked a new stage in domestic statistics and remains a desk book for anyone interested in the socio-demographic history of the 19th century.

The need to reform the system of state statistics was ripe in the 1830s, but the process stretched for almost two decades. The military achieved the first concrete results. The military-topographical survey of the Empire, which began in the mid-1830s, by the end of the 1840s, was formalized in a serial publication entitled "Military Statistical Review of the Russian Empire". On October 1, 1848, the minister of war approved the project program, which contained mandatory sections such as I. General information; II. Locality; III. Residents; IV. Industry; V. Education; VI. Special information on the military department. It was planned to publish a total of 18 volumes with descriptions of 80 provinces and regions. Descriptions of Ukrainian provinces were included in the 10th (Kyiv, Podillia, Volyn), 11th (Ekaterinoslav, Kherson, Tavrian, Bessarabian, and Don Army), and 12th (Poltava, Chernihiv, Kharkiv) volumes (Voyenno-statisticheskoye obozreniye Rossiyskoy imperii. Kiyevskaya guberniya, 1848; Ibid. Poltavskaya guberniya, 1848; Ibid. Podolskaya guberniya, 1849; Ibid. Khersonskaya guberniya, 1849; Ibid. Tavriyskaya guberniya, 1849;

Ibid. Volynskaya guberniya, 1850: Ibid. Kharkovskaya guberniya, 1850; Ibid. Yekaterinoslavskaya guberniya, 1850; Ibid. Chernigovskaya guberniya, 1851). It should only be noted that the advantages and disadvantages of the descriptions of each province of Ukraine in this project did not depend on the qualifications of the compilers because all of them were officers of the General Staff with military academic education and worked by the expedition method with field visits but on the quality of the information provided by the provincial administration. In general, all eleven books of the three "Ukrainian" volumes contain descriptive and statistical data on the demography, social composition, economic, and cultural life of the inhabitants of Right-Bank, Left-Bank, and Southern Ukraine in the period between 1845 and 1849. An overview of this group of sources can be found in the works of modern authors, in particular (Petrova, Petrov, 2009; Petrova, 2020, pp. 250 – 327; 39), etc. The publication of the series was stopped in 1854 during the Crimean (Eastern) War. In 1859 – 1868, "Materials for the Geography and Statistics of Russia, collected by officers of the General Staff" were published. In each volume, information on the history of the described region, the formation and settlement of cities, demography, ethnography, administrative structure, and the economic and spiritual life of the inhabitants were considered. Volumes devoted to the Ekaterinoslav, Kherson, and Chernihiv provinces emerged from the Ukrainian theme, and the materials included in them covered the years 1857 – 1860 (Materialy dlya geografii i statistiki Rossii. Yekaterinoslavskaya guberniya, 1862; Ibid. Khersonskaya guberniya, 1863; Ibid. Chernigovskaya guberniya, 1865). The quality of the used sources, including statistical ones, was higher than in the previous series. Unfortunately, this work was not completed.

In the process of reforming civil institutions of state statistics, provincial statistical committees were first created (1834). The provincial committees had their publications, among which the "Collection of statistical data on Kyiv province for 1859" (Sbornik statisticheskikh svedeniy o Kiyevskoy gubernii za 1859 god, 1861) and "Commemorative books" of Kyiv, Podillia, Poltava, Kharkiv provinces which contain important statistical data on various aspects of their lives and together cover the period of 1855 –1863 (Chernyshev, 1857; His, 1858; Pamyatnaya knizhka Podolskoy gubernii na 1859 god, 1859; Pamyatnaya knizhka Chernigovskoy gubernii, 1862; Golikhovskiy, 1864; Bodiansky, 1865). An important event was

the founding of the Russian Geographical Society in 1845, among the organizing members of which were the aforementioned P. Köppen and K. Arsenyev. This is not surprising since initially, the society was planned as a geographical and statistical one under the Ministry of Internal Affairs, but by order of the emperor, it became a Geographical one (since 1849, the Imperial Geographical, which gave it state status with the possibility of budget financing, and the form of the society allowed attracting funds from patrons). Academician P. Köppen became the first head of the Department of Statistics, who was soon replaced in this position by A. Zablotskiy-Desiatovskiy (Skrydlov, 2019, pp. 11–14). The efforts of the employees of the Statistical Department of the Geographical Society prepared the first collective work on domestic statistics – "Collection of Statistical Information about Russia", which was published in three volumes and became, in particular, an important collection of scientifically processed sources from the demographic, social, and economic history of Ukraine at the end of the first half of the 19th century (Sbornik statisticheskikh svedeniy o Rossii, 1851; 1854; 1858). The Statistical Department of the Geographical Society closely cooperated with the Statistical Committee under the Ministry of Internal Affairs, transformed in 1858 into the Central Statistical Committee with a division into statistical and zemstvo departments. The statistical department, continuing the publication of statistical sources, prepared "Statistical Tables of the Russian Empire" for 1856 and 1858. The second issue became the publication of the results of the Tenth National Revision (Statisticheskiye tablitsy Rossiyskoy imperii za 1856 god, 1858; Statisticheskiye tablitsy Rossiyskoy imperii, 1863). Based on the materials of the same Revision, a monograph dedicated to the condition of serfs in the Russian Empire was published by the head of the Statistical Department, comrade (deputy) Minister of Internal Affairs, and active member of the committee on preparation for the release of peasants A. Troynitskyi (1807 – 1871). Among other problems, there is a gradation of Ukrainian provinces according to the percentage of serfs among the total population, ranging by occupied places among all the provinces of the Empire: 7. Podillia (59.5%); 10. Kyiv (57.7%); 14. Volyn (56.5%); 28. Chernihiv (37.6%); 29. Poltava (37.5%); 34. Kharkiv (29.8%) (by the way, this indicator was the highest in Smolensk province (69.1%), and the lowest in Bessarabia region (1.2%)). The largest number of peasant serfs

was concentrated in the three Right-Bank provinces – Kyiv, Podillia, and Volyn (Troynitskiy, 1861, p. 85). Finally, in 1866, through the efforts of the Statistical Department of the Central Statistical Committee, the first complete statistical description of the state based on data from 1860 to 1863 was published – "Statistical Timeline of the Russian Empire", edited by K. Arsenyev. It contained detailed statistical information on the Empire territory and population by provinces, districts, cities and rural settlements, religions, social groups, population movement; statistical characteristics of different types of settlements; data on the distribution of land plots by category; industrial and commercial information by branches of production and types of trade, by factories and plants, on inland shipping, on the movement of goods by railways, on fair trade, on guild and industrial certificates, finance and the banking system, joint-stock companies, foreign trade, on the number of livestock; data of judicial statistics, public education, state financial statistics, military statistics. Each chapter was accompanied by a preface and comments (Statisticheskiy vremennik Rossiyskoy imperii, 1866). The publication continued successfully until 1890, but subsequent issues of "Vremennik" already go beyond the chronological framework of our research.

Important sources in studying the ethnic-confessional composition of the Ukraine population in the middle – second half of the 19th century became the works of the General Staff Lieutenant Colonel (later General) A. Rittikh. On behalf of the Geographical Society, he compiled an ethnographic map of European Russia based on data from the Tenth Revision of 1858 and other statistical sources from the early 1860s (Rittikh, 1875). At the Ministry of Internal Affairs, the specialist prepared two editions (1851 and 1864) of the "Atlas of the Population of the Western Russian Territory by Religion", which contains statistical information not only about the confessional but also the ethnic and even social affiliation of the of Right-Bank Ukraine inhabitants by provinces (Rittikh, 1864). Concluding our review of the sources, we cannot help but dwell on one more edition, which absorbed the best developments of statistical science and practice of the middle of the last century. This refers to the 4th issue of the "Military Statistical Collection", dedicated to the Russian Empire (Voyenno-statisticheskiy sbornik. Rossiya, 1871). Compared to "Vremennik", the "Collection" demographic section was significantly supplemented and corrected; ratio

calculations and conclusions accompany the tables. The table of population movements in 1859–1863 by provinces was compiled based on previously unpublished materials of the Central Statistical Committee of the Ministry of Internal Affairs; a table of violent deaths selected from provincial records; the distribution of the population of the European part of the Empire was calculated according to the tables of Academician V. Bunyakovsky (Ibid., p. XIX).

Thus, from the mid-1830s to the beginning of the peasant reform of the 19th century, various statistical sources from various aspects of Ukrainian society within the Russian Empire were accumulated, and some experience of their systematization and scientific generalization was gained. The most active work in this direction began in the mid-1840s. As a result, at the turn of the 1850s and 1860s, many of the best examples of comprehensive publication and scientific understanding of socio-economic statistical information appeared.

Turning to the present, we note that an outline of the formation of demographic thought in Ukraine in the 18th and 19th centuries can be found, in particular, in the publication of I. Prybytkova (2000). Among the works of modern researchers of Ukraine's historical demography, the works of V. Kabuzan (1932 – 2008) are outstanding. The data on the dynamics of the number and settlement of Ukrainians in the first half of the 19th century, given by the author based on Revision's materials, deserve our attention (Bruk, Kabuzan, 1981, pp. 16 – 19, tbl. 1, 2; Kabuzan, 1992, tbl. 6, 7). At the same time, it should be remembered that there was no column on the ethnicity of the auditees in the form of any Revision. "Malorossians" for purely fiscal reasons, as we talked about above, were accounted for separately only in Poltava, Kharkiv, and Kursk provinces until the Eighth Revision. A monograph of A. Rashin, widely known at the previous time, was more official. It draws attention to the section dedicated to the study of the dynamics of the population of European Russia in the period 1811 – 1863, built on the thorough statistical sources described by us above (Rashin, 1956, pp. 27–42, tbl. 10, 13, 17).

The research on the ethnic composition of the Right-Bank Ukraine population from the entry of the region into the Russian Empire until the beginning of the 20th century, was carried out recently by Yu. Polishchuk (2012) is noteworthy. In recent years, some historians are fruitfully working

in this direction: well-known researchers M. Krykun (2002), A. Filiniuk (2016), young scientists – O. Kuzema (2004), A. Bogutska (2017), V. Kundelskyi (2013; 2018) and others.

2. Quantitative distribution of population

Population and people were the main resources of Ukrainian society in the pre-reform period of the 19th century, with a late-feudal model of social relations, almost non-mechanized production, and a per capita system of fiscal taxation. It is not for nothing that the owners of "populated estates" were considered real nobles, the elite, and their wealth was measured not so much by the size of the land but by the number of "souls" of the dependent population. In the same way, the state first began to make significant efforts to count the number of residents, primarily male, able to work physically, serve in the army, and pay taxes, and only then began to accurately measure its territory.

In the middle of the 19th century, six provinces of Forest-Steppe Ukraine were one of the most populated territories in Eastern Europe. In 1862 – 1863, 10,473,800 people lived here, which was about 17% of the Russian Empire's European part population, and by almost 730 thousand it exceeded the Kingdom of Poland and Siberia, taken together (Voyenno-statisticheskiy sbornik, 1871, p. 46). For comparison with other countries, in our case, Turkey at that time was best suited, where in the indigenous lands of Asia Minor without the territories of European vassals, there were also about 10.5 million people (Pavlov, 1871, p. 58). It is clear that the Ukrainian demographic potential did not arise immediately, and the process of its formation was not always straightforward.

Tables I.2.1 and I.2.2 were created to organize the statistical data we collected from the source about the population of Forest-Steppe Ukraine between 1846 and 1863, which corresponds to the division of the Forest-Steppe historical-geographical region of Eastern Europe into two subregions – Right-Bank and Left-Bank. The structure of the tables includes information about the time of the population census (1846, 1851, 1856, 1858, 1863), spatial factors of the system's organization (6 provinces and 77 districts), and information about the number of residents of cities and military settlements.

Different methods are required to study statistical sources with different levels of organization. We are not dealing with exhaustive information about the population of the province (district, settlement) at a certain point in time, but only with data on residents recorded in the course of accounting activities. In our case, this is Forest-Steppe Ukraine, within which the centralized calculation of the population was carried out between 1846 and 1863 five times – twice according to the data of national audits (1851, 1858), three times according to provincial reports and using other sources. The number of inhabitants determined each time did not exactly coincide with the actual population but only reflected it with a certain degree of probability. Since we cannot verify the original data, our study focuses on statistical reflections of the real state of affairs. To denote this phenomenon, we propose to introduce the concept of "calculated demographic mass" (CDM), which is close to, but not identical to "population", a more complex and multifaceted phenomenon. The situation is complicated by the fact that significant demographic fluctuations are observed within the period: the population of 1851 was less than the population of 1846 by 1.15%, and the population of 1858 increased by 4.3% compared to the population of 1856. In real terms, it amounted to " - " (minus) 106,339 people in five years and +416,391 in two years. As for the provinces, significant fluctuations in the CDM were observed, first of all in Kyiv and Kharkiv. Kyiv province lost 93,262 people between 1846 and 1851 (-1.01% from the 1846 data) but increased its population by 160,799 between 1856 and 1858 (+9.02% to the 1856 data). In Kharkiv province, the CDM of 1851 was less than the CDM of 1846 by 4.14% but increased by 9.95% in 1856. There were also demographic fluctuations in other provinces, but they are less noticeable against the general background (fig. I.2.1).

The reasons for such phenomena could be different, from natural changes in fertility and mortality, the consequences of weather disasters, crop failures, and epidemics, to social factors such as organized or spontaneous migrations, and even changes in departmental subordination and the system of accounting for large groups of the population. In the latter case, we mean military settlements and military settlers.

Within the studied territory in the middle of the 19th century, there were two military settlements: the Kyiv–Podillia on Right-Bank and Slobidsko-Ukrainian on the southeast of Left-Bank.

The Kyiv-Podillia military settlement of the cavalry was formed during 1831 – 1843. In 1836, the confiscated property of the insurgent Poles in the Kyiv and Podillia provinces was transferred to the Ministry of War, and 5 districts and 2 separate volosts of a military settlement with a population of 86,000 were formed from them to house a light cavalry division and a horse-artillery brigade. Among those sequestered were the estates of tycoons Vladimir, Aleksandr, Herman and Joseph Pototskiy, Adam Chartoryiskiy, Vaclav Rzhevuskiy, Aleksandr Sabanskiy, and others. In 1840, to eliminate agrarian overpopulation, 13,974 peasants were evicted from here, partly to the districts of the Novorossiysk military settlement and partly transferred to the composition of labor companies. 1853, there were 117,528 military settlers, and in 1856, 124,176 people. The military settlement occupied an area of 70 geographical (German) square miles, consisted of 2 cities, 9 towns, and 83 settlements in Umanskyi and Zvenihorodskyi districts in Kyiv province, Baltskyi, Olhopolskyi, Haisynskyi, and Letychivskyi districts in Podillia (Tsubenko, 2007, p. 86; His, 2008, pp. 61–62; His, 2011, pp. 59–60; Yachmenikhin, 2006, pp. 80–81; Statisticheskiye tablitsy, 1858, pp. 50, 100).

The Ukrainian military settlement in Slobozhanshchyna was established in 1817. Eight districts of the settlement were located on the territory of Starobilskyi, Kupianskyi, Iziumskyi, Zmiivskyi, and Vovchanskyi districts of Kharkiv province, surrounded by landlord and state estates: 148 square geographical miles of land were set aside for the placement of the 2nd Lancer and 2nd Cuirassier divisions, in 1855 207,362 people lived there (Tsubenko, 2007, pp. 81–82; Yachmenikhin, 2006, pp. 65 – 79, tbl. 24; Statisticheskiye tablitsy, 1858, p. 144).

The military settlements' estates did not constitute a coherent massif; their administrative system did not coincide with the administrative division of the provinces. In addition, the military settlements were under the jurisdiction of the Ministry of War, where reports on them were received. Their population in statistical tables was listed as a separate line in the total number of residents of Kyiv, Podillia, and Kharkiv provinces (tbl. I.2.1, I.2.2), significantly complicating the processing of demographic statistics for the districts of 1846 and 1851. Later, the situation changes with the beginning of the liquidation of military settlements. Since 1856, a statistical “legalization” of military settlers has been observed, and most

likely not only them, accompanied by a rapid increase in the civilian population of provinces with military settlements, starting from the district level of statistical accounting. This was reflected in the materials of the People Revision of 1858, the last before the reforms of the 1860s. The fact is that the beginning of the liquidation of the military settlements of the cavalry was accompanied by the granting of the rights of the imperial family's peasants to the former settlers and the reform of the land tax, so the treasury was interested in having reliable information about the number and demographic composition of the settlers themselves. For a better understanding of the situation, here are some excerpts from the relevant normative documents in our translation:

"§3. The following are included in the census to pay taxes and send other state duties: 7) Peasant-soldiers, except for those renamed to this rank from military settlers, whose census is provided to their leadership. Note: peasant-soldiers who entered the special department are included in the census on the same terms as other peasants of this department" (Polozheniye o provedenii Desyatoy natsionalnoy perepisi naseleniya, 1858, p. 435).

"50. Military settlers enjoy the same rights as defined by the decree of March 14, 1857, for peasants (former peasant soldiers) who are under the jurisdiction of a special department. <...> 67. Instead of all the work and duties that peasants are now obliged to perform, and monetary dues paid by state peasants, a land tax is established for them on each tithe of land owned by peasant communities. Note: The land tax came into force on January 1, 1859. <...>. 68. The allocation of land to rural communities is equalized, if possible, in such a way that for every Revision soul, there are four to five desiatinas[3] of arable land and hayfields" (Polozheniye o novom ustroystve voyennogo poseleniya kavalerii, 1858, pp. 475, 477).

An excursion into the history of military settlements shows that it is much more difficult to compare, for example, the CDM of Vinnytskyi and Zvenyhorodskyi districts than Podillia and Kyiv provinces as a whole, since for a long time there were many military settlers in Zvenyhorodskyi district, who existed in the "hidden" form from civilian statistics status until their sudden "appearance" at the turn of the 1850s and 1860s. This problem affects every fourth district of Kyiv and Podillia provinces and almost half of Kharkiv province's districts. The author must develop a special

[3] Desiatina ("one tenth") – old Russian unit of land area, equal to about 1.09 hectares.

methodology to prepare and analyze incomplete statistical data due to accumulation methods and partially deformed due to various circumstances. The basis of this methodology is the calculation of descriptive statistics of the quantitative characteristics of the studied phenomena with the following meaningful classification of objects using multidimensional statistical analysis, methods of socio-economic mapping, and others.

Descriptive statistics of the quantitative distribution of the population (more precisely, CDM) by provinces and districts of Forest-Steppe Ukraine are presented in tbl. I.2.3 and I.2.4. For the convenience of analyzing the results, we listed the obtained values of the "minimum," "maximum," and "average" indicators as deviations (%) from the average sample values (tbl. I.2.5).

Vinnytskyi (0.6%, 1856) and Haisynskyi (0.8%, 1851) districts in Podillia were the closest to the sample average regarding the minimum number of populations. In 37 cases (48% of the sample), deviations were positive, and 29 (38%) of such districts were located on Right-Bank and only 8 (10%) on Left-Bank of the Dnipro. In this regard, on Right-Bank a kind of leaders became Kyivskyi (32.9%, 1851), Berdychivskyi (31.5%, 1851), Vasylkivskyi (41.7%, 1846), Radomyshlskyi (25.6%, 1851), Cherkaskyi (25.4%, 1851) of Kyiv pr.; Zhytomyrskyi (50.0%, 1851), Novohradvolynskyi (32.6%, 1846) in Volyn pr.; Kamianetspodilskyi (29.5%, 1851), Olhopolskyi (25.2%, 1851) of Podillia pr. On Left-Bank, there was Zolotonoshskyi district (25.2%, 1846, 1851) in Poltava pr.; Starobilskyi (18.7%, 1846) and Iziumskyi (18.4%, 1851) districts in Kharkiv pr. The lowest values of the indicator were for the districts of Letychivskyi (-26.6%, 1851) in Podillia pr., Ovrutskyi (-25.8%, 1846) in Volyn pr., Lubenskyi (-30.4%, 1846) in Poltava pr. The indicator's value was negative for the entire Chernihiv pr., the most in Osterskyi district (-33.9%, 1858), and 9 out of 11 districts of Kharkiv province.

The average sample value of the indicator of the maximum number of population (CDM) found full correspondence in Zaslavskyi district (0.0%, 1858) of Volyn pr., it turned out to be close to it in Litynskyi (0.6%, 1863) district of Podillia and Chyhyrynskyi (-0.8%, 1863) district in Kyiv provinces. In 34 districts (44%) deviations from the Forest-Steppe average had a positive value, including 22 (29%) cases recorded on Right-Bank and 12 (16%) on the Left-Bank of Dnipro. They were the largest in

Kyivskyi (58.8%, 1863), Berdychivskyi (40.4%, 1863), and Cherkaskyi (30.4%, 1863) districts of Kyiv pr.; Kamianetspodilskyi (36.3%, 1863), Baltskyi (52.5%, 1863) districts of Podillia pr.; Zhytomyrskyi district (64.5%, 1863) of Volyn pr.; in Starobilskyi (105.1%, 1863) and Iziumskyi (33.4%, 1863) districts of Kharkiv pr. Negative values of deviations of the indicator in Kyiv province occur twice and do not go beyond the standard error for the sample as a whole, also twice in the Podillia province, but here their sizes are more significant: -4.7% in Vinnytskyi (1863) and -20.7% in Letychivskyi (1863) districts. In Volyn province, the maximum population of half of the districts was smaller than the average in the Ukrainian Forest-Steppe; in Poltava province, there were 9 out of 15 such districts; in Kharkiv province 5 out of 11; in Chernihiv province all 15 (tbl. I.2.5).

The average number of population (average CDM) for the entire period of observation was close to the average sample value in Chyhyrynskyi (1.2%), Starokonstiantynivskyi (1.3%) and Sumskyi (1.7%) districts in Kyiv, Poltava, and Kharkiv provinces. The positive value of the indicator is observed in all 12 districts of Kyiv province, in 10 out of 12 districts of Podillia, in 6 out of 12 districts of Volyn, in 6 out of 15 districts of Poltava province, in 3 out of 11 districts of Kharkiv province, where the largest deviation from the calculated standard is recorded in Starobilskyi district (65.7%). In Chernihiv province, all district's indicator values were negative, and in the Osterskyi district, it was the lowest in the entire sample (-38.2%) (tbl. I.2.5).

The "standard deviation" indicator makes it possible to assess the intensity of fluctuations in the number of district's population (CDM), or, in other words, the stability of the process. In our sample, the demographic situation in Radomyshlskyi and Vasylkivskyi districts of Kyiv pr. was fairly stable and positive as in some others: Litynskyi, Mohylivpodilskyi, Proskurivskyi of Podillia; Kremenetskyi, Novohradvolynskyi in Volyn; Zolotonoshskyi, Prylutskyi, Romenskyi in Poltava province. The situation in the Vinnytsia district in Podillia was permanently unstable. A similar situation was seen in Dubenskyi, Kovelskyi, Lutskyi, Ovrutskyi, and Ostrozhskyi districts in Volyn; Hadiatskyi, Zenkivskyi, Konstiantynohradskyi, Lokhvytskyi, Lubenskyi, Myrhorodskyi, Pyriatynskyi, Khorolskyi districts in Poltava; for all districts in Chernihiv, first of all, Kozelskyi, Mhlynskyi, Novhorodsiverskyi, Novozybkivskyi, Osterskyi, Starodubskyi; also,

in Akhtyrskyi, Bogodukhivskyi, and Valkivskyi districts of Kharkiv provinces. The largest values of the standard deviation of demographic indicators (in the range from 19205.22 to 36775.78) were observed in Kyivskyi, Zvenihorodskyi, Tarashchansky, and Umanskyi districts of Kyiv pr.; Baltskyi, Haisynskyi on Podillia; Zhytomyrskyi in Volyn; Kharkivskyi, Zmiivskyi, Iziumskyi, Kupianskyi districts in Kharkiv pr. and Starobilskyi, where the standard deviation was 64727.65(!) (tbl. I.2.5). Significantly, this list includes all territories of Kyiv-Podillia and Ukrainian military settlements.

Preliminary analysis of the quantitative distribution of the population in Forest-Steppe Ukraine, using descriptive statistics, indicates that demographic processes developed most actively in the districts of Kyiv and Podillia provinces had a depressive character in Chernihiv and most of Kharkiv provinces, and Volyn and Poltava provinces occupied an intermediate position between them.

The descriptive statistics indicators (tbl. I. 2.3, I. 2.4) were the initial matrix for the multivariate statistical cluster analysis of the population distribution by the regions of the Ukrainian Forest-Steppe. Five cluster groups of the Forest-Steppe provinces' districts were identified (fig. I.2.3; tbl. I.2.6), the numbering of which coincided with the growth of the average group values of the descriptive statistics indicators (fig. I.2.4).

Cluster group 1. It includes 36 districts with the lowest average group values of indicators of descriptive statistics. Among them, 6 (17%) were located in the Right-Bank area (fig. I.2.5). They are Letychivskyi in Podillia; Ovrutskyi, Ostrozhskyi, Dubenskyi, Lutskyi, Kovelskyi in Volyn. The rest belonged to the Left-Bank provinces: 8 to Poltava, 15 to Chernihiv, and 7 to Kharkiv.

Cluster group 2 consists of 10 districts (tbl. I.2.6; fig. I.2.4). Among them, 7 were located on Right-Bank (70%): Chyhyrynskyi in Kyiv pr.; Vinnytskyi, Litynskyi and Mohylivpodilskyi in Podillia pr.; Zaslavskyi, Starokonstiantynivskyi, Rivnenskyi in Volyn pr. The remaining 3 districts (30%) were located on Left-Bank: Prylutskyi, Pereiaslavskyi in Poltava pr., and Lebedynskyi in Kharkiv province (fig. I.2.5).

Cluster group 3 united 16 districts from both banks of Dnipro-river (table I.2.6; fig. I.2.4). Among them, 10 (63%) were on Right-Bank (fig. I.2.5): Kanivskyi, Lypovetskyi, Radomyshlskyi, Skvyrskyi (Kyiv pr.); Haisynskyi, Bratslavskyi, Novoushytskyi, Proskurivskyi (Podillia pr.);

Kremenetskyi, Volodymyrvolynskyi (Volyn pr.). The other 6 Left-Bank districts (44%) were located mainly in Poltava pr. (Kobeliakskyi, Poltavskyi, Romenskyi, Kremenchukskyi, Zolotonoshskyi) and only 1 in Kharkiv pr. (Kharkivskyi).

Cluster group 4 absorbed 10 districts (tbl. I.2.6; fig. I.2.4). Of them, 9 (90%) located on Right-Bank: Vasylkivskyi, Cherkaskyi, Zvenihorodskyi, Tarashchansky, Umanskyi in Kyiv pr.; Olhopolskyi, Kamianetspodilskyi, Yampilskyi on Podillia; Novohradvolynskyi in Volyn pr.; and only one the Left-Bank's district, Iziumskyi, was in Kharkiv province (fig. I.2.5).

Cluster group 5 united the five largest by population districts of Forest-Steppe Ukraine (tbl. 2.6; fig. 2.4): Kyivskyi and Berdychivskyi in Kyiv pr.; Zhytomyrskyi on Volyn; Baltskyi on Podillia; Starobilskyi in Kharkiv province (fig. I.2.5).

We can distinguish three options for the quantitative distribution of the population of Ukrainian Forest-Steppe provinces by districts in the middle of the 19th century: Kyiv-Podillia, Volyn-Poltava-Kharkiv, and Chernihiv (fig. I.2.5, I.2.6). The 3rd and 4th cluster groups of districts dominated in Kyiv and Podillia provinces (75% and 59% respectively). On Volyn and the Left-Bank area districts with a relatively small population of the 1st cluster group prevailed (42% in Volyn, 53% in Poltava, 64% in Kharkiv, and 100% in Chernihiv provinces). Each local option, except Chernihiv, had a military settlement and a regional city-center in the formation process – Kyiv on Right-Bank and Kharkiv on Left-Bank.

Table I.2.1. Distribution of the Right-Bank Ukraine population by provinces and districts (1846–1863)

Code	Provinces/districts	Population				
		1846	1851	1856	1858	1863
	Kyiv prov.	***1730101***	***1636839***	***1783535***	***1944334***	***2012095***
R1	Kyivskyi	176281	147133	162304	209551	218806
R2	Berdychivskyi	170798	145573	178881	186603	193428
R3	Vasylkivskyi	156916	160370	158347	171767	177518
R4	Zvenyhorodskyi	130649	135017	152595	174072	166353
R5	Kanivskyi	140327	142231	145344	157148	167606
R6	Lypovetskyi	122895	117405	134165	134610	130449
R7	Radomyshlskyi	146336	139063	145320	152972	156491
R8	Skvyrskyi	136353	126272	131058	141571	147432

R9	Taraschanskyi	135124	125223	126016	149595	160399
R10	Umanskyi	114541	102849	124021	166762	177273
R11	Cherkaskyi	139496	138811	148258	163831	179710
R12	Chyhyrynskyi	113475	115280	123880	135862	136630
	Including cities	*161617*	*no data*	*196548*	*203612*	*224531*
Kyiv-Podillia military settlement		*46910*	*41612*	*53346*	*cancelled*	*cancelled*
Podillia prov.		***1540254***	***1577966***	***1730827***	***1748466***	***1868857***
R13	Kamianetspodilskyi	145072	143324	155230	160993	187815
R14	Baltskyi	130508	142657	178703	194699	210069
R15	Bratslavskyi	126495	131447	129713	148190	157165
R16	Vinnytskyi	115494	118999	111378	123460	131294
R17	Haisynskyi	129281	111571	131948	154470	163891
R18	Letychivskyi	99805	81221	99711	104460	109185
R19	Litynskyi	122032	124057	135213	130405	138535
R20	Mohylivpodilskyi	130453	121615	119654	131032	140028
R21	Novoushytskyi	116228	130620	157895	143230	150033
R22	Olhopolskyi	146688	138598	159994	163837	177126
R23	Proskurivskyi	129468	131920	137394	138007	147454
R24	Yampilskyi	130294	138534	144670	155653	166362
	Including cities	*70476*	*no data*	*103494*	*120822*	*130370*
Kyiv-Podillia military settlement		*18436*	*63403*	*69324*	*cancelled*	*cancelled*
Volyn prov.		***1413485***	***1469442***	***1498387***	***1528328***	***1602715***
R25	Zhytomyrskyi	167908	166026	170176	194515	226654
R26	Volodymyrvolynskyi	131255	145833	146664	135237	139912
R27	Dubenskyi	99811	99080	100822	98115	104261
R28	Zaslavskyi	118205	123147	125444	137776	135284
R29	Kovelskyi	102479	115411	116542	103284	112253
R30	Kremenetskyi	140290	130530	132884	139634	147852
R31	Lutskyi	102036	105538	108915	112187	109309
R32	Novohradvolynskyi	146799	149626	154079	160702	158429
R33	Ovrutskyi	82196	93988	97299	103937	103993
R34	Ostrozhskyi	95367	97782	98233	100758	104416
R35	Rivnenskyi	117227	120961	122920	116160	126342
R36	Starokonstiantynivskyi	119915	121475	124419	125997	134010
	Including cities	*103418*	*no data*	*103569*	*110245*	*146041*
Right-Bank Ukraine		**4683863**	**4684247**	**5012749**	**5221128**	**5483667**

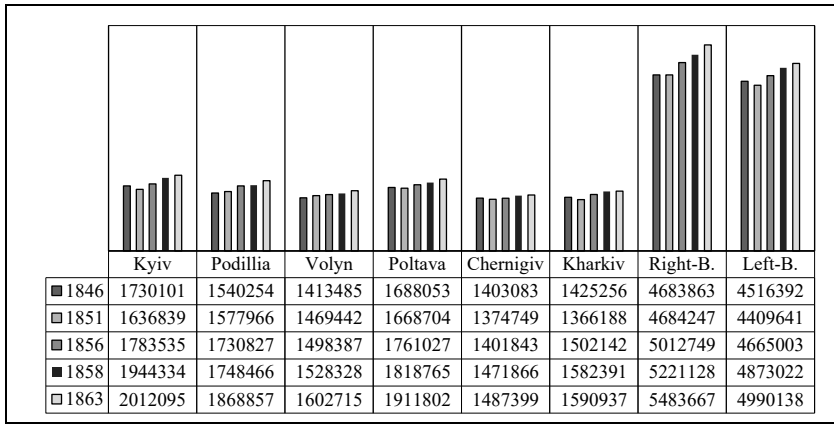
Sources: calculated by the author according to (Voyenno-statisticheskoye obozreniye. Kiyevskaya guberniya, 1848, tab. 2, 3; Ibid. Pdolskaya guberniya, 1849, tab. 5, 6, 14; Ibid. Volynskaya guberniya, 1850, pp. 6, 14, 26, 28, tab. 3; Köppen, 1857, pp. 16, 33, 69, 106; Statisticheskiye tablitsy, 1858, pp. 20–23, 50–53, 100–103; Statisticheskiye tablitsy, 1863, pp. 27, 28, 30, 38, 160, 163, 168, 182; Statisticheskiy vremennik, 1866, pp. 4–5, 10-11, 14-15, 22-23).

Table I.2.2. Distribution of the Left-Bank Ukraine population by provinces and districts (1846–1863)

Code	Provinces/districts	Population				
		1846	1851	1856	1858	1863
	Poltava prov.	***1688053***	***1668704***	***1761027***	***1818765***	***1911802***
L1	Poltavskyi	129564	129429	135044	142715	153774
L2	Hadiatskyi	94436	92776	96498	102202	110418
L3	Zenkivskyi	105801	94964	101837	105219	117771
L4	Zolotonoshskyi	138703	138613	146890	149226	147155
L5	Kobeliakskyi	116857	120136	131028	134212	158018
L6	Konstiantynohradskyi	103118	109126	114469	119140	120027
L7	Kremenchukskyi	123955	122251	133547	135144	148292
L8	Lokhvytskyi	119672	103798	119111	115249	117524
L9	Lubenskyi	77075	81377	82098	86786	91612
L10	Myrhorodskyi	103754	104560	109050	113494	115845
L11	Pereiaslavskyi	113064	113574	115664	122634	127211
L12	Pyriatynskyi	103019	102281	106488	107874	105510
L13	Prylutskyi	124823	124374	129220	134206	140236
L14	Romenskyi	131009	128990	133432	138223	139710
L15	Khorolskyi	103203	102455	106651	112441	118699
	Including cities	*119795*	*no data*	*130366*	*143917*	*157047*
	Chernihiv prov.	***1403083***	***1374749***	***1401843***	***1471866***	***1487399***
L16	Chernihivskyi	94596	92039	89956	108955	100253
L17	Borznianskyi	89489	91688	94752	96229	105818
L18	Hlukhivskyi	84890	84639	89419	88007	94816
L19	Horodianskyi	86462	84417	86708	96173	101496
L20	Kozelskyi	80772	81251	80833	84644	85322
L21	Konotopskyi	100267	88773	95798	102229	84128
L22	Krolevetskyi	85976	82445	86292	99219	98826
L23	Mhlynskyi	93587	88586	88965	91136	94990
L24	Nijinskyi	105745	99097	99288	103653	111824
L25	Novhorodsiverskyi	90995	88598	87506	91800	86616
L26	Novozybkivskyi	107966	110723	112326	112150	114111
L27	Osterskyi	76977	77162	77583	73146	76655
L28	Sosnytskyi	101076	95682	98418	109423	110057
L29	Starodubskyi	104205	106759	105769	105647	108849
L30	Surazhskyi	100080	102890	108230	109455	113638
	Including cities	*112771*	*no data*	*118739*	*139965*	*140574*
	Kharkiv prov.	***1425256***	***1366188***	***1502142***	***1582391***	***1590937***

L31	Kharkivskyi	108613	128033	139419	157301	169884
L32	Akhtyrskyi	84555	93416	98318	99035	101171
L33	Bohoduhivskyi	96008	93400	101703	105024	100828
L34	Valkivskyi	82717	84813	93411	90775	96926
L35	Vovchanskyi	83637	82097	88363	112723	109273
L36	Zmiivskyi	84444	78275	84265	151443	147074
L37	Iziumskyi	147495	131096	143727	174156	183795
L38	Kupianskyi	80967	86044	93237	151159	152290
L39	Lebedynskyi	128512	105910	113155	133427	116793
L40	Starobilsky	131400	164042	185739	260081	282619
L41	Sumskyi	96988	121891	131663	147267	130284
	Including cities	*144151*	*no data*	*161981*	*179096*	*197030*
	Ukrainian military settlement	*231769*	*197171*	*229142*	*cancelled*	*cancelled*
	Left-Bank Ukraine	**4516392**	**4409641**	**4665003**	**4873022**	**4990138**

Sources: calculated by the author according to (Voyenno-statisticheskoye obozreniye. Poltavskaya guberniya, 1848, p. 37; Voyenno-statisticheskoye obozreniye. Kharkovskaya guberniya, 1850, tab. 3, 4, 5; Voyenno-statisticheskoye obozreniye. Chernigovskaya guberniya, 1851, pp. 28-29, 40-42б 71; Köppen, 1857, pp. 14, 108, 148, 152; Statisticheskiye tablitsy, 1858, pp. 104-107, 144-147, 154-157; Statisticheskiye tablitsy, 1863, p. 168 – 169, 173 – 174, 182; Statisticheskiy vremennik, 1866, p. 22-24, 28-31).



	Kyiv	Podillia	Volyn	Poltava	Chernigiv	Kharkiv	Right-B.	Left-B.
1846	1730101	1540254	1413485	1688053	1403083	1425256	4683863	4516392
1851	1636839	1577966	1469442	1668704	1374749	1366188	4684247	4409641
1856	1783535	1730827	1498387	1761027	1401843	1502142	5012749	4665003
1858	1944334	1748466	1528328	1818765	1471866	1582391	5221128	4873022
1863	2012095	1868857	1602715	1911802	1487399	1590937	5483667	4990138

Figure I.2.1. The population change in the Forest-Steppe Ukraine provinces (1846 – 1863)

Table I.2.3. Descriptive statistics on the quantitative distribution of the Right-Bank Ukraine population by district (1846–1863)

Code	Districts	Descriptive statistics of the population			
		Minimum	Maximum	Average	Standard deviation
R1	Kyivskyi	147133.0	218806.0	182815.0	30605.4
R2	Berdychivskyi	145573.0	193428.0	175056.6	18526.1
R3	Vasylkivskyi	156916.0	177518.0	167217.6	6192.2
R4	Zvenyhorodskyi	130649.0	174072.0	152360.2	19205.2
R5	Kanivskyi	130449.0	167606.0	149027.5	9629.1
R6	Lypovetskyi	117405.0	134610.0	126007.5	15008.6
R7	Radomyshlskyi	139063.0	156491.0	147777.0	4997.5
R8	Skvyrskyi	126272.0	147432.0	136852.0	13195.9
R9	Taraschanskyi	125223.0	160399.0	142811.0	21702.6
R10	Umanskyi	102849.0	177273.0	140061.6	33717.2
R11	Cherkaskyi	138811.0	179710.0	154021.2	17547.7
R12	Chyhyrynskyi	113475.0	136630.0	125025.4	10974.9
R13	Kamianetspodilskyi	143324.0	187815.0	158486.8	17936.7
R14	Baltskyi	130508.0	210069.0	171327.2	33873.9
R15	Bratslavskyi	126495.0	157165.0	138602.0	13353.9
R16	Vinnytskyi	111378.0	131294.0	120125.0	7666.4
R17	Haisynskyi	111571.0	163891.0	138232.2	20931.3
R18	Letychivskyi	81221.0	109185.0	98876.4	10615.0
R19	Litynskyi	122032.0	138535.0	130048.4	7053.1
R20	Mohylivpodilskyi	119654.0	140028.0	128556.4	8196.9
R21	Novoushytskyi	116228.0	157895.0	139601.2	16459.2
R22	Olhopolskyi	138598.0	177126.0	157248.6	15045.2
R23	Proskurivskyi	129468.0	147454.0	136848.6	6944.0
R24	Yampilskyi	130294.0	166362.0	147102.6	14194.2
R25	Zhytomyrskyi	166026.0	226654.0	185055.8	25968.6
R26	Volodymyrvolynskyi	131255.0	146664.0	139780.2	6658.8
R27	Dubenskyi	98115.0	104261.0	100417.8	2366.1
R28	Zaslavskyi	118205.0	137776.0	127971.2	8286.3
R29	Kovelskyi	102479.0	116542.0	109993.8	6686.2
R30	Kremenetskyi	130530.0	147852.0	138238.0	6831.3
R31	Lutskyi	102036.0	112187.0	107597.0	3901.9
R32	Novohradvolynskyi	146799.0	160702.0	153927.0	5820.2
R33	Ovrutskyi	82196.0	103993.0	96282.6	8982.9
R34	Ostrozhskyi	95367.0	104416.0	99311.2	3435.5
R35	Rivnenskyi	116160.0	126342.0	120722.0	4168.3
R36	Starokonstiantynivskyi	119915.0	134010.0	125163.2	5492.3

Table I.2.4. Descriptive statistics of the Left-Bank Ukraine population quantitative distribution by districts (1846–1863)

Code	Districts	Descriptive statistics of the population			
		Minimum	Maximum	Average	Standard deviation
L1	Poltavskyi	129429.0	153774.0	138105.2	10300.0
L2	Hadiatskyi	92776.0	110418.0	99266.0	7178.1
L3	Zenkivskyi	94964.0	117771.0	105118.4	8283.2
L4	Zolotonoshskyi	138613.0	149226.0	144117.4	5065.2
L5	Kobeliakskyi	116857.0	158018.0	132050.2	16223.6
L6	Konstiantynohradskyi	103118.0	120027.0	113176.0	7101.8
L7	Kremenchukskyi	122251.0	148292.0	132637.8	10433.6
L8	Lokhvytskyi	103798.0	119672.0	115070.8	6531.1
L9	Lubenskyi	77075.0	91612.0	83789.6	5566.3
L10	Myrhorodskyi	103754.0	115845.0	109340.6	5331.7
L11	Pereiaslavskyi	113064.0	127211.0	118429.4	6221.0
L12	Pyriatynskyi	102281.0	107874.0	105034.4	2347.6
L13	Prylutskyi	124374.0	140236.0	130571.8	6706.2
L14	Romenskyi	128990.0	139710.0	134272.8	4594.4
L15	Khorolskyi	102455.0	118699.0	108689.8	6844.5
L16	Chernihivskyi	89956.0	108955.0	97159.8	7638.5
L17	Borznianskyi	89489.0	105818.0	95595.2	6288.3
L18	Hlukhivskyi	84639.0	94816.0	88354.2	4147.7
L19	Horodianskyi	84417.0	101496.0	91051.2	7403.8
L20	Kozelskyi	80772.0	85322.0	82564.4	2228.5
L21	Konotopskyi	84128.0	102229.0	94239.0	7660.2
L22	Krolevetskyi	82445.0	99219.0	90551.6	7880.2
L23	Mhlynskyi	88586.0	94990.0	91452.8	2809.6
L24	Nizhynskyi	99097.0	111824.0	103921.4	5258.1
L25	Novhorodsiverskyi	86616.0	91800.0	89103.0	2227.3
L26	Novozybkivskyi	107966.0	114111.0	111455.2	2291.6
L27	Osterskyi	73146.0	77583.0	76304.6	1797.3
L28	Sosnytskyi	95682.0	110057.0	102931.2	6505.4
L29	Starodubskyi	104205.0	108849.0	106245.8	1716.9
L30	Surazhskyi	100080.0	113638.0	106858.6	5391.7
L31	Kharkivskyi	108613.0	169884.0	140650.0	24077.8
L32	Akhtyrskyi	84555.0	101171.0	95299.0	6643.3
L33	Bohoduhivskyi	93400.0	105024.0	99392.6	4649.7
L34	Valkivskyi	82717.0	96926.0	89728.4	5911.5
L35	Vovchanskyi	82097.0	112723.0	95218.6	14639.3
L36	Zmiivskyi	78275.0	151443.0	109100.2	36775.8
L37	Iziumskyi	131096.0	183795.0	156053.8	22053.1
L38	Kupianskyi	80967.0	152290.0	112739.4	35856.6
L39	Lebedynskyi	105910.0	133427.0	119559.4	11263.2
L40	Starobilsky	131400.0	282619.0	204776.2	64272.6
L41	Sumskyi	96988.0	147267.0	125618.6	18442.9

Source to the tbl. I.2.3, I.2.4: calculated by the author according to the tbl. I.2.1, I.2.2.

Table. I.2.5. The descriptive statistics deviation of the Forest-Steppe Ukraine population distribution by districts from the average sample values (1846 – 1863)

	Districts	Minimum ± %	Maximum ± %	Average ± %	Standard deviation (tab. 2.3, 2.4)
1	Kyivskyi	32.9	58.8	48.0	30605.4
2	Berdychivskyi	31.5	40.4	41.7	18526.1
3	Vasylkivskyi	41.7	28.9	35.3	6192.2
4	Zvenyhorodskyi	18.0	26.4	23.3	19205.2
5	Kanivskyi	17.8	21.7	20.6	9629.1
6	Lypovetskyi	6.0	-2.3	2.0	15008.6
7	Radomyshlskyi	25.6	13.6	19.6	4997.5
8	Skvyrskyi	14.1	7.0	10.8	13195.9
9	Taraschanskyi	13.1	16.4	15.6	21702.63
10	Umanskyi	-7.1	28.7	13.4	33717.2
11	Cherkaskyi	25.4	30.4	24.7	17547.7
12	Chyhyrynskyi	2.5	**-0.8**	**1.2**	10974.9
13	Kamianetspodilskyi	29.5	36.3	28.3	17936.6
14	Baltskyi	17.9	52.5	38.7	33873.8
15	Bratslavskyi	14.3	14.1	12.2	13353.8
16	Vinnytskyi	**0.6**	-4.7	-2.8	7666.3
17	Haisynskyi	**0.8**	19.0	11.9	20931.2
18	Letychivskyi	-26.6	-20.7	-20.0	10615.03
19	Litynskyi	10.2	**0.6**	5.3	7053.05
20	Mohylivpodilskyi	8.1	1.6	4.0	8196.9
21	Novoushytskyi	5.0	14.6	13.0	16459.2
22	Olhopolskyi	25.2	28.6	27.3	15045.1
23	Proskurivskyi	16.9	7.0	10.8	6944.0
24	Yampilskyi	17.7	20.8	19.1	14194.2
25	Zhytomyrskyi	50.0	64.5	49.8	25968.6
26	Volodymyrvolynskyi	18.6	6.5	13.1	6658.8
27	Dubenskyi	-11.4	-24.3	-18.7	2366.1
28	Zaslavskyi	6.8	**0.0**	3.6	8286.2
29	Kovelskyi	-7.4	-15.4	-11.0	6686.2
30	Kremenetskyi	17.9	7.3	11.9	6831.3
31	Lutskyi	-7.8	-18.6	-12.9	3901.9
32	Novohradvolynskyi	32.6	16.7	24.6	5820.2
33	Ovrutskyi	-25.8	-24.5	-22.1	8982.9
34	Ostrozhskyi	-13.9	-24.2	-19.6	3435.4
35	Rivnenskyi	4.9	-8.3	-2.3	4168.3

36	Starokonstiantynivskyi	8.3	-2.7	**1.3**	5492.3
37	Poltavskyi	16.9	11.6	11.8	1030.0
38	Hadiatskyi	-16.2	-19.8	-19.7	7178.0
39	Zenkivskyi	-14.2	-14.5	-14.9	8283.1
40	Zolotonoshskyi	25.2	8.3	16.6	5065.2
41	Kobeliakskyi	5.6	14.7	6.9	16223.6
42	Konstiantynohradskyi	-6.9	-12.9	-8.4	7101.8
43	Kremenchukskyi	10.4	7.6	7.3	10433.5
44	Lokhvytskyi	-6.2	-13.1	-6.9	6531.0
45	Lubenskyi	-30.4	-33.5	-32.2	5566.3
46	Myrhorodskyi	-6.3	-15.9	-11.5	5331.6
47	Pereiaslavskyi	2.1	-7.7	-4.2	6221.0
48	Pyriatynskyi	-7.6	-21.7	-15.0	2347.6
49	Prylutskyi	12.3	1.8	5.7	6706,2
50	Romenskyi	16.5	1.4	8.7	4594.4
51	Khorolskyi	-7.5	-13.8	-12.0	6844.5
52	Chernihivskyi	-18.7	-20.9	-21.4	7638.4
53	Borznianskyi	-19.2	-23.2	-22.6	6288.2
54	Hlukhivskyi	-23.5	-31.2	-28.5	4147.6
55	Horodianskyi	-23.8	-26.3	-26.3	7403.7
56	Kozelskyi	-27.0	-38.1	-33.2	2228.4
57	Konotopskyi	-24.0	-25.8	-23.7	7660.2
58	Krolevetskyi	-25.5	-28.0	-26.7	7880.5
59	Mhlynskyi	-20.0	-31.0	-26.0	2809.5
60	Nizhynskyi	-10.5	-18.8	-15.9	5258.1
61	Novhorodsiverskyi	-21.8	-33.4	-27.9	2227.3
62	Novozybkivskyi	-2.5	-17.2	-9.8	2291.5
63	Osterskyi	-33.9	-43.7	-38.2	1797.3
64	Sosnytskyi	-13.6	-20.1	-16.7	6505.4
65	Starodubskyi	-5.9	-21.0	-14.0	1716.8
66	Surazhskyi	-9.6	-17.5	-13.5	5391.6
67	Kharkivskyi	-1.9	23.3	13.8	24077.7
68	Akhtyrskyi	-23.6	-26.6	-22.9	6643.2
69	Bohodukhivskyi	-15.6	-23.8	-19.6	4649.6
70	Valkivskyi	-25.3	-29.6	-27.4	5911.5
71	Vovchanskyi	-25.8	-18.2	-22.9	14639.3
72	Zmiivskyi	-29.3	9.9	-11.7	36775.7
73	Iziumskyi	18.4	33.4	26.3	22053.1
74	Kupianskyi	-26.9	10.5	-8.8	35856.6
75	Lebedynskyi	-4.3	-3.1	-3.2	11263.1
76	Starobilskyi	18.7	105.1	65.7	64272.6
77	Sumskyi	-12.4	6.9	**1.7**	18442.8

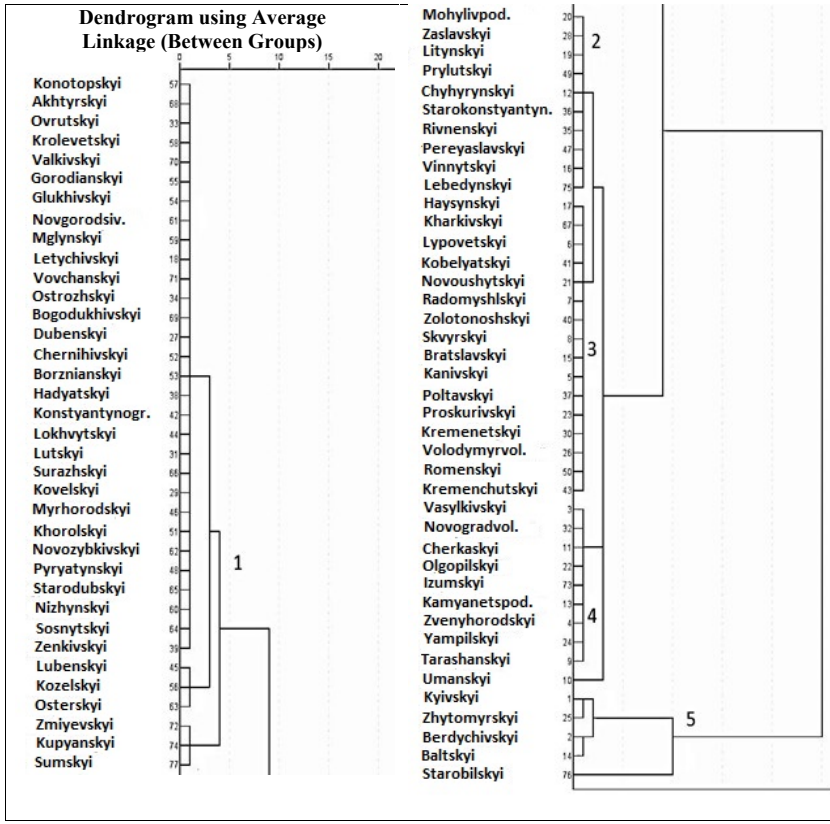


Figure I.2.2. Cluster analysis of the Forest-Steppe Ukraine population quantitative distribution by districts (1846 – 1863)

Table I.2.6. The results of the Forest-Steppe Ukraine districts' population distribution by cluster groups

N	Groups/districts	Descriptive population statistics			
		Minimum	Maximum	Average	Standard deviation
	Group 1 (average)	91440.50	109445.90	100190.26	-
57	Konotopskyi	84128.00	102229.00	94239.00	7660.24
68	Akhtyrskyi	84555.00	101171.00	95299.00	6643.26

33	Ovrutskyi	82196.00	103993.00	96282.60	8982.91
29	Kovelskyi	82445.00	99219.00	90551.60	7880.15
70	Valkivskyi	82717.00	96926.00	89728.40	5911.49
55	Horodianskyi	84417.00	101496.00	91051.20	7403.77
54	Hlukhivskyi	84639.00	94816.00	88354.20	4147.67
21	Novhorodsiverskyi	86616.00	91800.00	89103.00	2227.33
59	Mhlynskyi	88586.00	94990.00	91452.80	2809.56
18	Letychivskyi	81221.00	109185.00	98876.40	10615.03
71	Vovchanskyi	82097.00	112723.00	95218.60	14639.32
34	Ostrozhskyi	95367.00	104416.00	99311.20	3435.47
69	Bohodukhivskyi	93400.00	105024.00	99392.60	4649.67
27	Dubenskyi	98115.00	104261.00	100417.80	2366.13
52	Chernihivskyi	89956.00	108955.00	97159.80	7638.47
53	Borznianskyi	89489.00	105818.00	95595.20	6288.28
38	Hadiatskyi	92776.00	110418.00	99266.00	7178.06
42	Konstiantynohradskyi	103118.00	120027.00	113176.00	7101.82
44	Lokhvytskyi	103798.00	119672.00	115070.80	6531.08
31	Lutskyi	102036.00	112187.00	107597.00	3901.93
66	Surazhskyi	100080.00	113638.00	106858.60	5391.69
29	Kovelskyi	102479.00	116542.00	109993.80	6686.23
46	Myrhorodskyi	103754.00	115845.00	109340.60	5331.67
51	Khorolskyi	102455.00	118699.00	108689.80	6844.52
21	Novoushytskyi	107966.00	114111.00	111455.20	2291.56
48	Pyriatynskyi	102281.00	107874.00	105034.40	2347.63
65	Starodubskyi	104205.00	108849.00	106245.80	1716.89
60	Nizhynskyi	99097.00	111824.00	103921.40	5258.13
64	Sosnytskyi	95682.00	110057.00	102931.20	6505.42
39	Zenkivskyi	94964.00	117771.00	105118.40	8283.17
45	Lubenskyi	77075.00	91612.00	83789.60	5566.34
56	Kozelskyi	80772.00	85322.00	82564.40	2228.48
63	Osterskyi	73146.00	77583.00	76304.60	1797.29
72	Zmiivskyi	78275.00	151443.00	109100.20	36775.77
74	Kupianskyi	80967.00	152290.00	112739.40	35856.62
77	Sumskyi	96988.00	147267.00	125618.60	7602.85
	Group 2 (average	*116416.70*	*134548.90*	*124617.22*	-
20	Mohylivpodilskyi	119654.00	140028.00	128556.40	8196.94
28	Zaslavskyi	118205.00	137776.00	127971.20	8286.28
19	Litynskyi	122032.00	138535.00	130048.40	7053.05
49	Prylutskyi	124374.00	140236.00	130571.80	6706.21
12	Chyhyrynskyi	113475.00	136630.00	125025.40	10974.92

36	Starokonstiantynivskyi	119915.00	134010.00	125163.20	5492.29
35	Rivnenskyi	116160.00	126342.00	120722.00	4168.32
47	Pereiaslavskyi	113064.00	127211.00	118429.40	6221.03
16	Vinnytskyi	111378.00	131294.00	120125.00	7666.37
75	Lebedynskyi	105910.00	133427.00	119559.40	11263.16
	Group 3 (average)	*125218.06*	*154177.19*	*138422.74*	-
17	Haisynskyi	111571.00	163891.00	138232.20	20931.29
67	Kharkivskyi	108613.00	169884.00	140650.00	24077.76
6	Lypovetskyi	117405.00	156491.00	133113.20	15008.56
41	Kobeliakskyi	116857.00	158018.00	132050.20	16223.64
21	Novoushytskyi	116228.00	157895.00	139601.20	16459.21
7	Radomyshlskyi	139063.00	156491.00	147777.00	4997.52
40	Zolotonoshskyi	138613.00	149226.00	144117.40	5065.23
8	Skvyrskyi	126272.00	147432.00	136852.00	13195.89
15	Bratslavskyi	126495.00	157165.00	138602.00	13353.86
5	Kanivskyi	130449.00	167606.00	149027.50	9629.049
37	Poltavskyi	129429.00	153774.00	138105.20	10300.01
23	Proskurivskyi	129468.00	147454.00	136848.60	6944.03
30	Kremenetskyi	130530.00	147852.00	138238.00	6831.31
26	Volodymyrvolynskyi	131255.00	146664.00	139780.20	6658.83
50	Romenskyi	128990.00	139710.00	134272.80	4594.41
30	Kremenetskyi	122251.00	148292.00	132637.80	10433.58
	Group 4 (average)	*134455.90*	*175833.20*	*152180.12*	-
3	Vasylkivskyi	156916.00	171767.00	162750.60	6192.22
32	Novohradvolynskyi	146799.00	160702.00	153927.00	5820.19
11	Cherkaskyi	138811.00	179710.00	154021.20	17547.74
22	Olhopolskyi	138598.00	177126.00	157248.60	15045.15
73	Iziumskyi	131096.00	183795.00	156053.80	22053.11
13	Kamianetspodilskyi	143324.00	187815.00	158486.80	17936.68
4	Zvenyhorodskyi	130649.00	174072.00	151987.80	19205.22
24	Yampilskyi	130294.00	166362.00	147102.60	14194.20
9	Taraschanskyi	125223.00	160399.00	142811.00	21702.63
10	Umanskyi	102849.00	177273.00	137576.60	33717.24
	Group 5 (average)	*144128.00*	*226315.20*	*183806.16*	-
1	Kyivskyi	147133.00	218806.00	182815.00	30605.41
25	Zhytomyrskyi	166026.00	226654.00	185055.80	25968.61
2	Berdychivskyi	145573.00	193428.00	175056.60	18526.14
14	Baltskyi	130508.00	210069.00	171327.20	33873.88
76	Starobilskyi	131400.00	282619.00	204776.20	64272.62

Source: calculated by the author according to the tbl. I.2.3, I.2.4.

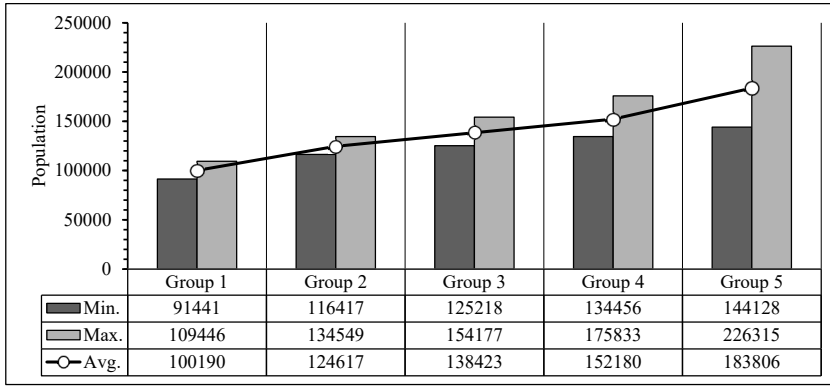


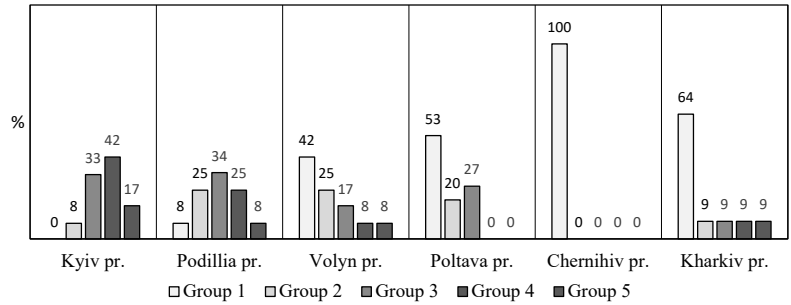
Figure I.2.4. Diagram of the Forest-Steppe Ukraine population distribution by cluster groups (1846 – 1863)

Sources: calculated by the author according to the tbl. 2.6.

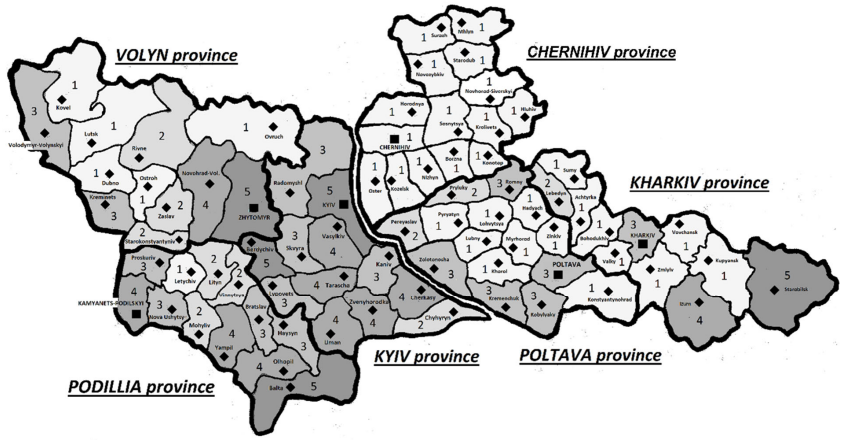
Table I.2.7. Correlation between the feature "district area" and the features of descriptive population statistics

	Observation	Pearson correlation between value vectors				
		1	2	3	4	5
1	District area	1.0	0.1	0.1	0.1	0.1
2	Minimum of population	0.1	1.0	0.8	0.9	0.3
3	Maximum of population	0.1	0.8	1.0	1.0	0.8
4	Average of population	0.1	0.9	1.0	1.0	0.6
5	Standard deviation	0.1	0.3	0.8	0.6	1.0

Source: calculated by the author according to the tbl. I.2.1, I.2.2, I.3.3, I.3.4.

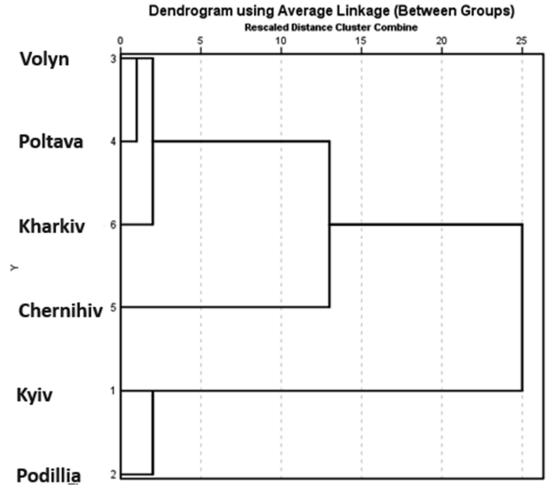


a) The structure of the population's cluster groups ratio in provinces (%)



b) Distribution of population's cluster groups by district of provinces

Figure I.2.5. Spatial distribution of the Forest-Steppe Ukraine population's cluster groups by districts and provinces (1846 – 1863)



Proximity matrix						
Matrix file input						
Province	**Kyiv**	**Podillia**	**Volyn**	**Poltava**	**Chernihiv**	**Kharkiv**
Kyiv	0	724	3546	5042	13206	5826
Podillia	724	0	1734	2788	10934	4274
Volyn	3546	1734	0	374	4406	806
Poltava	5042	2788	374	0	3338	728
Chernihiv	13206	10934	4406	3338	0	1620
Kharkiv	5826	4274	806	728	1620	0

Figure I.2.6. Classification of the Forest-Steppe Ukraine provinces according to the interrelation of cluster groups of the quantitative distribution of the population

3. Population density

Population density is an indicator calculated as a mathematical ratio of the number of the permanent population to the size of the territory of residence, which allows for measuring the distribution of the spatial concentration of the population itself. In our research, it is used as a supplement to the results of the above analysis of the quantitative distribution of the population of Forest-Steppe Ukraine by the main units of its territorial-administrative division. Above, we got acquainted with the problems of the accuracy of measuring the number of the population according to the data of the middle of the 19th century, no less difficulties await us concerning the spatial characteristics of the studied territory.

In the Moscovite State, the territory was measured through "general demarcation". Starting in the 1780s, they used a single general measure called "desiatina" – a plot measuring 80x30 three-arshin fathoms. Geometric demarcation was introduced only in 1754 by decree of Empress Elizaveta Petrovna. Measurements began to be made not with ropes and arshins, but with chains 10 fathoms long. At the end of the reign of Nicholas I, in the European part of the Empire, the provinces of Kyiv, Podillia, Volyn, Grodno, Kovel, and Minsk remained unmarked, where "inventories" had existed since the days of the Polish-Lithuanian Commonwealth, as well as the provinces of Chernihiv and Poltava on the Left-Bank Ukraine.

Calculating the territory according to geographical maps was less accurate for a long time. Only in 1844, the Academy of Sciences, at the insistence of P. Köppen, carried out geometric calculations of territories based on Schubert's map, the most advanced at that time. In 1856 – 1858, new calculations were made using the planimetric method under the guidance of the astronomer Schweitzer, with the determination of the sizes of provinces and districts. Starting from 1849, general surveying and cartographic measurement methods began to be supplemented with more accurate triangulation tablet surveys. The results of military topographical surveying became more accurate at the end of the 50s – the beginning of the 60s of the 19th century. In practice, in statistical publications, the sizes of provinces and districts were given according to Schweitzer's calculations, replacing them, as they were received, with data from military topographic measurements (Statisticheskiye tablitsy, 1863, pp. 5–23).

According to data published in 1858 – 1863, the total area of six provinces of Forest-Steppe Ukraine was 282,230 square vestas (sq. v.), of which 144,690 sq. v. (51.3%) were on Right-Bank and 137,540 sq. v. (49.7%) on Left-Bank subregions. Among the provinces, the largest area had Volyn (62,677 sq. v., 22% of the region), followed by Kharkiv (47,836 sq. v., 17%), after it was Chernihiv and Kyiv (46,042 and 44,713 sq. v., 16% each of them), next Poltava (43,662 sq. v., 15%), and the last in the row was Podillia province (37,300 sq. v., 13%) (tbl. I.3.1, I.3.2).

The areas of the Right-Bank's districts varied from 2,270 sq. v. (Letychivskyi, Podillia pr.) to 9,329 sq. v. (Novohradvolynskyi, Volyn pr.). The same was observed on Left-Bank – from 2,001 sq. v. (Zinkivskyi, Poltava pr.) to 10,868 sq. v. (Starobilskyi, Kharkiv pr.). On average this indicator was 3,665 sq. v., and only 15 districts (19.5%) exceeded it. Districts of significant size were concentrated in Volyn (Novohradvolynskyi, Ovrutskyi, Zhytomyrskyi, Kovelskyi, Dubenskyi, Kremenskyi) and Kharkiv province (Zmiivskyi, Iziumskyi, Kupianskyi, Starobilskyi). In other provinces, there was one such district each: Radomyshlskyi in Kyiv, Baltskyi in Podillia, and Konstiantynohradskyi in Poltava (tbl. I.3.1, I.3.2).

During the studied period, the population density gradually increased in all provinces due to the increase in the number of residents (CDM), but the process itself proceeded at different rates (fig. I.3.1). On Right-Bank, the average values of the indicators in Podillia and Kyiv provinces

were higher than the regional values; on Left-Bank, Poltava province was among the leaders. In these provinces, between 1846 and 1863, the population density increased in Podillia (+21.3%), Kyiv (+16.3%), Volyn (+14.2%), Poltava (+13.2%), Kharkiv (+11.7%), Chernihiv (+5.9%). It generally rose by 17% in Right-Bank and 10.7% in Left-Bank. It is interesting that in 1846 – 1856, the population density of Kyiv and Poltava provinces was the same, differences appeared only from the end of the 1850s.

Hierarchical cluster analysis of district distribution according to territory size indicators and descriptive population density statistics (tbl. I.3.3, I.3.4) made identifying 7 groups of territorial taxa possible. The numbering of the groups is end-to-end, and the groups themselves are assigned ordinal numbers following the growth of the average population density (fig. I.3.2; tbl. I.3.5). For the convenience of comparative analysis, the final results are normalized according to the average sample values of the relevant indicators and given in % (fig. I.3.3). The sparsely populated category includes 15 large districts of cluster groups 6 and 7; most of the 35 districts of the 11th and 12th groups should be considered overpopulated by average sampling standards. Three districts of group 9, together with groups 8 and 10, form a total of 27 districts, where the ratio of population and territory approached the optimum, are almost perfectly under the average sample values (fig. I.3.4).

The structural analysis of the distribution of these three categories of cluster groups of districts by provinces (fig. I.3.5) shows that overpopulation was primarily in Podillia (92%), Kyiv (75%), Poltava (69%) provinces, and all of them can be attributed to common local macrogroup of the Ukrainian Forest-Steppe provinces in terms of population density (fig. 3.6). Chernihiv province, divided into one and a half dozen small districts (tbl. 3.2), was populated fairly evenly, taking into account the features of the landscape in the north and south parts, forming another local version of the provincial structure in terms of the population density (fig. I.3.4, I.3.5, I.3.6).

Volyn and Kharkiv provinces demonstrate else one local variant of the provincial structures according to the population density (fig. I.3.4, I.3.6). As to Volyn, most of the districts (59%) were formally “underpopulated”, and a quarter were overpopulated. In Kharkiv province, signs of possible overpopulation were observed in three out of eleven

districts, in four the population density appeared to be optimal, and four more, assigned to the Ukrainian military settlement, demonstrated artificial "underpopulation" (fig. I.3.5) to create normative land funds for the maintenance of significant cavalry formations (Yachmenikhin, 2006, pp. 212–220). Thus, according to the staff of 1833, there were 14,824 soldiers and 10,112 service horses in 8 regiments with added units of the 2nd cuirassier and 2nd lance divisions (Obozreniye izmeneniy v chislennom sostave pekhotnykh i kavaleriyskikh polkov pervykh chetyrekh pekhotnykh korpusov, 1852, pp. LV–LVI). To provide them with provisions and fodder 207,360 military settlers were concentrated in the southeast of Kharkiv province on an area of 758,574 desiatinas (7,282 sq. v., in terms of the area something similar to districts Baltskyi on Podillia or Ovrutskyi on Volyn) in 1855 – 1857 (Tsubenko, 2006, pp. 82 – 83). The population density here was close to 28 people per sq.v., which corresponds to the average indicator for cluster group 8. In the remaining territories of the five "settled" districts (almost 24,849 sq. v. in total), 595,330 "civil" residents lived in 1856 (tbl. 2.2, 3.2) with an average density of 24 persons per sq. v. (actually from 19 in Kupianskyi and Starobilskyi to almost 42 in Valkivskyi districts).

In the Kyiv-Podillia settlement, as of 1856, on the territory of almost 3,235 sq. v., 124,180 people were accommodated (Tsubenko, 2011, pp. 59–61), or 38 persons per sq. v., which corresponds to cluster group 10. At that time, the settlement covered parts of Umanskyi, Haisynskyi, Proskurivskyi, Letychivskyi, Olhopolskyi, Baltskyi districts, where on an area of 18,642 sq. v. (without military settlement lands) 720,150 civilians lived (tbl. I.2.1, I.3.1) at an average density of 39 people per sq. v. (actually from 25 in Baltskyi to 62 in Letychivskyi districts) (tbl. I.3.3).

The last examples are given to once again emphasize the difficulties of calculating demographic indicators for areas with military settlements. At the same time, we ensured the effectiveness of the applied methodology and the reliability of the obtained results, since the optimal interval of demographic pressure on the ecosystem determined by us is 28 – 38 people per sq.v. (groups 8 – 10) of the Ukrainian Forest-Steppe in the middle of the 19th century, coincides with the calculations implemented in practice in those distant times by economists of the Ministry of War Military Settlement's Department.

Table I.3.1. Population density of the Right-Bank Ukraine by provinces and districts (1846–1863)

Code	Provinces/districts	Area* (sq. v.)	Population density				
			1846	1851	1856	1858	1863
	Kyiv prov.	**∑44713**	**avg.38.7**	**avg.36.6**	**avg.40.1**	**avg.43.5**	***avg.45.0***
R1	Kyivskyi	4958	35.6	29.7	32.8	42.3	44.1
R2	Berdychivskyi	2992	57.1	48.7	59.8	62.4	64.6
R3	Vasylkivskyi	3647	43.0	44.0	43.4	47.1	48.6
R4	Zvenyhorodskyi	2904	45.0	53.7	61.7	60.1	57.7
R5	Kanivskyi	2909	48.2	48.9	50.0	54.0	57.6
R6	Lypovetskyi	2523	48.7	46.5	53.2	53.4	51.7
R7	Radomyshlskyi	8399	17.4	16.6	17.3	18.2	18.6
R8	Skvyrskyi	3228	42.2	39.1	40.6	43.9	45.6
R9	Taraschanskyi	2884	46.7	43.4	43.7	51.9	55.6
R10	Umanskyi	3859	29.7	32.0	42.0	43.2	45.9
R11	Cherkaskyi	3466	40.2	40.0	42.8	47.3	51.8
R12	Chyhyrynskyi	2944	38.5	39.2	42.1	46.1	46.4
	Podillia prov.	***∑37300***	***avg.41.3***	***avg.42.3***	***avg.46.4***	***avg.49.9***	***avg.50.1***
R13	Kamianetspodilskyi	2499	58.1	57.4	62.1	64.3	75.1
R14	Baltskyi	7048	18.5	22.0	25.4	27.6	29.8
R15	Bratslavskyi	2787	45.4	50.8	46.5	53.2	56.4
R16	Vinnytskyi	2844	45.5	41.8	39.2	43.4	46.2
R17	Haisynskyi	2975	38.8	41.8	53.0	51.9	55.1
R18	Letychivskyi	2270	57.0	35.8	54.4	46.0	48.1
R19	Litynskyi	2933	34.0	46.6	46.1	44.5	47.2
R20	Mohylivpodilskyi	2469	49.4	49.3	48.5	53.1	56.7
R21	Novoushytskyi	2509	52.0	52.1	52.9	62.9	59.8
R22	Olhopolskyi	3434	33.8	44.1	46.6	47.7	51.6
R23	Proskurivskyi	2291	64.0	63.1	60.0	60.2	64.4
R24	Yampilskyi	3241	40.2	42.8	44.6	48.0	51.3
	Volyn prov.	***∑62677***	***avg.22.4***	***avg.23.4***	***avg.23.9***	***avg.24.4***	***avg.25.6***
R25	Zhytomyrskyi	6726	25.0	24.7	25.3	30.2	33.7
R26	Dubenskyi	3447	29.0	28.7	29.2	17.9	30.2
R27	Kovelskyi	6375	16.3	18.4	18.6	16.2	17.9
R28	Kremenetskyi	2884	48.6	45.3	46.1	46.7	51.3
R29	Lutskyi	6563	15.6	16.1	16.6	17.1	16.7
R30	Novohradvolynskyi	6248	23.5	23.9	24.7	25.7	25.4
R31	Ostrozhskyi	2647	36.0	36.9	37.1	38.1	39.4
R32	Ovrutskyi	9329	8.8	10.1	10.4	11.1	11.1
R33	Rivnenskyi	7529	15.6	16.1	16.3	15.4	16.8
R34	Starokonstiantynivsk.	2293	52.3	53.0	54.3	54.9	58.4
R35	Volodymyrvolynskyi	5638	23.3	25.9	26.0	24.0	24.8
R36	Zaslavskyi	2998	39.4	41.1	41.8	46.0	45.1
	Right-Bank Ukraine	**∑144690**	***avg.*32.4**	***avg.*32.4**	***avg.*34.7**	***avg.*36.1**	***avg.*37.9**

*Sq. v. – square versta.

Table I.3.2. Population density of the Left-Bank Ukraine by provinces and districts (1846–1863)

Code	Provinces/districts	Area* (sq. v.)	Population density				
			1846	1851	1856	1858	1863
	Poltava prov.	***∑43662***	***avg.38.7***	***avg.38.2***	***avg.40.3***	***avg.41.7***	***avg.43.8***
L1	Poltavskyi	3030	42.8	42.7	44.6	47.1	50.8
L2	Hadiatskyi	2166	43.6	42.8	44.6	47.2	51.0
L3	Zenkivskyi	2001	52.9	47.5	50.9	52.6	58.9
L4	Zolotonoshskyi	3869	35.8	35.8	38.0	38.6	38.0
L5	Kobeliakskyi	3120	37.5	38.5	42.0	43.0	50.6
L6	Konstiantynohradskyi	5269	19.6	20.7	21.7	22.6	22.8
L7	Kremenchukskyi	3061	40.5	40.0	43.6	44.2	48.5
L8	Lokhvytskyi	2328	51.4	44.6	51.2	49.5	50.5
L9	Lubenskyi	2065	37.3	39.4	39.8	42.0	44.4
L10	Myrhorodskyi	2358	44.0	44.3	46.2	48.1	49.1
L11	Pereiaslavskyi	3522	32.1	32.2	32.8	34.8	36.1
L12	Pyriatynskyi	2830	36.4	36.1	37.6	38.1	37.3
L13	Prylutskyi	2810	44.4	44.3	46.0	47.8	50.0
L14	Romenskyi	2335	56.1	55.2	57.1	59.2	59.8
L15	Khorolskyi	2898	35.6	35.4	36.8	38.8	41.0
	Chernihiv prov.	***∑46042***	***avg.30.5***	***avg.29.9***	***avg.30.5***	***avg.32.0***	***avg.32.3***
L16	Chernihivskyi	3215	29.4	28.6	28.0	33.9	31.2
L17	Borznianskyi	2464	36.3	37.2	38.5	39.1	42.9
L18	Hlukhivskyi	2722	31.2	31.1	32.9	32.3	34.8
L19	Horodianskyi	3509	24.6	24.1	24.7	27.4	28.9
L20	Kozelskyi	2788	29.0	29.1	29.0	30.4	30.6
L21	Konotopskyi	2073	36.0	31.8	34.4	36.7	30.2
L22	Krolevetskyi	2366	36.3	34.8	36.7	41.9	41.8
L23	Mhlynskyi	3296	28.4	26.9	27.0	27.6	28.8
L24	Nizhynskyi	2492	42.4	39.8	39.8	41.6	44.9
L25	Novhorodsiverskyi	3347	27.2	26.5	26.1	27.4	25.9
L26	Novozybkivskyi	3376	32.0	32.8	33.3	33.2	33.8
L27	Osterskyi	3963	19.4	19.5	19.6	18.5	19.3
L28	Sosnytskyi	3832	26.4	25.0	25.7	28.6	28.7
L29	Starodubskyi	2928	35.6	36.5	36.1	36.1	37.2
L30	Surazhskyi	3671	27.3	28.0	29.5	29.8	31.0
	Kharkiv prov.	***∑47836***	***avg.29.8***	***avg.28.6***	***avg.31.4***	***avg.33.1***	***avg.33.3***
L31	Kharkivskyi	2905	37.4	44.1	48.0	54.1	58.5
L32	Akhtyrskyi	2439	34.7	38.3	40.3	40.6	41.5
L33	Bohoduhivskyi	2719	35.3	34.4	37.4	38.7	37.1
L34	Valkivskyi	2140	38.7	39.6	43.7	42.4	45.3
L35	Vovchanskyi	3481	24.1	23.6	25.4	32.4	31.4
L36	Zmiivskyi	4936	17.1	15.9	17.1	30.7	29.8
L37	Iziumskyi	6818	21.6	19.2	21.1	25.5	26.9

L38	Kupianskyi	6028	13.4	14.2	15.5	25.1	25.2
L39	Lebedynskyi	2713	47.4	39.1	41.7	49.2	43.1
L40	Starobilsky	10868	12.1	15.1	17.1	23.9	26.1
L41	Sumskyi	2789	34.8	43.7	47.2	52.8	46.7
Left-Bank Ukraine		**∑137540**	***avg*.32.8**	***avg*.32.1**	***avg*.33.9**	***avg*.35.4**	***avg*.36.3**

**Sq. v. – square versta.*

Source to the tbl. I.3.1, I.3.2: calculated by the author according to (Voyenno-statisticheskoye obozreniye. Kiyevskaya guberniya, 1848, tab. 2. 3; Ibid. Podolskaya guberniya, 1849, tab. 5, 6, 14; Ibid. Poltavskaya guberniya, 1848, p. 37; Ibid. Volynskaya guberniya, 1850, tab. 3, 4, 5; Ibid. Kharkovskaya guberniya, 1850, pp. 6, 14, 26, 28-29, 40–42; tab. 3; Köppen, 1857, pp. 14, 16, 33, 69, 106, 108, 148, 152; Statisticheskiye tablitsy Rossiyskoy imperii, 1858, pp. 20–23, 50–53, 100–103, 104–107, 144–147, 154–157; Ibid., 1863, pp. 27, 28, 30, 38, 160, 163, 168–169, 173–174, 182; Statisticheskiy vremennik, 1866, pp. 4–5, 10–11, 14–15, 22–23, 22–24, 28–31).

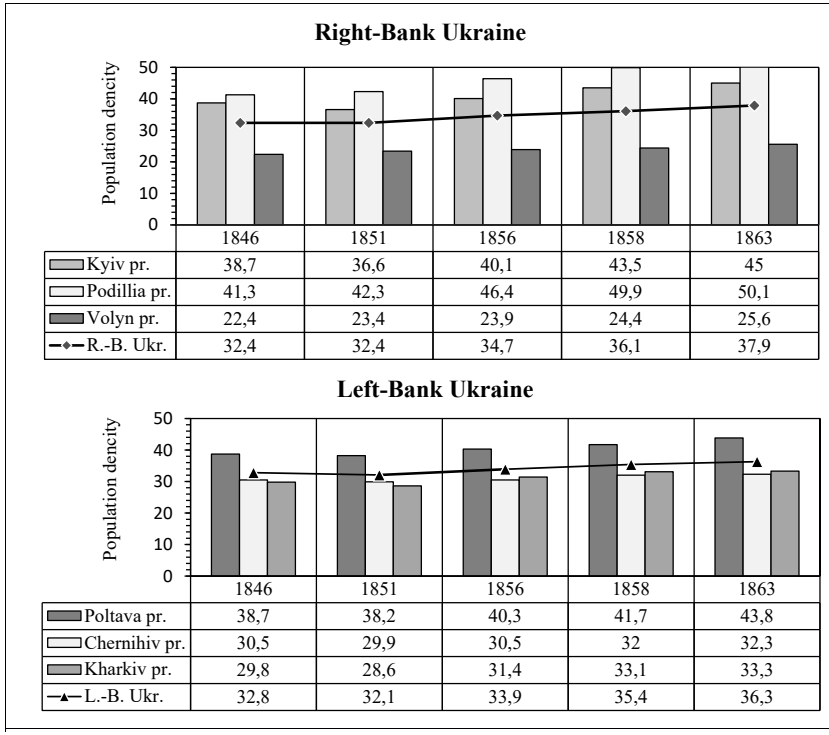


Figure I.3.1. Dynamics of the Forest-Steppe Ukraine population density changes by provinces (1846–1863)

Table I.3.3. Descriptive statistics of the Right-Bank Ukraine population density by districts (1846–1863)

Code	Districts	Area (sq. v.)	Descriptive statistics of the population density			
			Minimum	Maximum	Average	Standard deviation
R1	Kyivskyi	4958	29.70	44.10	36.90	6.15
R2	Berdychivskyi	2992	48.70	64.60	58.52	6.17
R3	Vasylkivskyi	3647	43.00	47.10	44.62	1.70
R4	Zvenyhorodskyi	2904	45.00	61.70	55.64	6.67
R5	Kanivskyi	2909	44.80	54.00	49.18	3.32
R6	Lypovetskyi	2523	46.50	62.00	52.76	5.95
R7	Radomyshlskyi	8399	16.60	18.20	17.42	0.58
R8	Skvyrskyi	3228	39.10	49.70	43.10	4.10
R9	Taraschanskyi	2884	43.40	61.50	49.44	7.56
R10	Umanskyi	3859	29.70	46.60	38.70	7.41
R11	Cherkaskyi	3466	40.00	51.80	44.42	5.07
R12	Chyhyrynskyi	2944	38.50	46.40	42.46	3.72
R13	Kamianetspodilskyi	2499	57.40	75.10	63.40	7.13
R14	Baltskyi	7048	18.50	29.80	24.66	4.49
R15	Bratslavskyi	2787	45.40	56.40	50.46	4.59
R16	Vinnytskyi	2844	39.20	46.20	43.22	2.84
R17	Haisynskyi	2975	38.80	55.10	48.12	7.31
R18	Letychivskyi	2270	35.80	57.00	48.26	8.28
R19	Litynskyi	2933	34.00	47.20	43.68	5.50
R20	Mohylivpodilskyi	2469	48.50	56.70	51.40	3.46
R21	Novoushytskyi	2509	52.00	62.90	55.94	5.07
R22	Olhopolskyi	3434	33.80	51.60	44.76	6.70
R23	Proskurivskyi	2291	60.00	64.40	62.34	2.10
R24	Yampilskyi	3241	40.20	51.30	45.38	4.36
R25	Zhytomyrskyi	6726	24.70	33.70	27.78	4.01
R26	Volodymyrvolynskyi	3447	17.90	30.20	27.00	5.12
R27	Dubenskyi	6375	16.20	18.60	17.48	1.15
R28	Zaslavskyi	2884	45.30	51.30	47.60	2.40
R29	Kovelskyi	6563	15.60	17.10	16.42	0.58
R30	Kremenetskyi	6248	23.50	25.70	24.64	0.94
R31	Lutskyi	2647	36.00	39.40	37.50	1.30
R32	Novohradvolynskyi	9329	8.80	11.10	10.30	0.95
R33	Ovrutskyi	7529	15.40	16.80	16.04	0.56
R34	Ostrozhskyi	2293	52.30	58.40	54.58	2.37
R35	Rivnenskyi	5638	23.30	26.00	24.80	1.18
R36	Starokonstiantynivskyi	2998	39.40	46.00	42.68	2.78

Table I.3.4. Descriptive statistics of the Left-Bank Ukraine population density by districts (1846–1863)

Code	Districts	Area* (sq. v.)	Descriptive statistics of the population density			
			Minimum	Maximum	Average	Standard deviation
L1	Poltavskyi	3030	42.70	50.80	45.60	3.41
L2	Hadiatskyi	2166	42.80	51.00	45.84	3.33
L3	Zenkivskyi	2001	47.50	58.90	52.56	4.14
L4	Zolotonoshskyi	3869	35.80	38.60	37.24	1.34
L5	Kobeliakskyi	3120	37.50	50.60	42.32	5.17
L6	Konstiantynohradskyi	5269	19.60	22.80	21.48	1.34
L7	Kremenchukskyi	3061	40.00	48.50	43.36	3.42
L8	Lokhvytskyi	2328	44.60	51.40	49.44	2.81
L9	Lubenskyi	2065	37.30	44.40	40.58	2.71
L10	Myrhorodskyi	2358	44.00	49.10	46.34	2.26
L11	Pereiaslavskyi	3522	32.10	36.10	33.60	1.77
L12	Pyriatynskyi	2830	36.10	38.10	37.10	0.83
L13	Prylutskyi	2810	44.30	50.00	46.50	2.42
L14	Romenskyi	2335	55.20	59.80	57.48	1.97
L15	Khorolskyi	2898	35.40	41.00	37.52	2.37
L16	Chernihivskyi	3215	28.00	33.90	30.22	2.38
L17	Borznianskyi	2464	36.30	42.90	38.80	2.54
L18	Hlukhivskyi	2722	31.10	34.80	32.46	1.51
L19	Horodianskyi	3509	24.10	28.90	25.94	2.10
L20	Kozelskyi	2788	29.00	30.60	29.62	0.81
L21	Konotopskyi	2073	30.20	36.70	33.82	2.76
L22	Krolevetskyi	2366	34.80	41.90	38.30	3.32
L23	Mhlynskyi	3296	26.90	28.80	27.74	0.84
L24	Nizhynskyi	2492	39.80	44.90	41.70	2.12
L25	Novhorodsiverskyi	3347	25.90	27.40	26.62	0.66
L26	Novozybkivskyi	3376	32.00	33.80	33.02	0.67
L27	Osterskyi	3963	18.50	19.60	19.26	0.44
L28	Sosnytskyi	3832	25.00	28.70	26.88	1.69
L29	Starodubskyi	2928	35.60	37.20	36.30	0.60
L30	Surazhskyi	3671	27.30	31.00	29.12	1.48
L31	Kharkivskyi	2905	37.40	58.50	48.42	8.28
L32	Akhtyrskyi	2439	34.70	41.50	39.08	2.71
L33	Bohoduhivskyi	2719	34.40	38.70	36.58	1.72
L34	Valkivskyi	2140	38.70	45.30	41.94	2.76

L35	Vovchanskyi	3481	23.60	32.40	27.38	4.19
L36	Zmiivskyi	4936	15.90	30.70	22.12	7.44
L37	Iziumskyi	6818	19.20	26.90	22.86	3.22
L38	Kupianskyi	6028	13.40	25.20	18.68	5.95
L39	Lebedynskyi	2713	39.10	49.20	44.10	4.14
L40	Starobilsky	10868	12.10	26.10	18.86	5.93
L41	Sumskyi	2789	34.80	52.80	45.04	6.60

*Sq. v. – square versta.

Source to the tbl. I.3.3, I.3.4: calculated by the author according to the tbl. I.3.1, I.3.2.

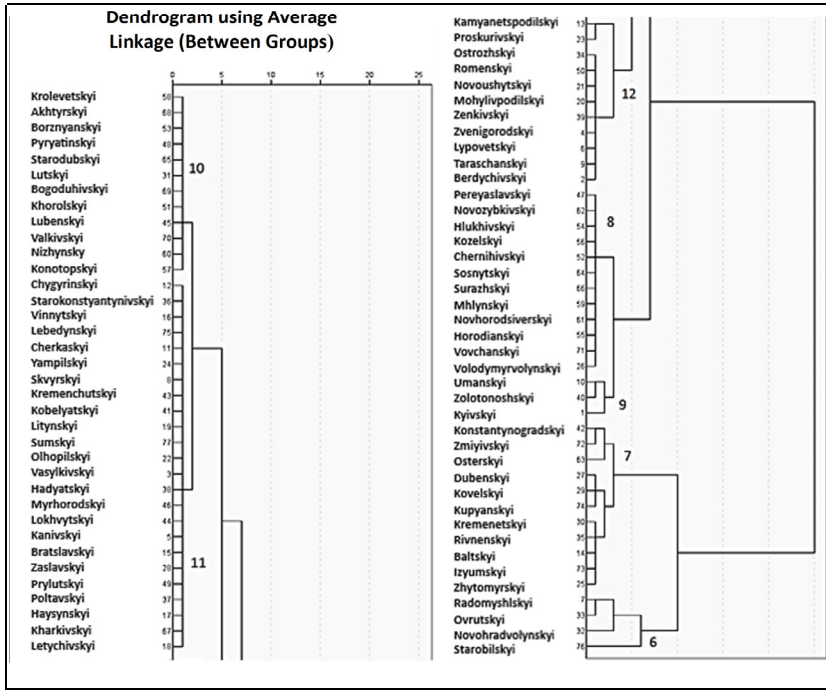


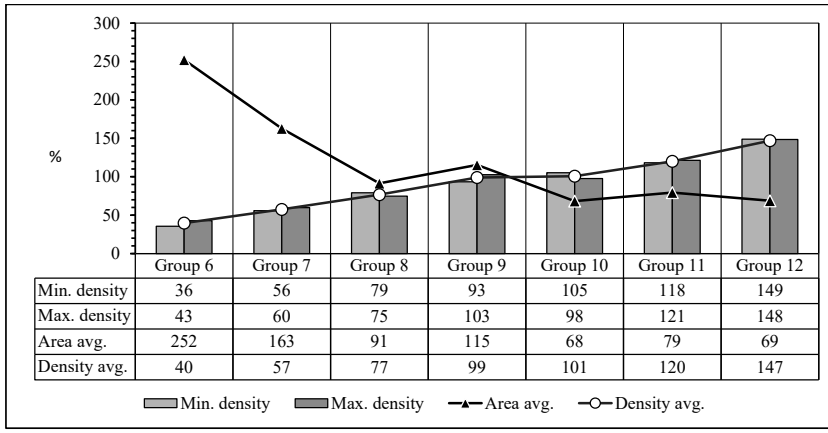
Figure I.3.2. Hierarchical cluster analysis of the Forest-Steppe Ukraine population density distribution by districts of (1846 – 1863)

Table I.3.5. Ranked results of the Forest-Steppe Ukraine population density cluster grouping of the districts (1846 – 1863)

Code	Groups/districts	Square (sq. v.)	Descriptive statistics of the population density			
			Minimum	Maximum	Average	Standard deviation
	Group 6 (average)	*9242*	*12.10*	*18.00*	*15.07*	-
R7	Radomyshlskyi	8399	16.60	18.20	17.42	0.58
R33	Ovrutskyi	7529	15.40	16.80	16.04	0.56
R32	Novohradvolynskyi	9329	8.80	11.10	10.30	0.95
L40	Starobilskyi	10868	12.10	26.10	18.86	5.93
	Group 7 (average)	*5965*	*18.95*	*25.10*	*21.83*	-
L6	Konstiantynohradskyi	5269	19.60	22.80	21.48	1.34
L36	Zmiivskyi	4936	15.90	30.70	22.12	7.44
L27	Osterskyi	3963	18.50	19.60	19.26	0.44
R27	Dubenskyi	6375	16.20	18.60	17.48	1.15
R29	Kovelskyi	6563	15.60	17.10	16.42	0.58
L38	Kupianskyi	6028	13.40	25.20	18.68	5.95
R30	Kremenetskyi	6248	23.50	25.70	24.64	0.94
R35	Rivnenskyi	5638	23.30	26.00	24.80	1.18
R14	Baltskyi	7048	18.50	29.80	24.66	4.49
L37	Iziumskyi	6818	19.20	26.90	22.86	3.22
R25	Zhytomyrskyi	6726	24.70	33.70	27.78	4.01
	Group 8 (average)	*3351*	*26.91*	*31.38*	*29.13*	-
L11	Pereiaslavskyi	3522	32.10	36.10	33.60	1.77
L26	Novozybkivskyi	3376	32.00	33.80	33.02	0.67
L18	Hlukhivskyi	2722	31.10	34.80	32.46	1.51
L20	Kozelskyi	2788	29.00	30.60	29.62	0.81
L16	Chernihivskyi	3215	28.00	33.90	30.22	2.38
L28	Sosnytskyi	3832	25.00	28.70	26.88	1.69
L30	Surazhskyi	3671	27.30	31.00	29.12	1.48
L23	Mhlynskyi	3296	26.90	28.80	27.74	0.84
L25	Novhorodsiverskyi	3347	25.90	27.40	26.62	0.66
L19	Horodianskyi	3509	24.10	28.90	25.94	2.10
L35	Vovchanskyi	3481	23.60	32.40	27.38	4.19
R26	Volodymyrvolynskyi	3447	17.90	30.20	27.00	5.12
	Group 9 (average)	*4229*	*31.73*	*43.10*	*37.61*	-
R10	Umanskyi	3859	29.70	46.60	38.70	7.41
L4	Zolotonoshskyi	3869	35.80	38.60	37.24	1.34
R1	Kyivskyi	4958	29.70	44.10	36.90	6.15
	Group 10 (average)	*2505*	*35.78*	*41.00*	*38.27*	-
L22	Krolevetskyi	2366	34.80	41.90	38.30	3.32
L32	Akhtyrskyi	2439	34.70	41.50	39.08	2.71
L17	Borznianskyi	2464	36.30	42.90	38.80	2.54
L12	Pyriatynskyi	2830	36.10	38.10	37.10	0.83
L29	Starodubskyi	2928	35.60	37.20	36.30	0.60

R31	Lutskyi	2647	36.00	39.40	37.50	1.30
L33	Bohoduhivskyi	2719	34.40	38.70	36.58	1.72
L15	Khorolskyi	2898	35.40	41.00	37.52	2.37
L9	Lubenskyi	2065	37.30	44.40	40.58	2.71
L34	Valkivskyi	2140	38.70	45.30	41.94	2.76
L24	Nizhynskyi	2492	39.80	44.90	41.70	2.12
L21	Konotopskyi	2073	30.20	36.70	33.82	2.76
	Group 11 (average)	*2910*	*40.19*	*50.96*	*45.62*	-
R12	Chyhyrynskyi	2944	38.50	46.40	42.46	3.72
R36	Starokonstiantynivskyi	2998	39.40	46.00	42.68	2.78
R16	Vinnytskyi	2844	39.20	46.20	43.22	2.84
L39	Lebedynskyi	2713	39.10	49.20	44.10	4.14
R11	Cherkaskyi	3466	40.00	51.80	44.42	5.07
R24	Yampilskyi	3241	40.20	51.30	45.38	4.36
R8	Skvyrskyi	3228	39.10	49.70	43.10	4.10
L7	Kremenchukskyi	3061	40.00	48.50	43.36	3.42
L5	Kobeliakskyi	3120	37.50	50.60	42.32	5.17
R19	Litynskyi	2933	34.00	47.20	43.68	5.50
L41	Sumskyi	2789	34.80	52.80	45.04	6.60
R22	Olhopolskyi	3434	33.80	51.60	44.76	6.70
R3	Vasylkivskyi	3647	43.00	47.10	44.62	1.70
L2	Hadiatskyi	2166	42.80	51.00	45.84	3.33
L10	Myrhorodskyi	2358	44.00	49.10	46.34	2.26
L8	Lokhvytskyi	2328	44.60	51.40	49.44	2.81
R5	Kyivskyi	2909	44.80	54.00	49.18	3.32
R15	Bratslavskyi	2787	45.40	56.40	50.46	4.59
R28	Zaslavskyi	2884	45.30	51.30	47.60	2.40
L13	Prylutskyi	2810	44.30	50.00	46.50	2.42
L1	Poltavskyi	3030	42.70	50.80	45.60	3.41
R17	Haisynskyi	2975	38.80	55.10	48.12	7.31
L31	Kharkivskyi	2905	37.40	58.50	48.42	8.28
R18	Letychivskyi	2270	35.80	57.00	48.26	8.28
	Group 12 (average)	*2518*	*50.59*	*62.36*	*55.82*	-
R13	Kamianetspodilskyi	2499	57.40	75.10	63.40	7.13
R23	Proskurivskyi	2291	60.00	64.40	62.34	2.10
R34	Ostrozhskyi	2293	52.30	58.40	54.58	2.37
L14	Romenskyi	2335	55.20	59.80	57.48	1.97
R21	Novoushytskyi	2509	52.00	62.90	55.94	5.07
R20	Mohylivpodilskyi	2469	48.50	56.70	51.40	3.46
L3	Zenkivskyi	2001	47.50	58.90	52.56	4.14
R4	Zvenyhorodskyi	2904	45.00	61.70	55.64	6.67
R6	Lypovetskyi	2523	46.50	62.00	52.76	5.95
R9	Taraschanskyi	2884	43.40	61.50	49.44	7.56
R2	Berdychivskyi	2992	48.70	64.60	58.52	6.17
Average sample values		**3665**	**34.15**	**42.28**	**38.10**	-

Source: calculated by the author according to the tbl. I.3.3, I.3.4; fig. I.3.2.



	Group 6	Group 7	Group 8	Group 9	Group 10	Group 11	Group 12
Min. density	36	56	79	93	105	118	149
Max. density	43	60	75	103	98	121	148
Area avg.	252	163	91	115	68	79	69
Density avg.	40	57	77	99	101	120	147

Figure I.3.3. Diagram of the Forest-Steppe Ukraine cluster groups of districts by population density (1846 – 1863). Normalized by the ratio of average group values of indicators to average sample values

Source: calculated by the author according to the tbl. I.3.5.

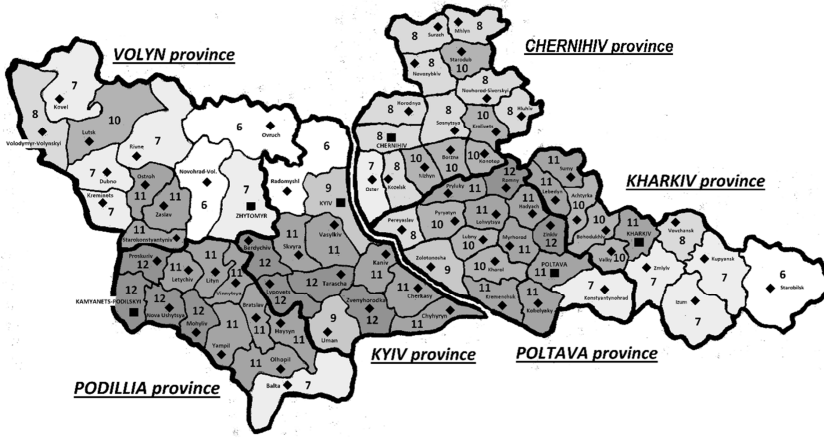


Figure I.3.4. Spatial distribution of cluster groups of districts in Forest-Steppe Ukraine by population density (1846 – 1863)

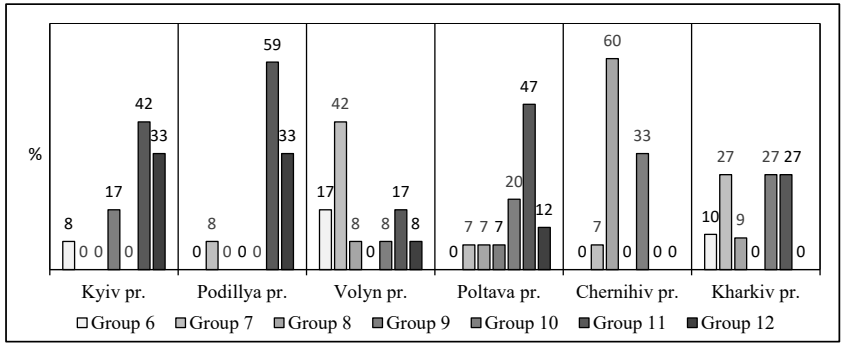
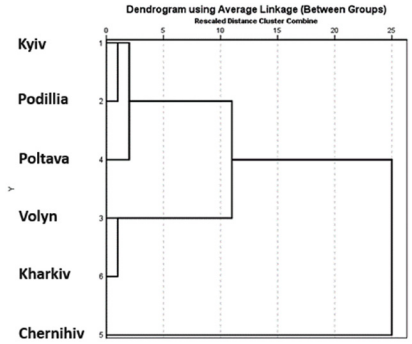


Figure I.3.5. The structure of Ukrainian Forest-Steppe provinces by cluster groups of population density (% of the group districts to the number of districts in the province)

Source: calculated by the author according to the tbl. I.3.5.



Proximity Matrix

Matrix File Input

Province	Kyiv	Podillia	Volyn	Poltava	Chernihiv	Kharkiv
Kyiv	0	706	3512	1128	7944	3146
Podillia	706	0	3962	1084	9260	3384
Volyn	3512	3962	0	2624	5196	800
Poltava	1128	1084	2624	0	5380	1146
Chernihiv	7944	9260	5196	5380	0	3866
Kharkiv	3146	3384	800	1146	3866	0

Figure I.3.6. Classification of the Forest-Steppe Ukraine provinces according to cluster groups of the density distribution of the population

4. Movement of population

"Population movement" is a term used in demography to denote various changes in the state of the population. At the same time, a distinction is made between natural, mechanical, and social movements.

Natural movement is the process of changing the number, structure, and composition of the population under the influence of direct (birth, death) or indirect (marriage) factors. Mechanical (migratory) movement is associated with the movement of people in space. Social movement refers to various forms of social mobility of people (Dolbik-Vrobey, Vorobyeva, 2018, p. 8) and is considered by us in a separate monograph section.

A classic example of a comprehensive approach to this problem in Ukrainian historiography was the Kyiv province population movement analysis carried out by D. Zhuravskyi. He emphasized that population growth cannot be determined only by comparing births and deaths; it is also necessary to involve data on the updated results of people's audits received from other provinces, on the resettlement of lower military ranks, sent on vacation for an indefinite period or released from service, a contingent of newcomers students, residents of charitable or penitentiary institutions, the quartering of troops that do not belong to the category of the permanent population of the province. Concerning the decline in the population, in addition to the dead, it is also necessary to take into account the recruitment, the expulsion of criminals from local prisons to Siberia or their transfer to prison companies or soldiers, relocation to other provinces, and the flight or disappearance of dependent peasants. D. Zhuravskyi considered these factors to be permanent. Temporary, in his opinion, included such phenomena as summer military camp gatherings and maneuvers, the movement of various units and brigades, movement along postal routes, navigable rivers, the movement of artels by workers, processions of pilgrims to Kyiv shrines, visitors to fairs and bazaars, vagabonds, peasants without passports, etc. (Statisticheskoye opisaniye Kiyevskoy gubernii, 1852, pp. 144–145). The researcher traced changes in the processes of birth and death of the province's population based on the publication of S. Korsakov for the years 1801–1834 (1839) and the data of the Kyiv Spiritual Consistory for 1835 – 1845. The deviations between this indicator's minimum and maximum values for 40 years of observations ranged from 16% to

30%, with the largest in 1835 – 1839 (Statisticheskoye opisaniye, 1852, pp. 145–146). The highest mortality rates occurred in 1812, 1822, 1831, and 1835, especially in 1842, when there were 50% more deaths than in the following year, 1843 (Ibid., pp. 147–151). According to D. Zhuravskyi, among those who died between 1834 and 1844, 67.4% were children and adolescents (0 – 15 years old); 24.2% of working-age persons (15 – 60 years); 8.3% were old people (60 – 100 years and more). There was an average of 4 – 5 births for each marriage, with a tendency toward a gradual decrease in baptisms from 4.8 to 4.3 per wedding (Ibid., pp. 161 – 163).

Due to the resettlement of people on permanent live in Kyiv province, the population increased in 1845 by only 0.08% and decreased by 0.27% mainly due to recruitment to the army. In the same year, 37,900 troops were quartered in Kyiv province; 26,200 soldiers were in summer camps here; about 24,000 servicemen as part of units passed through Kyiv city; 11,800 lower ranks were sent through the Kyiv internal guard; since the previous year, 6,542 convicts were in the Kyiv prison castle, 6,155 detainees were released during the year; 1,530 vagrants and other criminals were detained. Up to 10,000 travelers left Kyiv by horse mail service; 59,200 people, including 7,650 residents, passed through Kyiv by other means of transport, and some stayed there for several days. Between 50,000 and 80,000 ordinary pilgrims were in the city yearly but stayed there for no more than three consecutive days. On average, about 3,000 people gathered at the Kyiv Epiphany Fair; in 1845, almost 85.1 thousand people were resettled along the navigable rivers (Dnepr, Pripyat, Teterev). In Kyiv itself, 92,000 military personnel and 109,000 civilians were transported across the Dnipro; 28,800 wheeled carts; 82.4 thousand horses and 2.7 thousand oxen were driven from one bank of the Dnipro to the other (Ibid., pp. 171–176). Analyzing the demographic growth, D. Zhuravskyi drew our attention to the fact that the jump in the population of Kyiv province by almost 40,000 in 1844 was not natural but artificial, purely administrative in origin, since in that year, the city of Berdychiv was transferred from Volyn to Kyiv province. In general, the average annual growth of the Orthodox population of Kyiv province for 40 years was 1.29%, with significant fluctuations from -1.40% in 1816 to +4.85% in 1844 (Ibid., pp. 177 – 178).

It is clear that the level of information support available to D. Zhuravskyi, thanks to the patronage of the Kyiv governor I. Fundukley was beyond the

reach of most other researchers. So, in the "Military Statistical Review" of Kyiv province, the then captain of the General Staff, in the future Lieutenant General P. Menkov (1814 – 1875), noted that according to information received in 1846, 1,736,333 people lived in this province, which was 6,209 more than in the report of the Kyiv civil governor. Over the previous decade, an average of 76,954 children of various faiths were born per year, 50,538 died, and 26,116 survived. In 1846, 26,827 people died, of which 77.2% were children under the age of 5. (Voyenno-statisticheskoye obozreniye. Kiyevskaya guberniya, 1848, pp. 76, 84–88). The compiler of the "Military Statistical Review" of Podillia province, Captain of the General Staff (later Major General of the Admiralty) N. Tveritinov (1809 – ?), reported the following about the population movement: in the last 10 years (before 1846), on average, up to 86,372 people were born, 52,669 died, the annual average demographic increase was 28,703 people. In 1846, 97 single-farm families in 394 people were resettled in Kherson province. Epidemic diseases were the cause of significant mortality in the cities, namely typhus everywhere, smallpox (Olhopolskyi district, 1843), scarlet fever (Proskurivskyi district), and whooping cough (Novoushytskyi district). The average annual increase in the population of towns amounted to -0.55%, settlements and villages in districts +2.04% (Voyenno-statisticheskoye obozreniye. Podolskaya guberniya, 1849, pp. 83–84). The materials for the "Review" of Volyn province were collected and processed by the captain of the General Staff Fritche. According to his information 1842, 1843, and 1844, the mortality averaged 3.4% per year; during 1845 –1846, it increased to 4.2% due to the typhus epidemic. The mortality rate was the lowest in Kremenets (2.5%), the highest in Dubno (up to 7.4%), and the average in Zhytomyr (3 –5%) (Voyenno-statisticheskoye obozreniye. Volynskaya guberniya, 1850, pp. 69–70).

Lieutenant Colonel of the General Staff N. Obleukhov, a major general since 1862, characterizing the population movement in Poltava province noted that "no information has been received on the number of births". Regarding the dead, he indicated that in 1845 there were 50,527, the most in Prylutskyi district (4,492), the least in Zenkivskyi and Lubenskyi ones (2,464 and 2,380) (Voyenno-statisticheskoye obozreniye. Poltavskaya guberniya, 1848, p. 43). The author of the "Military Statistical Review" of Chernihiv province, Lieutenant Colonel of the General Staff, and future

hero of the Crimean War, A. Mitsevich, reported that since the 8th Revision of 1834 and as of January 1, 1846, the male population of the province had increased by 60,702 persons. During 1829 – 1839, the average demographic growth was 10,806 people. In 1845, 65,600 people were born, 54,891 died, and 10,709 arrived. A negative demographic increase of 13,549 occurred in 1831 due to the cholera epidemic (Voyenno-statisticheskoye obozreniye. Chernigovskaya guberniya, 1851, pp. 69–71). Captain of the General Staff V. Mochulskyi (1809 – after 1850), a hero of the Caucasian War of the 1830s, paid enough attention to demographic issues in his comprehensive survey of Kharkiv province. As of 1845, according to the report of the Kharkiv military governor and the head of the military settlement, 1,445,964 residents lived there "according to the civil and horse breeding departments" and 200,307 people "according to the military settlement". The author especially emphasizes that P. Köppen (more precisely, K. Arsenyev – *Yu. Boiko*) in 1846 published the data of the governor's report for 1845 without the inhabitants of the military settlement, which "reduced" the population of the Russian Empire by 200,000 souls. Despite this, the province's population doubled in 57 years (1788 – 1840). For 10 years (1836 – 1846), the average demographic growth of townspeople was 1.52% for men and 1.55% for women; in districts, respectively, 0.9% and 0.7%; in the province as a whole, 1.1% and 0.9%. For the Ukrainian military settlement, this indicator was not calculated (Voyenno-statisticheskoye obozreniye. Kharkovskaya guberniya, 1850, tbl. 4, 5).

As one can see, in addition to the work of D. Zhuravskyi, other descriptions of the Forest-Steppe Ukrainian provinces in the middle of the 19th century contained fragmentary data on population movement. The general dynamics of the process in a wider chronological range can be traced to the works of A. Zablotskyi-Desiatovskyi and E. Kaipsha (Zablotskiy, 1851; Kaipsha, 1858). The information collected by them about the growth of the Forest-Steppe Ukraine Orthodox population between 1838 and 1852 has been compiled into one table and two diagrams for convenience (tbl. I.4.1; fig. I.4.1). In 1838, negative demographic growth was observed only in Volyn province due to a local outbreak of cholera in the final phase of the second pandemic of 1829 – 1838 (82, p. 256). The year 1840 became difficult for the entire Left-Bank: in Poltava pr. population

growth decreased by 80%, in Chernihiv pr. by 71%, in Kharkiv province by 64%, which should be associated with the scurvy epidemic (Voyenno-statisticheskoye obozreniye. Kharkovskaya guberniya, 1850, p. 63). In 1842, negative demographic growth was recorded in Kyiv (-3,349), Poltava (-10,192), and Kharkiv (-12,951) provinces, and in Podillia, population growth decreased by -73%. It is known that in Kharkiv province this year fever became epidemic (Ibid., p. 64), while in Poltava, Kyiv, and Podillia provinces, many people died of typhus (Voyenno-statisticheskoye obozreniye. Volynskaya guberniya, 1850, p. 69). The third cholera pandemic reached Ukraine in 1847, with its peak values in 1848. There were so many deaths that authorities did not have time to register. Ye. Kaipsha especially noted that he could not obtain diocesan data for 1848 (Kaipsha, 1858, p. 435). All the Forest-Steppe provinces were affected. According to the Ministry of Internal Affairs, 36,804 people (2.24% of the population) died directly from cholera in Kyiv pr., 32,960 (2.18%) in Podillia pr., 24,688 (1.77%) in Volyn pr., 33,740 (2.02%) in Poltava pr., in Chernihiv pr. 31,543 (2.23%), and in Kharkiv province 30,345 (2.12%). Data on population losses in 1848 for Poltava and Chernihiv provinces were published later in other sources: -38175 (Poltava pr.), and -33827 (Chernihiv pr.) (Bodiansky, 1865, pp. XXXV–XXXIX; Materialy dlya geografii i statistiki Rossii. Chernigovskaya guberniya, 1865, pp. 122, 125). In the following 1849, the epidemic did not abate in Kharkiv (demographic growth -27,288 people), Poltava (-505) and Podillia (+327) provinces. Separate disease outbreaks were also traced in 1850 – 1853 in Podillia, Volyn, and Kyiv provinces (Vasilyev, Segal, 1960, pp. 257–258).

The analysis of the growth charts of the Orthodox population in 1838 – 1852 shows that short-term growth spurts, for example, in 1839 – 1841 and 1843 – 1844, were replaced by longer declines and even demographic failures during epidemics (tbl. I.4.1; fig. I.4.1), which were often aggravated by other natural disasters (Svyashchennik Slovtsov, 1858, pp. 465–502). On Left-Bank, these data can be fairly correctly extrapolated to the entire population with a high degree of probability, since the Orthodox in Poltava, Chernihiv, and Kharkiv provinces made up about 97% of the population. On Right-Bank the share of Orthodox was 77 – 78% (Boiko, 2021, p. 18, tbl. 4) this can only be done surely in condition if additional information about the demographic movement among local Catholics,

Protestants, and Jews is involved. Now, these data have not yet found their system researchers.

It is time to remind us that our statistical tables on the population of six provinces and 77 districts of Forest-Steppe Ukraine are forced to begin in 1846, with information borrowed from the publication of K. Arsenyev and supplemented materials of "Military and Statistical Reviews" of 1848 – 1851. Next, they have the materials of the 9th People's Revision (1851), monographically elaborated by P. Köppen (1857), the data of the reports of the heads of provinces for 1856 and the 10th People's Revision of 1858, published in two issues of "Statistical Tables of the Russian Empire" (Statisticheskiye tablitsy, 1858; Ibid., 1863) and, finally, information about the demographic situation in the Ukrainian Forest-Steppe in 1862 – 1863 from the first issue of the fundamental "Statistical Timeline" (Statisticheskiy vremennik, 1866). The general requirement for selecting information has become a mandatory district component of the data array, without which it is impossible to detail the peculiarities of the studied socio-demographic processes in space. Information on the natural movement of the population in districts of the Forest-Steppe provinces (born – died – difference) is contained only in the named editions for 1846 and 1856. To apply a unified methodical approach to the analysis of statistical information, we have introduced an indicator of estimated "average annual demographic growth", abbreviated AADG, which contains integrated data on the natural, mechanical, and social movement of the population.We will give an example of its calculation for the Kyiv province of the chronological interval 1851 – 1847 according to tbl. 2.1: (147133 – 176281)/5= -5830. To reduce the dimensionality, we recalculate the result in %: -5830/176281·100= -3.31% (tbl. 4.2). That is, we postulate that the process was linear, and uniform, and in each full year of the five-year plan (1847, 1848, 1849, 1850, 1851) 5830 more inhabitants left than arrived, or –3.31% of zero in 1846. This is the most simplified model of the phenomenon, focused on identifying generalized trends in the development of the process. In the given example, the value of the indicator shows a pronounced and prolonged demographic crisis, which, as can be seen from the tbl. 4.2 and 4.3, covered not only the Kyiv district. The above information about the catastrophic beginning of the third cholera pandemic of 1848 – 1862 helps to specify these statistical data

when 2.24% of the population died of the disease in the incomplete year of 1848 only in Kyiv province.

We will be back to the districts later, but first, the author will try to assess the problem at the regional and provincial levels (fig. I.4.2). In 1846, the annual increase in the population on Right-Bank was 1.38%, slightly ahead of Kyiv (1.53%) and Podillia provinces (1.43%) and lagging on Volyn (1.13%). In the Left-Bank part of the Forest-Steppe Ukraine, the annual demographic growth was somewhat lower (1.03%) and equaled 1.40% in Poltava pr., 1.04% in Kharkiv pr., and 0.57% in Chernihiv province. In the period between 1847 and 1851, the estimated average annual demographic growth (AADG) on Right-Bank approached zero (-0.21%) as a result of a sharp decrease in the indicator in Kyiv (-1.02%) and Podillia (-0.09%) provinces with its reduction on Volyn to 0.65%. Left-Bank showed a similar situation (-0.02%) with a noticeable reduction of the AADG in Poltava (-0.23%) and Chernihiv provinces (-0.40%) and partially in Kharkiv province (0.61%). The period between 1851 and 1856 was a time of restoration of the demographic potential to the level of 1846. The subregional indicator of the Right-Bank AADG rose again to 1.33%, thanks to the leading role of Kyiv (1.65%) and Podillia (1.86%) provinces. On Volyn, the demographic situation worsened and the province could not reach the level of 1846 until the 1860s. On Left-Bank, the AADG again reached 1.01% due to the outpacing growth of the indicator in Kharkiv pr. (1.52%), while Poltava pr. has not yet fully equalized since 1846, and the AADG of Chernihiv province did not exceed 0.39%.

The short period between 1856 and 1858 was significant for the Ukrainian Forest Steppe. On Right-Bank, the AADG formally almost tripled to 3.3%, rising to 6% in Kyiv, 2.5% in Podillia, and even 1% in Volyn provinces. However, the absolute record belonged to Left-Bank with the AADG rate of 4.69% – respectively 1.64% in Poltava, 2.5% in Chernihiv, and 10.3% in Kharkiv provinces. This ”miracle” had a purely administrative origin and was associated with the beginning of the liquidation of military settlements. The military villagers turned into social marginals – they continued to live in the military settlements, obeying the military authorities, under previously adopted decrees, orders, and charters, but as civilians, they began to be taken into account in the administrative districts of the respective provinces. In other words, there was not a natural or mechanical, but a mass

fictitious social movement of the population. Its scale can only be assessed using demographic measurement tools, but not from official documents of that era.

We start with the fact that, despite extensive historiography, none of the researchers knew and did not know the exact number of military settlers in Ukraine in the late 1850s – early 1860s and all the places of their settlement. Let's turn to the official data. "Statistical Tables of the Russian Empire" for 1856, built on the reports of the governors, show that 11,175 military settlers lived in the town of Uman (AADG -0.54%), 48,012 (AADG 1.08%) in Zvenyhorodskyi and Umanskyi districts (there were the 1st and 2nd parts of the Kyiv-Podillia military settlement), 5,334 settlers (AADG 1.56%) who served in the horse artillery brigade in a separate volost of the Umanskyi district. In total, there were 64,521 military settlers in Kyiv province, with an average of 0.84% of the AADG indicator (Statisticheskiye tablitsy, 1858, p. 52). In Podillia province, there were 12,306 military settlers in districts Baltskyi (5th part of the Kyiv-Podillia military settlement), AADG -2.54%, Haisynskyi (3rd part) 22,731, AADG 1.48%, and Letychivskyi (4th part) 23,793, AADG -0, 02%. In total 58,830 military settlers were shown with an average AADG indicator of 0.02% in this province by 1856 (Ibid., p. 100). In Kharkiv province, 8,130 military settlers were registered in the town of Chuguiev (AADG -4.2%), in the parts of the Ukrainian military settlement of Vovchanskyi, Zmiivskyi, Iziumskyi, Kupianskyi, Starobilsky administrative districts there were 221,012 settlers (AADG 0.83%) "together with the troops" (sic.!), a total of 229,142 people in this province with an average annual demographic growth of 0.65% (Ibid., p. 146). According to the data of the 10th People's Revision of 1858, former military settlers in the provinces of Kyiv accounted for 2.1%, Podillia 3.3%, and Kharkiv 11.9% of the population (Statisticheskiye tablitsy, 1863, p. 309).

Let's turn to one more source, neglected by researchers of military settlements on Right-Bank. In the "Atlas" of A. Rittikh, it is reported that in the early 1860s there were 42,437 Orthodox members of the Southern military settlement[4] in Umanskyi district of Kyiv province; in Podillia province, the Orthodox of this settlement were distributed by districts as follows: Baltskyi – 19,950, Haisynskyi – 19,105, Letychivskyi – 18,438,

[4] The previous name was "Kyiv-Podillia military settlement".

Olhopolskyi – 10,617, Proskurivskyi – 2,225 (Rittikh, 1864, Kyiv province; Podillia province), a total of 70,365 people, which does not match the data of the "Statistical Tables" for 1856, where the settlers in Olhopolskyi and Proskurivskyi districts are not mentioned.

Thus, in 1856, there were 64,521 military settlers in Kyiv province (42,437 at the beginning of the 1860s), 58,830 in Podillia (70,365 at the beginning of the 1860s), and in total 123,351 on the Right-Bank subregion (at the beginning of the 1860s – 112,802). Adding to these 229,142 military residents in Kharkiv province (with troops?), we have 352,483 of those in Forest-Steppe Ukraine late 50s of the 19th century. The quality of life of this category of peasants did not differ from others, and in some places, it was even worse, as evidenced by the AADG indicators of 0.02% – 0.83% in Right-Bank and 0.84% in Kharkiv province.

After such an extensive but necessary digression, let us return to the consideration of the issue at the general level of the Ukrainian Forest-Steppe districts, singling out separately those where the values of the AADG indicator look abnormal (tbl. I.4.4). We included 11 out of 12 districts with military settlements in the first group. In 1856, they had a total AADG of 32,528 people, standing out for its size in the Baltskyi, Haisynskyi, Letychivskyi, and Olhopolskyi districts of Podillia province. The total AADG in this group of districts in 1858 became already 182,782 people. The highest values are shown by districts of Kharkiv pr. and Umanskyi in Kyiv province (10.59% and 39.86%). Behind them were Haisynskyi, Zvenihorodskyi, Baltskyi, and Letychivskyi districts. Proskurivskyi district, on the contrary, showed consistently low rates of AADG throughout the entire period, except for the beginning of the 1860s. It seems that the transfer of the military settlers of Podillia under the care of civil statistics institutions took place in several stages from 1856 – 1858. But the vast majority of military settlers in Kharkiv and Kyiv provinces acquired a new status of peasants of the imperial family in 1857 – 1858, which is recorded in the materials of the 10th People's Revision (Statisticheskiye tablitsy, 1863, p. 274, note (*) on p. 310).

The second group of districts with anomalous AADG values in 1857 – 1858 includes districts with central provincial cities. In Kyivskyi, the average annual demographic growth increased by 3.5 times in two full years, in Chernihivskyi by 23 times, in Zhytomyrskyi by almost 15 times,

in Kharkivskyi by 3.9 times, and in Poltavskyi by 3.4 times. Only in the Kamianetspodilskyi district were minor changes observed from the beginning of the 1860s.

The third group includes districts that belonged to the circle of "others" in all respects, except for the abnormally high AADG in 1858. Ten of them ranged from 4.75% to 9.36% of the total population, and the Tarashchanskyi district was extremely similar to the leading Podillia districts with military settlers, although no settlements were known there. In 1856, the Novoushytskyi district on Podillia had a demographic increase of 4.18%, and in 1857 – 1858 it lost almost 14,600 inhabitants (AADG -4.64%). In 1858, the population of Kovelskyi district in Volyn province decreased by more than 6,600 (AADG -5.69%).

Thus, we have a reason to consider that in the years 1856 – 1858, a social group of military settlers of the Forest-Steppe Ukraine was legalized in the civil statistical space, which can be confirmed by simple calculations according to the data in tbl. I.4.4. The question remains open regarding almost 96,200 people who were not in the five "capital" districts according to the reports of 1856 and who, according to the Revision data of 1858, appeared here over the natural possibilities of the demographic movement of the population. The same should be noted about 131,900 residents of 10 "other" districts of the third group. We hope that in the future the involvement of other sources will eventually allow at least partial answers to these questions. The above-mentioned fluctuations in the movement of the population, both of natural and artificial origin, are partially leveled thanks to the methodology we use, where the raw data for multidimensional statistical analysis are calculated materials of descriptive statistics (tbl. I.4.5, I.4.6). Hierarchical cluster analysis of districts according to the descriptive statistics of the AADG indicators made it possible to identify 6 cluster groups of objects (tbl. I.4.7; fig. I.4.3, I.4.4, I.4.5).

Cluster group 13 consists of 10 districts, almost equally distributed among the subregions of Forest-Steppe Ukraine, namely: Volyn pr. – 4, Chernihiv pr. – 2, Podillia, Kyiv, Poltava, and Kharkiv provinces – for 1 district in each.

Cluster group 14 is represented by 21 districts, mostly in the Left-Bank provinces: Chernihiv – 7, Poltava – 6, Kharkiv – 2. There were 6 such

districts on Right-Bank: 4 in Volyn pr., for one each in Kyiv and Podillia provinces.

In both groups, districts with the lowest values of descriptive statistics indicators were selected, including the average AADG (0.26%–0.64% with an average value for the sample of 1.44%) and others.

***Cluster group* 15** united 22 districts. The Right-Bank provinces had 11: Kyiv – 5, Podillia – 4, and Volyn – 2. On Left-Bank, 9 districts were located in Poltava pr. and 2 in Chernihiv province. In this case, the group value of the average AADG (1.37%) is the closest to the sample average (1.44%).

The cluster group 16 from 7 districts on both banks of the Dnipro, which did not form any territorial clusters, looks close to it. The difference lies in the group values of such descriptive statistics indicators as the maximum and average AADG. The first is close to the sample average, and the second slightly exceeds it.

Groups 17 and 18 demonstrate higher-than-average sample values of the maximum and average AADG indicators.

Cluster group 17 includes 11 districts of Forest-Steppe Ukraine, distributed by provinces as follows: Podillia – 4, Kyiv – 2, Volyn – 1, Chernihiv – 2, Kharkiv – 2.

Cluster group 18, which includes 6 districts (4 of which are located in the Ukrainian military settlement of Kharkiv province and Umanskyi with Kyivskyi in the Right Bank subregion), is characterized not only by the highest maximum and average AADG values in the entire Ukrainian Forest Steppe but also by the largest standard deviation values, which indicates the instability of demographic processes and peculiarities in the database's formation. In our opinion, the latter is the most important common feature of groups 17 and 18.

The classification of the Forest-Steppe Ukraine provinces according to the internal structure of cluster groups of demographic growth (fig. I.4.6, I.4.7) allows us to talk about three local variants of the process in 1846 – 1863: Kyiv-Podillia, Volyn-Chernihiv, to which Poltava province also gravitated, and Kharkiv, which real demographic face was distorted by the forty-year experiment with the Ukrainian military settlement.

Table I.4.1. Demographic growth of the Forest-Steppe Ukraine Orthodox population according to diocesan data (1838 – 1852)

Regions/ provinces/ years	Right-Bank Ukraine								
	Kyiv prov.			Podillia prov.			Volyn prov.		
	Born	Died	Difference	Born	Died	Difference	Born	Died	Difference
1838	60417	48691	11726	50077	39401	10676	30090	33588	**-3498**
1839	62845	49395	13450	52399	37920	14479	42473	33452	9021
1840	57061	43393	13668	48517	31161	17356	38242	29080	9162
1841	58858	44071	14787	53305	37619	15686	42623	35774	6849
1842	58360	61709	**-3349**	50209	46039	**4170**	46271	40504	5767
1843	67462	34247	33215	57566	36882	20684	52899	33119	19780
1844	73409	36800	36609	58876	36699	22177	54637	32961	21676
1845	69794	45265	24529	59244	41231	18013	50995	39991	11004
1846	70242	48645	21597	59570	44678	14892	47691	38872	8819
1847	72333	54058	18275	59048	46408	12640	48199	40016	8183
1848[5]		36804[6]			32960[2]			24688[2]	
1849	71064	60033	11031	55815	55488	**327**	56049	42453	13596
1850	74948	49978	24970	63247	40924	22323	54447	46293	8154
1851	71123	49736	21387	55702	42486	13216	51935	38992	12943
1852	75066	46361	28705	62477	39037	23440	49221	42701	6520
Regions/ provinces/ years	**Left-Bank Ukraine**								
	Poltava prov.			Chernihiv prov.			Kharkiv prov.		
	Born	Died	Difference	Born	Died	Difference	Born	Die	Difference
1838	77279	62382	14897	62936	51701	11235	69584	49122	20462
1839	85648	56131	29517	63989	57174	6815	75538	53335	22203
1840	65624	59861	**5763**	57987	56022	**1965**	69384	61302	**8082**
1841	78501	58300	20201	60977	53149	7828	72006	53080	18926
1842	86317	76125	**-10192**	60015	52592	7423	62057	75008	**-12951**
1843	85423	44827	40596	66105	39904	26201	76992	49269	27723
1844	84524	50527	33997	67376	45162	22214	76104	47259	28845
1845	85945	65059	20886	65929	55413	10516	76788	54767	22021
1846	84220	65121	19099	62629	59776	**2853**	76105	52129	23976
1847	88345	58354	29991	62160	54175	7985	81835	56514	25321
1848[1]	86672	124847	**-38175**	63385	97212	**-33827**		***30345***[2]	
1849	74240	74745	**-505**	64900	45335	19565	58107	85395	**-27288**
1850	86914	59549	27365	64295	55117	9178	77403	51301	26102
1851	77731	60423	17308	65126	53325	11801	67539	51888	15651
1852	85419	55940	29479	67774	49279	18495	74046	48096	25950

Source: calculated by the author according to (Zablotskiy, 1851, pp. 74–75, 78–79; Kaypsha, 1858, pp. 442–443, 450–451).

[5] There are no diocesan population growth statistics for 1848.

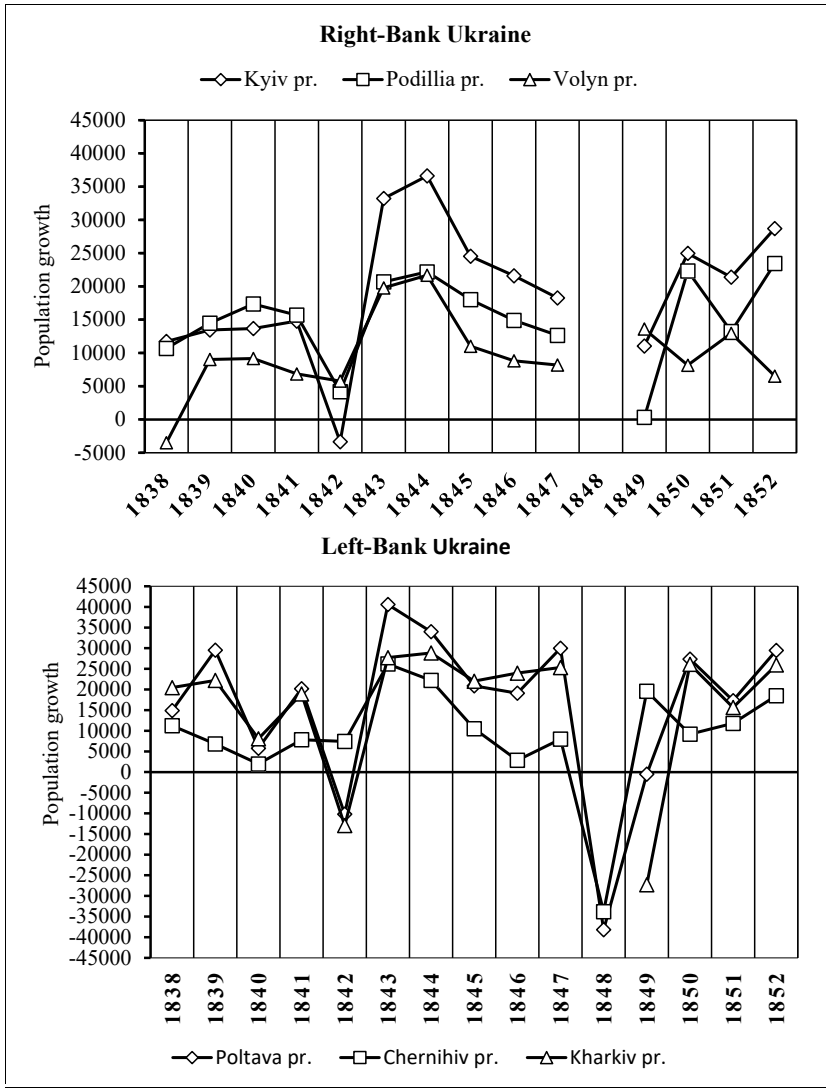


Figure I.4.1. Charts of the Forest-Steppe Ukraine Orthodox population demographic growth according to diocesan data (1838 – 1852)

Source: calculated by the author according to the tbl. I.4.1.

Table I.4.2. Estimated demographic growth of the Right-Bank Ukraine population (1846 – 1863)

Code	Provinces/districts	Estimated average annual demographic growth (*AADG*)					
		1846		1847 – 1851		1852 – 1856	
		Growth	(%)	Growth	(%)	Growth	(%)
	Kyiv prov.	25998	***1.53***	***-17592***	***-1.02***	***26992***	***1.65***
R1	Kyivskyi	1735	0.98	-5830	-3.31	6662	4.58
R2	Berdychivskyi	1370	0.80	-5045	-2.95	-405	-0.25
R3	Vasylkivskyi	3806	2.43	691	0.44	3516	2.60
R4	Zvenyhorodskyi	3316	2.06	874	0.67	623	0.44
R5	Kanivskyi	3208	2.29	381	0.27	3352	2.86
R6	Lypovetskyi	1319	1.07	-1098	-0.89	1251	0.90
R7	Radomyshlskyi	423	0.29	-1455	-0.99	957	0.76
R8	Skvyrskyi	1672	1.23	-2016	-1.48	159	0.13
R9	Taraschanskyi	2192	1.62	-1980	-1.47	4234	4.12
R10	Umanskyi	2959	2.58	-2338	-2.04	1889	1.36
R11	Cherkaskyi	1701	1.22	-137	-0.10	1720	1.49
R12	Chyhyrynskyi	2297	2.02	361	0.32	3034	2.06
	Podillia prov.	***21765***	***1.43***	***-1453***	***-0.09***	***29387***	***1.86***
R13	Kamianetspodilskyi	3666	2.53	-350	-0.24	2381	1.66
R14	Baltskyi	603	0.46	2430	1.86	7209	5.05
R15	Bratslavskyi	261	0.21	990	0.78	-347	-0.26
R16	Vinnytskyi	959	0.83	701	0.61	-1524	-1.28
R17	Haisynskyi	1021	0.79	-3542	-2.74	4075	3.65
R18	Letychivskyi	1100	1.10	-3717	-3.72	3698	4.55
R19	Litynskyi	1799	1.47	405	0.33	2231	1.80
R20	Mohylivpodilskyi	2644	2.03	-1768	-1.35	-392	-0.32
R21	Novoushytskyi	3496	3.01	2878	2.48	5455	4.18
R22	Olhopolskyi	2409	1.64	-1618	-1.10	4279	3.09
R23	Proskurivskyi	826	0.64	490	0.38	1095	0.83
R24	Yampilskyi	2981	2.29	1648	1.26	1227	0.89
	Volyn prov.	***15824***	***1.13***	***9181***	***0.65***	***5799***	***0.39***
R25	Zhytomyrskyi	1823	1.12	-376	-0.22	830	0.50
R26	Volodymyrvolynskyi	862	1.09	2916	2.22	166	0.11
R27	Dubenskyi	624	0.66	-146	-0.15	348	0.35
R28	Zaslavskyi	728	0.63	988	0.84	459	0.37
R29	Kovelskyi	1806	0.62	2586	2.52	226	0.20
R30	Kremenetskyi	528	1.76	-1952	-1.39	471	0.36
R31	Lutskyi	91	0.36	700	0.69	675	0.64
R32	Novohradvolynskyi	3720	0.09	565	0.39	891	0.60
R33	Ovrutskyi	1742	2.53	2358	2.87	662	0.70
R34	Ostrozhskyi	529	2.12	483	0.51	90	0.09
R35	Rivnenskyi	1454	0.55	747	0.64	392	0.32
R36	Starokonstiantynivskyi	1917	1.24	312	0.26	589	0.48
Right-Bank Ukraine		**63587**	**1.38**	**-9864**	**-0.21**	**62178**	**1.33**

Table I.4.2. Ending

Code	Provinces/districts	Estimated average annual demographic growth (*AADG*)			
		1857 – 1858		1859 – 1863	
		Growth	(%)	Growth	(%)
	Kyiv prov.	***107081***	***6.00***	***13551***	***0.70***
R1	Kyivskyi	23624	14.56	1851	0.88
R2	Berdychivskyi	3861	2.16	1365	0.73
R3	Vasylkivskyi	6710	4.24	1150	0.67
R4	Zvenyhorodskyi	10739	7.04	-1544	-0.89
R5	Kanivskyi	5902	4.06	2092	1.33
R6	Lypovetskyi	223	0.17	-832	-0.62
R7	Radomyshlskyi	3826	2.63	704	0.46
R8	Skvyrskyi	5257	4.01	1172	0.83
R9	Taraschanskyi	11790	9.36	2161	1.44
R10	Umanskyi	21371	17.23	2102	1.26
R11	Cherkaskyi	7787	5.25	3176	1.94
R12	Chyhyrynskyi	5991	4.84	154	0.11
	Podillia prov.	***43469***	***2.51***	***26104***	***1.49***
R13	Kamianetspodilskyi	2882	1.86	5364	3.33
R14	Baltskyi	7998	4.48	3074	1.58
R15	Bratslavskyi	9239	7.12	1795	1.21
R16	Vinnytskyi	6041	5.42	1567	1.27
R17	Haisynskyi	11261	8.53	1884	1.22
R18	Letychivskyi	2375	2.38	945	0.90
R19	Litynskyi	-2404	-1.78	1626	1.25
R20	Mohylivpodilskyi	5689	4.75	1799	1.37
R21	Novoushytskyi	-7333	-4.64	1361	0.95
R22	Olhopolskyi	1922	1.20	2658	1.62
R23	Proskurivskyi	307	0.22	1889	1.37
R24	Yampilskyi	5492	3.80	2142	1.38
	Volyn prov.	***14953***	***1.00***	***14883***	***0.97***
R25	Zhytomyrskyi	12170	7.15	6428	3.30
R26	Volodymyrvolynskyi	-5714	-3.90	935	0.69
R27	Dubenskyi	-1354	-1.34	1229	1.25
R28	Zaslavskyi	6166	4.92	-498	-0.36
R29	Kovelskyi	-6629	-5.69	1794	1.74
R30	Kremenetskyi	3375	2.54	1644	1.18
R31	Lutskyi	1636	1.50	-576	-0.51
R32	Novohradvolynskyi	3312	2.15	-455	-0.28
R33	Ovrutskyi	3319	3.41	11	0.01
R34	Ostrozhskyi	1263	1.29	732	0.73
R35	Rivnenskyi	-3380	-2.75	2036	1.75
R36	Starokonstiantynivskyi	789	0.63	1603	1.27
Right-Bank Ukraine		**165503**	**3.30**	**54538**	**1.04**

Source: calculated by the author according to (Arsenyev, 1850, pp. 6-7. 14-15. 26-28; Köppen. 1857, pp. 14, 16, 33, 69, 106, 108, 148,152; Statisticheskiye tablitsy, 1858, pp. 20-22,50-52, 100-102; Ibid., 1863, pp. 160, 163, 168; Statisticheskiy vremennik, 1866, pp. 58-59).

Table I.4.3. Estimated demographic growth of the Left-Bank Ukraine population (1846 – 1863)

Code	Provinces/districts	Estimated average annual demographic growth (*AADG*)					
		1846		1847 – 1851		1852 – 1856	
		Growth	(%)	Growth	(%)	Growth	(%)
	Poltava prov.	***23346***	***1.40***	***-3871***	***-0.23***	***18463***	***1.11***
L1	Poltavskyi	2272	1.75	-27	-0.02	1123	0.87
L2	Hadiatskyi	667	0.71	-332	-0.35	744	0.80
L3	Zenkivskyi	1283	1.21	-2167	-2.05	1375	1.45
L4	Zolotonoshskyi	1018	0.73	-18	-0.01	1655	1.19
L5	Kobeliakskyi	2284	1.95	656	0.56	2178	1.81
L6	Konstiantynohradskyi	1761	1.71	1202	1.17	1069	0.98
L7	Kremenchukskyi	1655	1.34	-341	-0.27	2259	1.85
L8	Lokhvytskyi	2920	2.44	-3175	-2.65	3063	2.95
L9	Lubenskyi	1772	2.30	860	1.12	144	0.18
L10	Myrhorodskyi	1520	1.47	161	0.16	898	0.86
L11	Pereiaslavskyi	1958	1.73	102	0.09	418	0.37
L12	Pyriatynskyi	932	0.90	-148	-0.14	841	0.82
L13	Prylutskyi	489	0.39	-90	-0.07	969	0.78
L14	Romenskyi	741	0.57	-404	-0.31	888	0.69
L15	Khorolskyi	2074	2.01	-150	-0.14	839	0.82
	Chernihiv prov.	***7899***	***0.57***	***-5666***	***-0.40***	***5418***	***0.39***
L16	Chernihivskyi	94	0.11	-511	-0.54	-417	-0.45
L17	Borznianskyi	915	1.02	440	0.49	613	0.67
L18	Hlukhivskyi	188	0.22	-50	-0.06	956	1.13
L19	Horodianskyi	168	0.19	-409	-0.47	458	0.54
L20	Kozelskyi	821	1.02	96	0.12	-84	-0.10
L21	Konotopskyi	810	0.81	-2299	-2.29	1405	1.58
L22	Krolevetskyi	124	0.14	-706	-0.82	769	0.93
L23	Mhlynskyi	422	0.45	-1000	-1.07	76	0.09
L24	Nizhynskyi	779	0.74	-1330	-1.26	38	0.04
L25	Novhorodsiverskyi	818	0.89	-479	-0.53	-218	-0.25
L26	Novozybkivskyi	86	0.08	551	0.51	321	0.29
L27	Osterskyi	551	0.72	37	0.05	84	0.11
L28	Sosnytskyi	873	0.86	-1079	-1.07	547	0.57
L29	Starodubskyi	720	0.69	511	0.49	-198	-0.19
L30	Surazhskyi	530	0.53	562	0.56	1068	1.04
	Kharkiv prov.	***14689***	***1.04***	***8735***	***0.61***	***20796***	***1.52***
L31	Kharkivskyi	1431	1.33	3884	3.58	2277	1.78
L32	Akhtyrskyi	757	0.89	1772	2.10	980	1.05
L33	Bohoduhivskyi	784	0.82	-522	-0.54	1661	1.78
L34	Valkivskyi	1002	1.21	419	0.51	1720	2.03
L35	Vovchanskyi	1100	1.32	-308	-0.37	1253	1.53
L36	Zmiivskyi	843	0.99	-1234	-1.46	1198	1.53
L37	Iziumskyi	1958	1.33	-3280	-2.22	2526	1.93
L38	Kupianskyi	1286	1.59	1015	1.25	1439	1.67
L39	Lebedynskyi	991	0.78	-4520	-3.52	1449	1.37
L40	Starobilsky	3175	2.42	6528	4.97	4339	2.65
L41	Sumskyi	1362	1.41	4981	5.14	1954	1.60
	Left-Bank Ukraine	**45934**	**1.03**	**–802**	**-0.02**	**44677**	**1.01**

Table I.4.3. Ending

Code	Provinces / districts	Estimated average annual demographic growth (*AADG*)			
		1857 – 1858		1859 – 1863	
		Growth	(%)	Growth	(%)
	Poltava prov.	***28871***	***1.64***	***18606***	***1.02***
L1	Poltavskyi	3836	2.84	2212	1.55
L2	Hadiatskyi	2852	2.96	1643	1.61
L3	Zenkivskyi	1691	1.66	2510	2.39
L4	Zolotonoshskyi	1168	0.80	-414	-0.28
L5	Kobeliakskyi	1592	1.22	4761	3.55
L6	Konstiantynohradskyi	2336	2.04	177	0.15
L7	Kremenchukskyi	799	0.60	2630	1.95
L8	Lokhvytskyi	-1931	-1.62	455	0.39
L9	Lubenskyi	2344	2.86	965	1.11
L10	Myrhorodskyi	2222	2.04	470	0.41
L11	Pereiaslavskyi	3485	3.01	915	0.75
L12	Pyriatynskyi	693	0.65	-473	-0.44
L13	Prylutskyi	2493	1.93	1206	0.90
L14	Romenskyi	2396	1.80	297	0.22
L15	Khorolskyi	2895	2.71	1252	1.11
	Chernihiv prov.	***35016***	***2.50***	***3108***	***0.21***
L16	Chernihivskyi	9500	10.56	-1740	-1.60
L17	Borznianskyi	739	0.78	1918	1.99
L18	Hlukhivskyi	-706	-0.79	1362	1.55
L19	Horodianskyi	4733	5.46	1065	1.11
L20	Kozelskyi	1906	2.36	136	0.16
L21	Konotopskyi	3216	3.36	-3620	-3.54
L22	Krolevetskyi	6464	7.49	-79	-0.08
L23	Mhlynskyi	1086	1.22	771	0.85
L24	Nizhynskyi	2183	2.20	1634	1.58
L25	Novhorodsiverskyi	2147	2.45	-1037	-1.13
L26	Novozybkivskyi	-88	-0.08	392	0.35
L27	Osterskyi	-2219	-2.86	702	0.96
L28	Sosnytskyi	5503	5.59	127	0.12
L29	Starodubskyi	-61	-0.06	640	0.61
L30	Surazhskyi	613	0.57	837	0.76
	Kharkiv prov.	***154697***	***10.30***	***1709***	***0.11***
L31	Kharkivskyi	8941	6.41	2517	1.60
L32	Akhtyrskyi	359	0.36	427	0.43
L33	Bohoduhivskyi	1661	1.63	-839	-0.80
L34	Valkivskyi	-1318	-1.41	1230	1.36
L35	Vovchanskyi	12180	13.78	-690	-0.61
L36	Zmiivskyi	33589	39.86	-874	-0.58
L37	Iziumskyi	15215	10.59	1928	1.11
L38	Kupianskyi	28961	31.06	226	0.15
L39	Lebedynskyi	10136	8.96	-3327	-2.49
L40	Starobilsky	37171	20.01	4508	1.73
L41	Sumskyi	7802	5.93	-3397	-2.31
	Left-Bank Ukraine	**218584**	**4.69**	**23423**	**0.48**

Sources: calculated by the author according to (Voyenno-statisticheskoye obozreniye. Khakovskaya guberniya, 1850a, tab. 4, 5; Arsenyev, 1850, pp. 28–29, 40–41, 42–43; Köppen, 1857, pp. 14, 16, 33, 69, 106, 108, 148, 152; Statisticheskiye tablitsy, 1858, pp. 104 – 106, 144–146, 152–154; Ibid., 1863, pp. 168, 173; Statisticheskiy vremennik, 1866, pp. 58–59).

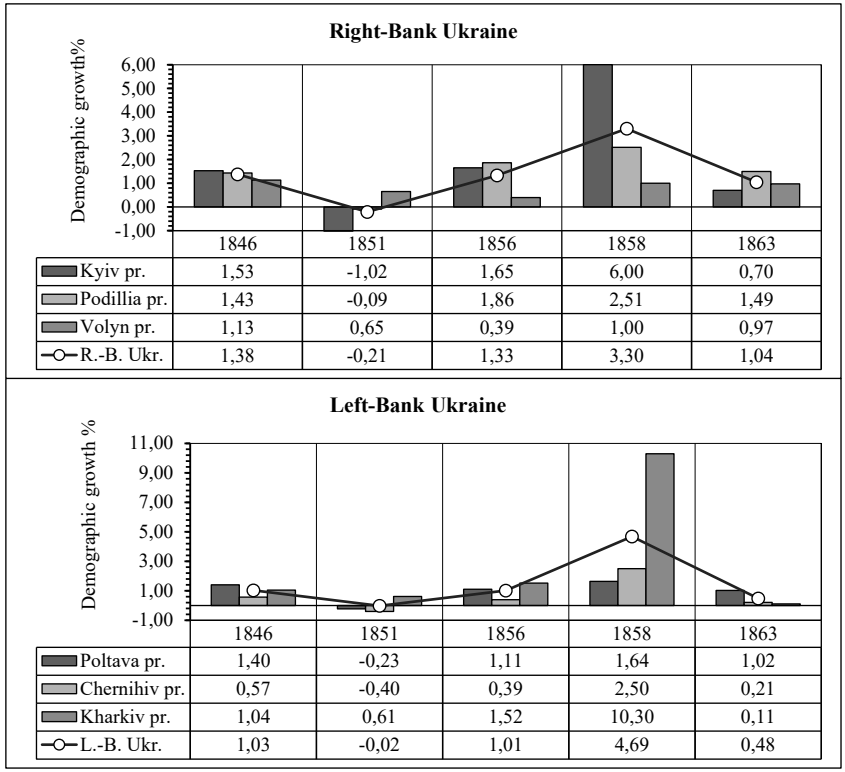


Figure I.4.2. Diagrams of the Forest-Steppe Ukraine population estimated average annual demographic growth by provinces and subregions (1846 – 1863)

Source: calculated by the author according to the tab. 4.2; 4.3

Table I.4.4. Districts of the Forest-Steppe Ukraine with abnormally high average annual demographic growth in 1856 – 1858

Code	Districts	Estimated average annual demographic growth (AADG) %							
		1847 – 1851		1852 – 1856		1857 – 1858		1859 – 1863	
		Q-ty*	%	Q-ty	%	Q-ty	%	Q-ty	%
With military settlements		**-5190**	**-**	**32528**	**-**	**182782**	**-**	**14217**	**-**
L36	Zmiivskyi	-1234	-1.46	1198	1.53	33589	*39.86*	-874	-0.58

L38	Kupianskyi	1015	1.25	1439	1.67	28961	*31.06*	226	0.15
L40	Starobilskyi	6528	*4.97*	4339	*2.65*	37171	*20.01*	4508	1.73
R10	Umanskyi	-2338	-2.04	1889	1.36	21371	*17.23*	2102	1.26
L35	Vovchanskyi	-308	-0.37	1253	1.53	12180	*13.78*	-690	-0.61
L37	Iziumskyi	-3280	-2.22	2526	1.93	15215	*10.59*	1928	1.11
R17	Haisynskyi	-3542	-2.74	4075	*3.65*	11261	*8.53*	1884	1.22
R4	Zvenyhorodskyi	874	0.67	623	0.44	10739	*7.04*	-1544	-0.89
R14	Baltskyi	2430	1.86	7209	*5.05*	7998	*4.48*	3074	1.58
R18	Letychivskyi	-3717	-3.72	3698	*4.55*	2375	*2.38*	945	0.90
R22	Olhopolskyi	-1618	-1.10	4279	*3.09*	1922	1.20	2658	1.62
R23	Proskurivskyi	*490*	*0.38*	*1095*	*0.83*	*307*	*0.22*	*1889*	*1.37*
With provincial centers		**-2860**	**-**	**12856**	**-**	**58071**	**-**	**11268**	**-**
R1	Kyivskyi	-5830	-3.31	6662	*4.58*	23624	*14.56*	1851	0.88
L16	Chernihivskyi	-511	-0.54	-417	-0.45	9500	*10.56*	-1740	-1.60
П25	Zhytomyrskyi	-376	-0.22	830	0.50	12170	*7.15*	6428	*3.30*
L31	Kharkivskyi	3884	*3.58*	2277	1.78	8941	*6.41*	2517	1.60
L1	Poltavskyi	-27	-0.02	1123	0.87	3836	*2.84*	2212	*1.55*
Others		**-2802**	**-**	**7607**	**-**	**73563**	**-**	**1213**	**-**
R9	Taraschanskyi	-1980	-1.47	4234	*4.12*	11790	*9.36*	2161	1.44
L39	Lebedynskyi	-4520	-3.52	1449	1.37	10136	*8.96*	-3327	-2.49
L22	Krolevetskyi	-706	-0.82	769	0.93	6464	*7.49*	-79	-0.08
R15	Bratslavskyi	990	0.78	-347	-0.26	9239	*7.12*	1795	1.21
L41	Sumskyi	4981	*5.14*	1954	1.60	7802	*5.93*	-3397	-2.31
L28	Sosnytskyi	-1079	-1.07	547	0.57	5503	*5.59*	127	0.12
L19	Horodianskyi	-409	-0.47	458	0.54	4733	*5.46*	1065	1.11
R16	Vinnytskyi	701	0.61	-1524	-1.28	6041	*5.42*	1567	1.27
R28	Zaslavskyi	988	0.84	459	0.37	6166	*4.92*	-498	-0.36
R20	Mohylivpodilskyi	-1768	-1.35	-392	-0.32	5689	*4.75*	1799	1.37
R21	Novoushytskyi	2878	*2.48*	5455	*4.18*	-7333	-4.64	1361	0.95
R29	Kovelskyi	2586	*2.52*	226	0.20	-6629	-5.69	1794	1.74

Q-ty* – quantity.

Table I.4.5. Descriptive statistics of the Right-Bank Ukraine population estimated demographic growth by districts (1846–1863)

Code	Districts	Descriptive statistics of demographic growth %			
		Minimum	Maximum	Average	Standard deviation
R1	Kyivskyi	-3.31	14.56	3.03	6.76
R2	Berdychivskyi	-2.95	4.58	1.06	2.73
R3	Vasylkivskyi	-0.25	4.24	1.51	1.82
R4	Zvenyhorodskyi	-0.89	7.04	2.30	2.98
R5	Kanivskyi	0.27	4.06	1.68	1.56

R6	Lypovetskyi	-0.89	2.86	0.52	1.52
R7	Radomyshlskyi	-0.99	2.63	0.66	1.31
R8	Skvyrskyi	-1.48	4.01	1.07	1.96
R9	Taraschanskyi	-1.47	9.36	2.22	4.18
R10	Umanskyi	-2.04	17.23	4.63	7.40
R11	Cherkaskyi	-0.10	5.25	1.93	2.00
R12	Chyhyrynskyi	0.11	4.84	1.76	1.90
R13	Kamianetspodilskyi	-0.24	3.33	1.83	1.33
R14	Baltskyi	0.46	5.05	2.69	1.98
R15	Bratslavskyi	-0.26	7.12	1.81	3.02
R16	Vinnytskyi	-1.28	5.42	1.37	2.46
R17	Haisynskyi	-2.74	8.53	2.29	4.17
R18	Letychivskyi	-3.72	4.55	1.04	3.03
R19	Litynskyi	-1.78	1.80	0.61	1.45
R20	Mohylivpodilskyi	-1.35	4.75	1.30	2.35
R21	Novoushytskyi	-4.64	4.18	1.20	3.46
R22	Olhopolskyi	-1.10	3.09	1.29	1.52
R23	Proskurivskyi	0.22	1.37	0.69	0.45
R24	Yampilskyi	0.89	3.80	1.92	1.17
R25	Zhytomyrskyi	-0.22	7.15	2.37	2.98
R26	Volodymyrvolynskyi	-3.90	2.22	0.04	2.33
R27	Dubenskyi	-1.34	1.25	0.15	0.98
R28	Zaslavskyi	-0.36	4.92	1.28	2.08
R29	Kovelskyi	-5.69	2.52	-0.12	3.24
R30	Kremenetskyi	-1.39	2.54	0.89	1.50
R31	Lutskyi	-0.51	1.50	0.54	0.72
R32	Novohradvolynskyi	-0.28	2.15	0.59	0.93
R33	Ovrutskyi	0.01	3.41	1.90	1.47
R34	Ostrozhskyi	0.09	2.12	0.95	0.79
R35	Rivnenskyi	-2.75	1.75	0.10	1.69
R36	Starokonstiantynivskyi	0.26	1.27	0.78	0.46

Sources to the tbl. I.4.4, I.4.5: calculated by the author according to the tbl. I.4.2, I.4.3.

Table I.4.6. Descriptive statistics of the Left-Bank Ukraine population estimated demographic growth by districts (1846 – 1863)

Code	Districts	Descriptive statistics of demographic growth %			
		Minimum	Maximum	Average	Standard deviation
L1	Poltavskyi	-0.02	2.84	1.40	1.06
L2	Hadiatskyi	-0.35	2.96	1.15	1.23
L3	Zenkivskyi	-2.05	2.39	0.93	1.72
L4	Zolotonoshskyi	-0.28	1.19	0.49	0.61

L5	Kobeliakskyi	0.56	3.55	1.82	1.11
L6	Konstiantynohradskyi	0.15	2.04	1.21	0.73
L7	Kremenchukskyi	-0.27	1.95	1.09	0.93
L8	Lokhvytskyi	-2.65	2.95	0.30	2.45
L9	Lubenskyi	0.18	2.86	1.51	1.06
L10	Myrhorodskyi	0.16	2.04	0.99	0.77
L11	Pereiaslavskyi	0.09	3.01	1.19	1.19
L12	Pyriatynskyi	-0.44	0.90	0.36	0.61
L13	Prylutskyi	-0.07	1.93	0.79	0.74
L14	Romenskyi	-0.31	1.80	0.59	0.78
L15	Khorolskyi	-0.14	2.71	1.30	1.10
L16	Chernihivskyi	-1.60	10.56	1.62	5.04
L17	Borznianskyi	0.49	1.99	0.99	0.59
L18	Hlukhivskyi	-0.79	1.55	0.41	0.94
L19	Horodianskyi	-0.47	5.46	1.37	2.36
L20	Kozelskyi	-0.10	2.36	0.71	1.02
L21	Konotopskyi	-3.54	3.36	-0.02	2.84
L22	Krolevetskyi	-0.82	7.49	1.53	3.39
L23	Mhlynskyi	-1.07	1.22	0.31	0.88
L24	Nizhynskyi	-1.26	2.20	0.66	1.35
L25	Novhorodsiverskyi	-1.13	2.45	0.29	1.41
L26	Novozybkivskyi	-0.08	0.51	0.23	0.23
L27	Osterskyi	-2.86	0.96	-0.20	1.54
L28	Sosnytskyi	-1.07	5.59	1.21	2.55
L29	Starodubskyi	-0.19	0.69	0.31	0.40
L30	Surazhskyi	0.53	1.04	0.69	0.21
L31	Kharkivskyi	1.33	6.41	2.94	2.13
L32	Akhtyrskyi	0.36	2.10	0.97	0.70
L33	Bohoduhivskyi	-0.80	1.78	0.58	1.20
L34	Valkivskyi	-1.41	2.03	0.74	1.32
L35	Vovchanskyi	-0.61	13.78	3.13	6.03
L36	Zmiivskyi	-1.46	39.86	8.07	17.81
L37	Iziumskyi	-2.22	10.59	2.55	4.78
L38	Kupianskyi	0.15	31.06	7.14	13.38
L39	Lebedynskyi	-3.52	8.96	1.02	4.90
L40	Starobilsky	1.73	20.01	6.36	7.73
L41	Sumskyi	-2.31	5.93	2.35	3.31

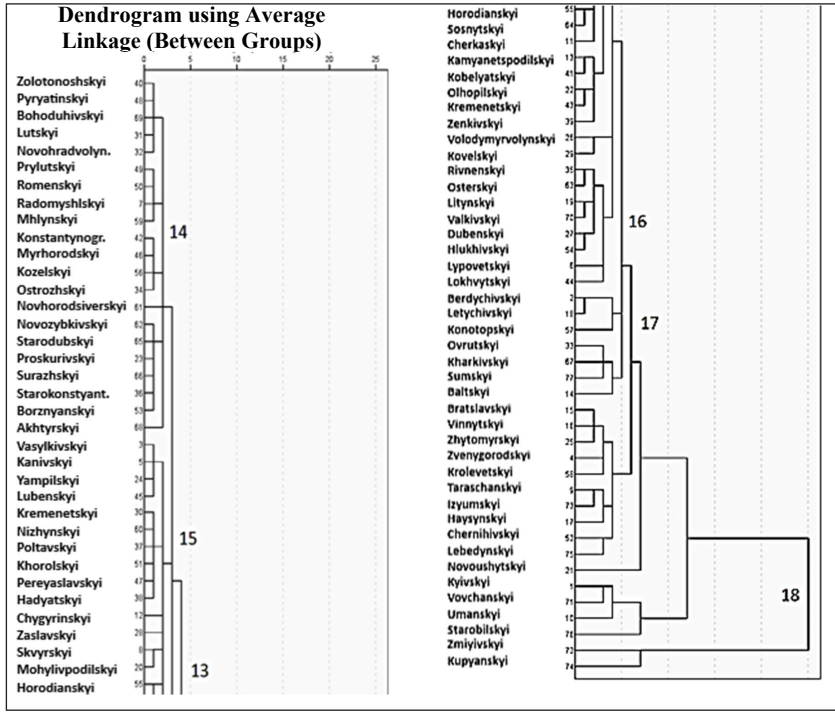


Figure I.4.3. Cluster analysis of the Forest-Steppe Ukraine population demographic growth distribution by districts (1846 – 1863)

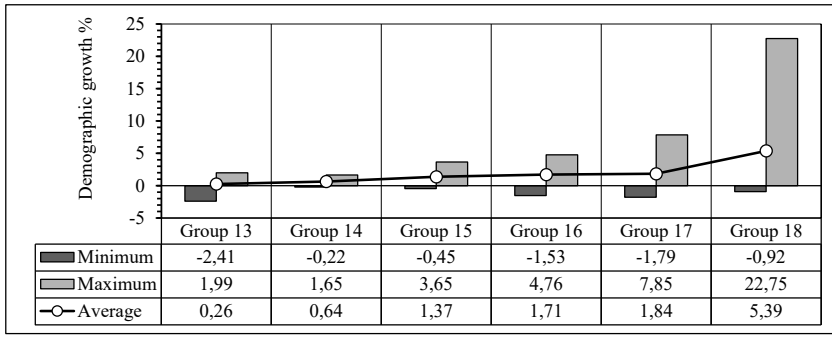
Table I.4.7. The results of the Forest-Steppe Ukraine districts cluster grouping by the estimated demographic growth (1846 – 1863)

Code	Groups / districts	Descriptive statistics of demographic growth %			
		Minimum	Maximum	Average	Standard deviation
Group 14 (average)		-0.22	1.65	0.64	-
L4	Zolotonoshskyi	-0.28	1.19	0.49	0.61
L12	Pyriatynskyi	-0.44	0.90	0.36	0.61
L33	Bohoduhivskyi	-0.80	1.78	0.58	1.20
R31	Lutskyi	-0.51	1.50	0.54	0.72
R32	Novohradvolynskyi	-0.28	2.15	0.59	0.93

L13	Prylutskyi	-0.07	1.93	0.79	0.74
L14	Romenskyi	-0.31	1.80	0.59	0.78
R7	Radomyshlskyi	-0.99	2.63	0.66	1.31
L23	Mhlynskyi	-1.07	1.22	0.31	0.88
L6	Konstiantynohradskyi	0.15	2.04	1.21	0.73
L10	Myrhorodskyi	0.16	2.04	0.99	0.77
L20	Kozelskyi	-0.10	2.36	0.71	1.02
R34	Ostrozhskyi	0.09	2.12	0.95	0.79
L25	Novhorodsiverskyi	-1.13	2.45	0.29	1.41
L26	Novozybkivskyi	-0.08	0.51	0.23	0.23
L29	Starodubskyi	-0.19	0.69	0.31	0.40
R23	Proskurivskyi	0.22	1.37	0.69	0.45
L30	Surazhskyi	0.53	1.04	0.69	0.21
R36	Starokonstiantynivskyi	0.26	1.27	0.78	0.46
L17	Borznianskyi	0.49	1.99	0.99	0.59
L32	Akhtyrskyi	0.36	2.10	0.97	0.70
	Group 15 (average)	*-0.45*	*3.65*	*1.37*	-
R3	Vasylkivskyi	-0.25	4.24	1.51	1.82
R5	Kanivskyi	0.27	4.06	1.68	1.56
R24	Yampilskyi	0.89	3.80	1.92	1.17
L9	Lubenskyi	0.18	2.86	1.51	1.06
R30	Kremenetskyi	-1.39	2.54	0.89	1.50
L24	Nizhynskyi	-1.26	2.20	0.66	1.35
L1	Poltavskyi	-0.02	2.84	1.40	1.06
L15	Khorolskyi	-0.14	2.71	1.30	1.10
L11	Pereiaslavskyi	0.09	3.01	1.19	1.19
L2	Hadiatskyi	-0.35	2.96	1.15	1.23
R12	Chyhyrynskyi	0.11	4.84	1.76	1.90
R28	Zaslavskyi	-0.36	4.92	1.28	2.08
R8	Skvyrskyi	-1.48	4.01	1.07	1.96
R20	Mohylivpodilskyi	-1.35	4.75	1.30	2.35
L19	Horodianskyi	-0.47	5.46	1.37	2.36
L28	Sosnytskyi	-1.07	5.59	1.21	2.55
R11	Cherkaskyi	-0.10	5.25	1.93	2.00
R13	Kamianetspodilskyi	-0.24	3.33	1.83	1.33
L5	Kobeliakskyi	0.56	3.55	1.82	1.11
R22	Olhopolskyi	-1.10	3.09	1.29	1.52
L7	Kremenetskyi	-0.27	1.95	1.09	0.93
L3	Zenkivskyi	-2.05	2.39	0.93	1.72
	Group 13 (average)	*-2.41*	*1.99*	*0.26*	-
R26	Volodymyrvolynskyi	-3.90	2.22	0.04	2.33
R29	Kovelskyi	-5.69	2.52	-0.12	3.24

R35	Rivnenskyi	-2.75	1.75	0.10	1.69
L27	Osterskyi	-2.86	0.96	-0.20	1.54
R19	Litynskyi	-1.78	1.80	0.61	1.45
L34	Valkivskyi	-1.41	2.03	0.74	1.32
R27	Dubenskyi	-1.34	1.25	0.15	0.98
L18	Hlukhivskyi	-0.79	1.55	0.41	0.94
R6	Lypovetskyi	-0.89	2.86	0.52	1.52
L8	Lokhvytskyi	-2.65	2.95	0.30	2.45
	Group 16 (average)	*-1.53*	*4.76*	*1.71*	-
R2	Berdychivskyi	-2.95	4.58	1.06	2.73
R18	Letychivskyi	-3.72	4.55	1.04	3.03
L21	Konotopskyi	-3.54	3.36	-0.02	2.84
R33	Ovrutskyi	0.01	3.41	1.90	1.47
L31	Kharkivskyi	1.33	6.41	2.94	2.13
L41	Sumskyi	-2.31	5.93	2.35	3.31
R14	Baltskyi	0.46	5.05	2.69	1.98
	Group 17 (average)	*-1.79*	*7.85*	*1.84*	-
R15	Bratslavskyi	-0.26	7.12	1.81	3.02
R16	Vinnytskyi	-1.28	5.42	1.37	2.46
R25	Zhytomyrskyi	-0.22	7.15	2.37	2.98
R4	Zvenyhorodskyi	-0.89	7.04	2.30	2.98
L22	Krolevetskyi	-0.82	7.49	1.53	3.39
R9	Taraschanskyi	-1.47	9.36	2.22	4.18
L37	Iziumskyi	-2.22	10.59	2.55	4.78
R17	Haisynskyi	-2.74	8.53	2.29	4.17
L16	Chernihivskyi	-1.60	10.56	1.62	5.04
L39	Lebedynskyi	-3.52	8.96	1.02	4.90
R21	Novoushytskyi	-4.64	4.18	1.20	3.46
	Group 18 (average)	*-0.92*	*22.75*	*5.39*	-
R1	Kyivskyi	-3.31	14.56	3.03	6.76
L35	Vovchanskyi	-0.61	13.78	3.13	6.03
R10	Umanskyi	-2.04	17.23	4.63	7.40
L40	Starobilskyi	1.73	20.01	6.36	7.73
L36	Zmiivskyi	-1.46	39.86	8.07	17.81
L38	Kupianskyi	0.15	31.06	7.14	13.38
Average sample values		**-0.96**	**5.08**	**1.44**	-

Source: calculated by the author according to the tbl. I.4.5, I.4.6; fig. I.4.3.



	Group 13	Group 14	Group 15	Group 16	Group 17	Group 18
Minimum	-2,41	-0,22	-0,45	-1,53	-1,79	-0,92
Maximum	1,99	1,65	3,65	4,76	7,85	22,75
Average	0,26	0,64	1,37	1,71	1,84	5,39

Figure I.4.4. Ranked diagram of the Forest-Steppe Ukraine districts cluster groups by the demographic growth (1846 – 1863)

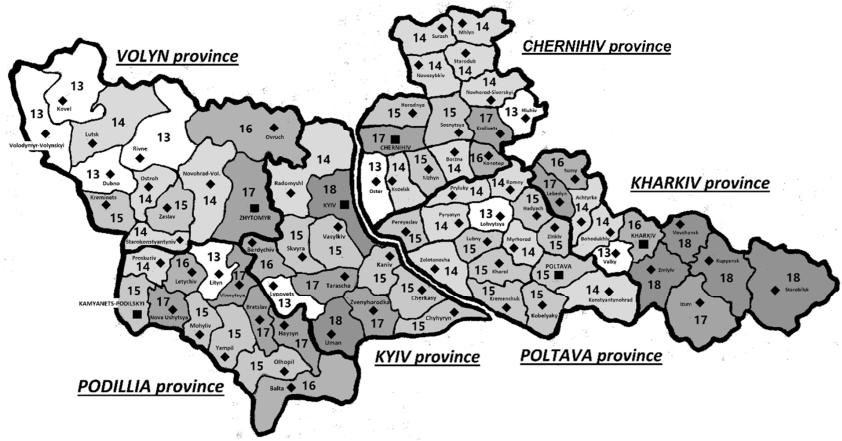


Figure I.4.5. Spatial distribution of the Forest-Steppe Ukraine cluster groups of districts according to demographic growth (1846 – 1863)

Source to fig. I.4.5, I.4.6: calculated by the author according to the tbl. I.4.6.

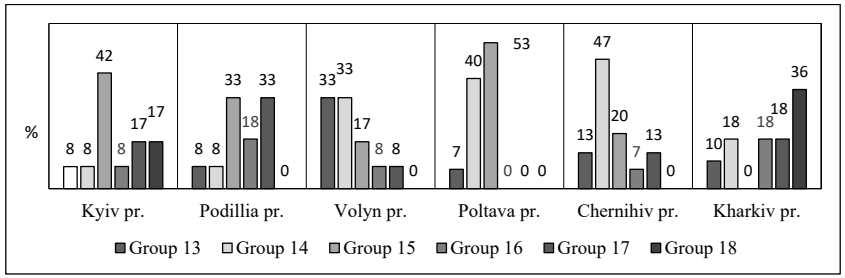
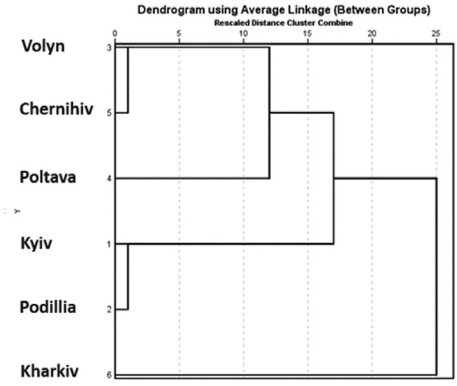


Figure I.4.6. The structure of Ukrainian Forest-Steppe provinces by cluster groups of demographic growth (% of districts of the group to the number of districts in the provinces)



Proximity matrix

Matrix file input

Provinces	Kyiv	Podillia	Volyn	Poltava	Chernihiv	Kharkiv
Kyiv	0	726	2245	1788	2336	2330
Podillia	726	0	2231	2838	2236	2714
Volyn	2245	2231	0	2149	631	2539
Poltava	1788	2838	2149	0	1392	5246
Chernihiv	2336	2236	631	1392	0	2692
Kharkiv	2330	2714	2539	5246	2692	0

Figure I.4.7. Classification of the Forest-Steppe Ukraine provinces according to the structure of cluster groups of demographic growth

5. Dynamics of population growth

The dynamics of population growth rates are a kind of relative statistical indicators of dynamics with a constant basis of comparison, for which we take the data of 1846. This will help us better understand the trend in the accumulation of the demographic potential of Forest-Steppe Ukraine in the middle of the 19th century. At the province and region levels, the situation was as follows (tbl. I.5.1, I.5.2; fig. I.5.1). In 1851, only two provinces showed positive dynamics of demographic growth – Podillia (2.5%) and Volyn (3.9%), while the population of Kyiv province decreased (-5.4%). Right-Bank remained at 1846, and the number of residents on Left-Bank decreased by -2.4% (Poltava pr. -1.1%, Chernihiv pr. -2.1%, Kharkiv pr. -4.1%).

Five years later, Podillia (12.4%) and Volyn (6.1%) remained the leaders in the dynamics of population growth on Forest-Steppe, and Kyiv province (3.1%) began to restore its population, which required almost ten years. On Left-Bank, the population of Poltava (4.3%) and Kharkiv provinces (5.4%) gradually increased, but Chernihiv province barely reached the level of 1846. The population of Right-Bank grew at twice the rate of Left-Bank in general.

In 1858, the leaders in the dynamics of population growth in Forest-Steppe Ukraine were Podillia (13.5%), Kyiv (12.4%), and Kharkiv (11.1%) provinces, not least due to bureaucratic manipulations with the accounting of military settlers. In Poltava province, compared to 1846, the population increased by 7.7%, and in Chernihiv province by 4.9%. Right-Bank of the Dnipro continued to outpace Left-Bank in dynamics of population growth by 1.5 times.

At the beginning of the 1860s, Podillia remained the undisputed leader in dynamics of demographic growth (21.3%), the second place belonged to Kyiv province (16.3%), the third place was shared between Volyn (13.4%) and Poltava provinces (13.3%), and followed by Kharkiv (11.6%) and Chernihiv (6.1%) provinces. At the end of the studied period, the highest and lowest provincial levels of dynamics population growth rates differed by 3.5 times, and the gap between Right-Bank and Left-Bank in the rate of dynamics demographic development was estimated to be 1.6 times.

Hierarchical cluster analysis made it possible to structure a sample of 77 districts of the Forest-Steppe provinces, dividing the total array into 5 groups, ranked according to the order of growth of such group values of descriptive statistics as "average rates" and "maximum rates" of dynamics population growth (tbl. I.5.5; fig. I.5.3, I.5.4).

Cluster group 19 includes 15 districts, 9 of which are located on the Left-Bank (Chernihiv pr. 6, Poltava pr. 2, Kharkiv pr. 1) and 6 on the Right-Bank subregion (Kyiv pr. 3, Podillia pr. 2, Volyn pr. 1).

Cluster group 20, with minimum rates of dynamics population growth close to the sample average (-0.41%), turned out to be the most numerous. Among the 34 provinces, 20 were in the Left-Bank subregion (10 in Poltava pr., 9 in Chernihiv pr., 1 in Kharkiv province). The remaining 14 were distributed on the Right-Bank: Volyn – 8, Podillia – 4, and Kyiv province – 2.

Cluster group 21 of 7 districts, distributed almost evenly between the provinces of both banks of the Dnipro, had an average group indicator of descriptive statistics "maximum rates" close to the sample one.

Cluster group 22 comprises 14 districts, including 5 in Kyiv, 4 in Podillia, 2 in Volyn, 1 in Poltava, and 2 in Kharkiv provinces.

According to the descriptive statistics indicator, the "average rates" of groups 21 and 22 are almost the same, but according to the indicators of the "minimum" and "maximum" rates of dynamic population growth, the differences between them are significant.

Cluster group 23, formed by the Umanskyi, Baltskyi, Zmiivskyi, Kupianskyi, Starobilskyi, Kharkivskyi, and Sumskyi districts, differs significantly from the rest in terms of the "maximum rates" of dynamic population growth due to the negative role of the Ukrainian Forest-Steppe military settlements in the formation of local demographic statistical data of the 19th century.

The classification of provinces according to the structures of cluster groups of districts following the dynamics of their population growth demonstrates three local variants of the process: Kyiv-Podillia (important role of group 22), Volyn-Poltava-Chernihiv (the defining role of group 20), and Kharkiv (leading role of group 23) (fig. I.5.4 – I.5.6).

Table I.5.1. Growth rates of the Right-Bank Ukraine population in 1846–1863

Code	Provinces/districts	±% to 1846			
		1851	1856	1858	1863
	Kyiv prov.	-5.4	3.1	12.4	16.3
R1	Kyivskyi	-16.5	-7.9	18.9	24.1
R2	Berdychivskyi	-14.8	4.7	9.3	13.2
R3	Vasylkivskyi	2.2	0.9	9.5	6.1
R4	Zvenyhorodskyi	3.3	16.8	33.2	28.3
R5	Kanivskyi	1.4	3.6	11.9	-7.1
R6	Lypovetskyi	-4.5	9.2	9.5	27.3
R7	Radomyshlskyi	-4.9	-0.7	4.3	1.0
R8	Skvyrskyi	-7.4	-3.9	3.8	17.6
R9	Taraschanskyi	-7.3	-6.7	10.7	31.2
R10	Umanskyi	-10.2	8.3	45.6	56.9
R11	Cherkaskyi	-0.5	6.3	17.4	28.8
R12	Chyhyrynskyi	1.6	9.2	19.7	20.4
	Including cities	*no data*	*21.6*	*25.9*	*38.9*
	Kyiv-Podillia military settlement	*-11.3*	*13.7*	*cancelled*	*cancelled*
	Podillia prov.	***2.5***	***12.4***	***13.5***	***21.3***
R13	Kamianetspodilskyi	-1.2	7.1	10.9	29.5
R14	Baltskyi	9.3	36.9	49.2	60.9
R15	Bratslavskyi	3.9	2.4	17.1	24.2
R16	Vinnytskyi	3.1	-3.6	6.9	13.7
R17	Haisynskyi	-13.7	2.1	19.5	26.8
R18	Letychivskyi	-18.6	-0.1	4.7	9.4
R19	Litynskyi	1.7	10.8	6.9	13.5
R20	Mohylivpodilskyi	-6.8	-8.3	0.4	7.3
R21	Novoushytskyi	12.4	35.8	23.2	29.1
R22	Olhopolskyi	-5.5	9.1	11.7	20.8
R23	Proskurivskyi	4.9	6.1	6.6	13.9
R24	Yampilskyi	6.3	11.1	19.5	27.7
	Including cities	*no data*	*46.9*	*71.4*	*84.9*
	Kyiv-Podillia military settlement	*243.9*	*276.1*	*cancelled*	*cancelled*
	Volyn prov.	***3.9***	***6.1***	***8.1***	13.4
R25	Zhytomyrskyi	-1.1	1.4	15.8	34.9
R26	Volodymyrvolynskyi	11.1	11.7	3.1	6.6
R27	Dubenskyi	-0.7	1.1	-1.7	4.5
R28	Zaslavskyi	4.2	6.1	16.6	14.4
R29	Kovelskyi	12.6	13.7	0.8	9.5
R30	Kremenetskyi	-6.9	-5.3	-0.5	5.4
R31	Lutskyi	3.4	6.7	9.9	7.1

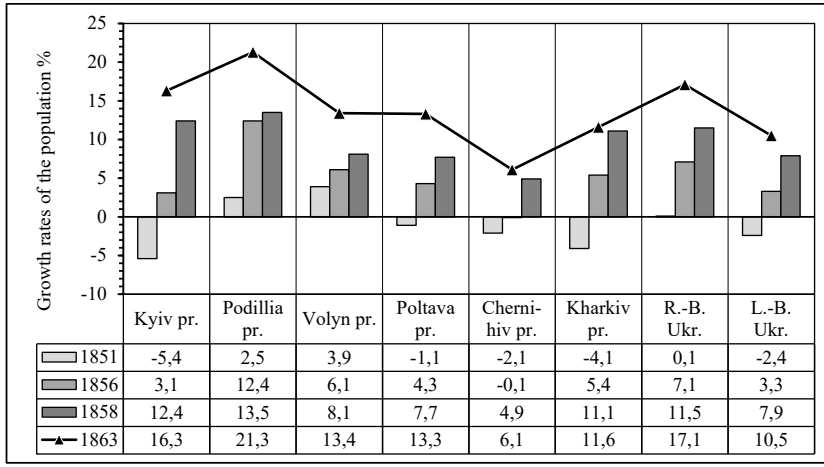
R32	Novohradvolynskyi	1.9	4.9	9.5	7.9
R33	Ovrutskyi	14.3	18.4	26.5	26.5
R34	Ostrozhskyi	2.5	3.1	5.7	9.5
R35	Rivnenskyi	3.2	4.9	-0.9	7.8
R36	Starokonstiantynivskyi	1.3	3.8	5.1	11.8
	Including cities	*no data*	*0.14*	*6.6*	*41.2*
Right-Bank Ukraine		**0.1**	**7.1**	**11.5**	17.1

Table I.5.2. Growth rates of the Left-Bank Ukraine population in 1846-1863

Code	Provinces/districts	±% to 1846			
		1851	1856	1858	1863
	Poltava prov.	***-1.1***	***4.3***	***7.7***	***13.3***
L1	Poltavskyi	-0.1	4.2	10.1	18.7
L2	Hadiatskyi	-1.8	2.2	8.2	16.9
L3	Zenkivskyi	-10.2	-3.7	-0.6	11.3
L4	Zolotonoshskyi	-0.1	5.9	7.6	6.1
L5	Kobeliakskyi	2.8	12.1	14.9	35.2
L6	Konstiantynohradskyi	5.8	11.1	15.5	16.4
L7	Kremenchukskyi	-1.4	7.7	9.1	19.6
L8	Lokhvytskyi	-13.3	-0.5	-3.7	-1.8
L9	Lubenskyi	5.6	6.5	12.6	18.9
L10	Myrhorodskyi	0.88	5.1	9.4	11.7
L11	Pereiaslavskyi	0.45	2.3	8.5	12.5
L12	Pyriatynskyi	-0.7	3.4	4.7	2.4
L13	Prylutskyi	-0.4	3.5	7.5	12.3
L14	Romenskyi	-1.5	1.8	5.5	6.6
L15	Khorolskyi	-0.7	3.3	8.9	15.1
	Including cities	*no data*	*8.8*	*20.1*	*31.1*
	Chernihiv prov.	***-2.1***	***-0.1***	***4.9***	***6.1***
L16	Chernihivskyi	-2.7	-4.9	15.2	5.9
L17	Borznianskyi	-2.5	5.9	7.5	18.2
L18	Hlukhivskyi	-0.3	5.3	3.7	11.7
L19	Horodianskyi	-2.4	0.28	11.2	17.4
L20	Kozelskyi	0.6	0.1	4.8	5.6
L21	Konotopskyi	-11.4	-4.5	1.9	-16.1
L22	Krolevetskyi	-4.1	0.4	15.4	14.9
L23	Mhlynskyi	-5.3	-4.9	-2.6	1.5
L24	Nizhynskyi	-6.2	-6.1	-1.9	5.7
L25	Novhorodsiverskyi	-2.6	-3.8	0.9	-4.8
L26	Novozybkivskyi	2.6	4.1	3.9	5.7
L27	Osterskyi	0.2	0.8	-4.9	-0.4

L28	Sosnytskyi	-5.3	-2.6	8.3	8.9
L29	Starodubskyi	2.4	1.5	1.4	4.5
L30	Surazhskyi	2.8	8.1	9.4	13.5
	Including cities	*no data.*	*no data*	*no data*	*no data*
	Kharkiv prov.	***-4.1***	***5.4***	***11.11***	***11.62***
L31	Kharkivskyi	17.9	28.4	44.8	56.4
L32	Akhtyrskyi	10.5	16.3	17.1	19.7
L33	Bohoduhivskyi	-2.7	5.9	9.4	5.1
L34	Valkivskyi	2.5	12.9	9.7	17.2
L35	Vovchanskyi	-1.8	5.7	34.8	30.65
L36	Zmiivskyi	-7.3	-0.2	79.3	74.2
L37	Iziumskyi	-11.1	-2.6	18.1	24.6
L38	Kupianskyi	6.3	15.2	86.7	88.1
L39	Lebedynskyi	-17.6	-11.9	3.8	-9.11
L40	Starobilsky	24.8	41.4	97.9	115.1
L41	Sumskyi	25.7	35.8	51.8	34.3
	Including cities	*no data*	*12.4*	*24.2*	*36.7*
	Ukrainian military settlement	*-14.9*	*-1.13*	*cancelled*	*cancelled*
	Left-Bank Ukraine	**-2.4**	**3.3**	**7.9**	**10.5**

Source to the tbl. I.5.1, I.5.2: calculated by the author according to the tbl. I.2.1, I. 2.2.



	Kyiv pr.	Podillia pr.	Volyn pr.	Poltava pr.	Cherni-hiv pr.	Kharkiv pr.	R.-B. Ukr.	L.-B. Ukr.
1851	-5,4	2,5	3,9	-1,1	-2,1	-4,1	0,1	-2,4
1856	3,1	12,4	6,1	4,3	-0,1	5,4	7,1	3,3
1858	12,4	13,5	8,1	7,7	4,9	11,1	11,5	7,9
1863	16,3	21,3	13,4	13,3	6,1	11,6	17,1	10,5

Figure I.5.1. Diagram of the Forest-Steppe Ukraine population growth rates byprovinces (±% to 1846)

Table I.5.3. Descriptive statistics of the Right-Bank Ukraine population growth rates by districts (±% to 1846)

Code	Districts	Descriptive statistics of the population growth rates			
		Minimum %	Maximum %	Average %	Standard deviation
R1	Kyivskyi	-16.50	24.10	4.65	19.88
R2	Berdychivskyi	-14.80	13.20	3.10	12.43
R3	Vasylkivskyi	0.90	9.50	4.68	3.90
R4	Zvenyhorodskyi	3.30	33.20	20.40	13.31
R5	Kanivskyi	-7.10	11.90	2.45	7.81
R6	Lypovetskyi	-4.50	27.30	10.38	13.04
R7	Radomyshlskyi	-4.90	4.30	-0.08	3.83
R8	Skvyrskyi	-7.40	17.60	2.53	11.09
R9	Taraschanskyi	-7.30	31.20	6.98	18.18
R10	Umanskyi	-10.20	56.90	25.15	31.41
R11	Cherkaskyi	-0.50	28.80	13.00	12.86
R12	Chyhyrynskyi	1.60	20.40	12.73	9.01
R13	Kamianetspodilskyi	-1.20	29.50	11.58	12.97
R14	Baltskyi	9.30	60.90	39.08	22.14
R15	Bratslavskyi	2.40	24.20	11.90	10.53
R16	Vinnytskyi	-3.60	13.70	5.03	7.23
R17	Haisynskyi	-13.70	26.80	8.68	18.16
R18	Letychivskyi	-18.60	9.40	-1.15	12.26
R19	Litynskyi	1.70	13.50	8.23	5.12
R20	Mohylivpodilskyi	-8.30	7.30	-1.85	7.19
R21	Novoushytskyi	12.40	35.80	25.13	9.92
R22	Olhopolskyi	-5.50	20.80	9.03	10.91
R23	Proskurivskyi	4.90	13.90	7.88	4.08
R24	Yampilskyi	6.30	27.70	16.15	9.44
R25	Zhytomyrskyi	-1.10	34.90	12.75	16.54
R26	Volodymyrvolynskyi	3.10	11.70	8.13	4.05
R27	Dubenskyi	-1.70	4.50	0.79	2.73
R28	Zaslavskyi	4.20	16.60	10.33	6.09
R29	Kovelskyi	0.80	13.70	9.15	5.84
R30	Kremenetskyi	-6.90	5.40	-1.83	5.53
R31	Lutskyi	3.40	9.90	6.78	2.66
R32	Novohradvolynskyi	1.90	9.50	6.05	3.36
R33	Ovrutskyi	14.30	26.50	21.43	6.09
R34	Ostrozhskyi	2.50	9.50	5.20	3.19
R35	Rivnenskyi	-0.90	7.80	3.75	3.64
R36	Starokonstiantynivskyi	1.30	11.80	5.50	4.49

Table I.5.4. Descriptive statistics of the Left-Bank Ukraine population growth rates by districts (±% to 1846)

Code	Districts	Descriptive statistics of the population growth rates			
		Minimum %	Maximum %	Average %	Standard deviation
L1	Poltavskyi	-0.10	18.70	8.23	8.14
L2	Hadiatskyi	-1.80	16.90	6.38	8.13
L3	Zenkivskyi	-10.20	11.30	-0.80	9.00
L4	Zolotonoshskyi	-0.10	7.60	4.88	3.40
L5	Kobeliakskyi	2.80	35.20	16.25	13.65
L6	Konstiantynohradskyi	5.80	16.40	12.20	4.85
L7	Kremenchukskyi	-1.40	19.60	8.75	8.60
L8	Lokhvytskyi	-13.30	-0.50	-4.83	5.80
L9	Lubenskyi	5.60	18.90	10.90	6.17
L10	Myrhorodskyi	0.88	11.70	6.77	4.79
L11	Pereiaslavskyi	0.45	12.50	5.94	5.57
L12	Pyriatynskyi	-0.70	4.70	2.45	2.30
L13	Prylutskyi	-0.40	12.30	5.73	5.44
L14	Romenskyi	-1.50	6.60	3.10	3.69
L15	Khorolskyi	-0.70	15.10	6.65	6.87
L16	Chernihivskyi	-4.90	15.20	3.38	9.16
L17	Borznianskyi	-2.50	18.20	7.28	8.50
L18	Hlukhivskyi	-0.30	11.70	5.10	4.99
L19	Horodianskyi	-2.40	17.40	6.62	9.29
L20	Kozelskyi	0.10	5.60	2.78	2.83
L21	Konotopskyi	-16.10	1.90	-7.53	7.89
L22	Krolevetskyi	-4.10	15.40	6.65	9.99
L23	Mhlynskyi	-5.30	1.50	-2.83	3.12
L24	Nizhynskyi	-6.20	5.70	-2.13	5.59
L25	Novhorodsiverskyi	-4.80	0.90	-2.58	2.49
L26	Novozybkivskyi	2.60	5.70	4.08	1.27
L27	Osterskyi	-4.90	0.80	-1.08	2.60
L28	Sosnytskyi	-5.30	8.90	2.33	7.33
L29	Starodubskyi	1.40	4.50	2.45	1.44
L30	Surazhskyi	2.80	13.50	8.45	4.41
L31	Kharkivskyi	17.90	56.40	36.88	17.09
L32	Akhtyrskyi	10.50	19.70	15.90	3.88
L33	Bohoduhivskyi	-2.70	9.40	4.43	5.10
L34	Valkivskyi	2.50	17.20	10.58	6.20
L35	Vovchanskyi	-1.80	34.80	17.34	18.11
L36	Zmiivskyi	-7.30	79.30	36.50	46.61
L37	Iziumskyi	6.30	88.10	49.08	44.41
L38	Kupianskyi	-17.60	3.80	-8.70	9.05
L39	Lebedynskyi	24.80	115.10	69.80	43.49
L40	Starobilsky	25.70	51.80	36.90	10.88
Average sample values		**-0.42**	**20.34**	**9.79**	**-**

Sources to the tbl. I.5.4: calculated by the author according to the tbl. I.5.1, I.5.2.

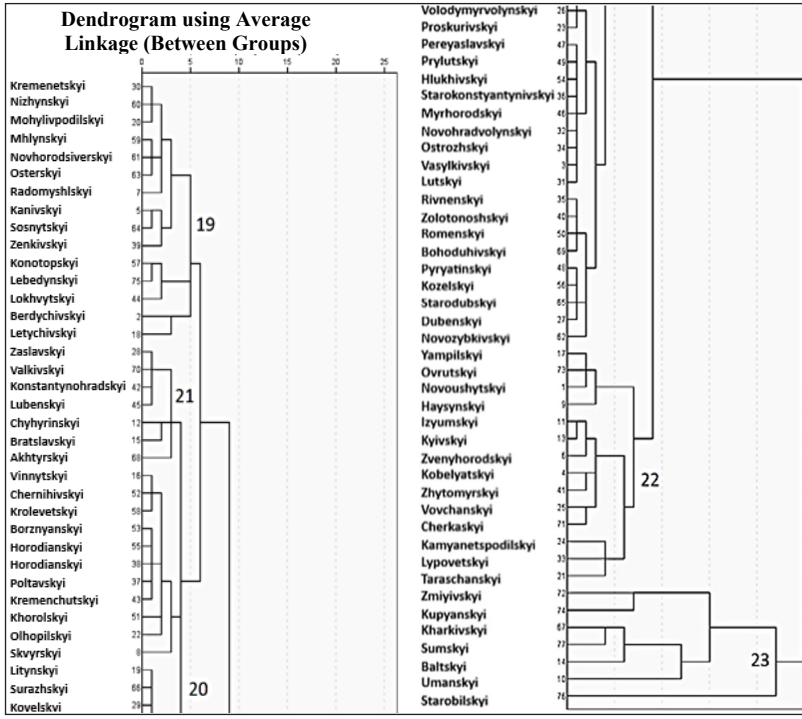


Figure I.5.2. Cluster analysis of the Forest-Steppe Ukraine districts distribution according to the population growth rates (1846 – 1863)

Table I.5.5. The results of the Forest-Steppe Ukraine districts grouping by the population growth rates in 1846 – 1863 (±% to 1846)

Code	Cluster groups/districts	Descriptive statistics of the population growth rates %			
		Minimum	Maximum	Average	Standard deviation
Group 19 (average)		*-9.62*	*5.72*	*-1.83*	-
R30	Kremenetskyi	-6.90	5.40	-1.83	5.53
L24	Nizhynskyi	-6.20	5.70	-2.13	5.59
R20	Mohylivpodilskyi	-8.30	7.30	-1.85	7.19
L23	Mhlynskyi	-5.30	1.50	-2.83	3.12
L25	Novhorodsiverskyi	-4.80	0.90	-2.58	2.49
L27	Osterskyi	-4.90	0.80	-1.08	2.60
R7	Radomyshlskyi	-4.90	4.30	-0.08	3.83

R5	Kanivskyi	-7.10	11.90	2.45	7.81
L28	Sosnytskyi	-5.30	8.90	2.33	7.33
L3	Zenkivskyi	-10.20	11.30	-0.80	9.00
L21	Konotopskyi	-16.10	1.90	-7.53	7.89
L39	Lebedynskyi	-17.60	3.80	-8.70	9.05
L8	Lokhvytskyi	-13.30	-0.50	-4.83	5.80
R2	Berdychivskyi	-14.80	13.20	3.10	12.43
R18	Letychivskyi	-18.60	9.40	-1.15	12.26
	Group 21 (average)	4.66	19.06	12.08	-
R28	Zaslavskyi	4.20	16.60	10.33	6.09
L34	Valkivskyi	2.50	17.20	10.58	6.20
L6	Konstiantynohradskyi	5.80	16.40	12.20	4.85
L9	Lubenskyi	5.60	18.90	10.90	6.17
R12	Chyhyrynskyi	1.60	20.40	12.73	9.01
R15	Bratslavskyi	2.40	24.20	11.90	10.53
L32	Akhtyrskyi	10.50	19.70	15.90	3.88
	Group 20 (average)	*-0.41*	*12.05*	*5.67*	-
R16	Vinnytskyi	-3.60	13.70	5.03	7.23
L16	Chernihivskyi	-4.90	15.20	3.38	9.16
L22	Krolevetskyi	-4.10	15.40	6.65	9.99
L17	Borznianskyi	-2.50	18.20	7.28	8.50
L19	Horodianskyi	-2.40	17.40	6.62	9.29
L2	Horodianskyi	-1.80	16.90	6.38	8.13
L1	Poltavskyi	-0.10	18.70	8.23	8.14
L7	Kremenchukskyi	-1.40	19.60	8.75	8.60
L15	Khorolskyi	-0.70	15.10	6.65	6.87
R22	Olhopolskyi	-5.50	20.80	9.03	10.91
R8	Skvyrskyi	-7.40	17.60	2.53	11.09
R19	Litynskyi	1.70	13.50	8.23	5.12
L30	Surazhskyi	2.80	13.50	8.45	4.41
R29	Kovelskyi	0.80	13.70	9.15	5.84
R26	Volodymyrvolynskyi	3.10	11.70	8.13	4.05
R23	Proskurivskyi	4.90	13.90	7.88	4.08
L11	Pereiaslavskyi	0.45	12.50	5.94	5.57
L13	Prylutskyi	-0.40	12.30	5.73	5.44
L18	Hlukhivskyi	-0.30	11.70	5.10	4.99
R36	Starokonstiantynivskyi	1.30	11.80	5.50	4.49
L10	Myrhorodskyi	0.88	11.70	6.77	4.79
R32	Novohradvolynskyi	1.90	9.50	6.05	3.36
R34	Ostrozhskyi	2.50	9.50	5.20	3.19
R3	Vasylkivskyi	0.90	9.50	4.68	3.90
R31	Lutskyi	3.40	9.90	6.78	2.66
R35	Rivnenskyi	-0.90	7.80	3.75	3.64
L4	Zolotonoshskyi	-0.10	7.60	4.88	3.40
L14	Romenskyi	-1.50	6.60	3.10	3.69
L33	Bohoduhivskyi	-2.70	9.40	4.43	5.10
L12	Pyriatynskyi	-0.70	4.70	2.45	2.30
L20	Kozelskyi	0.10	5.60	2.78	2.83

L29	Starodubskyi	1.40	4.50	2.45	1.44
R27	Dubenskyi	-1.70	4.50	0.79	2.73
L26	Novozybkivskyi	2.60	5.70	4.08	1.27
Group 22 (average)		*-1.33*	*30.03*	13.71	-
R24	Yampilskyi	6.30	27.70	16.15	9.44
R33	Ovrutskyi	14.30	26.50	21.43	6.09
R21	Novoushytskyi	12.40	35.80	25.13	9.92
R17	Haisynskyi	-13.70	26.80	8.68	18.16
L37	Iziumskyi	-11.10	24.60	7.25	16.86
R1	Kyivskyi	-16.50	24.10	4.65	19.88
R4	Zvenyhorodskyi	3.30	33.20	20.40	13.31
L5	Kobeliakskyi	2.80	35.20	16.25	13.65
R25	Zhytomyrskyi	-1.10	34.90	12.75	16.54
L35	Vovchanskyi	-1.80	34.80	17.34	18.11
R11	Cherkaskyi	-0.50	28.80	13.00	12.86
R13	Kamianetspodilskyi	-1.20	29.50	11.58	12.97
R6	Lypovetskyi	-4.50	27.30	10.38	13.04
R9	Taraschanskyi	-7.30	31.20	6.98	18.18
Group 23 (average)		*9.50*	*72.64*	*41.91*	-
L36	Zmiivskyi	-7.30	79.30	36.50	46.61
L38	Kupianskyi	6.30	88.10	49.08	44.41
L31	Kharkivskyi	17.90	56.40	36.88	17.09
L41	Sumskyi	25.70	51.80	36.90	10.88
R14	Baltskyi	9.30	60.90	39.08	22.14
R10	Umanskyi	-10.20	56.90	25.15	31.41
L40	Starobilskyi	24.80	115.10	69.80	43.49
Average sample values		**-0.42**	**20.34**	**9.79**	-

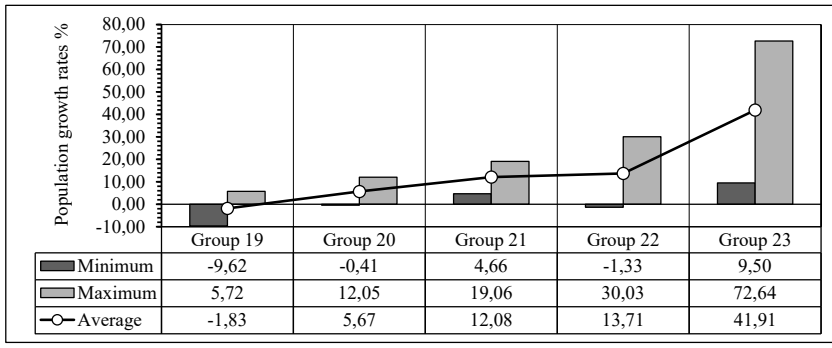


Figure I.5.3. Ranked diagram of the Forest-Steppe Ukraine cluster groups of districts by population growth rates in 1846 – 1863 (±% to 1846)

Source to fig. I.5.3: calculated by the author according to the tbl. I.5.5

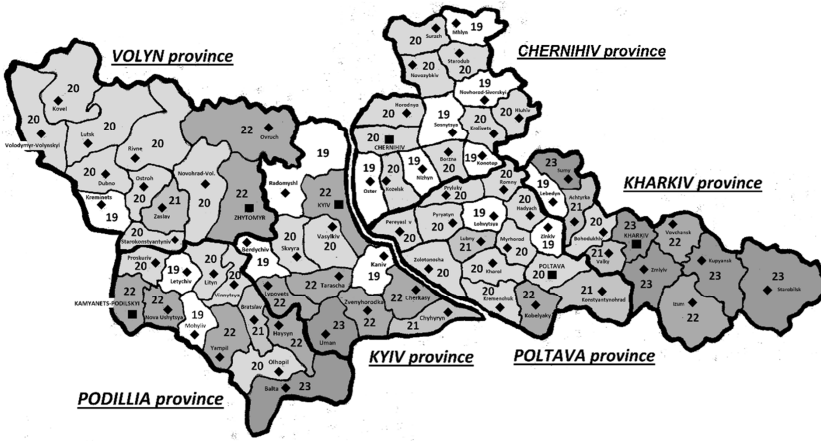


Figure I.5.4. Spatial distribution of the Forest-Steppe Ukraine cluster groups of districts by population growth rates in 1846-1863 (±% to 1846)

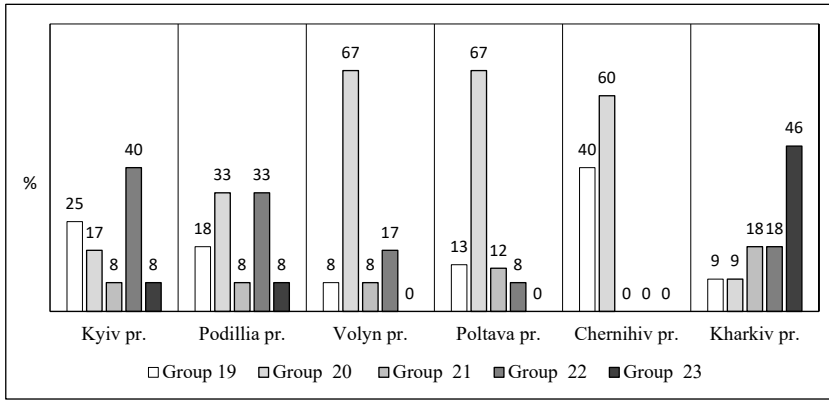
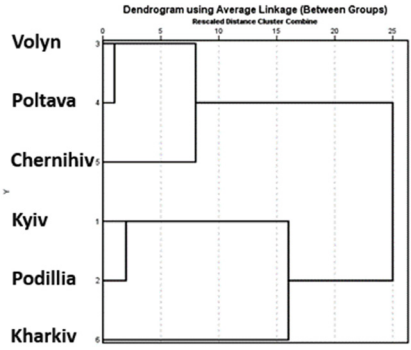


Figure I.5.5. The structure of the Ukrainian Forest Steppe provinces by cluster groups of the population growth rates in 1846 – 1863 (±% to 1846)



Proximity matrix

Matrix input file

Provinces	Kyiv	Podillia	Volyn	Poltava	Chernihiv	Kharkiv
Kyiv	0	354	3382	3748	3802	2348
Podillia	354	0	1576	1886	2430	2426
Volyn	3382	1576	0	122	1426	5582
Poltava	3748	1886	122	0	986	5632
Chernihiv	3802	2430	1426	986	0	6326
Kharkiv	2348	2426	5582	5632	6326	0

Figure I.5.6. Classification of the Forest-Steppe Ukraine provinces according to the internal structure of cluster groups of the population growth rates in 1846 – 1863 (±% to 1846)

6. General statistical model of the demographic situation in the mid-1840s – early 1860s Ukrainian Forest-Steppe

Relying on extensive statistical sources, taking into account the achievements of our predecessors, and using the possibilities of modern methods of numerical information processing, the author offered readers some micromodels of the demographic situation in the Ukrainian Forest-Steppe of the mid-19th century. Each of these reconstructions is based on one of the four most important parameters of the demographic system – the population's number, density, growth, and dynamics. As a result, 23 cluster groups of 77 administrative districts in 6 provinces

have been identified, variants of their spatial distribution have been traced, and local peculiarities in the system organization at the level of provinces and subregions have been determined. The time has come to synthesize the acquired information by combining individual blocks into a general statistical model.

In the first stage, we should compress the information to reduce the number of objects under study (groups of districts according to their demographic characteristics). To do this, we create a matrix (tbl. I.6.1), which indicates the belonging of the districts to cluster groups with the use of a binary code, where the presence of a feature is indicated by the number "10", and its absence by the number "0". This is followed by processing the original matrix using standard factor analysis procedures, in our case using the principal component method. The ten identified components describe 82.8% of the sample variance, which indicates a fairly high reliability of the results obtained. After rotating the matrix of components using the "varimax" method and Kaiser normalization, we obtain a matrix of coefficients of factor values (factor weights) (tbl. 6.2), which connect factors and cluster groups through the contribution of the latter to the formation of each factor. Factors 1, 3, 4, 7, 9, and 10 are described by cluster groups that present all four micromodels of the demographic situation, while groups 5, 6, and 9 do not have significant positive factor weights. The districts that fell into these groups are quite fully described by other categories of demographic characteristics. Cluster group *5* united the five largest by population districts of Forest-Steppe Ukraine (tbl. I.2.6; fig. I.2.4): Kyivskyi and Berdychivskyi in Kyiv pr.; Zhytomyrskyi on Volyn; Baltskyi on Podillia; Starobilskyi in Kharkiv province (fig. I.2.5). The sparsely populated category includes 15 large districts of the 6 and 7 cluster groups; three districts of the 9 group, together with the 8 and 10 groups, formed a total of 27 districts in which the ratio of population and territory was close to optimal (fig. I.3.4).

Another matrix informs us about the relationship between factors and districts through factor loading coefficients, as a result of which we can study factor groups of districts (tbl. I.6.3). Thus, 23 cluster groups can be replaced by 10 factor groups (tbl. I.6.4) without a significant loss of the original information, although the latter still occurs. Kyivskyi, Umanskyi,

and Starobilskyi districts demonstrate the lowest factor loadings among significant ones (0.16, 0.21, 0.29). Previously, we drew the readers' attention to the peculiarities of the demographic history of these territories. Starobilskyi district was artificially constructed as a military settlement, and this is its uniqueness among other districts of the Ukrainian Forest Steppe; Umanskyi district was specially reformatted as a model military settlement. There were officially no military settlers in Kyivskyi district, but there was the largest in Europe 1st-class Kyiv fortress at that time. Kyiv and its district were overcrowded with troops already in the mid-1840s, as can be seen from the data provided by D. Zhuravskyi (Statisticheskoye opisaniye Kiyevskoy gubernii, 1852, pp. 171–176, 341 –342, 351–354; Voyenno-statisticheskiy sbornik, 1871, part 2, pp. 182–183). In other words, Kyivskyi, Umanskyi, and Starobilskyi districts seem the least integrated into the system according to our adopted parametric scale of demographic measurement, which is primarily focused on identifying relevant trends in the life of the civilian population.

The next stage in creating a general demographic model of Forest-Steppe Ukraine for the mid-19th century was a hierarchical cluster analysis of factor groups of districts based on the average values of group indicators. As a result, we get two macrogroups (A and B) divided into three subgroups (B1, B2, and B3) (tbl. I.6.5; fig. I.6.1; I.6.2, a).

Macrogroup A consists of 27 units (35% of all): on Right-Bank 6 in a dense group in the north-west of Volyn, on Left-Bank 11 in Chernihiv, 5 each in Poltava and Kharkiv provinces (fig. I.6.2, c; I.6.3, a). Average group indicators of population size, density, annual (AADG), and absolute (PGR) growth are inferior to those for macrogroup B. Only one of the six central districts of the provinces, Chernihivskyi, was classified as part of the macrogroup A.

Macrogroup B (50 districts) differs from macrogroup A by higher average values of all indicators (fig. I.6.2, b). Its objects were concentrated mainly on Right-Bank (30), as a continuous massif in the southwest of Volyn (6), throughout Kyiv and Podillia provinces (24). On Left-Bank (20), there were more such districts in Poltava (10), less in Kharkiv (6) and Chernihiv (4) provinces (fig. I.6.3, a).

Subgroup B1 is represented by 30 districts, of which 18 were on Right-Bank (8 in Kyiv, 7 in Podillia, and 3 in Volyn provinces). On Left-

Bank there were 6 such districts in Poltava, and 5 in Kharkiv provinces, while in Chernihiv there were none (fig. I.6.2, c). Compared to other subgroups (B2 and B3), it had average indicators values close to those of the macrogroup, except for higher rates of population growth and lower population density. The latter circumstance was determined by the relatively large size of the districts themselves. Poltava and Kharkiv provinces' "capital" districts belonged to this subgroup (fig. I.6.3, a).

Subgroup B2 consisted of 14 districts – 6 on Right-Bank and 8 on Left-Bank (fig. I.6.2, c; I.6.3, a). A characteristic feature of this construct was the relatively small average size of the districts, the lowest values of average annual and absolute population growth in the Forest-Steppe (fig. I.6.2, b). No provincial center is noted in the areas of this subgroup.

Subgroup B3 included 7 districts – 6 on Right-Bank with 3 provincial centers (Kyivskyi, Kamianetspodilskyi, Zhytomyrskyi) among them, and only one (Iziumskyi) on Left-Bank. The average size of administrative districts approached the group average meaning, while the indicators of population size, density, and annual growth significantly exceeded (fig. I.6.2, b, c; I.6.3, a).

In the conditions of the dominance of the agricultural economy, based on the manual labor of many dependent peasants, it seems reasonable to compare the results of demographic modeling with the map of soil fertility of the territory under consideration (fig. 6.3; 6.4). Districts of macrogroup A (34% of the territory and 28% of the population), in most cases, coincided with soils of low and medium productivity, swampy, forested, clayed, and sanded. Macrogroup B (66% and 72%) gravitated towards medium and high-productivity soils, which formed a continuous massif on Right-Bank, interspersed with swampy, forested, and sandy soils on Left-Bank.

Demographic processes developed most actively on the scale of the entire Forest-Steppe in districts of subgroups B1 and B3 (fig. I.6.2 b; I.6.3, b), while the areas of subgroup B2 were more dependent on the influence of natural and socio-economic factors.

Table I.6.1. Summary matrix of the Forest-Steppe Ukraine districts membership to cluster groups of demographic statistics (1846 – 1863)

Code	№	Districts / cluster groups	1	2	3	4	5	6	7	8	9	10	11	12
R1	1	Kyivskyi	0	0	0	0	10	0	0	0	10	0	0	0
R2	2	Berdychivskyi	0	0	0	0	10	0	0	0	0	0	0	10
R3	3	Vasylkivskyi	0	0	0	10	0	0	0	0	0	0	10	0
R4	4	Zvenyhorodskyi	0	0	0	10	0	0	0	0	0	0	0	10
R5	5	Kanivskyi	0	0	10	0	0	0	0	0	0	0	10	0
R6	6	Lypovetskyi	0	0	10	0	0	0	0	0	0	0	0	10
R7	7	Radomyshlskyi	0	0	10	0	0	0	0	0	0	0	0	10
R8	8	Skvyrskyi	0	0	10	0	0	0	0	0	0	0	10	0
R9	9	Taraschanskyi	0	0	0	10	0	0	0	0	0	0	0	10
R10	10	Umanskyi	0	0	0	10	0	0	0	0	10	0	0	0
R11	11	Cherkaskyi	0	0	0	10	0	0	0	0	0	0	10	0
R12	12	Chyhyrynskyi	0	10	0	0	0	0	0	0	0	0	10	0
R13	13	Kamianetspodilskyi	0	0	0	10	0	0	0	0	0	0	0	10
R14	14	Baltskyi	0	0	0	0	10	0	10	0	0	0	0	0
R15	15	Bratslavskyi	0	0	10	0	0	0	0	0	0	0	10	0
R16	16	Vinnytskyi	0	10	0	0	0	0	0	0	0	0	10	0
R17	17	Haisynskyi	0	0	10	0	0	0	0	0	0	0	10	0
R18	18	Letychivskyi	10	0	0	0	0	0	0	0	0	0	10	0
R19	19	Litynskyi	0	10	0	0	0	0	0	0	0	0	10	0
R20	20	Mohylivpodilskyi	0	10	0	0	0	0	0	0	0	0	0	10
R21	21	Novoushytskyi	0	0	10	0	0	0	0	0	0	0	0	10
R22	22	Olhopolskyi	0	0	0	10	0	0	0	0	0	0	10	0
R23	23	Proskurivskyi	0	0	10	0	0	0	0	0	0	0	0	10
R24	24	Yampilskyi	0	0	0	10	0	0	0	0	0	0	10	0
R25	25	Zhytomyrskyi	0	0	0	0	10	0	10	0	0	0	0	0
R26	26	Volodymyrvolynskyi	0	0	10	0	0	0	0	10	0	0	0	0
R27	27	Dubenskyi	10	0	0	0	0	0	10	0	0	0	0	0
R28	28	Zaslavskyi	0	10	0	0	0	0	0	0	0	0	10	0
R29	29	Kovelskyi	10	0	0	0	0	0	10	0	0	0	0	0
R30	30	Kremenetskyi	0	0	10	0	0	0	10	0	0	0	0	0
R31	31	Lutskyi	10	0	0	0	0	0	0	0	0	10	0	0
R32	32	Novohradvolynskyi	0	0	0	10	0	10	0	0	0	0	0	0
R33	33	Ovrutskyi	10	0	0	0	0	10	0	0	0	0	0	0
R34	34	Ostrozhskyi	10	0	0	0	0	0	0	0	0	0	0	10
R35	35	Rivnenskyi	0	10	0	0	0	0	10	0	0	0	0	0
R36	36	Starokonstiantynivskyi	0	10	0	0	0	0	0	0	0	0	10	0
L1	37	Poltavskyi	0	0	10	0	0	0	0	0	0	0	10	0

L2	38	Hadiatskyi	10	0	0	0	0	0	0	0	0	0	10	0
L3	39	Zenkivskyi	10	0	0	0	0	0	0	0	0	0	0	10
L4	40	Zolotonoshskyi	0	0	10	0	0	0	0	0	10	0	0	0
L5	41	Kobeliakskyi	0	0	10	0	0	0	0	0	0	0	10	0
L6	42	Konstiantynohradskyi	10	0	0	0	0	0	10	0	0	0	0	0
L7	43	Kremenchukskyi	0	0	10	0	0	0	0	0	0	0	10	0
L8	44	Lokhvytskyi	10	0	0	0	0	0	0	0	0	0	10	0
L9	45	Lubenskyi	10	0	0	0	0	0	0	0	0	10	0	0
L10	46	Myrhorodskyi	10	0	0	0	0	0	0	0	0	0	10	0
L11	47	Pereiaslavskyi	0	10	0	0	0	0	0	10	0	0	0	0
L12	48	Pyriatynskyi	10	0	0	0	0	0	0	0	0	10	0	0
L13	49	Prylutskyi	0	10	0	0	0	0	0	0	0	0	10	0
L14	50	Romenskyi	0	0	10	0	0	0	0	0	0	0	0	10
L15	51	Khorolskyi	10	0	0	0	0	0	0	0	0	10	0	0
L16	52	Chernihivskyi	10	0	0	0	0	0	0	10	0	0	0	0
L17	53	Borznianskyi	10	0	0	0	0	0	0	0	0	10	0	0
L18	54	Hlukhivskyi	10	0	0	0	0	0	0	10	0	0	0	0
L19	55	Horodianskyi	10	0	0	0	0	0	0	10	0	0	0	0
L20	56	Kozelskyi	10	0	0	0	0	0	0	10	0	0	0	0
L21	57	Konotopskyi	10	0	0	0	0	0	0	0	0	10	0	0
L22	58	Krolevetskyi	10	0	0	0	0	0	0	0	0	10	0	0
L23	59	Mhlynskyi	10	0	0	0	0	0	0	10	0	0	0	0
L24	60	Nizhynskyi	10	0	0	0	0	0	0	0	0	10	0	0
L25	61	Novhorodsiverskyi	10	0	0	0	0	0	0	0	0	10	0	0
L26	62	Novozybkivskyi	10	0	0	0	0	0	10	0	0	10	0	0
L27	63	Osterskyi	10	0	0	0	0	0	10	0	0	0	0	0
L28	64	Sosnytskyi	10	0	0	0	0	0	0	10	0	0	0	0
L29	65	Starodubskyi	10	0	0	0	0	0	0	0	0	10	0	0
L30	66	Surazhskyi	10	0	0	0	0	0	0	10	0	0	0	0
L31	67	Kharkivskyi	0	0	10	0	0	0	0	0	0	0	10	0
L32	68	Akhtyrskyi	10	0	0	0	0	0	0	0	0	10	0	0
L33	69	Bohodukhivskyi	10	0	0	0	0	0	0	0	0	10	0	0
L34	70	Valkivskyi	10	0	0	0	0	0	0	0	0	10	0	0
L35	71	Vovchanskyi	10	0	0	0	0	0	0	10	0	0	0	0
L36	72	Zmiivskyi	10	0	0	0	0	0	10	0	0	0	0	0
L37	73	Iziumskyi	0	0	0	10	0	0	10	0	0	0	0	0
L38	74	Kupianskyi	10	0	0	0	0	0	10	0	0	0	0	0
L39	75	Lebedynskyi	0	10	0	0	0	0	0	0	0	0	10	0
L40	76	Starobilsky	0	0	0	0	10	10	0	0	0	0	0	0
L41	77	Sumskyi	10	0	0	0	0	0	0	0	0	0	10	0

Table I.6.1. Ending

Code	№	Districts / cluster groups	13	14	15	16	17	18	19	20	21	22	23
R1	1	Kyivskyi	0	0	0	0	0	10	0	0	0	10	0
R2	2	Berdychivskyi	0	0	0	10	0	0	10	0	0	0	0
R3	3	Vasylkivskyi	0	0	10	0	0	0	0	10	0	0	0
R4	4	Zvenyhorodskyi	0	0	0	0	10	0	0	0	0	10	0
R5	5	Kanivskyi	0	0	10	0	0	0	10	0	0	0	0
R6	6	Lypovetskyi	10	0	0	0	0	0	0	0	0	10	0
R7	7	Radomyshlskyi	0	10	0	0	0	0	10	0	0	0	0
R8	8	Skvyrskyi	0	0	10	0	0	0	0	10	0	0	0
R9	9	Taraschanskyi	0	0	0	0	10	0	0	0	0	10	0
R10	10	Umanskyi	0	0	0	0	0	10	0	0	0	0	10
R11	11	Cherkaskyi	0	0	10	0	0	0	0	0	0	10	0
R12	12	Chyhyrynskyi	0	0	10	0	0	0	0	0	10	0	0
R13	13	Kamianetspodilskyi	0	0	10	0	0	0	0	0	0	10	0
R14	14	Baltskyi	0	0	0	10	0	0	0	0	0	0	10
R15	15	Bratslavskyi	0	0	0	0	10	0	0	0	10	0	0
R16	16	Vinnytskyi	0	0	0	0	10	0	0	10	0	0	0
R17	17	Haisynskyi	0	0	0	0	10	0	0	0	0	10	0
R18	18	Letychivskyi	0	0	0	10	0	0	10	0	0	0	0
R19	19	Litynskyi	10	0	0	0	0	0	0	10	0	0	0
R20	20	Mohylivpodilskyi	0	0	10	0	0	0	10	0	0	0	0
R21	21	Novoushytskyi	0	0	0	0	10	0	0	0	0	10	0
R22	22	Olhopolskyi	0	0	10	0	0	0	0	10	0	0	0
R23	23	Proskurivskyi	0	10	0	0	0	0	0	10	0	0	0
R24	24	Yampilskyi	0	0	10	0	0	0	0	0	0	10	0
R25	25	Zhytomyrskyi	0	0	0	0	10	0	0	0	0	10	0
R26	26	Volodymyrvolynskyi	10	0	0	0	0	0	0	10	0	0	0
R27	27	Dubenskyi	10	0	0	0	0	0	0	10	0	0	0
R28	28	Zaslavskyi	0	0	10	0	0	0	0	0	10	0	0
R29	29	Kovelskyi	10	0	0	0	0	0	0	10	0	0	0
R30	30	Kremenetskyi	0	0	10	0	0	0	10	0	0	0	0
R31	31	Lutskyi	0	10	0	0	0	0	0	10	0	0	0
R32	32	Novohradvolynskyi	0	10	0	0	0	0	0	10	0	0	0
R33	33	Ovrutskyi	0	0	0	10	0	0	0	0	0	10	0
R34	34	Ostrozhskyi	0	10	0	0	0	0	0	10	0	0	0
R35	35	Rivnenskyi	10	0	0	0	0	0	0	10	0	0	0
R36	36	Starokonstiantynivskyi	0	10	0	0	0	0	0	10	0	0	0
L1	37	Poltavskyi	0	0	10	0	0	0	0	10	0	0	0
L2	38	Hadiatskyi	0	0	10	0	0	0	0	10	0	0	0

L3	39	Zenkivskyi	0	0	10	0	0	0	10	0	0	0	0
L4	40	Zolotonoshskyi	0	10	0	0	0	0	0	10	0	0	0
L5	41	Kobeliakskyi	0	0	10	0	0	0	0	0	0	10	0
L6	42	Konstiantynohradskyi	0	10	0	0	0	0	0	0	10	0	0
L7	43	Kremenchukskyi	0	0	10	0	0	0	0	10	0	0	0
L8	44	Lokhvytskyi	10	0	0	0	0	0	10	0	0	0	0
L9	45	Lubenskyi	0	0	10	0	0	0	0	0	10	0	0
L10	46	Myrhorodskyi	0	10	0	0	0	0	0	10	0	0	0
L11	47	Pereiaslavskyi	0	0	10	0	0	0	0	10	0	0	0
L12	48	Pyriatynskyi	0	10	0	0	0	0	0	10	0	0	0
L13	49	Prylutskyi	0	10	0	0	0	0	0	10	0	0	0
L14	50	Romenskyi	0	10	0	0	0	0	0	10	0	0	0
L15	51	Khorolskyi	0	0	10	0	0	0	0	10	0	0	0
L16	52	Chernihivskyi	0	0	0	0	10	0	0	10	0	0	0
L17	53	Borznianskyi	0	10	0	0	0	0	0	10	0	0	0
L18	54	Hlukhivskyi	10	0	0	0	0	0	0	10	0	0	0
L19	55	Horodianskyi	0	0	10	0	0	0	0	10	0	0	0
L20	56	Kozelskyi	0	10	0	0	0	0	0	10	0	0	0
L21	57	Konotopskyi	0	0	0	10	0	0	10	0	0	0	0
L22	58	Krolevetskyi	0	0	0	0	10	0	0	10	0	0	0
L23	59	Mhlynskyi	0	10	0	0	0	0	10	0	0	0	0
L24	60	Nizhynskyi	0	0	10	0	0	0	10	0	0	0	0
L25	61	Novhorodsiverskyi	0	10	0	0	0	0	10	0	0	0	0
L26	62	Novozybkivskyi	0	10	0	0	0	0	0	10	0	0	0
L27	63	Osterskyi	10	0	0	0	0	0	10	0	0	0	0
L28	64	Sosnytskyi	0	0	10	0	0	0	10	0	0	0	0
L29	65	Starodubskyi	0	10	0	0	0	0	0	10	0	0	0
L30	66	Surazhskyi	0	10	0	0	0	0	0	10	0	0	0
L31	67	Kharkivskyi	0	0	0	10	0	0	0	0	0	0	10
L32	68	Akhtyrskyi	0	10	0	0	0	0	0	0	10	0	0
L33	69	Bohodukhivskyi	0	10	0	0	0	0	0	10	0	0	0
L34	70	Valkivskyi	10	0	0	0	0	0	0	0	10	0	0
L35	71	Vovchanskyi	0	0	0	0	0	10	0	0	0	10	0
L36	72	Zmiivskyi	0	0	0	0	0	10	0	0	0	0	10
L37	73	Iziumskyi	0	0	0	0	10	0	0	0	0	10	0
L38	74	Kupianskyi	0	0	0	0	0	10	0	0	0	0	10
L39	75	Lebedynskyi	0	0	0	0	10	0	10	0	0	0	0
L40	76	Starobilsky	0	0	0	0	0	10	0	0	0	0	10
L41	77	Sumskyi	0	0	0	10	0	0	0	0	0	0	10

Table I.6.2. Factor values

Cluster groups	Factors									
	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
1	**2.30**	-0.12	**1.36**	-0.98	-0.72	0.18	**1.73**	**0.88**	**1.72**	0.23
2	-0.63	-0.54	0.15	-0.86	**2.46**	-0.60	-0.40	0.05	-1.39	-0.42
3	-0.63	**0.86**	-0.33	**2.38**	-1.24	-0.90	-0.36	-0.03	0.05	**2.61**
4	-0.16	**0.81**	-0.41	-0.34	-0.07	**1.90**	-0.45	-0.46	-0.28	-1.68
5	-0.63	-0.61	-0.47	-0.04	-0.32	-0.28	-0.34	-0.20	0.24	-0.64
6	-0.36	-0.47	-0.58	-0.12	-0.20	-0.35	-0.07	-0.58	-0.02	-0.61
7	-0.14	-0.26	-0.26	-0.16	-0.54	0.46	-1.38	**3.06**	0.34	-0.51
8	-0.99	-0.64	-0.03	-0.20	-0.27	-0.82	**3.24**	-0.74	-0.70	-0.07
9	-0.40	-0.39	-0.77	0.05	-0.45	-0.55	-0.13	-0.57	-0.25	-0.43
10	**2.35**	-0.43	-0.15	-1.05	-0.78	-0.40	-1.00	-0.64	-0.90	**0.70**
11	-0.38	**2.05**	-0.01	-0.55	**2.31**	-0.23	-0.53	-0.54	**1.96**	**1.09**
12	-0.41	-0.53	**1.31**	**1.77**	-0.25	**1.39**	-0.47	-0.30	-0.97	-0.35
13	-0.69	-0.75	-0.05	-0.25	0.21	-0.35	0.31	**2.36**	-0.88	**0.87**
14	**2.08**	-0.71	-0.08	**2.00**	**0.81**	-0.25	-0.61	-1.09	0.02	-0.85
15	-0.29	**3.04**	**1.30**	-0.93	-1.22	-0.46	-0.12	-0.26	-1.46	-0.61
16	-0.54	-0.57	0.25	-0.01	0.07	-0.48	-0.27	-0.51	**1.66**	-0.21
17	-0.14	-0.87	-0.54	-0.56	**1.03**	**1.91**	0.48	-0.31	-0.11	**1.67**
18	-0.57	-0.28	-0.96	-0.33	-0.93	-0.50	0.21	-0.30	**0.64**	-0.89
19	-0.68	-0.81	**3.36**	0.29	0.39	-0.37	-0.35	-0.07	0.32	-0.12
20	**1.25**	**1.41**	-1.09	**1.56**	**1.35**	-0.29	**1.49**	**1.34**	-0.65	-0.83
21	0.60	-0.41	-0.59	-1.41	-0.19	-0.91	-0.93	-0.55	-1.19	**1.24**
22	-0.33	0.32	-0.49	-0.21	-0.77	**2.71**	0.45	-0.49	0.23	**0.73**
23	-0.60	-0.11	-0.90	-0.06	-0.68	-0.83	-0.49	0.00	**1.63**	-0.92

Table I.6.3. Factor groups

Factor groups / districts	Factor									
	1	2	3	4	5	6	7	8	9	10
Group f1										
Borznianskyi	0.94									
Pyriatynskyi	0.94									
Starodubskyi	0.94									
Lutskyi	0.94									
Bohodukhivskyi	0.94									
Akhtyrskyi	0.86									
Novozybkivskyi	0.85									

Novhorodsiv.	0.71				
Krolevetskyi	0.67				
Khorolskyi	0.66				
Myrhorodskyi	0.62				
Ostrozhskyi	0.61				
Lubenskyi	0.58				
Konstiantynohr.	0.57				
Valkivskyi	0.53				
Group f2					
Poltavskyi		0.86			
Skvyrskyi		0.86			
Kremenchukskyi		0.86			
Vasylkivskyi		0.86			
Olhopolskyi		0.86			
Hadiatskyi		0.75			
Kobeliakskyi		0.74			
Cherkaskyi		0.73			
Yampilskyi		0.73			
Kanivskyi		0.60			
Zaslavskyi		0.49			
Chyhyrynskyi		0.49			
Group f3					
Zenkivskyi			0.86		
Mohylivpodilskyi			0.72		
Sosnytskyi			0.70		
Nizhynskyi			0.69		
Konotopskyi			0.57		
Lokhvytskyi			0.55		
Mhlynskyi			0.54		
Berdychivskyi			0.52		
Kremenetskyi			0.48		
Group f4					
Proskurivskyi				0.90	
Romenskyi				0.90	
Radomyshlskyi				0.76	
Zolotonoshskyi				0.70	
Novohradvolyn.				0.36	
Group f5					
Vinnytskyi					0.84

Prylutskyi	0.81				
Starokonstiant.	0.81				
Litynskyi	0.74				
Lebedynskyi	0.73				
Group f6					
Taraschanskyi		0.93			
Zvenyhorodskyi		0.93			
Iziumskyi		0.82			
Kamyanetspod.		0.65			
Novoushytskyi		0.60			
Zhytomyrskyi		0.56			
Kyivskyi		0.16			
Group f7					
Chernihivskyi			0.81		
Hlukhivskyi			0.79		
Horodianskyi			0.74		
Kozelskyi			0.69		
Surazhskyi			0.69		
Vovchanskyi			0.66		
Volodymyrvolyn.			0.55		
Pereiaslavskyi			0.49		
Group f8					
Kovelskyi				0.90	
Dubenskyi				0.90	
Rivnenskyi				0.80	
Osterskyi				0.73	
Group f9					
Sumskyi					0.82
Letychivskyi					0.66
Kharkivskyi					0.62
Zmiivskyi					0.51
Kupianskyi					0.51
Baltskyi					0.45
Ovrutskyi					0.42
Starobilsky					0.29
Umanskyi					0.21
Group f10					
Bratslavskyi					0.78
Haisynskyi					0.72
Lypovetskyi					0.45

Table I.6.4. Detailed characteristics of the factor groups

Factor groups / districts	Area sq. v.	Parameters of demographic descriptive statistics ("average")			
		Population	Density	AADG %	PGR %
Group f 1 *(average)*	***3093***	***100290***	***37.7***	***0.8***	***6.7***
Borznianskyi	2464	95595	38.8	1.0	7.3
Pyriatynskyi	2830	105034	37.1	0.4	2.5
Starodubskyi	2928	106245	36.3	0.3	2.5
Lutskyi	6563	107597	37.5	0.6	6.8
Bohodukhivskyi	2719	99392	36.6	0.6	4.4
Akhtyrskyi	2439	95299	39.1	1.0	15.9
Novozybkivskyi	3376	111495	33.1	0.2	4.1
Novhorodsiverskyi	3347	89103	26.6	0.3	-2.6
Krolevetskyi	2366	90551	38.3	1.5	6.7
Khorolskyi	2898	108689	37.5	1.3	6.7
Myrhorodskyi	2358	109340	46.3	1.0	6.8
Ostrozhskyi	2637	99311	54.6	1.0	5.2
Lubenskyi	2065	83789	40.6	1.5	10.9
Konstiantynohradskyi	5269	113176	21.5	1.2	12.2
Valkivskyi	2140	89728	41.9	0.7	10.6
Group f 2 *(average)*	***3102***	***138880***	***44.9***	***1.5***	***9.2***
Poltavskyi	3030	138105	45.6	1.4	8.2
Skvyrskyi	3228	136852	43.1	1.1	2.5
Kremenchukskyi	3061	132678	43.4	1.1	8.8
Vasylkivskyi	3647	167217	44.6	1.5	4.7
Olhopolskyi	3434	157248	44.8	1.3	9.1
Hadiatskyi	2166	99266	45.8	1.2	6.4
Kobeliakskyi	3120	132050	42.3	1.8	16.3
Cherkaskyi	3446	154021	44.4	1.9	13.1
Yampilskyi	3241	147102	45.4	1.9	16.2
Kanivskyi	2909	149027	49.2	1.7	2.5
Zaslavskyi	2998	127971	47.6	1.3	10.3
Chyhyrynskyi	2944	125025	42.5	1.8	12.7
Group f 3 *(average)*	***2707***	***117108***	***40.7***	***0.7***	***-1.8***
Zenkivskyi	2001	105118	52.6	0.9	-0.8
Mohylivpodilskyi	2469	128556	51.4	1.3	-1.8
Sosnytskyi	3832	102931	26.9	1.2	2.3
Nizhynskyi	2492	103291	41.7	0.7	-2.1
Konotopskyi	2073	94239	33.8	-0.1	-7.5
Lokhvytskyi	2328	115070	49.4	0.3	-4.8
Mhlynskyi	3296	91452	27.7	0.3	-2.8
Berdychivskyi	2992	175076	58.5	1.1	3.1
Kremenetskyi	2884	138238	24.6	0.9	-1.83
Group f 4 *(average)*	***4628***	***143388***	***36.9***	***0.6***	***4.4***
Proskurivskyi	2291	136848	62.3	0.7	7.9
Romenskyi	2335	134272	57.5	0.6	3.1
Radomyshlskyi	8399	147777	17.4	0.7	-0.1

Zolotonoshskyi	3869	144117	37.2	0.5	4.9
Novohradvolynskyi	6248	153927	10.3	0.6	6.1
Group f 5 *(average)*	***2718***	***125101***	***44.1***	***0.9***	***3.2***
Vinnytskyi	2844	120125	43.2	1.4	5.1
Prylutskyi	2810	130572	46.5	0.8	5.7
Starokonstiantynivskyi	2293	125163	42.7	0.8	5.5
Litynskyi	2933	130048	43.7	0.6	8.2
Lebedynskyi	2713	119599	44.1	1.1	-8.4
Group f 6 *(average)*	***3717***	***159598***	***44.6***	***2.2***	***12.7***
Taraschanskyi	2884	142811	49.4	2.2	7.1
Zvenyhorodskyi	2904	152360	55.6	2.3	20.4
Iziumskyi	6818	156053	22.9	2.6	7.3
Kamianetspodilskyi	2499	158487	63.4	1.8	11.6
Novoushytskyi	2509	139601	55.9	1.2	25.1
Zhytomyrskyi	3447	185056	27.8	2.4	12.8
Kyivskyi	4958	182815	36.9	3.1	4.65
Group f 7*(average)*	***3568***	***102427***	***29.4***	***1.2***	***7.2***
Chernihivskyi	3215	97160	30.2	1.6	3.4
Hlukhivskyi	2722	88354	32.5	0.4	5.1
Horodianskyi	3509	91051	25.9	1.4	6.6
Kozelskyi	2788	82564	29.6	0.7	2.8
Surazhskyi	3671	106859	29.1	0.7	8.5
Vovchanskyi	3481	95218	27.4	3.1	17.3
Volodymyrvolynskyi	5638	139780	27.1	0.1	8.1
Pereiaslavskyi	3522	118429	33.6	1.2	6.1
Group f 8 *(average)*	***5328***	***101860***	***20.4***	***0.0***	***3.1***
Kovelskyi	6375	109994	16.4	-0.1	9.2
Dubenskyi	3447	100418	17.5	0.2	0.8
Rivnenskyi	7529	120722	28.4	0.1	3.4
Osterskyi	3963	76305	19.3	-0.2	-1.1
Group f 9 *(average)*	***5559***	***133270***	***31.2***	***4.1***	***34.9***
Sumskyi	2789	125619	45.1	2.4	36.9
Letychivskyi	2270	98876	48.3	1.1	-1.2
Kharkivskyi	2905	140650	48.4	2.9	36.9
Zmiivskyi	4936	109100	22.1	8.1	36.5
Kupianskyi	6028	112739	18.7	7.1	49.1
Baltskyi	7048	171327	24.7	2.7	39.1
Ovrutskyi	9329	96283	16.1	1.9	21.4
Starobilskyi	10868	204776	18.9	6.4	69.8
Umanskyi	3859	140062	38.7	4.6	25.2
Group f 10 *(average)*	***2778***	***134280***	***50.4***	***1.5***	***10.4***
Bratslavskyi	2787	138602	50.5	1.8	11.9
Haisynskyi	2975	138232	48.1	2.3	8.9
Lypovetskyi	2573	126007	52.6	0.5	10.4

Sq. v. – square versta, AADG – average annual demographic growth, PGR –population growth rate.

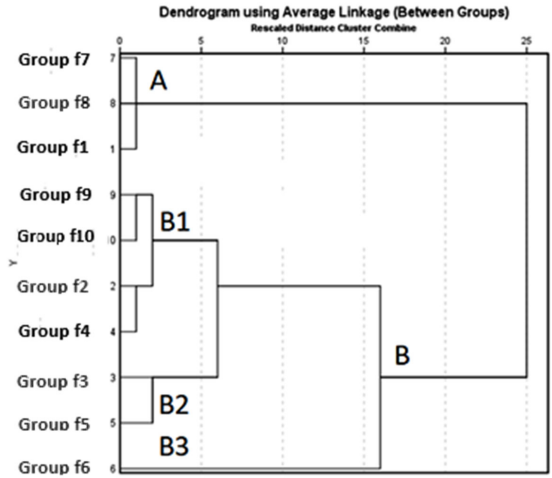


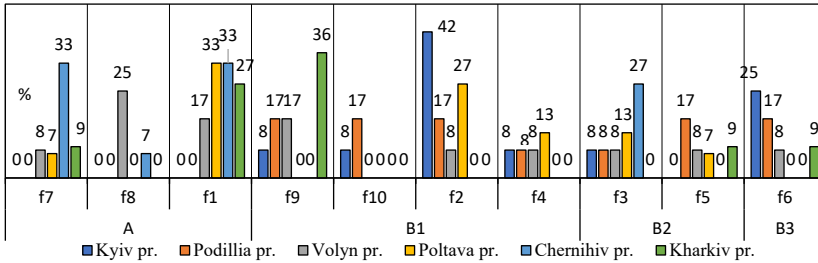
Figure I.6.1. Dendrogram of the Forest-Steppe Ukraine cluster macrogroups of the factor groups of districts according to demographic statistics (1846 – 1863)

Table I.6.5. Detailed characteristics of the Forest-Steppe Ukraine macro groups of factor groups of districts according to demographic statistics (1846 – 1863)

Cluster macro groups/ subgroups/factor groups/ districts	Area sq. v.	Parameters of demographic descriptive statistics ("average")			
		Population	Density	AADG %	PGR %
Macrogroup A	**3208**	**107725**	**36.3**	**0.8**	**4.0**
Group f 7*(average)*	3568	102427	29.4	1.2	7.2
Chernihivskyi	3215	97160	30.2	1.6	3.4
Hlukhivskyi	2722	88354	32.5	0.4	5.1
Horodianskyi	3509	91051	25.9	1.4	6.6
Kozelskyi	2788	82564	29.6	0.7	2.8
Surazhskyi	3671	106859	29.1	0.7	8.5
Vovchanskyi	3481	95218	27.4	3.1	17.3
Volodymyrvolynskyi	5638	139780	27.1	0.1	8.1
Pereiaslavskyi	3522	118429	33.6	1.2	6.1
Group f 8 *(average)*	5328	101860	20.4	0.0	3.1
Kovelskyi	6375	109994	16.4	-0.1	9.2

Dubenskyi	3447	100418	17.5	0.2	0.8
Rivnenskyi	7529	120722	28.4	0.1	3.4
Osterskyi	3963	76305	19.3	-0.2	-1.1
Group f 1 *(average)*	3093	100290	37.7	0.8	6.7
Borznianskyi	2464	95595	38.8	1.0	7.3
Pyriatynskyi	2830	105034	37.1	0.4	2.5
Starodubskyi	2928	106245	36.3	0.3	2.5
Lutskyi	6563	107597	37.5	0.6	6.8
Bohodukhivskyi	2719	99392	36.6	0.6	4.4
Akhtyrskyi	2439	95299	39.1	1.0	15.9
Novozybkivskyi	3376	111495	33.1	0.2	4.1
Novhorodsiverskyi	3347	89103	26.6	0.3	-2.6
Krolevetskyi	2366	90551	38.3	1.5	6.7
Khorolskyi	2898	108689	37.5	1.3	6.7
Myrhorodskyi	2358	109340	46.3	1.0	6.8
Ostrozhskyi	2637	99311	54.6	1.0	5.2
Lubenskyi	2065	83789	40.6	1.5	10.9
Konstiantynohradskyi	5269	113176	21.5	1.2	12.2
Valkivskyi	2140	89728	41.9	0.7	10.6
Macrogroup B	***3601***	***135946***	***41.8***	***1.6***	***10.4***
Subgroup B1	***4017***	***137455***	***40.9***	***1.9***	***14.7***
Group f 9 *(average)*	5559	133270	31.2	4.1	34.9
Sumskyi	2789	125619	45.1	2.4	36.9
Letychivskyi	2270	98876	48.3	1.1	-1.2
Kharkivskyi	2905	140650	48.4	2.9	36.9
Zmiivskyi	4936	109100	22.1	8.1	36.5
Kupianskyi	6028	112739	18.7	7.1	49.1
Baltskyi	7048	171327	24.7	2.7	39.1
Ovrutskyi	9329	96283	16.1	1.9	21.4
Starobilskyi	10868	204776	18.9	6.4	69.8
Umanskyi	3859	140062	38.7	4.6	25.2
Group f 10 *(average)*	***2778***	***134280***	***50.4***	***1.5***	***10.4***
Bratslavskyi	2787	138602	50.5	1.8	11.9
Haisynskyi	2975	138232	48.1	2.3	8.9
Lypovetskyi	2573	126007	52.6	0.5	10.4
Group f 2 *(average)*	3102	138880	44.9	1.5	9.2
Poltavskyi	3030	138105	45.6	1.4	8.2
Skvyrskyi	3228	136852	43.1	1.1	2.5
Kremenchukskyi	3061	132678	43.4	1.1	8.8
Vasylkivskyi	3647	167217	44.6	1.5	4.7
Olhopolskyi	3434	157248	44.8	1.3	9.1
Hadiatskyi	2166	99266	45.8	1.2	6.4

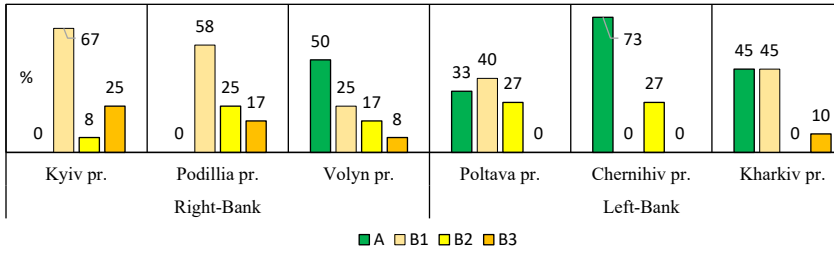
Kobeliakskyi	3120	132050	42.3	1.8	16.3
Cherkaskyi	3446	154021	44.4	1.9	13.1
Yampilskyi	3241	147102	45.4	1.9	16.2
Kanivskyi	2909	149027	49.2	1.7	2.5
Zaslavskyi	2998	127971	47.6	1.3	10.3
Chyhyrynskyi	2944	125025	42.5	1.8	12.7
Group f 4 *(average)*	4628	143388	36.9	0.6	4.4
Proskurivskyi	2291	136848	62.3	0.7	7.9
Romenskyi	2335	134272	57.5	0.6	3.1
Radomyshlskyi	8399	147777	17.4	0.7	-0.1
Zolotonoshskyi	3869	144117	37.2	0.5	4.9
Novohradvolynskyi	6248	153927	10.3	0.6	6.1
Subgroup B2	***2713***	***121105***	***42.4***	***0.8***	***0.7***
Group f 3 *(average)*	2707	117108	40.7	0.7	-1.8
Zenkivskyi	2001	105118	52.6	0.9	-0.8
Mohylivpodilskyi	2469	128556	51.4	1.3	-1.8
Sosnytskyi	3832	102931	26.9	1.2	2.3
Nizhynskyi	2492	103291	41.7	0.7	-2.1
Konotopskyi	2073	94239	33.8	-0.1	-7.5
Lokhvytskyi	2328	115070	49.4	0.3	-4.8
Mhlynskyi	3296	91452	27.7	0.3	-2.8
Berdychivskyi	2992	175076	58.5	1.1	3.1
Kremenetskyi	2884	138238	24.6	0.9	-1.83
Group f 5 *(average)*	2718	125101	44.1	0.9	3.2
Vinnytskyi	2844	120125	43.2	1.4	5.1
Prylutskyi	2810	130572	46.5	0.8	5.7
Starokonstiantynivskyi	2293	125163	42.7	0.8	5.5
Litynskyi	2933	130048	43.7	0.6	8.2
Lebedynskyi	2713	119599	44.1	1.1	-8.4
Subgroup B3	***3717***	***159598***	***44.6***	***2.2***	***12.7***
Group f 6 *(average)*	3717	159598	44.6	2.2	12.7
Taraschanskyi	2884	142811	49.4	2.2	7.1
Zvenyhorodskyi	2904	152360	55.6	2.3	20.4
Iziumskyi	6818	156053	22.9	2.6	7.3
Kamianetspodilskyi	2499	158487	63.4	1.8	11.6
Novoushytskyi	2509	139601	55.9	1.2	25.1
Zhytomyrskyi	3447	185056	27.8	2.4	12.8
Kyivskyi	4958	182815	36.9	3.1	4.65



a)

Cluster macrogroups / subgroups	Area sq. v.	District average Parameters of demographic descriptive statistics Population	Density	AADG %	PGR %
Macrogroup A	**3208**	**107725**	**36.3**	**0.8**	**4.0**
Macrogroup B	**3601**	**135946**	**41.8**	**1.6**	**10.4**
Subgroup B1	4017	137455	40.9	1.9	14.7
Subgroup B2	2713	121105	42.4	0.8	0.7
Subgroup B3	3717	159598	44.6	2.2	12.7

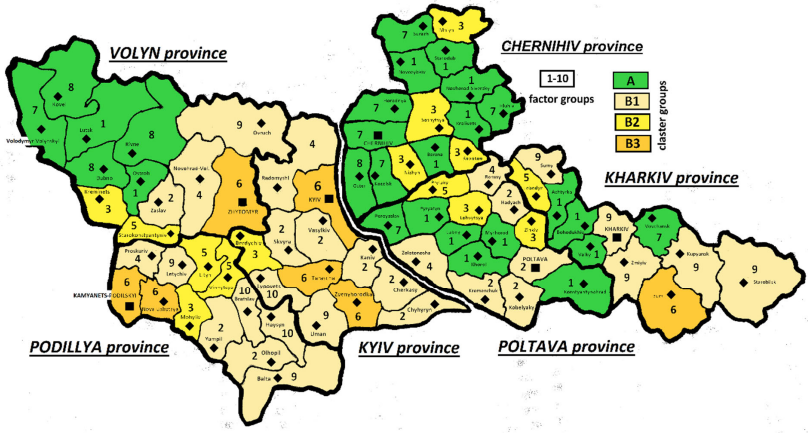
b)



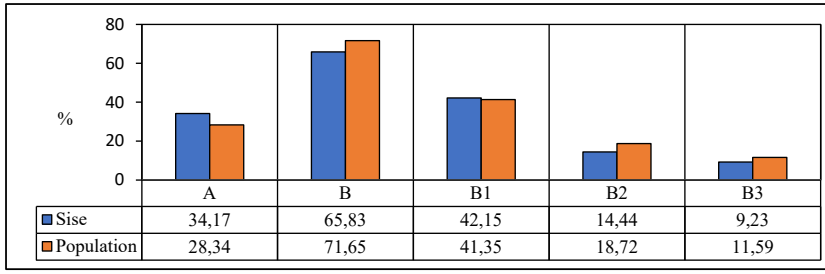
c)

AADG – Annual average demographic growth, PGR – Population growth rate.

Figure I.6.2. Generalized statistical model of the demographic situation in the Ukrainian Forest-Steppe of the 1840s – early 1860s



a)



	A	B	B1	B2	B3
Sise	34,17	65,83	42,15	14,44	9,23
Population	28,34	71,65	41,35	18,72	11,59

b)

Figure I.6.3. Generalized demographic landscape of Forest-Steppe Ukraine (1846 – 1863)

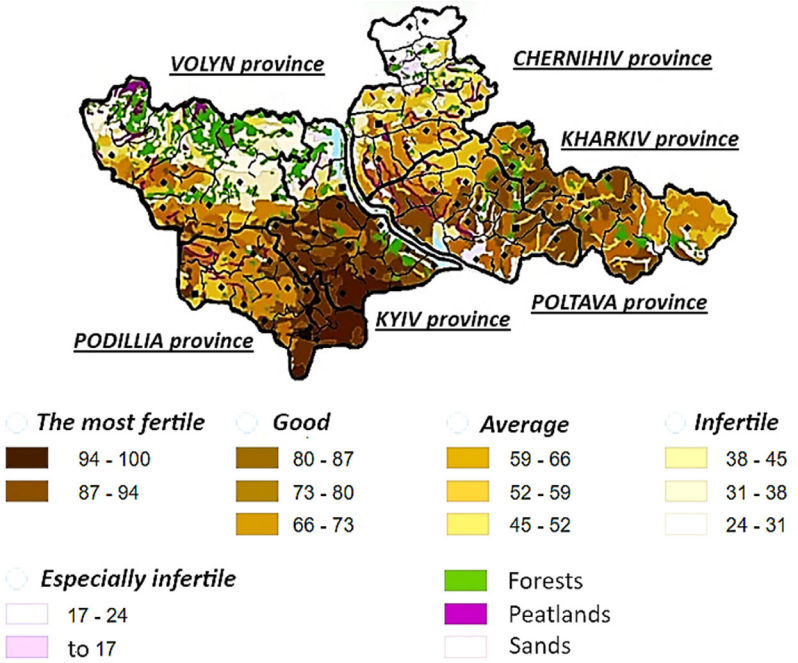


Figure I.6.4. Soil fertility in Forest-Steppe Ukraine in points (current state)