Population Number and Density within Physic-Geographical Regions of Ukraine

Valeriy RUDENKO, Stepan RUDENKO, Hanna YEREMIIA

Abstract: *The aim of this paper is to estimate the number of inhabitants in each of 278 basic natural physic-geographical regions of Ukraine, forming larger units as follows: 57 oblasts, 14 krays, 3 sub-zones, 4 zones and 3 countries, covering all levels of physic-geographical zoning of Ukraine. Subsequently, the aim is to identify the population density in those regions. Population density is defined as the proportion between population number within the physic-geographical region and its area. Territorial differentiation in the population number and the population density is assessed in the aspect of natural regions of Ukraine.*

Keywords: *population number, population density, natural (physic-geographical) regions of Ukraine*

Introduction, central question and argument

The Improved Scheme of Physic-Geographical Zoning of Ukraine developed under the guidance of O. M. Marynych, Corresponding Member, National Academy, Ukraine (Marynych, Parkhomenko, Petrenko and Shyshchenko 2003) had summarized the results of long-term study of complex geographers in this area conducted throughout the 1968 – 2003 period (Popov, Marinina and Lanko 1968, Marynych 2003).

The Scheme has become the basis for estimation of Ukrainian nature-resource potential, as well as for subsequent social-geographical studies (Rudenko 2014). Nevertheless, further geographical analysis and synthesis has been restrained by the absence of such essentially important information as population number and population density within delimited physic-geographical regions. The data on population in Ukraine are available only at the level of administrative-territorial units, and unfortunately not at any of the hierarchic levels of units of physic-geographical zoning (countries, zones, sub-zones, krays, oblasts, and rayons). Thus, the estimations of population number and density for physic-geographical units are necessarily based on the data for administrative-territorial units.

Therefore, the present study is focused on the establishment of the number and the density of population within the units of physic-geographical zoning, including all of the 278 natural regions, 57 oblasts, 14 krays, 3 sub-zones, 4 zones, and 3 countries of Ukrainian state.

Methods

Calculation of population number in the physic-geographical units of Ukraine is based on the official statistics available for the 1st of January 2012 (State Statistic Service of Ukraine 2012), and with application of cartographic method. The map scheme of physic-geographical regions was for that purpose superimposed on the 1:750 000 map of population density in Ukrainian administrative units. The number of inhabitants in physic-geographical spatial units whose boundaries did not coincide with administrative units was calculated by the curve-comparison method using the cartograms of population density in administrative units. Population density in physic-geographical regions was defined as the proportion of their population number and the unit of their superficial area (people per 1 km^2). Due to limited length of this work, estimation results presented in Table 1 account for only physic-geographical oblasts, krays, sub-zones, zones, and countries. Beside the values of population density in natural regions (people per 1 km^2), Tables 1 and 2 contain estimates expressed in points where 100 points mean the average population density in Ukraine amounting to 76 people per 1 km^2. That is, the database on the open estimation scale. Population density ranges from 29 points in the

Oblast of Novgorod-Siversk Polissia to 850 in South Coast Crimean Oblast. Figures 1 and 2 hereunder show territorial differentiation of the indices of population density within each of 278 physic-geographical units (rayons).

Analysis and Discussion

As evident from the materials presented below, the East-European Plain as the physic-geographical country accumulates almost 9/10 of the whole Ukrainian population, the Ukrainian Carpathians – nearly 8%, and the Crimean Mountains – almost 3% (tab. 1 and 2).

Tab. 1. *Population number within physic-geographical countries and zones of Ukraine*

physic-geographical countries and zones	total area, thousand km^2	population number		population density	
		thousand people	%	people / km^2	In points
East-European Plain	**561.4**	**40 919.48**	**89.02**	**73**	**96**
Mixed Forests Zone	105.0	5 070.57	11.03	48	63
Deciduous Forests Zone	52.5	5 074.97	11.04	96	126
Forest-Steppe Zone	157.5	12 195.67	26.53	77	101
Steppe Zone	246.4	18578.27	40.42	75	99
Crimean Mountains	**4.1**	**1 296.79**	**2.82**	**316**	**416**
Ukrainian Carpathians	**38.2**	**3 747.95**	**8.16**	**98**	**129**
Ukraine	**603.7**	**45 964.22**	**100.0**	**76**	**100**

Tab. 2. *Population number within physic-geographical oblasts, krays, sub-zones, zones, and countries of Ukraine*

physic-geographical region	population number		population density	
	thousand people	%	people / km^2	In points
1	2	3	4	5
East-European Plain	40 919.48	89.02	73	76
Mixed Forests Zone	5 070.57	11.03	48	63
Polissia Kray	5 070.57	11.03	48	63
I. Oblast of Volyn Polissia	997.48	2.17	36	47
II. Oblast of Smaller Polissia	590.68	1.29	66	87
III. Oblast of Zhytomyr Polissia	1094.77	2.38	43	57
IV. Oblast of Kyiv Polissia	1040.94	2.26	81	107
V. Oblast of Chernigiv Polissia	1137.5	2.47	57	75
VI. Oblast of Novgorod-Siversk Polissia	209.2	0.46	22	29
Deciduous Forests Zone	5074.97	11.04	96	126
West-Ukrainian Kray	5074.97	11.04	96	126
VII. Volyn Upland Oblast	1 157.17	2.52	116	153
VIII. Roztoky-Opillia Hilly-Mountainous Oblast	1 374.23	2.99	168	221
IX. West-Podillia Upland Oblast	1 094.52	2.38	87	114
X. Mid-Podillia Upland Oblast	1 017.2	2.21	58	76
XI. Prut-Dniester Upland Oblast	431.85	0.94	96	126
Forest-Steppe Zone	12 195.67	26.53	77	101
Podilsko-Prydniprovskyy Kray	6 106.39	13.28	81	107

1	2	3	4	5
XII. North-Prydniprovska Upland Oblast	471.78	1.03	56	74
XIII. North-Eastern Prydniprovska Upland Oblast	630.63	1.37	73	96
XIV. Kyiv Upland Oblast	1 264.58	2.75	207	272
XV. Prydnistrovsko-East-Podilska Upland Oblast	360.54	0.78	51	67
XVI. Mid-Bug Upland Oblast	1 549.15	3.37	154	203
XVII. Central-Prydniprovska Upland Oblast	1 052.59	2.29	80	105
XVIII. South-Podilska Upland Oblast	350.86	0.76	35	46
XIX. South-Prydniprovska Upland Oblast	426.26	0.93	36	47
Left-Bank-Dnieper Kray	3 161.59	6.88	57	75
XX. North-Prydniprovska Terrace Lowland Oblast	1 201.63	2.62	74	97
XXI. North-Poltava Upland Oblast	840.03	1.83	39	51
XXII. East-Poltava Upland Oblast	727.06	1.58	65	86
XXIII. South-Prydniprovska Terrace Lowland Oblast	392.87	0.85	59	78
East-Ukrainian Kray	2 927.69	6.37	118	155
XXIV. Sumy Slope-Upland Oblast	542.65	1.18	60	79
XXV. Kharkiv Slope-Upland Oblast	2385.04	5.19	152	200
Steppe Zone	18 578.27	40.42	75	99
North-Steppe Sub-Zone	13 531.76	29.45	82	108
Dniester-Dnieper Kray	4 007.57	8.72	67	88
XXVI. South-Moldavian Slope-Upland Oblast	259.38	0.56	35	46
XXVII. South-Podillia Slope-Upland Oblast	379.12	0.82	51	67
XXVIII.South-Prydniprovska Slope-Upland Oblast	3 369.25	7.34	91	120
Left-Bank-Dnieper-Pryazovskyy Kray	3 025.25	6.58	62	82
XXIX.Orilsko-Samarska Lowland Oblast	815.99	1.78	38	50
XXX. Kinsko-Yalynska Lowland Oblast	1 264.13	2.74	79	104
XXXI. Pryazovska Upland Oblast	351.72	0.77	43	57
XXXII. Pryazovska Lowland Oblast	593.41	1.29	174	229
Donetsk Kray	5 717.76	12.45	178	234
XXXIII. West-Donetsk Slope-Upland Oblast	1 570.04	3.42	102	134
XXXIV. Donetsk Upland Oblast	4 147.72	9.03	249	328
Zadonetsko-Donskyy Kray	781.18	1.70	33	43
XXXV. Starobilsk Slope-Upland Oblast	781.18	1.70	33	43
Mid-Steppe Sub-Zone	3 040.41	6.61	69	91
Prychornomorskyy Kray	3 040.41	6.61	69	91
XXXVI. Zadnistrovsko-Prychornomorska Lowland Oblast	288.54	0.63	36	47
XXXVII. Dniester-Bug Lowland Oblast	1 332.78	2.88	213	280
XXXVIII. Bug-Dnieper Lowland Oblast	898.95	1.96	63	83
XXXIX. Dnieper-Molochanka Lowland Oblast	287.82	0.63	28	37
XL. West-Pryazovska Slope-Upland Oblast	232.32	0.51	46	61
South Steppe (Dry Steppe) Sub-Zone	2 006.10	4.36	50	66

1	2	3	4	5
Prychornomorsko-Pryazovskyy Kray	967.35	2.10	44	58
XLI. Lower Bug-Dnieper Lowland Oblast	96.96	0.21	27	36
XLII. Lower Dnieper Terrace-Delta Lowland Oblast	528.51	1.15	74	97
XLIII. Prysyvasko-Pryazovska Lowland Oblast	341.88	0.74	30	39
Crimean Steppe Kray	1 038.77	2.26	58	76
XLIV. Prysyvasko -Crimean Lowland Oblast	263.03	0.57	45	59
XLV. Tarkhankut Upland Oblast	199.42	0.43	41	54
XLVI. Central Crimean Upland Oblast	256.34	0.56	61	80
XLVII. Kerch Hilly-Ridge Oblast	319.98	0.70	102	134
Crimean Mountains	1 296.79	2.82	316	416
Crimean Mountainous Kray	1 296.79	2.82	316	416
I. Piedmont-Crimean Oblast	820.78	1.78	371	488
II. Mountainous Crimea Oblast	142.27	0.31	104	137
III. South Coast Crimean Oblast	333.74	0.73	646	850
Ukrainian Carpathians	3 747.95	8.16	98	129
I. Pre-Carpathian Upland Oblast	1 819.78	3.96	133	175
II. Outer-Carpathian Oblast	563.30	1.23	69	91
III. Vododilno-Verkhovynska Oblast	164.94	0.36	45	59
IV. Polonynsko-Chornogirska Oblast	267.14	0.58	51	67
V. Marmaros Oblast	21.59	0.05	48	63
VI. Volcanic-Intermountain-Hollow Oblast	442.83	0.96	100	132
VII. Zakarpattia Lowland Oblast	468.37	1.02	180	237
Ukraine	45 964.22	100.00	76	100

The Steppe Zone is inhabited by over 2/5, the Forest-Steppe – by over 1/4, the Deciduous Forests Zone and the Mixed Forests Zone – 11% each out of the total number of inhabitants.

With respect to natural krays, the first five most-populated are as follows: Podilsko-Prydniprovskyy Kray of the Forest-Steppe Zone – over 13%, Donetsk Kray of the North-Steppe Sub-Zone – nearly 12,5 %, West-Ukrainian Kray of the Deciduous Forests Zone – over 11%, Poliskyy Kray of the Mixed Forests Zone – nearly 11%, Dniester-Dnieper Kray of the North-Steppe Sub-Zone – slightly beyond 9%.

Physic-geographical oblasts significantly differ in proportion of inhabitants (tab. 2): from the maximum of 9.03% in the Donetsk Upland Oblast of Donetsk Kray to the minimum of 0.05% in the Marmaros Oblast of the Ukrainian Carpathians. Beside the latter, the South-Prydniprovska Slope-Upland Oblast of the Dniester-Dnieper Kray (7.34%), the Kharkiv Slope-Upland Oblast of the East-Ukrainian Kray (5.19%), the Peredkarpatska Upland Oblast of the Ukrainian Carpathians (3.96%), and the West-Donetsk Slope-Upland Oblast of the Donetsk Kray (3.42%) are also among the most populated Ukrainian physic-geographical oblasts.

Along with the Marmaros Oblast, the Lower-Bug-Dnieper Lowland Oblast of the Prychornomorsko-Pryazovskyy Kray (0.21%), Mountainous-Crimea Oblast of the Crimean Mountains (0.31%), Vododilno-Verkhovynska Oblast of the Ukrainian Carpathians (0.36%), and the Oblast of Novgorod- Siversk Polissia of the Polissia Kray (0.46%) are among the least inhabited physic-geographical oblasts.

Geographically interesting are the values of population density in physic-geographical regions of Ukraine. On the level of physic-geographical oblasts, the density of population ranges from 22 people/km^2 (the Oblast of Novgorod-Siversk Polissia of the Deciduous Forests Zone) to 646 people/km^2 in the South-Coast-Crimean Oblast of the Crimean Mountains. With regard to physic-geographical krays, the Zadonetsko-Donskyy Kray of the North-Steppe Sub-Zone (33 people/km^2) are among the least densely populated units, while the highest population density is observed in the Crimean Mountainous Kray (316 people/km^2).

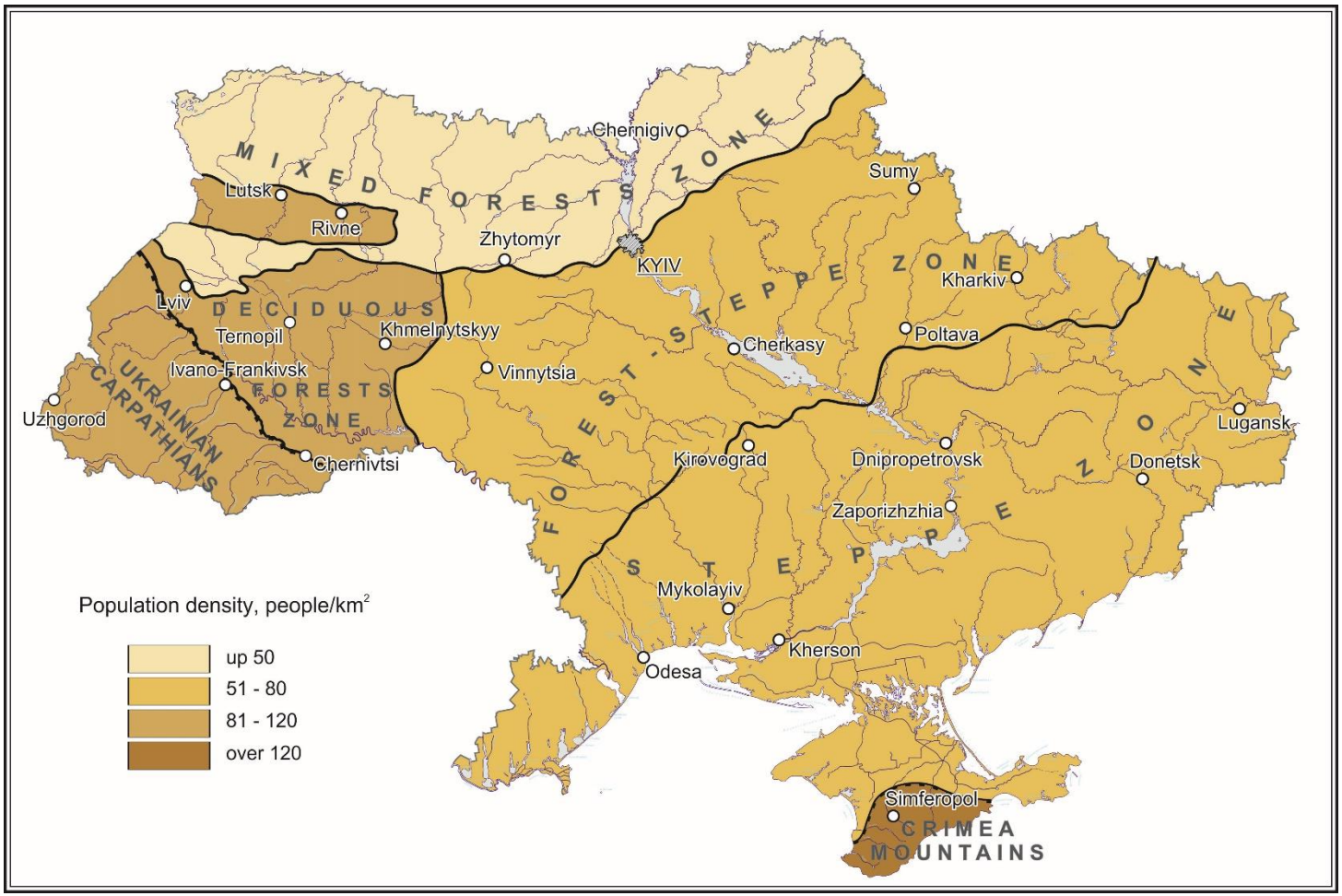

***Fig. 1**. Population density in physic-geographical countries and zones of Ukraine*

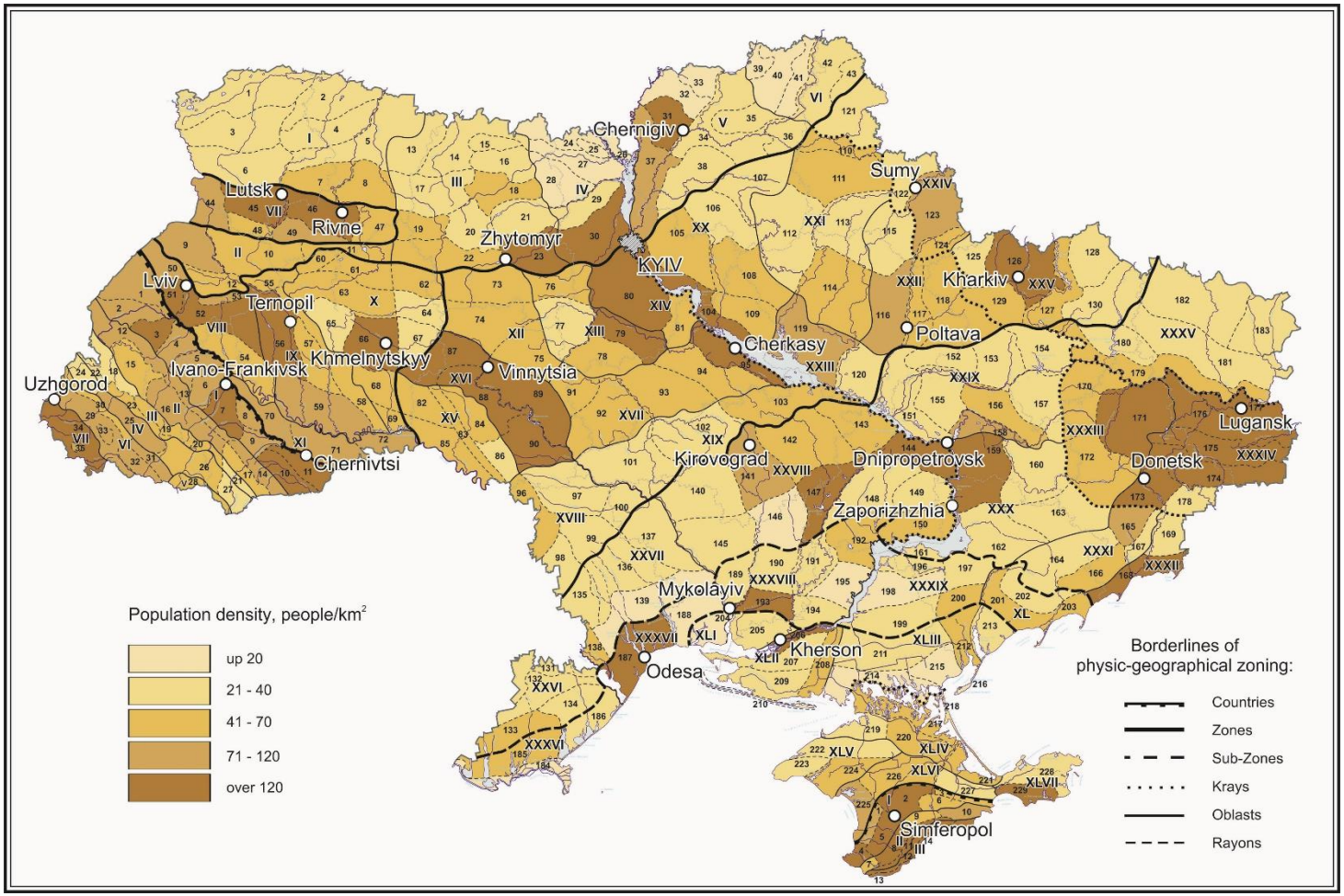

***Fig. 2**. Population density in physic-geographical regions of Ukraine (According to Scheme of physic-geographical regions of Ukraine by Marynych, et al. 2003*

As to natural zones, high population density is recorded in the Deciduous Forests Zone (96 people/km^2), the average values are observed in the Forest-Steppe Zone and the Steppe Zone, and low population density is recorded in the Mixed Forests Zone (63 points out of 100-point average Ukrainian scale) (tab. 1, fig. 1).

It seems geographically interesting also to trace territorial differentiation of the indices of population density within 278 physic-geographical regions (fig. 2). The least population density is observed in Tendrivsko-Dzharylchatskyy Region (3 people/km^2) of Prychornomorsko-Pryazovskyy Kray. Low density is also observed in Kholmynsko-Kostobobrivskyy, Chystogalivsko-Korogodskyy, Nyzhnyoprypyatskyy, and Nyzhnyouzkyy regions (7-8-9 people/km^2) of the Polissia Kray.

On the opposite, the figures obtained for Balaklavsko-Yaltynskyy (1802 people/km^2) and Nyzhnyochornorichenskyy (1513 people/km^2) regions of the Crimean Mountainous Kray demonstrate the highest country-wide levels of population density due to relatively big number of inhabitant concentration within small territories of plain limited by mountainous massifs.

Conclusions

The introduced analyses and assessments lead to the three main conclusions as follows:

1. The Steppe Zone is the most populated natural zone in Ukraine, followed by the Forest-Steppe Zone, Deciduous Forests Zone and Mixed Forests Zone. At the same time, the Deciduous Forests Zone is the most densely populated zone, while the lowest population density is observed in the Mixed Forests Zone.

2. The open estimation scale of population density within the units of physic-geographical zoning when the average national index is equated with 100 (76 people/km^2) allows to clearly trace and disclose specificities of territorial differentiation in population distribution within natural regions of this country.

3. The obtained values of population density in Ukrainian natural regions allow for development of social-economic proportions and balances that would take into account genetically formed nature-resource complexes represented by combination of natural and social productive forces.

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Summary: *The article deals with quantitative estimation of population number and density in natural regions of Ukraine. It is for the first time in Ukraine that such estimation was conducted on the level of all 278 basic physic-geographical rayons, 57 oblasts, 14 krays, 3 sub-zones, 4 zones and 3 countries (units of physic-geographical zoning by Marynych, Parkhomenko, Petrenko and Shyshchenko 2003). Determination of population levels within natural regions of the state is important scientific and applied significance since it is the regions' occupancy that majorly helps to solve problems of balanced development of nature use.*

Population number within the units of physic-geographical zoning was estimated for the 1st January 2012 with application of cartographic method. The map scheme of physic-geographical regions was for this purpose superimposed on the 1:750 000 map of population density in Ukrainian administrative rayons. The number of inhabitants living in physic-geographical rayons whose boundaries did not coincide with administrative rayons was calculated by the curve-comparison method using cartograms of population density in administrative rayons.

It was established that the East-European Plain has accumulated nearly 9/10 of the whole number of Ukrainian population, whereas the Crimean Mountains have accounted only for about 3%, and the Ukrainian Carpathians 9%. At the same time, the mountainous regions of the country are significantly ahead of featureless lands when population density is concerned showing the value of 316 people/km^2 in the Crimean Mountains and 98 people/km^2 in Ukrainian Carpathians, whereas the East European Plain accounts for only 73 people/km^2.

It should be specially emphasized that the number and the density of population presented in the tables characterize 57 physic-geographical oblasts, 14 krays, 3 sub-zones, 4 zones and 3 countries of Ukrainian state, while cartographic estimation shows the same in the aspect of each of 278 natural rayons.

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