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Geospatial information services based on official statistics

Use of geodata in official statistics

Note by the National Statistical Committee of the Republic of Belarus

Summary

The document gives an overview of the use of the geographic information system and digital mapping for the dissemination of the 2009 Belarus population census results and discusses plans for the use of digital maps in the population census of the 2020 round. It also describes the role of the geographic information system in the dissemination of official statistics.

This document is presented for discussion to the Conference of European Statisticians' seminar on "Geospatial information services based on official statistics".

I. Background

1. In 2010, a geographic information system (GIS) “Population Census” (further referred to as the Census GIS) was created to disseminate the results of the 2009 population census in Belarus. The system was based on the graphic paper maps which were used for fieldwork during the census operation of 2009.

2. The Census GIS was developed using the so called ArcGIS software.

3. The objectives of the Census GIS creation were:

- to compile a spatial attribute database of the Census GIS in the ArcGIS geodatabase format;
- to establish information interconnection between the census data and corresponding geographic locations of the basic map;
- to automate spatial analysis and to prepare thematic cartographic and graphical (by means of business graphics) representations of the population census results using standard ArcGIS tools;
- to provide users with the census results in the cartographic and graphical form, including digital format suited for the dissemination on the web.

4. The core of the geographic information system is the geodatabase. The spatial data of the Census GIS are superimposed on the entire territory of Belarus in the WGS-84 coordinate system, with the spatial accuracy not lower than the accuracy of maps developed for the 2009 population census.

5. The geodatabase contains spatial classes, or layers of the national, regional and district boundaries and settlements.

6. The elements of the layers have attribute data ensuring their identification and matching with the relevant on-the-ground objects (Figure 1).

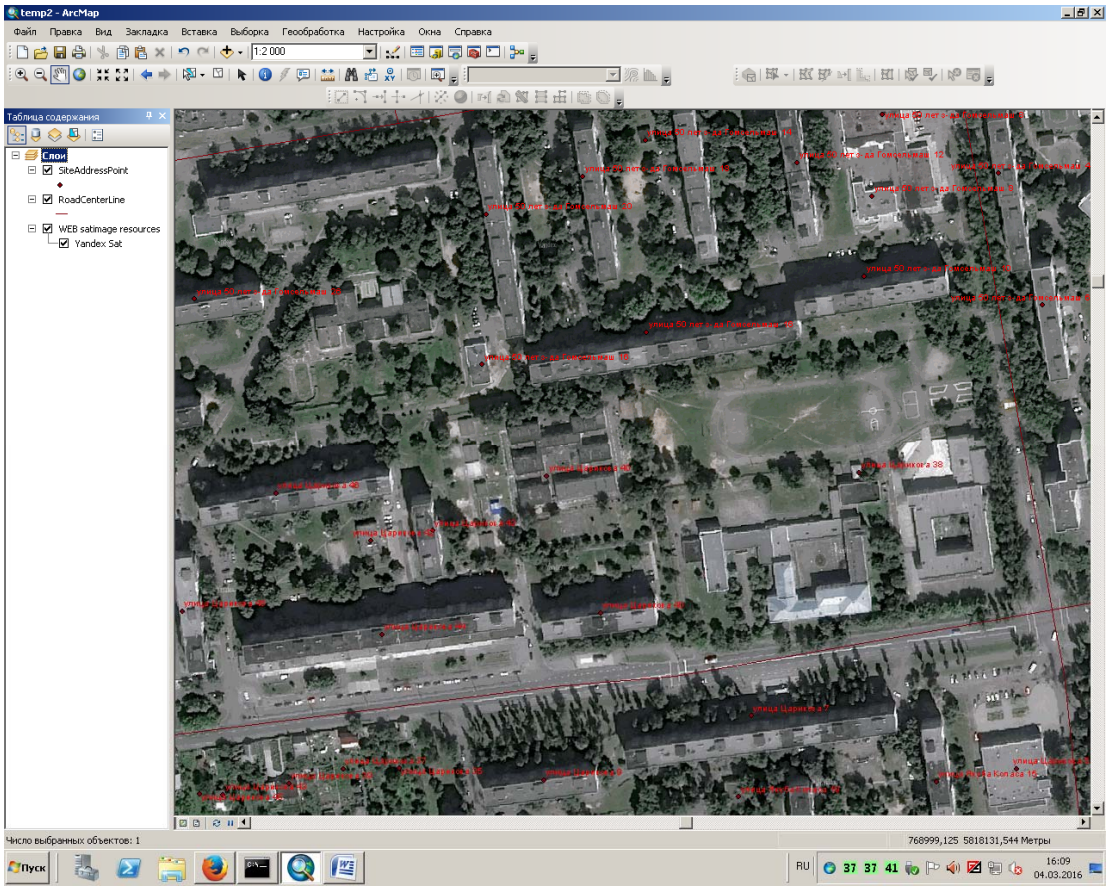
Figure 1.
Delineation of national, regional and district boundaries

II. Development of address layer

7. As part of the preparation for the population census of the 2020 round in Belarus, Belstat continued the work to further develop the Census GIS, update the spatial information on the administrative division and create the layer of address information.

8. According to the address register of the National Cadastre Agency of the Republic of Belarus, the layers of the existing Census GIS were updated in 2015, and a new layer of address information was developed, with referencing the addresses to the raster map base with building contours for all localities (using satellite images and open source maps) (Figure 2).

Figure 2.
Example of address layer representation.



9. The attribute table of the address layer contains the following information:

- names of localities;
- names of streets, squares, avenues, etc.;
- numbers of buildings;
- geographic location coordinates.

10. The use of the address layer will allow for:

- reducing the value of cartographic materials for the population census of the 2020 round;
- using the cartographic materials for various sample surveys and dissemination of official statistics.

III. Plans for 2016

11. Plans for the current year include the development of computer technology for constructing statistical districts for surveys and censuses to be carried out on the basis of data drawn from administrative sources. As an administrative data source, the Population

Register of the Ministry of Internal Affairs of the Republic of Belarus is currently being reviewed.

12. The Census GIS will be used wherever possible at all stages of the forthcoming population census:

- revision of address stock;
- census zoning;
- estimating the workload of the census staff;
- monitoring of the work progress and dissemination of results.

13. It will be possible to collect data referenced to the address point and use them when disseminating the final results for any spatial units.

IV. Publication of results

14. The statistical book "*Spatial representation of results of the 2009 population census of the Republic of Belarus" (volume 8)* was published based on the Census GIS. The book contains 210 pages and presents the final census results on the main socioeconomic characteristics of the population in a breakdown by administrative units projected on statistical maps. The electronic version of the book is available on the website of Belstat at www.belstat.gov.by .

15. The application of the Census GIS is not limited to the population census. In recent years there has been a growing interest in geographic information systems as a user-friendly and visual means of presentation of statistical results.

16. The Census GIS software allows for binding any statistical data to the cartographic base and showing the distribution of an indicator across the country, region, administrative district or locality.

17. The Census GIS is also used for the visualization of official statistical information of other statistical domains. Visualized data are presented in statistical books published by Belstat and made available on the Internet (www.belstat.gov.by) (Figures 3 and 4).

Figure 3.
Air polluting emissions from stationary sources by regions, districts and cities in 2014 (thousand tonnes).

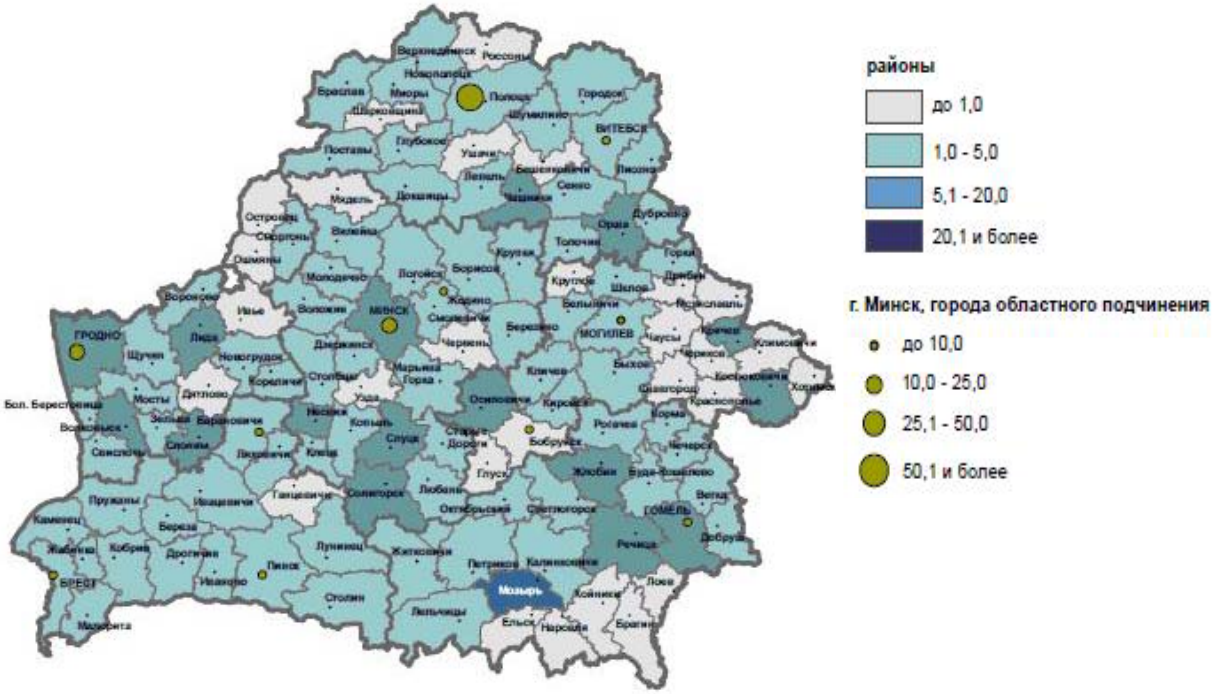


Figure 4.
Availability of housing at the end of 2014 (square metres of total floor space per inhabitant)