

Statistical Atlas of Poland – challenges of cartographic presentation of official statistical data

Maciej Zych ^{a,*}

^a Statistics Poland, Spatial and Environmental Surveys Department, m.zych@stat.gov.pl

* Corresponding author

Keywords: Atlas, Statistical maps, Thematic maps

Abstract:

The key institution in Poland responsible for collecting and sharing statistical data is Statistics Poland. The data collected by this institution is made available mainly in the form of databases and publications. One of the important ways of presenting statistical data is through graphical presentation, including statistical maps. Nowadays, statistical maps are used in Statistics Poland as intertextual illustrations in analytical publications, as elements of infographics published on websites and social media, as well as maps generated from databases, particularly in the *Geostatistics Portal*. Statistical atlases are also an important means of providing statistical maps.

Cartographic presentation of statistical data allows for the visualization of phenomena and processes occurring in various areas. An important task of statistical maps, apart from providing statistical values themselves, is to illustrate spatial relations between individual objects. They synthesize spatial features, organize the image of the presented phenomenon, and focus the recipient's attention on general quantitative relations. The *Statistical Atlas of Poland. Society – Quality of Life – Space* is the latest atlas publication prepared by Statistics Poland. The publication aims to comprehensively present the social, economic, and environmental status of the country, as well as changes taking place, by showcasing the latest statistical data, including those from censuses and experimental studies.

Presenting statistical data collected by Statistics Poland in the form of an atlas poses significant challenges. The primary limitations are related to the availability of data. Not all potential statistical data are collected due to the need to balance the costs associated with data acquisition, including the time burden on respondents, against the potential benefits of obtaining specific data. This significantly limits the thematic scope that can be considered when preparing maps for the atlas. Additional limitations arise from the need to maintain statistical confidentiality and the exclusion of low-reliability data, meaning not all data held by Statistics Poland can be used for statistical maps. These constraints result in gaps for some topics, complicating the logical arrangement of the atlas content. Most data in Poland are collected at the level of territorial division units, while some are available only at the national level. This introduces significant limitation on the presentation of data on statistical maps, which are predominantly created for administrative division units (in Poland: voivodships – first-order units, powiats or counties – second-order units, and gminas or communes – third-order units). In practice, this limits the use of cartographic presentation methods to choropleth maps and cartodiagrams. Only a small amount of data, mainly from censuses, is collected for specific points (geocoding), enabling presentations independent of administrative divisions in favour of other divisions (in Polish statistical cartography, such maps are typically presented on a square grid). In the case of the latter data, maintaining statistical confidentiality requires appropriate, often labor-intensive, data processing before they can be visualized on maps.

The spatial detail of the collected data is another critical factor during the preparation of a statistical atlas. The greatest thematic diversity of data is collected at the voivodship level (16 units in Poland), meaning such data can only be shown on voivodship-level maps. These maps are naturally smaller and often less engaging for recipients than larger maps with data presented at the powiat (county) or gmina (commune) level.

When determining the thematic scope of the atlas, it was decided to focus primarily on topics related to demography and the impact of socio-cultural changes on the structure, development, and lifestyle of modern society. These issues are combined with the presentation of various aspects of life: education, work, health, housing, and the environment in which society functions. The atlas aims to depict on statistical maps the level and quality of life of the Polish population, social needs and challenges, and their economic costs. Accordingly, the atlas is divided into eight chapters: *Territory and its division; Population; Labour market and income of population; Education; Dwellings and their service; Health and social welfare; Civil society and development expenditure; Surroundings and their quality.*

The atlas includes maps at the following scales: full-page maps of Poland – 1:3,800,000 (102 maps), maps of Poland covering of 1/4 page – 1:9,000,000 (88 maps), a map of maritime and coastal areas of Poland covering of 2/3 page – 1:2,000,000, a map with outlines of selected cities and towns – 1:500,000. Geographical databases of the Head Office of Geodesy and Cartography were used to prepare base maps, particularly boundaries of administrative division units.

The atlas consists of 164 pages, containing 192 maps and 54 charts/graphs. In terms of numbers, maps of Poland with divided into voivodships predominate, with 88 such maps included. Other types of maps are: full-page maps of Poland divided into gminas (51 maps), full-page maps of Poland divided into powiats (37 maps), full-page maps of Poland with 5×5 km grid (9 maps), and maps of Poland without division (5 maps).

Maps created using quantitative cartographic presentation methods predominate in the atlas. Choropleth and diagram methods are the most frequently used, appearing on 183 maps (Figure 1). Additionally, one map employs the isoline method (isopleths), and eight maps use chorochromatic and signature methods. Diagram maps are varied: simple diagrams are used 41 times (40 bar diagrams, 1 pie diagram), and complex diagrams are used 35 times (bar diagrams). Other diagrams include summary-structural diagrams (14 times: 1 bar diagram, 13 pie ones), segment diagrams (6 times), one structural pie diagram, and one choropleth pie diagram.

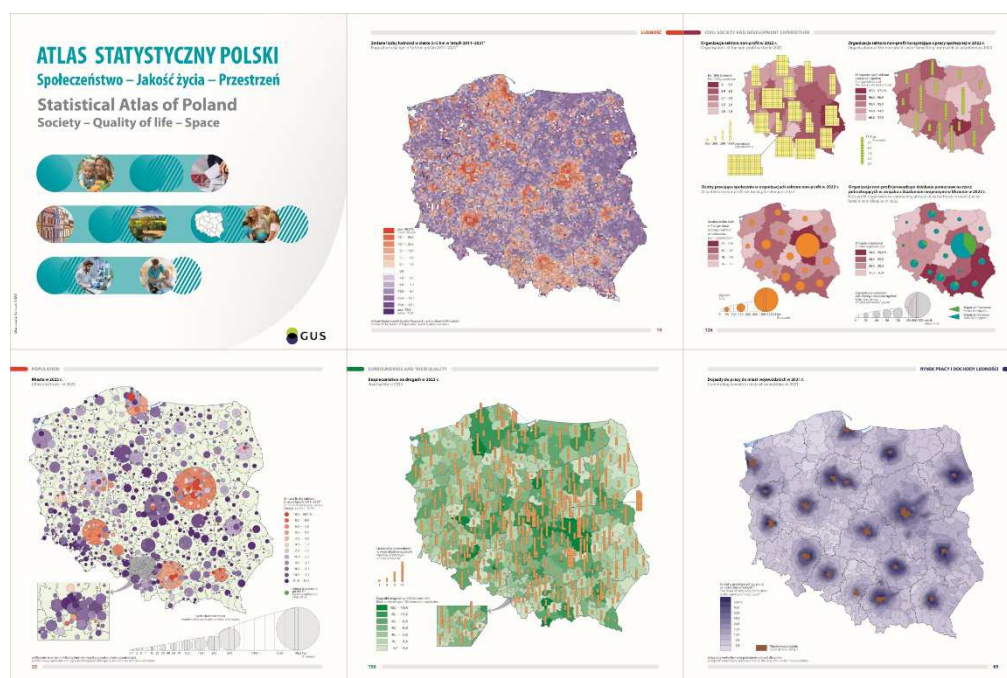


Figure 1. The cover of the *Statistical Atlas of Poland* and examples of the content (© Statistics Poland).

An effort was made to use the most recent data in the atlas, sometimes adding a perspective of changes over time. Data sources include resources from statistical reporting and the information systems made available to the official statistics by external providers. Additionally, it was decided to use slightly older data, but available independently of the administrative division. Therefore, a part of the information in the atlas comes from the National Population and Housing Census 2021. To present phenomena not previously researched by official statistics, results from experimental studies are also included, alongside official statistical data. These studies employ new methods, advanced tools, and programming solutions, enabling the processing and linkage of large Big Data sets.

The *Statistical Atlas of Poland. Society – Quality of Life – Space* is designed to present statistical data not only in tables or analytical texts but also in a visually attractive cartographic form. The presentation of statistical data on maps prepared by Statistics Poland is not limited to atlases (previously published: *Demographic Atlas of Poland*, *Statistical Atlas of Poland*, *Atlas of Enterprises*, *Atlas of Environment*). Maps and charts are increasingly frequent in other statistical publications (e.g. yearbooks) and in dedicated *Geostatistics Portal* (<https://portal.geo.stat.gov.pl/en/home/>; the portal was awarded first place in the *Digital Products* category during the 31st International Cartographic Conference in Cape Town, 2023).

The *Statistical Atlas of Poland. Society – Quality of Life – Space* is bilingual (Polish-English), and is available as an open data publication in PDF format on the Statistics Poland website: <https://stat.gov.pl/en/topics/other-studies/other-aggregated-studies/statistical-atlas-of-poland-society-quality-of-life-space,38,1.html>.