
The Geographic Reference Atlas of Georgia: Basic Principles

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Abstract: Developing the national atlases as a main goal of geography has been determined by the 18th International Geographical Congress in Rio-de-Janeiro in 1965. The interest to create thematic complex atlases was increased. The first and the second National Atlases of Georgia show a high level of the exploration of the nature, population, economy and history of Georgia. Both, the first and the second atlases are scientific by the content, the purpose and the design. Nowadays, Georgian society requires to understand country not only from maps, but also from photos, related text annotations and graphic representations. These requirements are well answered with a new Geographic Reference Atlas of Georgia and this is the first time this type of atlas is being prepared.

Keywords: Atlas of Georgia, Cartography, Map Design, Data Visualization

1. Introduction

The first edition of National Geographic Atlas of Georgia [1] was published in 1964 at the Vakhushti Institute of Geography (nowadays Vakhushti Bagrationi Institute of Geography). Based on the national atlases was developed the idea of regional atlases, and accordingly, their content was defined by the geographic characteristics of the regions. The concept of regional cartography, had been adjusted to the economic division of Georgia that was introduced at the 60's of the last century. The main goal of the regional atlases was to show the natural and economic characteristics of the country. Later in the 90's, regional studies were replaced by the studies of administrative districts, however, these studies were limited to composing maps without publishing.

In 2012 was published the second edition of National Atlas

of Georgia [2] issued again by the Institute of Geography. Similar to the first edition of the National Geographic Atlas of Georgia, the second addition was also scientific.

Developing and preparing geographic atlases for publication is a responsible task in cartography. Cartography is a branch of science and technology that provides marketable products. Therefore, marketing takes an important place in its practical activity. As a production and realization management system, it requires knowledge and understanding of market, consumer's needs and choices. Nowadays, visualization and cartographic production has acquired the broad importance in modern society [3].

All of this has led to the necessity to rethink reference atlas from various perspective and develop corresponding methodology that lets the user to define content and the design.

The primary purpose of issuing reference atlas is to consider not only the interests of the population of Georgia, but also the interests of citizens living abroad as well as the interests of the guests of the country (It is planned to publish the English version of the Atlas). Therefore, the content of the Atlas was defined on the basis of the systematic approach, which resulted in the content of nature, population, economy, etc.

Developed Atlas is issued for everyday use and contains maps of three different scales. The largest scale is 1:500 000 and occupies front page of the Atlas, based on this large scale

have been generated other scales of 1: 1 000 000 and 1: 2 500 000 and used for construction of various thematic maps.

The background information of maps includes the basic geographic elements, while thematic maps are constructed based on the scientific and social attribute information. Proposed thematic maps have reference function that can be seen from the layout design. Each map layout contains additional supplement maps, annotated texts, graphs and photo information that are relevant to the represented theme to complement each other (Figure 1, Figure 2, Figure 3).

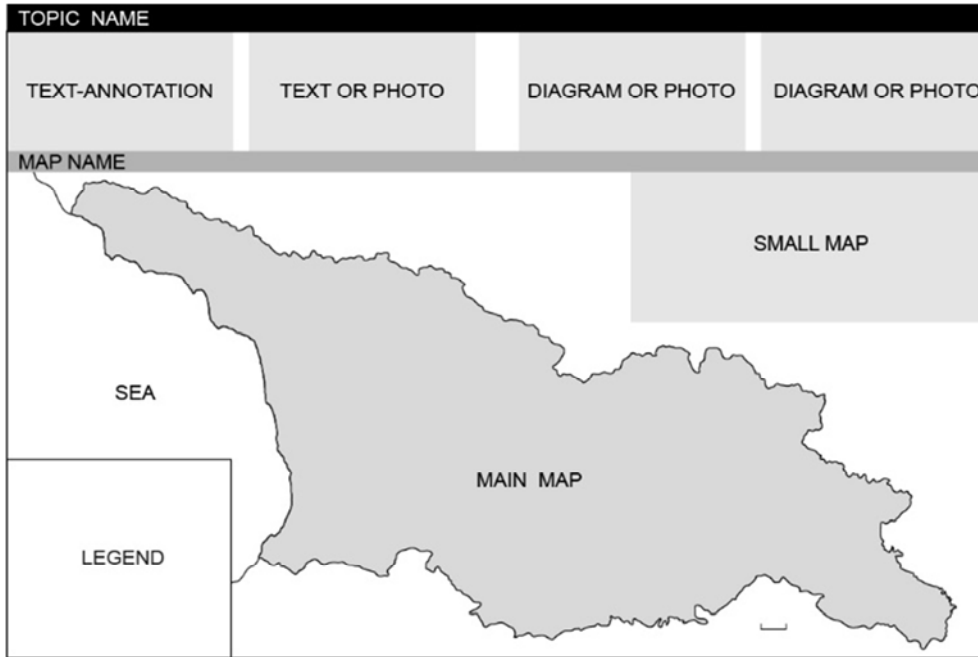


Figure 1. Layout for the scale: 1:1 500 000.

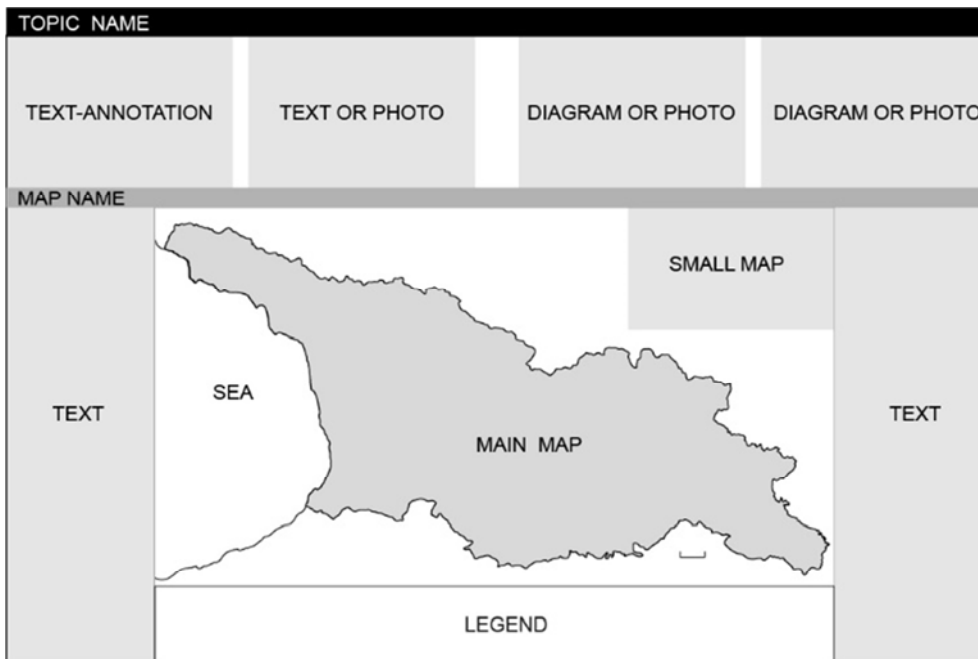


Figure 2. Layout for the scale: 1:2 000 000.

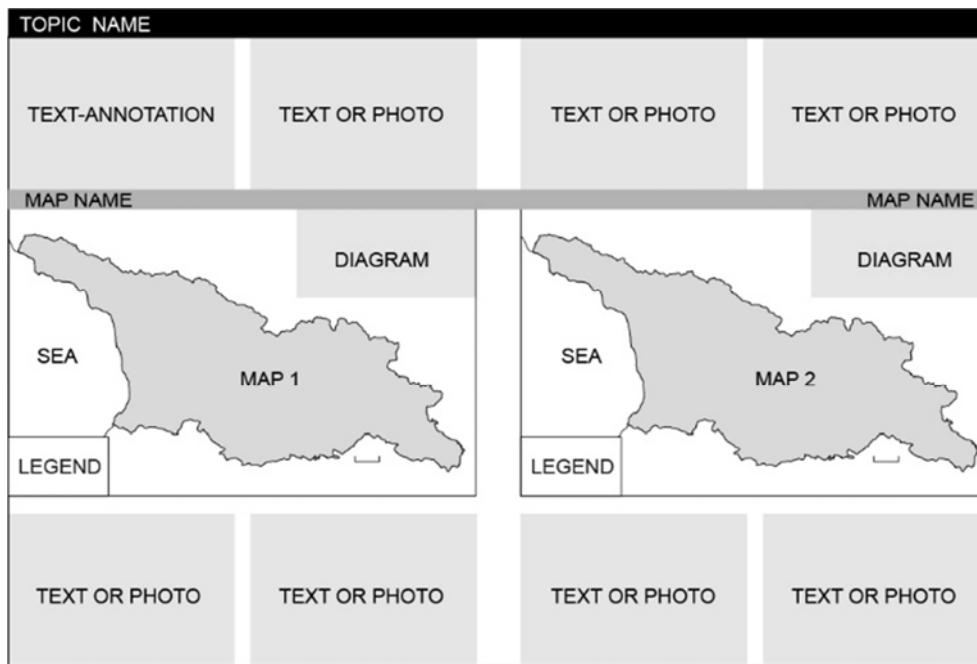


Figure 3. Layout for the scale: 1:3 000 000.

2. Methods

The use of traditional and modern scientific methods is important when developing reference atlas. They represent collection of the thematic maps and accordingly are significant to develop a particular strategy to archive results. Therefore, first was developed digital model containing topics and names of the map thematics in atlas. The atlas contains following themes:

- (1) Georgia and the World
- (2) Georgia and the Caucasus
- (3) Territorial division
- (4) Nature
- (5) Natural resources
- (6) Population
- (7) Economy
- (8) Social sector
- (9) Heritage of Georgian cartography
- (10) Traveling's of Georgian scientists

Different background information had been prepared for the nature and the social thematic maps. This was done by considered the list of the geographic objects that were significantly important for the visualization of various thematic maps. Besides, had been defined the format of the atlas, i.e. was created the standard grid for the pages that simplified the layout of the main maps supported by the related text, supplement maps, graphs and photos. The scale of those main maps influenced the design of the final map layouts. The other significant element of map design was selection of the fonts and font styles to make pleasant aesthetic impression on the map reader by naming the map elements. Thus, had been selected various fonts to emphasize the visual hierarchy and annotate geographic features.

Developing the standards for used basic elements of

hydrography, settlements, roads, boundaries, etc. on the main map was an important part of the working process. In particular, had been defined the standards for the width of lines, the size of signs, the colors and the font styles. For the visualization of various qualitative and quantitative thematic information, had been used different combination of visual variables, and particular attention in this process was given to their perceptual properties [12]. Accordingly, it resulted in a range of traditional and modern visualization methods for natural and social thematic maps. Furthermore, was developed the legend for the introductory part of the Atlas to define the meaning of the used basic symbols. Those symbols are not further explained on the individual map legends.

The copyright agreements collected from all the authors taking part in development of the atlas, allows editors to use and change design of constricted maps and photo materials for the next issue of the Atlas.

Maps are constructed in various programs, but designed in Adobe Illustrator that is compatible with publishing standards. All cartographic representations contain the source of information and the authors of the photo materials. The majority of used photo materials are taken and provided by our colleague geographers, botanists, zoologists and amateur photographers.

3. Results

The visualization process requires to represent information in an effective and efficient way to communicate the reader. Therefore, cartographic design theory has a critical role to play to help the map user to perceive represented information [4], [12]. In this process, visualization requires to keep the specifications of the represented thematic and make it easy

understandable for a wide audience. Thus, professional education and experience of a map author is a significant factor to achieve desirable results. These requirements had been followed while working on the atlas.

The individual approach to each theme decided diversity of the content and used design methods for each map [5], [6], [7], [12]. This had been resulted on the constructed maps described further.

The thematic maps on Alternative sources of energy shows two maps of Sunshine duration (Figure 4) and Wind energy (Figure 5). The quantitative information was represented by well-defined color scheme that clearly emphasized recommendable locations for solar batteries and suitable places to construct wind power stations.

The map for the natural disaster of the avalanche are indicates dangerous places. The used cold, blue colors intend to help the reader visually perceive and assimilate the phenomenon. The same approach of the design had been used for the development of hail, mudflow and landslide maps.

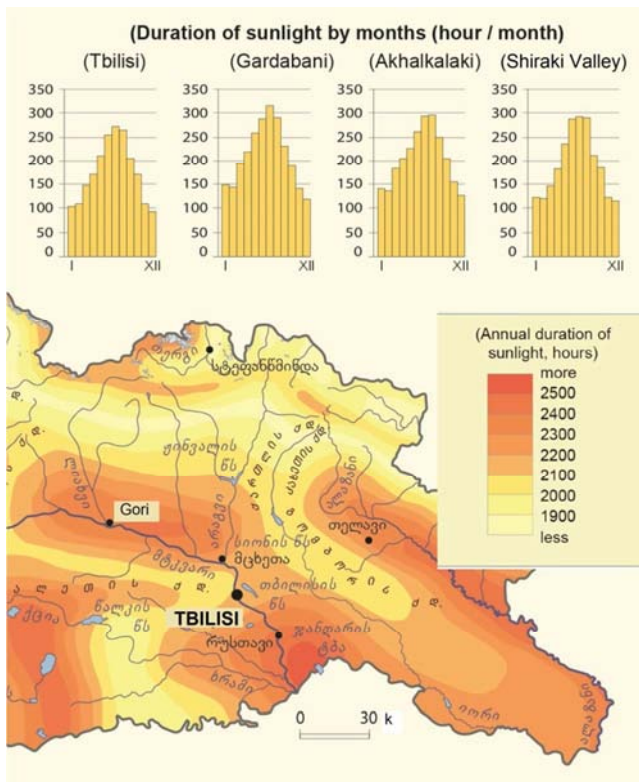


Figure 4. Sunshine duration (fragment).

Two small maps on Air masses intrusion in Georgia are accompanying the main Climate map (Figure 6). Their first schematic visualization was created by N. Beruchashvili for the geography textbook of Georgia (1996). Developed map is still in the use for other textbooks due to the its effectiveness [8]. In developed Atlas, the content of this map was kept, however, the cartographic design was changed that made it more meaningful.

A different conceptual approach and visualization perspective was used for the map developed on the Black sea

topic. Besides the traditional physical map and temperature condition map, underwater world and birdwatching's near Batumi are presented (Figure 7).

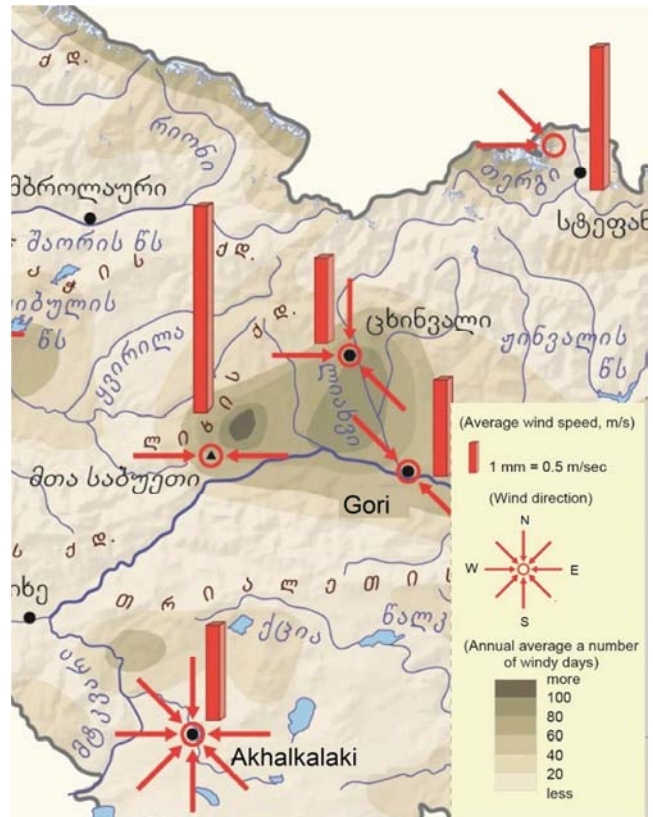


Figure 5. Wind energy (fragment).

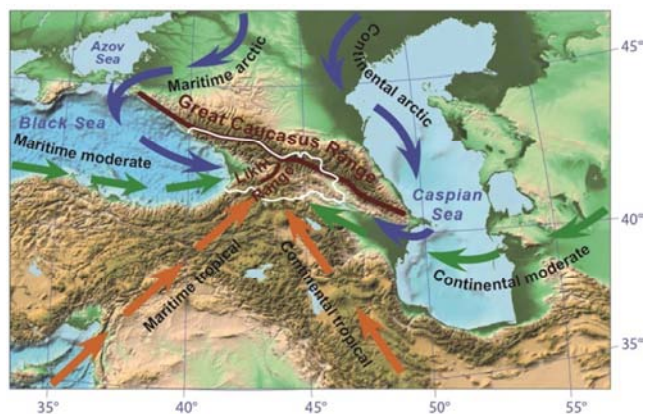


Figure 6. Air masses intrusion in Georgia.

The scientists' photos on the author's maps is also a new approach. There are several maps in Atlas with this precedent. For instance, the author of the soil map –T. Urushadze between members of the international scientific-practical conference. Also on the vegetation cover map – author R. Gagnidze while botanizing, and on the red list plant map – botanist K. Batsatsashvili researching rare species of plants.

The Population map revealed many problems of the country, including ones that cannot be seen through statistical records without spatial localization. Between those problems,

the most critical issues are emptied mountain villages, internally displaced people from the occupied territories and ecological migrants (Figure 8).



Figure 7. Batumi bottleneck.

In 2017, 200 years will pass since settling Georgia with German colonists. This theme appeared to be interesting not only for the map development, but also for revealing the accomplishments of German specialists in scientific, technical and cultural fields.

From new perspective are seen the resorts. Part of them does not function with a therapeutic purpose. The map created for assessing the potential of natural-resources is the best guide to develop resort industry. The content of the map is elaborated with an advice of a domain expert, the doctor in resorts medicine.

The maps of the traditional industry of viticulture and winemaking, are developed with interesting and popular information (Figure 9). The newest information was used to develop the maps of Energy industry. Also, current state is shown on the maps developed for education, culture, tourism, alpinism, etc.

The maps developed on the topic of Traveling's of Georgian Scientists shows the scientific routes and photos taken during this trips of two Georgian scientists. One is the expert in zoology and biogeography Arnold Gegechkori, and the other one is geographer and landscapologist Niko Beruchashvili (1947-2006). Both scientists are well-known in Georgian scientific society due to their accomplishments [9].

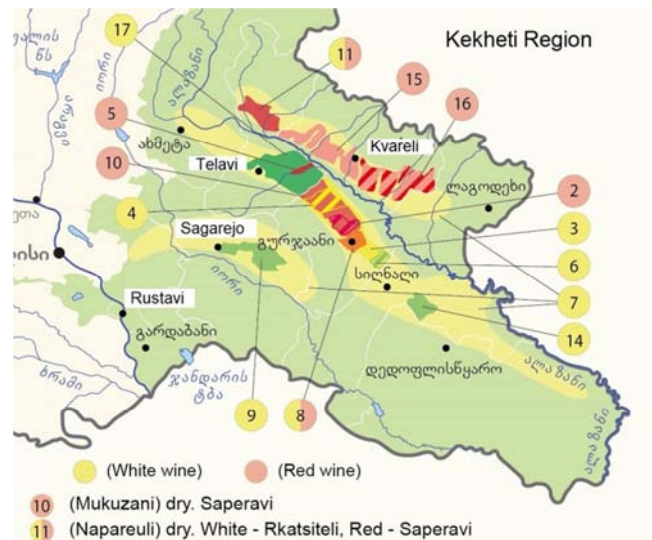


Figure 9. Appellation wines and microzones (fragment).

The leitmotif of his Scientific work is Spatio-temporal analysis, which are differently expressed on his maps and atlases: Landscape map of the Caucasus (1979) [10], Geopolitical Atlas of the Caucasus (1996, 2009-2011) [5], [6], Caucasus Environment Outlook-CEO-2002 [11], Schoolbooks for geography of Georgia with maps (8-9th grades, from 1996 to the present day) [8], Geoinformation atlases of Racha-Lechkhumi and Adjara (1990s, not published), Program and Model of the Scientific Atlas of Georgia etc. In the 90s, had been introduced new technologies to Georgian cartographers by Niko Beruchashvili. He implemented teaching of geographic information systems as the part of the learning process and started the first staff of GIS specialists. At the end of the 1980's, he was one of the first who brought the computer Atari ST in Georgia. On this computer was developed the special program to work on the landscape-geographic data of natural-territorial complexes. Based on the derived results, were automatically constructed simple digital maps. In the early 90's, Niko Beruchashvili brought also the first GIS program MapInfo in Georgia. Nowadays, many of his students are successfully working in GIS-domain, and some of them took a part in the development of this atlas.

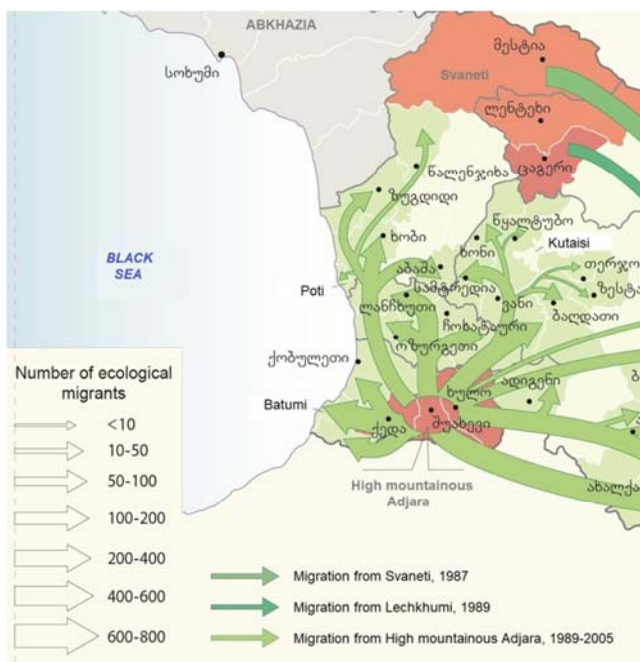


Figure 8. Environmental migrants (fragment).

4. Conclusions

The Geographic Reference Atlas of Georgia is a teamwork. The main purpose of this atlas is to show Georgia's place in the World and the Caucasus region. To do so, in atlas had been presented the population, economics and nonmanufacturing industries in a systematic relation. Each thematic map with the content and related information is exclusive.

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