

## METHODOLOGY OF COMPOSING THE ATLAS OF ENVIRONMENT OF THE YUGOSLAVIA

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The Atlas of environment shall have all characteristics of the „National Atlas” and it is well-known fact that the National Atlas of a country same as encyclopedia. The main task and the purpose of elaboration of an Atlas of Environment in Yugoslavia is to show cartographically the so far changes, present condition and relations, as well as changing tendencies in the Yugoslav living environment. The Atlas should also show the internal links and relations, interactions of elements and processes as well as of macrosystems and subsystems of the Yugoslav living environment. The Atlas has to satisfy all the needs of the scientific prognosis and to call attention to „white spots” of science when the living environment is concerned.

### Introduction

The cartographic method requires knowledge not only of the subject of research but also of the graphic-cartographic principles of the contents representation. It is a special "language" of representation of investigation results and as such usable even for laic. It is founded on the visual picture, legibility and it enables a stratified representation of spatial relations, the environment in this case.

### 1. Essential project assignment

The main task and the purpose of an Atlas-making of the Yugoslav environment is to cartographically show sofa changes, present condition and relations, as well as changing trends in the Yugoslav environment. The Atlas would show all the elements affecting the quality of environment (position as quality or deficiency in the environment quality, natural predisposition's and correlation of the environment, economic and regional geographical bases of the environment quality).

It should show both chronological and horological (spatial) conception of the environment. The chronological conception would cover three aspects : past, present and future of environment. The spatial conception would cover the regional differences in the present-day milieu and potential spatial differences.

The Atlas must also satisfy all the required scientific prognoses. The prognostic maps should be the basis for planning a series of actions in order to improve the environment quality. Besides, it should also give a scientific survey of the state of environmental study in Yugoslavia, to point out to "white spots" of science when environment is concerned. The task of the researchers who are to conceive and realize the Atlas of the Yugoslav environment is to ensure "publicity" of the problem of environment i.e. to make it become the subject of extensive interest and cognition. Thus the Atlas of environment shall have the educational role (1).

Elaboration and issuing of an Atlas of the Yugoslav environment would represent an important cultural-scientific event because the scope and quality of the Atlas content as well as that of the maps individually would reflect the state of science about the Yugoslav environment, investigation level of the Yugoslav territory, as well as the attitude toward this civilizational problem. This would show, in an indirect way, through the quality of printing, publishing and marketing, the Yugoslav capabilities for significant undertakings of high technology because the work on the Atlas of environment requires high informatics, first of all, marketing and printing technology.

## 2. Conception of Atlas of environment

### 2.1. Scale of Atlas maps

In accordance with the international map, the scale of the main maps would be 1:1,000,000. We have decided for this from the following reasons :

- This scale enables the most suitable format of the Atlas and thereby its easy utilization.
- The scale of 1:1,000,000 ensures optimal classification of the Atlas thematic elements related to the elements of environment irrespective whether dotted, linear or planar (areal) presentations of the state or prognosis of environment are concerned.
- This scale provides for the most suitable typization of phenomena and their indicators.
- The above stated scale enables cartographic modeling which gives the most adequate representation of : arrangement of phenomena, satisfactory density of indices of the environment condition, arealness of phenomena, structure of environment in the country, environment development trends, contents structure, as well as spatial arrangement of the stated indicators.
- The scale taken as the basic one enables full spatial metrics of maps but also presentation of contents to which the maps relate.
- The scale enables application of analytical-synthetic method in a satisfactory level.
- It enables measuring of certain contents of mapped milieu.
- On the basis of the stated scale, the appropriate conclusions will be taken about the condition, characteristics and regularities of the present and the future environment in Yugoslavia.
- It provides specific information basis for environment in Yugoslavia (2).

### 2.2. Atlas dimensions, format and graphical design

The stated scale of the Atlas and the Basic maps provides for the sheet of both the basic map and the Atlas have the following dimensions

- map sheet : width 376 mm, height 514 mm (ratio 1:0,732)
- effective surface area : width 342 mm, height 480 mm (ratio 1:0,712)

These dimensions with the accepted scale are binding by the form, size and geographical position of the present-day Yugoslavia. Such relations are close to an ideal format known as a "golden cut" which has the ratio of 1:0,618. The selected size of the map "margin" is the most suitable both because of functional and aesthetic reasons.

One basic map of the stated dimensions shall represent one Atlas sheet provided that on the front page is the cartographic presentation of certain contents and on the back page the "interpreter" i.e. textual representation of contents.

Scales and formats of other maps depend on contents and the intended purpose of those maps but they must be at less scales and smaller than the format of basic maps. The maps planned in this Atlas as the basic ones are also diminutive or partial maps. Diminutive maps relate or are connected to the basic content of a primary map, but due to its comprehensives and versatility of information their content cannot be presented in the appropriate primary map. They are the most frequently at a scale of 1:2,000,000 and more rarely at a smaller one. Partial maps relate to parts of the territory of Yugoslavia where the problem is much more expressed and cannot be shown at a scale of the basic map. In that case the scale of these maps shall be larger than the scale of the basic maps. Diminutive maps are by rule put on the Atlas sheet, 4 of them, if the scale is 1:1,000,000 or more if smaller scale is used. As for the partial maps their number on the Atlas sheet depend first of all on their scale and size.

In the Atlas graphic formation, selection of colors is particularly important since it enables achieving of visual differentiation of the map contents, harmony of representation and

presentation of contents. Colors will be used in displaying of surface, linear and dotted presentations of contents. The surface presentations include application of blots and hatching. At application of a prevailing color, the shades of individual colors would be used, up to 10 shades of lighter or darker tones. At hatching, 12 versions would be possible.

### 2.3. Map base

The map base represents the constant content introduced on the maps beforehand and used as an orientational content in cartography, but also during their utilization. What base will be applied depends on the map type, topic entered on the map, taken scale of the map, applied method, degree of generalization and cartographic generalization, etc. All primary maps shall have in their contents the outlines of the given borders of Yugoslavia, the main watercourses, and settlements, regional centers.

The basic (primary) maps shall have the following base contents:

1. the main river streams and lakes, Yugoslav borders, capital city and regional centers
2. borders of administrative entities, municipal centers, main river streams
3. relief shown in horizontal lines of 100, 200, 500 and 1,000 meters, names of the most important orographic entities, Yugoslav borders, main i.e. orientational flows
4. borders of the Republic, more important traffic routes, main water streams; capital city and regional centers
5. borders of the Republic, borders and names of cadastre municipalities, main water streams.

*Diminutive maps* can have the following elements:

- the same as one of the bases of the main map
- only borders of the Republic and main water streams
- only borders of the Republic
- only borders of the Republic, capital city and the republican and provincial centers.

Partial and inserted maps, in addition to the stated bases of primary and diminutive maps can have the following bases too:

- street network of a settlement
- borders of certain natural entities with the basic contents in them
- mining-energetic regions and the basic contents in them
- singled out regions with basic orientational contents.

The color of the base of all maps would be coating gray so as not to burden the map contents. The exception make the borders of the Republic which will be shown in red color on all maps.

### 3. Methodology of Atlas and maps making

Application of the appropriate method, technology and procedure will depend first of all on the topic dealt with by the appropriate map. Attention should be also paid to possibilities of the cartographic method itself (3). The applied cartographic method which is also the essential scientific method in this project understands and enables:

1.) Spatial determination of elements of the human environment in Yugoslavia which is realized through:

a) Localization of phenomena and processes of the human environment in Yugoslavia through clearly defined position of the same in the geodetic and geographical space. The spatial determination is the basic advantage and the feature of the cartographic method so that every map of environment can also be defined as the spatial indicator of arrangement of phenomena, elements and components of the environment. Thus the highest form of informativeness - the spatial informativeness of the map is achieved. First of all, the spatial determination is achieved through a network of geographical coordinates which exist on every map.

b) The reciprocal spatial determination of phenomena and processes in the environment is achieved by the spatial correlation.

2.) The chronological determination of phenomena, elements and components of the environment of Yugoslavia is achieved in two ways :

a) By linking certain components of the environment to the term, time, or period.

b) The time determination of phenomena in a time-measuring system and giving the age determination to phenomena and processes (for example geological determination of age, maps of the time order of occurrence of pollution sources, time determinations of duration of emissions and imissions, etc.)

c) Establishing of time series of changes in the character of the environment components thus achieving the determination of time development and evolutiveness of phenomena and processes of environment.

3.) Real (substantial) determination of environment is achieved by codification of quantitative and qualitative properties of milieu.

a) Quantitative codification is achieved by the established scale of values which can be found in the map legend, then in the form of numerical indexes showing the size of phenomenon. The quantitative determination can be also achieved by the size of the symbol or cartographic sign.

b) Qualitative determination of the process and phenomenon of environment is fulfilled through establishing of differences. This can be achieved by means of a legend but also through an overall cartographic display of reality.

c) The functional determination is achieved through presenting of functions of the environment components by a cartographic procedure.

#### 4. Stages and organization of Atlas-making

Organizationally and time-scheduling, the Atlas-making shall pass through the appropriate number of stages and through an adequate organization.

A) *In the preliminary stage* there will be drawn all the contents related to the basic topic of the Atlas. Particular attention will be paid in this stage to study of methodology of environmental mapping. In that respect a scientific symposium will be organized dealing with the topic "mapping of environment". The scientific symposium would be of the international character. In this stage, the map bases so called "blue point" would be printed in order to enable mapping of the content at an adequate scale.

B) *Assembling of maps* includes both production of the cartographic original and preparations for production of the editing original. We assumed that the manufactures of cartographic and editing originals are simultaneous. This method is more economical and enables shorter duration time of the Project, but requires engaging of more personnel and financial means. Subject to the number of personnel, financial means, and available data which would be mapped, assembling will be carried through :

- Shaping and assembling of the Atlas maps i.e. author's original maps. Drawings given in the author's original need not have high technical-graphical level
- Making of the editing originals is in the competence of the Technical-Graphical Service of the Faculty with the presence of the Publishing house and the map Author
- The Atlas-publishing includes printing of maps prepared for publishing according to map complexes and not publishing of a unique Atlas and waiting until all originals are made.

#### 5. Structure of the Atlas of environment

The structure of an Atlas of environment must comply with the structure of the real system of Yugoslav environment and it would include :

### **1. Map complex of natural environment**

- 1.1. Maps of geodiversity of the environment in Federal Republic of Yugoslavia
  - a. Geological diversity of Yugoslavia (5 maps)
  - b. Geomorphological diversity of Yugoslavia (5 maps)
  - c. Water diversity of Yugoslavia (3 maps)
  - d. Climatic diversity of Yugoslavia (9 maps)
  - e. Pedologic diversity of Yugoslavia (2 maps)
- 1.2. Maps of biodiversity in Federal Republic of Yugoslavia
  - a. Vegetation map
  - b. Zoo geographical map
  - c. Yugoslav ecosystem map

### **2. Map complex of cultural diversity**

- 2.1. Population in Yugoslavia (5 maps)
- 2.2. Settlements and infrastructural systems (3 maps)
- 2.3. Religion, education and health (3 maps)

### **3. Map complex of environmental pollution sources**

- 3.1. Maps of environmental natural degradation (5 maps)
- 3.2. Agricultural production degradation maps (3 maps)
- 3.3. Industrial degradation maps (8 maps)
- 3.4. Traffic degradation maps (5 maps)
- 3.5. Tertial activities degradation maps (5 maps)
- 3.6. Hazard maps (5 maps)

### **4. Map complex of the Yugoslav environmental condition**

- 4.1. Air quality condition maps (6 maps)
- 4.2. Water quality condition maps (4 maps)
- 4.3. Soil quality condition maps (3 maps)
- 4.4. Noise endanger maps (2 maps)
- 4.5. Radiation maps (3 maps)

### **5. Map complex resulted from degradation of environment**

- 5.1. Greenery degradation maps (3 maps)
- 5.2. Ecosystem degradation maps (6 maps)
- 5.3. Cultural values degradation maps (4 maps)
- 5.4. Health consequences maps (3 maps)

### **6. Map complex of environmental protection**

- 6.1. Natural inheritance protection maps (4 maps)
- 6.2. Natural disaster protection maps (6 maps)
- 6.3. Accident protection maps (4 maps)
- 6.4. Air protection maps (3 maps)
- 6.5. Water and from water protection maps
- 6.6. Power sources pollution maps (3 maps)

### **7. Prognostic map complex (15 maps)**

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