

Sandor Katona,* Retvari Laszlo,* Keresztesi Zoltan*

**METHODOLOGY AND SUBJECT OF ENVIRONMENT
QUALIFICATION MAPPING****1. Preliminaries**

Accelerated forms of human activities have created a new situation in the geographical sphere, especially so in earth surface processes, both quantitatively and qualitatively. Clarification and elaboration of new theoretical and methodological problems have become necessary all over the world owing to the distortion of the natural balance of environment to an unprecedented extent as well as to the complex tasks that have arisen in the fields of nature conservancy and environmental control and development. At the Geographical Research Institute of the Hungarian Academy of Sciences (GRI) research in ecological and economic problems of environment has been standing in the forefront of attention for a long time, therefore the budding new trend of environment qualification mapping can already rely on significant results. So among other things a lot of descriptive, summarizing papers have been prepared, thematic maps compiled on the consistence of environment, geomorphological processes, anthropogenous changes, settlement environment. Even more, a great part of maps related to land utilization, landslides, soil degradation, etc. have comprised prognostics, too. At the Institute Seminar held in spring 1975 to prepare the medium-term plan of the GRI, Director M. Pécsi gave a detailed account of the past and present views connected with questions of environmental and ecological research work, defining in this connection several current tasks. With regard to complex regional research he pointed out, for instance, that for the purposes of area and landscape utilization and development new evaluating maps are to be compiled. These maps would take into consideration the geographical potentials and interrelations between natural and social processes. He emphasized, as the treble principle of environmental qualification mapping, the relationship between **ecology, economy and environmental control**, thus underlining the **integrating**, but at the same time **interdisciplinary** character of the new approach.

* Dr., Geographical Research Institute HAS, Budapest, Népköztársasag 62, glej izvleček na koncu zbornika.

* Dr., Geographical Research Institute HAS, Budapest, Népköztársasag 62, glej izvleček na koncu zbornika.

* Dr., Geographical Research Institute HAS, Budapest, Népköztársasag 62, glej izvleček na koncu zbornika.

Lively exchanges of views having been carried on in recent years in the fields of environmental qualification mapping as well as the first results having emerged internationally were also a great help for us in explaining some notions and specifying our research tasks.

While developing the programme of environmental qualification mapping drafted at the GRI in 1977, from the international preliminaries and experiences we have paid particular attention

- a) to the recommendations promoting the environmental control programme, theme I. 3 of CMEA;
- b) to the proceedings of discussions on questions of environmental research and methods of mapping at the XXIII Moscow Congress of the International Geographical Union (IGU) in 1976;
- c) to the relevant advanced results of French geography (mapping of environmental dynamics, developing of map symbols for medium — and large-scale maps — A. JOURNAUX, an ecodynamical model map of one of the areas in Southern France — I. TRICART).

2. Purposes of environment qualification mapping, methods of investigation

The intensive exploitation, utilization of renewable and unrenewable natural resources as well as the influence of accelerated social activities have led by now to the distortion of the natural balance of the geographical environment, to its increasing pollution and transformation. It is exactly this field where environment qualification mapping offers more contemporary and more effective methods of exploring the complex processes mentioned above and the interdependence between them. That is to say, by depicting on maps the dynamics of natural and economic processes we also create new possibilities for outlining prognostics related to the transformation, or rather deterioration of the environment, and at the same time for drawing up the possibilities of its solution as well. This objective, however, can be achieved only by surveying the individual elements of the natural environment, the various factors of the socio-economic processes. This is due to the fact that analytic and syntetic maps indicating all these elements seem to be able to offer a **valuation characterized by quantitative and qualitative data** on earth surface processes, on the spatiality of the forms of socio-economic activities.

Therefore place and role of environment qualification mapping in geographical research work are motivated even from several points of view. The exploration of natural and social processes, apart from the foregoing, can help us in formulating our **regional development policy**, and also in optimizing land utilization. Of course, environmental qualification maps by themselves do not suffice for founding the short — or longterm development concepts of the regional development policy, for decision-making. However, environment qualification maps compiled by the help of quantitative and qualitative indicators can be useful by their own means and on a higher level for complex regional investigations and for the regional development itself.

Exceeding the objectives of earlier thematic geographical maps, the fundamental aspect of the recently launched environment qualification mapping consist in determining **natural ecotops, economic dynamics**, and hereby estimating the complex problems of natural conservancy and environmental control. After all, the environment qualification mapping has grown beyond the topics of earlier thematic geographic maps and its fundamental principle is to determine the ecological conditions, natural ecotops and economic dynamics and to evaluate this way the interactions and interdependences between natural and socio-economic processes. In the final analysis environment qualification

mapping irrespective of its being carried out for the purposes of ecodynamics, regional development, regional planning or environmental control, has been turning into a science of integrating character.

The complex regional research work going on currently, for instance the volume entitled »Landscape Geography of the Transdanubian Central Mountains«, can also be made more exact, more complex by environment qualification mapping, by displaying **the interactions between natural landscape and economic region.**

Nowadays the realization of the objectives of environment qualification mapping has considerably been hindered by the fact that exact criteria for the valuation of a given area, that is qualitative and quantitative indicators are not always available, or rather the methods of their determination can only be elaborated continuously, during the survey work itself.

In 1976—1977, for instance, we already made an attempt at valuating the land and mineral resources of Komárom county, and within this especially the geological and geographical subpotentials. But the methods of research and mapping elaborated for these purpose could only partially satisfy the double demand. True, in the course of the thematic mapping and of the valuation the fundamental geographical potentials, **the principles of qualification** could unequivocally be felt. The territorial projections of **the quantitative values**, however, came to fruition only in the field of some geographical factors (population, transport, water management) and geographical potentials. At that time, in consequence of the unsolved methodological problems, it was still impossible for us to undertake a complex, quantitative and qualitative valuation of the whole country.

3. Topics of environment qualification mapping

In spring 1977, in connection with the inauguration of the Research Station of Csákvár of the GRI, the research collective of our Institute discussed the tasks related to environment qualification mapping. The discussion took place in the framework of a one-week symposium with outside experts and several foreign geographers also taking part. The topics of the medium — and long-term programme discussed and approved at the conference have envisaged further environment qualification mapping work in several groups as follows.

A PROPOSED MAP SERIES FOR ENVIRONMENTAL ASSESSMENT (Qualification)

A. Analytical Maps

1. Maps for the classification of relief

1.1 Quantitative maps

1.1.1 Superponated contour lines (L, S)*

1.1.2 Valley density map (L, S)

1.1.3 Map of relative relief (L, S)

1.1.4 Classification of slopes (L)

1.1.5 Slope exposure (L)

1.1.6 Analysis of hydrographic units (L)

1.1.7 Complex quantitative map that summarizes the above

1.2 Maps showing types of relief

1.2.1. Qualitative parameters of relief types

1.2.2 Quantitative parameters of relief types

* L — Large scale (1 : 10000, 1 : 25000) used in representative studies

S — Small scale (1 : 200000, 1 : 500000) used for general maps

Separate legends are used for the large- and small-scale maps

- 1.3 Morphological maps
 - 1.3.1 Qualitative parameters of morphological forms
 - 1.3.2 Quantitative parameters of morphological forms
- 1.4 Combined map showing types of relief and morphological forms (simple geomorphological categories reflect genetic concepts and provide orographic information)
- 1.5 Geomorphological map
 - 1.5.1 General geomorphological map (L, S)
 - 1.5.2 Geomorphological map of surface-, mass movements (L, S)
 - 1.5.3 Engineering geomorphological map (L)
 - 1.5.4 Anthropogenic geomorphological map (L)
- 1.6 Hydrogeographical map (of representative areas) (L)
 - 1.6.1 Qualitative and quantitative assessment of surface and underground waters (based on natural parameters)
 - 1.6.2 Assessment of surface and underground water quality (based on pollution index)
 - 1.6.3 Special-purpose maps (e. g. water balance)
- 1.7 Classification of the natural vegetation cover (collection and application of data on hydrogeographical, ecological maps and on maps of overall environmental assessment)
- 1.8 Topoclimate
(On hydrogeographical, ecological maps and on maps of overall environmental assessment)
- 1.9 Soil classification maps (of representative areas)
 - 1.9.1 Soil genetic map
 - 1.9.2 Soil quality
 - 1.9.3 Soil erosion
 - 1.9.4 Natural productivity
 - 1.9.5 Soil capability (natural fertility of soil as % of the fertility of the most fertile soil)
2. **Landscape ecological maps and maps of landscape types**
 - 2.1 Agro-ecogeographical maps (of representative areas)
 - 2.2 General maps depicting landscape types
3. **Land use maps**
 - 3.1 General map of land use (agricultural, forest, uncultivated land)
 - 3.1.1 Changes in type of land use between 1935—1970
 - 3.1.2 Type of present land use
 - 3.2 Agricultural land use maps
 - 3.2.1 Proportion of land used for agriculture today (administrative boundaries of communes shown)
 - 3.2.2 Changes in the proportion of land used for agriculture between 1935—1970
 - 3.2.3 Mode of agricultural land utilization:
branches of cultivation in 1870 (ploughland, meadow, pasture, orchard, vineyard etc.)
 - 3.2.4 Changes in the mode and branches of agricultural land utilization between 1935—1970
 - 3.3 Dynamic areas of agricultural land use
 - 3.4 Agricultural land use in selected special »type-areas«
 - 3.4.1 Land use in areas in peripheral position

3.4.2 Land use in built-in areas

3.5 Types of agricultural land use maps

4. Population maps

4.1 Growth of population (1930, 1960, 1970)

4.2 Population migration

4.3 Occupational structure of the population

4.4 % ratio of active earners (in representative areas)

4.5 Types of age-structure (in representative areas)
(ratio of men and women respectively)

4.6 Ratio of partial families (in representative areas)

5. Maps for the assessment of the living conditions of the population

5.1 Standard of living and type of living conditions in rural settlements

5.2 Available basic amenities and standard of technical, infrastructural services in towns, and urbanized rural settlements

5.3 Underdeveloped areas in Hungary

6. Maps for the classification of settlements

6.1 General maps

6.1.1 Type of settlement according to economic activity (industrial, agricultural etc.)

6.1.2 Place of work and residential districts in settlements

6.1.3 Functional types of settlement

6.1.4 Functional units of the settlement pattern

6.2 Detailed maps

6.2.1 Morphological map of settlements

6.2.2 Functional morphological map

6.2.3 Sociogeographical map

6.2.4 Special-purpose maps (for representative studies)
(traffic, infrastructure, etc.)

7. Mining, industry and transport maps

7.1 Industrial activity in a settlement as indicated by the number of persons employed in industry and the volume of gross industrial fixed assets

7.2 Industrial structure of settlements (mining, metalurgy, electric power supply etc.) based on the number of persons employed in industry

7.3 Long-term trends and possibilities for the location of industry

7.4 The importance of rail-transport as indicated by the volume of freight turnover at railway stations

7.5 Volume of goods transported by the main road network expressed in tonnes

7.6 Traffic in goods at ports as indicated by volume of turnover and type of goods (oil, coal, iron ore, stone, gravel, sand, bauxite, brick-tile etc.)

8. Maps of holiday and recreational areas

8.1 General maps

8.1.1 Functional studies

(space-time dimensions planned and existing facilities)

1. Week-end holiday resorts

2. Regional, national, international holiday-centres

3. Sanatoriums

8.1.2 Separate study of recreational type areas (1—3)

8.1.3 Infrastructural facilities in 1—3 type areas (quantitative, qualitative indicators, standard of services, utilization)

8.2 Representative analytical maps of recreational type areas

8.2.1 Week-end zones, green belts

8.2.2 National recreational centres — sphere of attraction, seasonality

8.2.3 Sanatoriums — quantitative, qualitative parameters

9. Maps of environmental pollution

9.1 Air quality maps

9.1.1 Air currents

9.1.2 Air pollution (dust, smoke, smog, odour, noise)

9.1.3 Sources of air pollution (industry, agriculture, heating, vehicles, garbage etc.)

9.2 Quantitative parameters of water, water quality

9.2.1 Fluctuation in the quantity of surface and underground waters

9.2.2 Water pollution (physical, chemical, biological)

9.2.3 Sources of water pollution (industrial, agricultural, settlements)

9.3 Maps of soil pollution

9.3.1 Soil pollution (physical, chemical, biological)

9.3.2 Sources of soil pollution (industrial, agricultural, communal)

B. Integrated assessment of environmental quality

1. Integrated assessment of natural environment

2. Integrated assessment of socio-economic environment

C. Environmental prognosis

(special and complex suggestions for environmental protection and for optimal utilization)

Preventive measures against:

- physical and manmade damage to topography
- physical and manmade damage to agricultural areas and forest
- physical and manmade damage to settlements
- water and air pollution.

Sandor Katona, Laszlo Retvari, R. Keresztesi

METODOLOGIJA IN PREDMET KARTIRANJA ŽIVLJENJSKEGA OKOLJA

Ob uporabi tuje literature in po rezultatih doslej opravljenih raziskav na problemih življenjskega okolja smo na Geografskem inštitutu Madžarske akademije ved izdelali v letu 1977 metodologijo kartiranja okolja po kvalifikaciji. S to novo obliko kartiranja dosežemo s pomočjo kvantitativnih in kvalitativnih karakteristik oceno procesov, ki se odvijajo v prostoru in poznavanje vplivov na življenjsko okolje, ki nastajajo ob raznovrstnih dejavnostih človeka. Pomembna naloga kartiranja je, da omogoča izdelati prognozo preobrazbe življenjskega okolja. Po izdelani metodologiji smo lahko karte, ki kvalificirajo življenjsko okolje, združili v tri skupine:

- analitične karte,
- karte integriranega kvalificiranja življenjskega okolja,
- karte prognoze vsebine življenjskega okolja.