

GEOGRAPHICAL INFORMATION SYSTEM IN HUNGARY

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All over the world there is increasing interest and need to evaluate and direct environmental system because of the deterioration of natural ecological system. It is all the more important to apply fast and effective means when planning the environment.

Anyone who is dealing with ecological questions realizes that is becoming overly difficult to provide exact information both theoretically and methodologically as well about the environment, as the latter is becoming more and more complex. It is, therefore, necessary to have a wider spectrum of the relationship of ecological system, the complex mechanisms and it is also important to examine the effectivity of ecological units, and evaluate the stability of different system. For all this, naturally, new methods are required. Let us just think of the fact that is we use more maps and more survey photography, we will be unable to compare anything manually. We do hope that more and more people will realize that these questions must be examined on the basis of geography. We have to see that the validity and credibility of our studies depend on the answer given to these questions.

From the beginning of the 1970's it has become possible to measure up ecological system, to connect information gained from maps and charts, and to store data and generate new ones on the basis of a new synoptic view. All this has become possible because of the application of computer system. We have created expedient informative system which enable us to carry out environmental surveys more effectively, more exactly, and more economically. It is necessary to work out computer methods and adapt them in order informative system, and that is why it has become a way of measuring up a country's scientific level by measuring up to what extent it is provided by informative system.

Geographical information system (GIS)

In Hungary GIS is interpreted in a wider and narrower sense. In the wider sense GIS is interpreted as a general informative system, which enters, stores, and evaluates data on the basis of a well defined spatial correlation. In this sense GIS is a synonym concept of spatial informative systems. By GIS we mean a total system of environmental factors which makes it possible to enter, transform, store, and process data in order to get hold of new information, which we may utilize in geography and in practice as well.

Computerized GIS includes the data bank, and the methods needed to process, store, and further data. On the basis of this, there are three distinct components of GIS:

- data system (entering, transforming and storing data)
- processing system (data processing)
- control system (credibility, simulation models)

Data system

The most important point of any branch, or integrated environmental research is collecting and processing data. We have to process and transform data for our research to get hold of information. The data bank is not more than a storehouse of data, which have no meaning without further processing. When compiling the data bank we have to clarify in what system we will use our data (e.g.: at range taking we have to apply for placing and processing 10^6 data/sec).

Nowadays several institutions and organs have data systems in Hungary. This should mean that it has become easier to compile a data basis, however, this means several unanswered questions as well. For instance the data may accrue from several sources- from range-taking, from maps, and from field. These data may significantly differ in their informative value and credibility. It is difficult to apply them, as some of them are stored in raster (e.g.: remote sensing data) and some of them in vector form. Price is also an important question in connection with data. Data systems are becoming more and more expensive because the price includes the processing technology in an indirect way.

Processing System

GIS includes those means which are important and applicable to get hold of information, and in the case of computer systems algorithms and basic methods belong to this structure.

In connection with informative geographical systems together with capacity, credibility, and rentability, compatibility is also an important requirement. The complexity, bulk and price of the environmental data to be used make us apply the best possible means and methods which enable us to advise experts in the most understandable way.

Because of the special progress of environmental and spatial geography the concept and logical models are lagging behind.

In a simplified way one can distinguish two types of data entering and processing systems used in Hungarian field and environment research. One is branch data collecting and making topic maps, then by superimposing them the desired result may be achieved- the other one is collecting data-integrated data bases-synthesis. Both approaches are strongly based on classification and generalization in order to

reduce the large quantity of data. These methods have the great disadvantage that their success and mistakes greatly depend on the applied classification methods (as the original data are substituted by class or type characterizations). Problem solving with the help of GIS seems to be a great step ahead as for quality, as the data will not lose their original details and the possibility to use them for alternate classification and typifying will remain.

Control system

Good result may not be expected without proper data. However, data are not the only source of mistakes in GIS as these multiply because of the processing methods and models.

GIS in Hungary

Geographical information systems in Hungary well reflect to what extent we are behind Western European countries in technology. In Western European countries the main task is to work effectively the existing technological means and methods, on the other hand, in Hungary we are doing experiments which make problem solving possible with a GIS background, and to adapt the internationally used processes. To adapt and use GIS on a wider scale is especially difficult because recently made computer programs to store and analyse geographical data are not widely spread. We do not know well enough data processing methods yet, and many people still doubt their effectivity. The only exception to this is the informative systems used in simple computer cartography and digit modelling.

A. There are 7 or 8 significant and functioning data banks in Hungary, and there are experiments done to improve them into information systems. The following systems will be adapted in a short time:

Soil Information System (MTA TAKI)

Agrochemical Information and Directing System (MÉM NAK)

Surveying and Map Data Bank (FÖMI)

Aerial Statistical Information System (VÁTI, KSH)

Data is being fed into the following systems:

Recreational Information System (VÁTI)

Environment Protection Information System (OKTH)

Recultivating Information System (KFH)

There are three problems in connection with these systems:

- It is very important to make use of these data bases in the most compatible way. Effectivity is harmed if data bases are based on a different system of relationships. This problem will be solved by the unified identification system, called geocode. This is to be used according to a Ministerial decree.
- Accessibility to the data is very problematic. The legal, financial and technical conditions are still not clarified. That is why a large number of data are not accessible yet.
- At the moment software and experts are not available, although these would be vital to produce complex data.

B. Creating the Complex Environmental Informative System is under way in the Geographical Research Institute of the Hungarian Academy of Sciences on the basis of the following principles:

In our opinion only one logic data basis should exist for each mass of data. Several copies mean a lot of extra work and more source of error. This of course does not mean that we should store every geological datum in one data basis, but it means that it would only exist as a logical unit. (Environmental Informative System), but in most cases it would consist of separate units.

In our case these would fit the already existing informative system described above. The concerned authorities are responsible for the accessibility and functioning of these.

- These data banks will be connected to the Unified Data Recording System, which is to organize entering and treating data.
- We want to assure that the system works and many data are available by connecting it to the already existing and functioning ARC/INFO, MAP, ARIADNE informative system, and by applying their principles.
- Considering our hardware facilities we feel that greater emphasis must be placed on larger, existing memories than on rough calculating capacity.

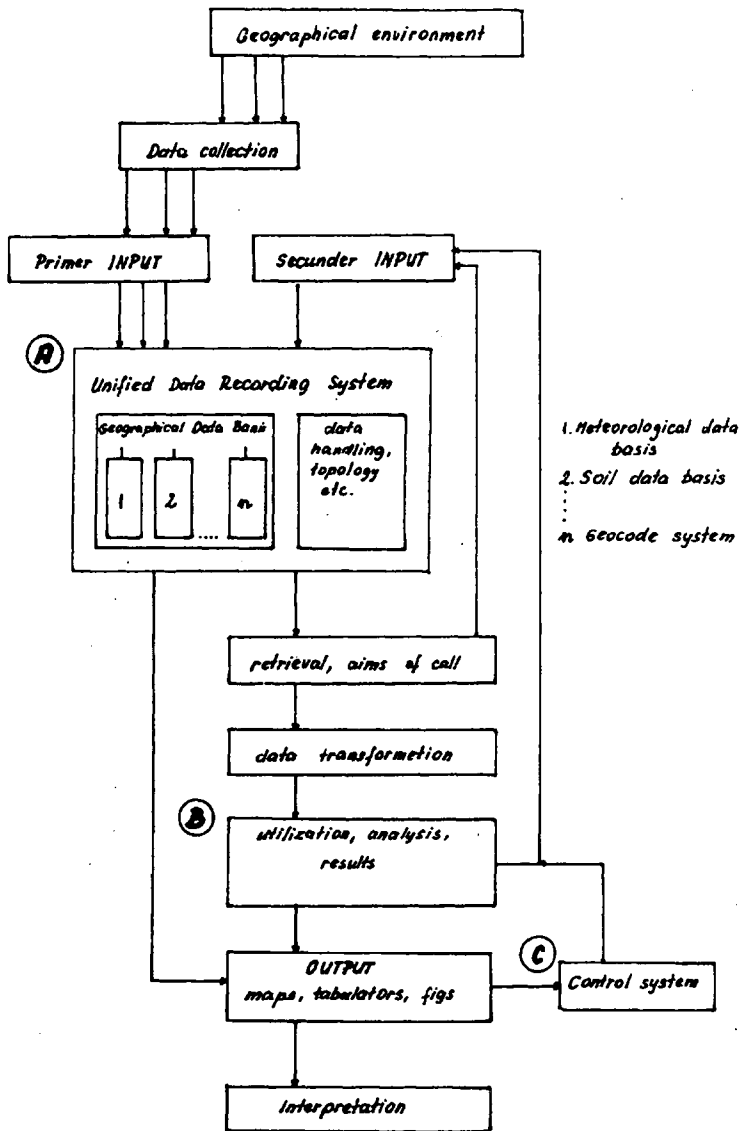


Fig. 1. The structure of the Environmental Information System