

**NATIONAL GEOINFORMATION SYSTEM OF NATURAL RESOURCES
OF THE AZERBAIJAN REPUBLIC FOR ENVIRONMENTAL
PROTECTION**

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Introduction

One of the main problems of natural and economy planning of natural and anthropogenic geosystem is the revealing of emergent characteristics of various types of geosystems with the help of application of complex methods of modern mathematics such as, theory of information (information - statistical methods and other); theory of mathematic statistics (methods of factorial, regressional, correlational, component and dispersional analysis and others); theory of linear and matrix algebra (methods of linear programming: -simplex methods and others); theory of distribution (methods of parameters estimation of universe and others); theory of accidental functions (methods of the definition of probability of events and others); theory of graphs; theory of catastrophe and so on.

Keywords: geographical information system, natural resources, digital map modeling, geosystem, resource management

**Formulation of methods for
natural resources management**

The system research of geosystem is carried out on the followings stages:

Collection, checking and archiving all geoinformation (being put to visual and instrumental measurement (on the computer) in the form of figures or images);

Compiling of list of scientific-geographical information on the basis of collected geoinformation;

Extraction of scientific-geographical information from archive of technical geoinformation with the help of compiling the algorithms and programs following the mathematic and geographical criterion;

Development of complex of applied programs (on FORTRAN, VISUAL BASIC or other programming language) for system analysis and modeling on computer on the base of above mentioned methods of the modern mathematics;

Composing of complex graphical program with the aim of printing on computer the mathematic-cartographical and graphical models;

Composing of complex of system programs with the aim of implementation of system operations at all stages of the system research (receiving of geoinformation from satellite, from flying apparatuses and terrestrial stations) and establishing of system relations between data bases,

between applied programs and computer environmental apparatus;

Composing of documents for the usage of the worked out geoinformational systems (GIS);

Geographical analysis of mathematic, graphic, cartographic and figure models with the aim of defining the emergent and particular peculiarities (characteristics) of different types of geosystem and its component elements, which would be used in rational nature utilization of studied territory and in a number of other industrial and agricultural projects functioning of planning in the given region.

Organizing internal and external geocommunication system.

Creating of natural data base

Input all maps: types of relief, types of soil and plant cover, types of quaternary sediments (according to age and mechanical composition), topographical map, hydrological map, climatic map, hidrogeological map, all satellite and air photos and number of other maps, finally, landscape (natural and anthropogenic; modern and paleo) maps with the help of colored scanner are entered the memory of computers or by mean of using MAPINFO GIS system, ARCWIEV GIS.

Input all numerical geoinformation in the memory of computer and archiving by dBASE IV.

**Calculation of scientific
geoinformation of nature**

Calculation of geographical coordinates of the all geographical objects (points, regions, linears) and keep its significance in the memory of computer.

Calculations of geometric parameters for contour, linear and point images. IDRISI, R2 or others software.

Calculation of all scientific geoinformation for natural and anthropogenic geosystem and its components with aim of composing of geographical data bank "AZGEODATA" which has the following structures:

The Structure of National Geographic Data Bank "AZGEODATA"

DATA BASE FOR LANDSCAPES AND ITS ELEMENTS:

Complex data of geosystem on macro, meso and micro levels; cartographical data of the structure of the components of geosystem; quantity and non-quantity information for naturally and anthropogenic landscape (morphometrical and image information) and other information.

DATA BASE FOR SOIL RESOURCES - geometrical, geochemical, geophysical, biological and mechanical characteristics by types of soil cover (quantitative and qualitative data);

DATA BASE FOR VEGETATION RESOURCES - geometrical, geochemical,

geophysical, biological data by types of vegetation cover (quantitative and qualitative data);

DATA BASE FOR WATER RESOURCES: geometrical parameters of river and lake basins, quantitative and qualitative data for water resources

DATA BASE FOR CLIMATIC RESOURCES: quantitative and qualitative data for air temperature, precipitation, moisture; physical features of wind, extreme atmospheric phenomena's and other

GEOECOLOGICAL DATA BASE - information for atmospheric, soil, plant and water pollution, information for natural reservation, marine pollution, medico-geographical information for all habitants and ecological information for zoological community and other.

Methods of modeling natural resources and processes

Geoinformation and digital map modeling of natural resources and processes

using Mapinfo geographical information system:

1. composing of geoinformational maps for spatial distribution of soil, plant, water and other resources;
2. composing of geoinformational maps for natural processes: erosion, landslide, river flow and other.
3. composing of digital maps modeling of spatial distribution of parametrical and non-parametrical characteristics of the soil, plant, water and mountain rocks as a component of nature

“MODELLING FOR ECOLOGICAL RESEARCH” - composing mathematical-analytical maps for the usage of geo-ecological problems (2d and 3d cartographical modeling on computer with the aim of solution of the different problems of environmental protection tasks) in Azerbaijan.

This geoinformation system at preset time has been used in research work by our geographical faculty teachers and student for more than 10 years.

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