Географические науки

Nabiyev Alpasha Alibek

Academician of IASHE,

Doctor of geoinformatics, Senior lecturer,

Department of Physical Geography, Faculty of Geography

Baku State University

Gahramanova Tahira Melikgeydar

Candidate of agriculture science, Docent

Department of Physical Geography, Faculty of geography

Baku State University

Gumbatova Shafiga Yusub

Candidate of geographical Science, Lecture

Department of Physical Geography, Faculty of Geography

Baku State University

Jafarov Nazim Jafar

Candidate of physico-mathematical sciences,

Senior scientific researcher

Institute of Mathematics at the National Academy of

Science of the Azerbaijan Republic

Abasova Nazifa Ali

Senior lecturer, Department of

Physical Geography, Faculty of Geography

Baku State University

Aktoprak Irken Fatih

Senior lecturer, Department of

Physical Geography, Faculty of Geography

Baku State University

Musayev Rovshan Ali

Candidate of physico-mathematical sciences,

Senior scientific researcher

Institute of Physics at the Baku State University

Hasanaliyeva Laman Hasan

Phd, Senior laborant of department

of Physical Geography, Faculty of Geography

Baku State University

NATIONAL GEOINFORMATION DATA BANK OF THE AZERBAIJAN REPUBLIC

Summary: One of the main problems of natural and economy planing of natural and anthropogenic geosystem is the revealing of emergent characteristics of various types of geosystems by the help of application of complex methods of modern mathematics such as theory of information(information - statistical methods and other);theory of mathematic statics(methods of factoral, regressional, correlational, component and dispersional analysis and other);theory of linear and mathix algebra(methods of linear programrning:-simplex methods and other);theory of distribution(methods of parameters estimation of universe and other);theory of accidental functions(methods the definition of probablity of events and other);theory of graphs; theory of catastrophe and so on.

Key words: geographical information system, natural resources, digital map modelling, geosystem, resource management

1. Formulation methods for natural resources management.

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

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

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

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

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

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

f) Composing of complex of system program with the aim of implementation of system operations at all stages of 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;

g) Composing of documents for use of worked out geoinformation systems(GIS);

h) Geographical analysis of mathematic, graphic, cartographic and figure models with aim of definition of emergent and' particular pecularities (characteristics) of different types of geosystem and its component elements, which will be used in rational nature utilitization of studied territory and in a number of other industrial and agricultural projects functioning of planing in the given region.

i) Organizing internal and external geocommunication system.

2. Creating of natural data base

1. 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, hydrogeological map. All satellite and airphotos and number of other maps, finally, landscape (natural and anthropogenic; modern and palaeo) maps by the help of colored scanner are entered the memory of computers or by mean of using MAPINFO GIS system, ARCWIEV GIS.

2. Input all numerical geoinformation on the memory of computer and archivization by dBASE IV.

3. Calculation of scientific geoinformation for nature

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

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

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

4. The structure of national geographic data bank "Azgeodata"

- Complex data of geosystem on macro, mezo and micro levels; cartographical data of the structure of the components of geosystem; quantity and nonquantity information for naturaly and anthropogenic landscape (morphometrical and image information) and other information;
- DATA BASE FOR SOIL RESOURCES-geometrical, geochemistry, geophysical, biological and mechanical characteristics by types of soil cover (quantitative and qualitative data);
- DATA BASE FOR VEGETATION RESOURCES- geometrical, geochemistry, 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, extremal 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.
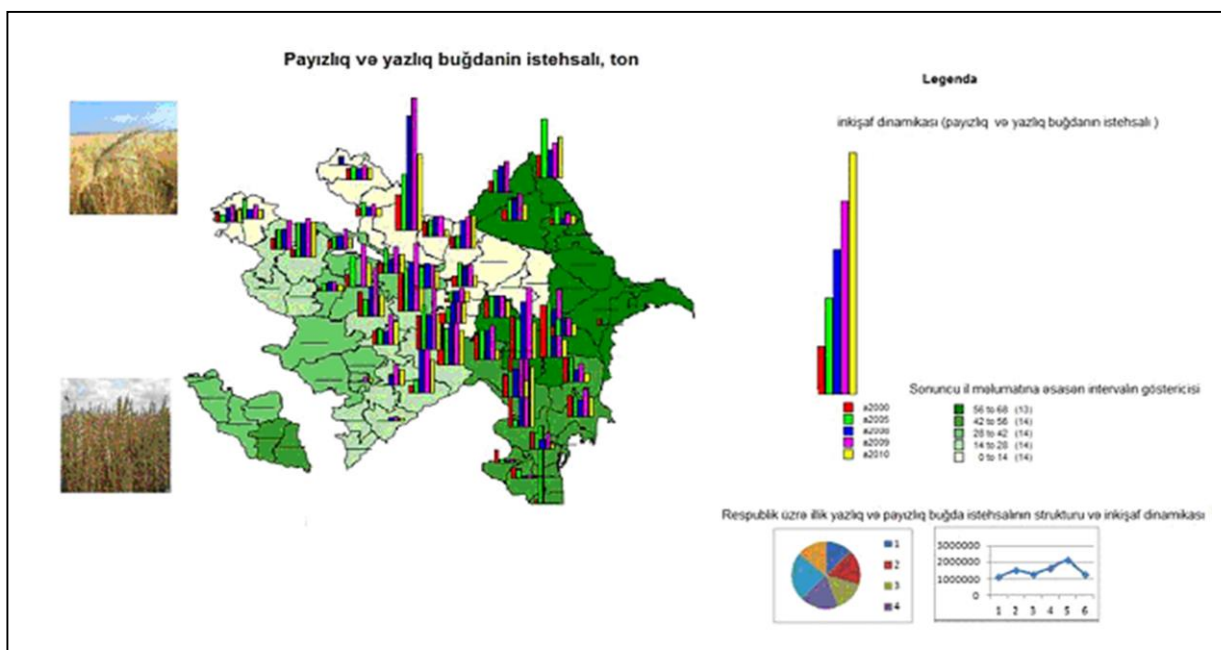
5. Methods of modeling natural resources and processes

1. Geoinformation and digital map modeling of natural resources and processes using MapInfo geographical information system:
   - composing of geoinformatiom maps for spatial distribution of soil, plant, water and other resources;
   - composing of geoinformation maps for natural processes: -erosion, landslide, river flow and other;
   - composing 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;
   - "MODELLIN FOR ECOLOGICAL RESEARCH" - composing mathematical-cartographical maps for use geoecological problems (2d and 3d cartographical
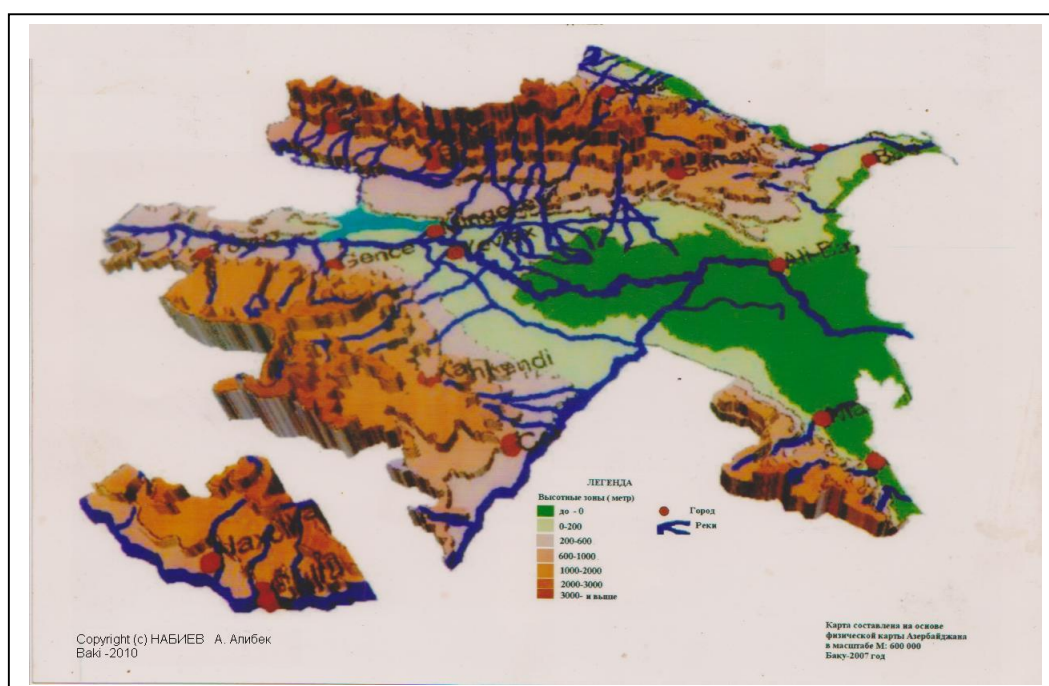
modeling on computer with aim of solution the different problems of environmental protection) in the Azerbaijan.

This geoinformation system at preset time used in research work by our geographical faculty teachers and student more than 10 years.
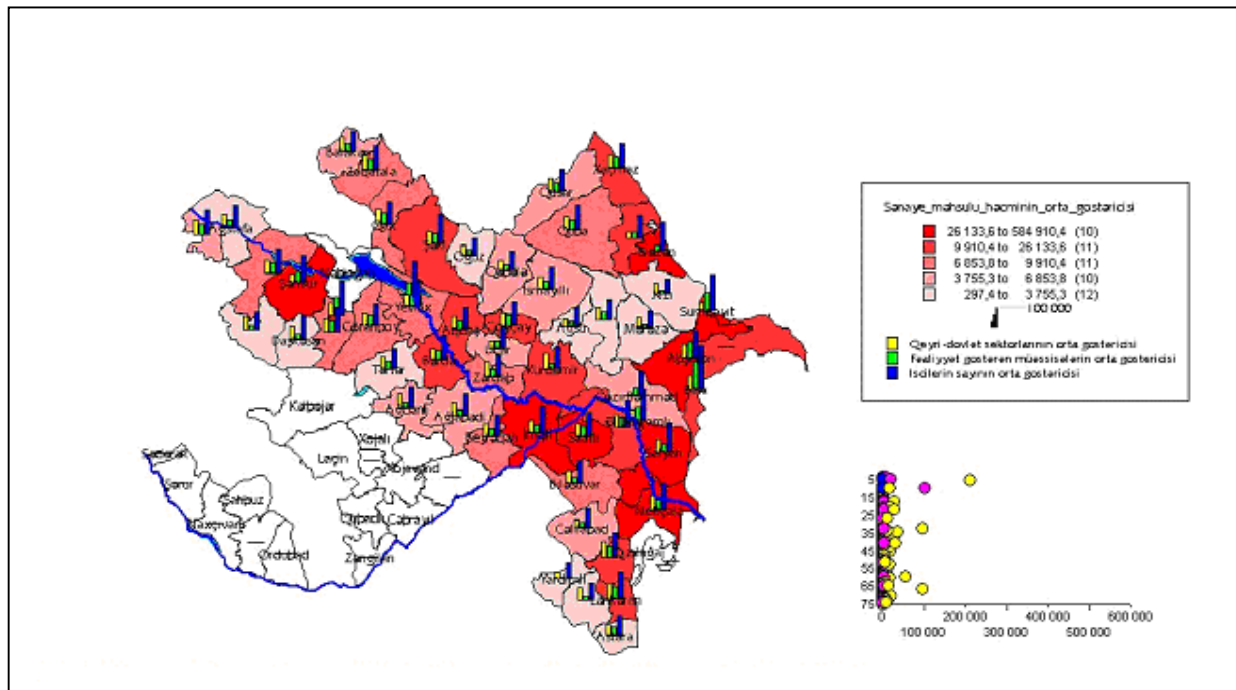
The next examples given any geoinformation and digital maps which composed by scientific workers our center "Geoinformatics and Computer Geograpy" at the Baku State University.
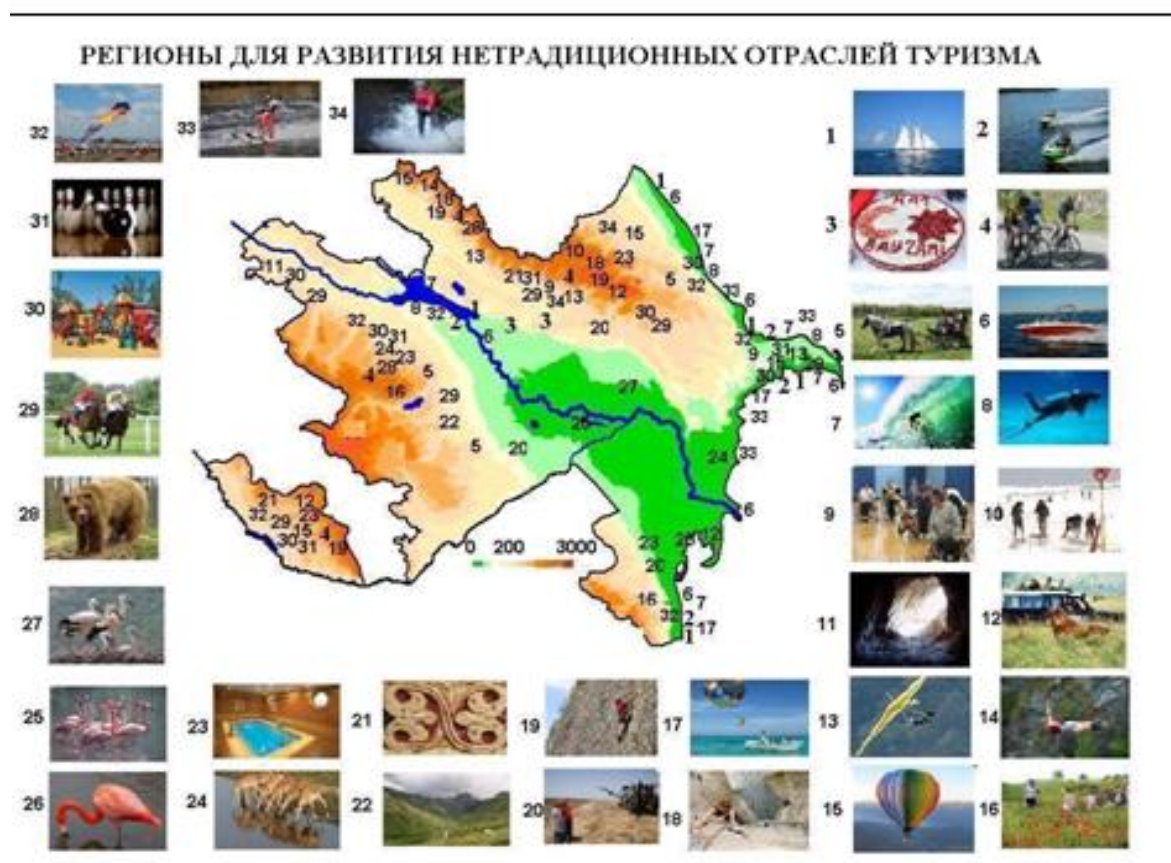

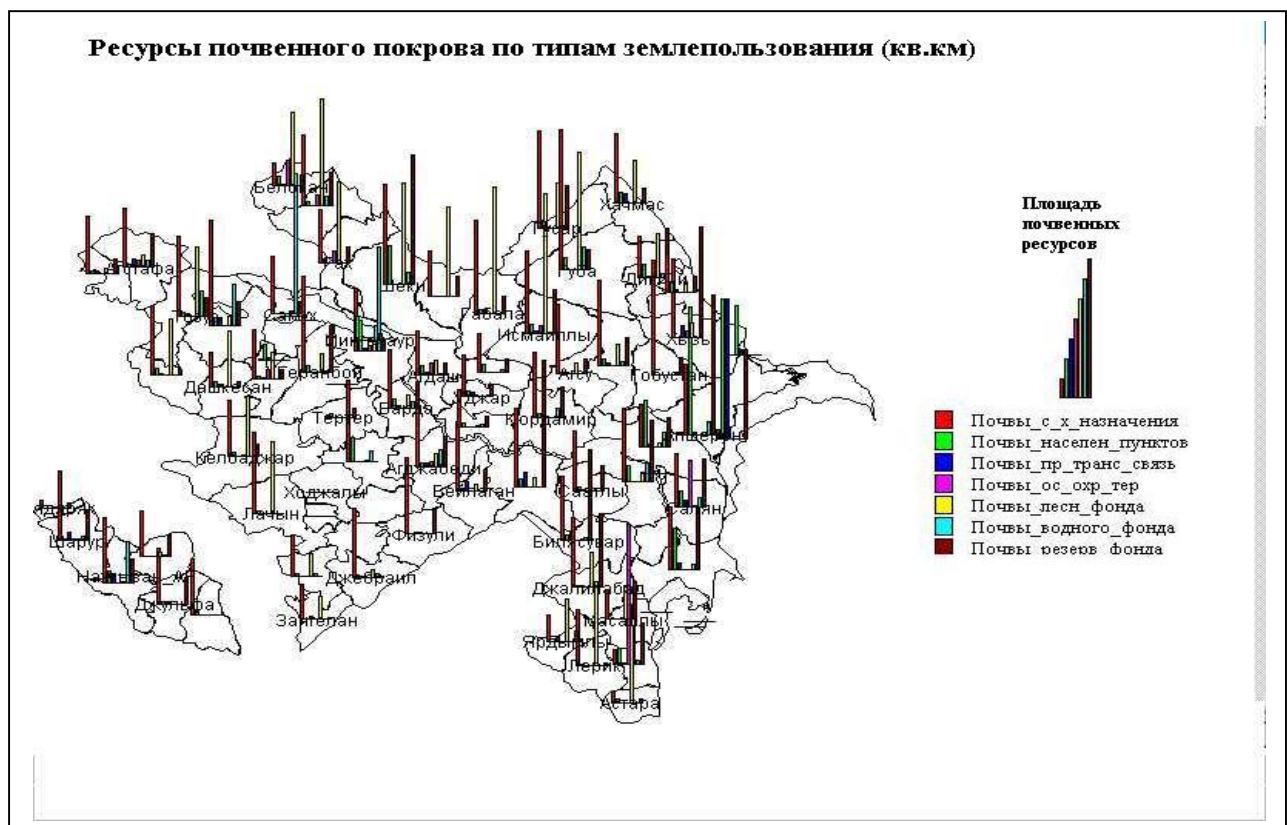**Pic. 1. Example geoinformation map for agriculture economy of the Azerbaijan Republic**

Pic. 2. Example prism maps of hypsography for Azerbaijan territory
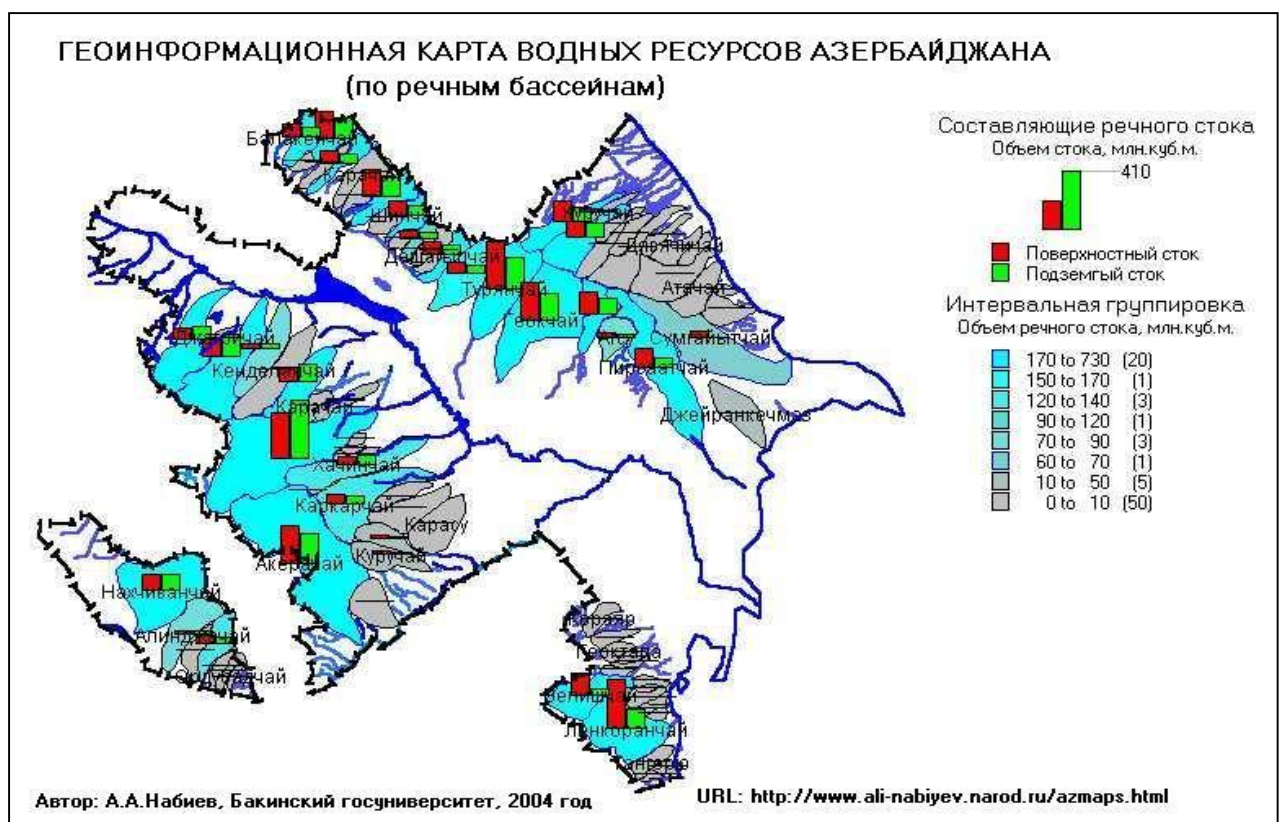
Pic. 3. Examle geoinformation map of industry for Azerbaijan territory
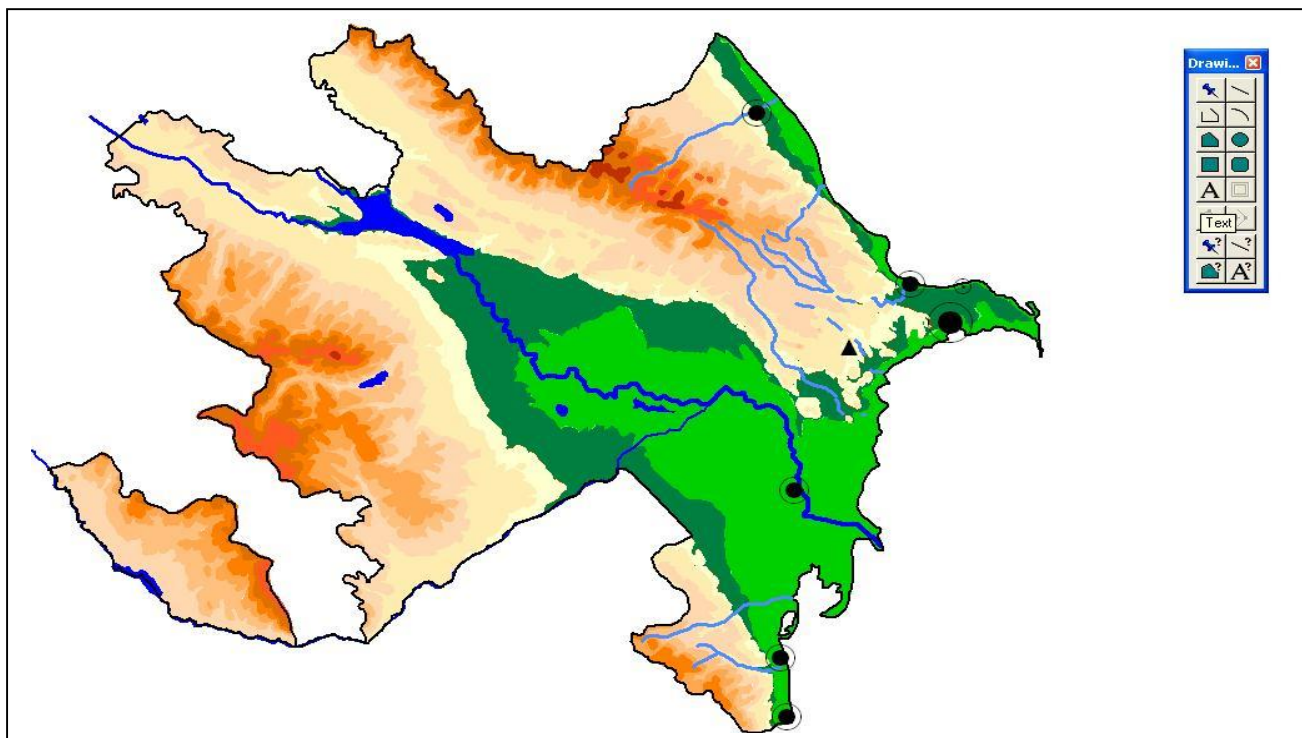

Pic. 4. Example geoinformation map of tourism economy of the Azerbaijan Republic
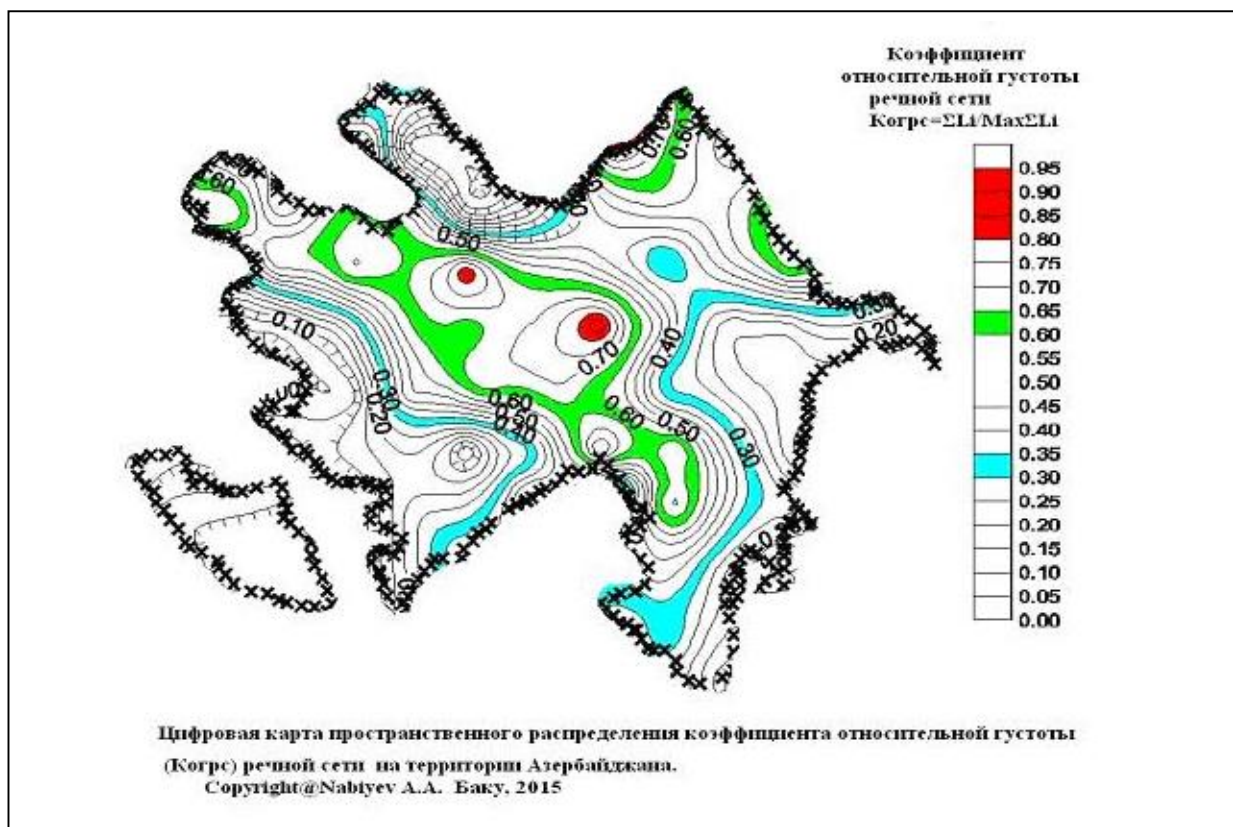
Pic. 5. Example geoinformation map of soil resources by regions of the Azerbaijan Republic

Pic. 6. Example geoinformation map of water resources in the river basins on territory of the Azerbaijan Republic

Pic. 7. Example digital 2D map of physical surface of the Azerbaijan Republic

Pic. 8. Examle digital 2d map of river dencity on the Azerbaijan territory

For another map models you may be see on the URL: www.ali-nabiyev.narod.ru

References

1. Набиев А.А. Основы компьютерной географии / В сб. "Актуальные вопросы современной информатики", Материалы Международной заочной научно-практической конференции, Том 1 (1-15 апреля 2011 года), г. Коломна, 2011. - с.30-33.

2. Набиев А.А. Методы моделирования компьютерной географии / В сб. "Актуальные вопросы современной информатики", Материалы Международной заочной научно-практической конференции, Том 2 (1-15 апреля 2011 года), г. Коломна, 2011. - с.160-163.

3. Набиев А.А. Электронные карты природных условий Азербайджанской Республики / В сб.: "Тематическое картографирование для создания инфраструктур пространственных данных", Материалы IX научной конференции по тематической картографии, Иркутск, 9-12 ноября 2010 г. Том 1, г. Иркутск, Издательство Института географии им. В.Б. Сочавы СО РАН, 2010 г. - с.162-164.

4. Набиев А.А. Геоинформационные математико-картографические модели природных условий Азербайджана / В сборнике: Информатика: проблемы, методология, технология", Материалы XI международной научно-методической конференции, 10-11 февраля 2011 года, Том 2, Издательство-полиграфический центр, Воронежского государственного Университета, г. Воронеж, 2011 г. - с. 82-85.

5. Nabiyev A.A. Fundamentals of computer geography / Сборник Материалов международной научно-практической конференции "Пространство-Время-Система Координат Развития Человечества" (г. Киев, г. Лондон, 25 августа - 1 сентября 2011г.). Изд-во "InPress", г. Одесса, 2011 г. - с. 21-22.