

Geoinformatics: enabling sustainable development in Uzbekistan

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Abstract:

Аннотация:

1. Introduction

Uzbekistan faces many problems which can be more effectively handled with the help of GIS:

1. Educational system due to budget constraints and other transitional problems following the collapse of the Soviet Union, teaching methods, curricula, and educational institutions are outdated and poorly kept. Although the government is concerned about this, budgets remain tight.
2. Land degradation is widespread due to deteriorating irrigation and drainage infrastructure causing water logging and soil salinity. Addressing this requires speeding up environmentally sustainable rural development by supporting: improved land and water use management, and land administration reform; rural infrastructure and services etc.
3. The heavy use of agrochemicals, diversion of huge amounts of irrigation water from the two rivers (Amu Darya and Syr Darya) that feed the region, and the chronic lack of water treatment plants are among the factors that have caused health and environmental problems on an enormous scale. As an example we should mention the Aral Sea. There is an assumption that all large underground fresh-water supplies in Uzbekistan are polluted by industrial and chemical wastes.
4. Rural areas: Poor water management and heavy use of agricultural chemicals also have polluted the air. Salt and dust storms and the spraying of pesticides and defoliants for the cotton crop have led to severe degradation of air quality.
5. Urban areas: factories and auto emissions are a growing threat to air quality. High levels of heavy metals such as lead, nickel, zinc, copper, mercury, and manganese have been found in Uzbekistan's atmosphere, mainly from the burning of fossil fuels, waste materials, and ferrous and nonferrous metallurgy. (Glenn E. Curtis, ed. Uzbekistan: A Country Study. Washington: GPO for the Library of Congress, 1996.)

GIS is used in almost every field where geographical data must be defined, like civil engineering, construction of roads and railways, rural and urban planning, environmental monitoring, land management, mining, natural resource management and sustainable agricultural development. GIS is a very important tool in decision making for sustainable development, because it can provide decision makers with useful information by means of analysis and assessment of spatial data.

Today the graduates have to possess modern knowledge with application of advanced computer technologies skills and be able to implement GIS applications.

A new GIS MSc course will address the following problems:

1. In land and real property management Geoinformatics support the computer based land registration. For this reason the GIS usage can enhance the reliability and actuality of the real properties. At present, land registration in Uzbekistan is done manually without using computer-based GIS, mainly due to lack of competence in digital mapping and particularly lack of competence in GIS.
2. Due to excessive pressure on its land and water resources, Uzbekistan now faces environmental problems mainly represented by land degradation and water shortage which negatively affects food supply in the country. As INSPIRE shows Geoinformatics has an inevitable role in environmental protection, it can help to map soil erosion, salinity and water logging progress, plan irrigation network for agriculture and water resource management.
3. As a developing country Uzbekistan faces with the problem of growing population in cities and towns. Therefore, understanding of the possible scenarios and environmental impacts of urban settlements is an increasingly important focus of attention in science and policy.
4. In municipality level GIS is powerful tool for decision making in national development and poverty reduction strategies; a coordinated and effective response to natural hazards, epidemic; and protect vulnerable populations.

As it can be seen from the above list Geoinformatics has an important role in the future development of the society teaching GIS is very important, although this field in Uzbekistan is also suffers from several problems:

1. The spatial data related technologies are in an ongoing development. For teaching these subjects and to address the market needs highly educated teacher staff is and the most recent developed geodetic and other data acquisition equipment is vital to reach the success of the project. These equipments are very expensive, but the Uzbek partner institutions will develop a shared usage of these equipments to fully exploit their capacity.
2. During Soviet period, higher education in geodesy and mapping in Uzbekistan was supervised by Russian universities. The GE-UZ project will help to develop a new MSc course in GIS because as an independent country, Uzbekistan needs its own up-to-date higher education on these topics.
3. Highly educated specialists are expected to contribute to national economy using their skills and research abilities. Unfortunately very often, employers in Uzbekistan have first to retrain the newly graduated engineers before they can satisfactorily handle their jobs.
4. In GIS education it is evident that teaching staff is not familiar with new methods and advanced technologies due to lack of modern geomatic equipment. Education has to be reoriented towards meeting the modern requirement of the society and ensuring competitiveness of graduates in the world market. Moreover, the educational curriculum shall be developed in line with development of global educational process based on Bologna Declaration of 1999.
5. Geospatial data are poorly maintained, maps and statistics are out of date, data and information are inaccurate, there is no modern data retrieval service, and there is no data sharing between different institutions. Uzbek geomatic engineering and technology is late in turning international and it has not come to terms with internationalization yet.

The GE-UZ project is intended to answer the above mentioned problem. It will be built the technical capacity with GIS labs and the good.