

Geographic Information System (GIS) And Its Application in Geology

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ABSTRACT:

Geography is the study of physical features and pattern of Earth. The traditional methods of presenting geographic information were in the form of 2-D (i.e., two dimensions). But over the last few decades, geographic information system has allowed for the development of innovative software applications for the storage, analysis, and display of geographic data. Geographic Information is the information, which can be related to a location on the Earth, particularly information on natural phenomena and human resources. GIS is the collection of hardware, software, data storage, and information for decision-making and analysis of data. Many studies utilized GIS to integrate different geological data. GIS can be used as a tool in problem-solving and decision-making processes. This paper discussed Geographic information systems and their application in the field of geology.

KEYWORDS:

Geographic, Technology, System, GIS (Geographic information system)

INTRODUCTION:

GIS is considered a subdiscipline of geography. It is the most promising systems for use by geologists and earth scientists is the Geographical Information Systems (GIS). Geographic Information system is the emerging science that puts all studies together such as geography, computer, science and so on. GIS system deals with information that can be viewed as data with specific meaning and context rather than simple data. GIS connects data to a map which contain all types of information. GIS is a map making tool which helps to improve communication and efficiency for better decision making.

Geographic information systems, are computer-based tools used to store, visualize, analyze the geographic data. Geographic data identifies the geographic location. Geographic information systems are utilized in multiple technologies and processes. They are attached to various operations and numerous applications, that relate to: engineering, planning, transport/logistics, telecommunications and so on.

WHAT IS GIS?

Geographic Information is a geographical information or data collect from different sources, then analyse data and making maps using computer system. Geographic Information Systems (GIS) is very good tool in handling data such as locations for transportation, locating new landfills and it has the capability of managing a large amount of data from different sources. GIS stores, analyzes and displays information according their specifications.

GIS composed of hardware and software system. GIS hardware system consists of computer, network with external device. While GIS software consists of 4 sub- system which includes data input, data pre-processing, data storage and management, data output.

- Data Input: Data input is the procedure of encoding data into a computer system. For GIS the data inputs are of two types:
 - (a) Spatial data: Spatial data specifies the locations and stores the information in database. It represents a specific location on the earth.
 - (b) Attribute data: Attribute data specifies the characteristics of locations, information stored in the database.

- Data storage and management: Storage and management of geographic information is programmed using GIS software. Information like location, attributes of geographic elements are stored in the database.
- Data analysis: Data analysis is an important component of GIS in order to achieves output data. However, it helps to represent the two- and three-dimensional features of the Earth's surface, subsurface, and atmosphere.
- Data output: The presentation of geographical data is characterised by output.

APPLICATION:

Increasingly use of GIS is to map and analyze geographical data and provide user-friendly information for better management of their resources and services.

Geographic Information System (GIS) also plays an important role in the study of the earth's surface. Geologists have used GIS Technology to gather, analyze, manipulate and visualize geographic data. GIS can be used for the visualization of data in a spatial environment.

(A) GEOLOGIC MAPPING:

Mapping is the main function of the Geographic Information System, which map out features of the earth's surface and offer guidance for natural resource management. A map is used as a way of communication with people.

Geologic mapping provides a framework for concurrent structural, and surface information and also explores new areas.

Example of Mapping using a GIS system:



Figure: Geological map of INDIA

(B) LAND INFORMATION SYSTEMS:

GIS based on land information system helps with the provision of complete information about land. It helps in tacking land assessment, payment for private land, identification and land related issues.

(C) URBAN PLANNING:

GIS technology is also used for urban growth, town planning and direction of expansion. It is also suitable for the further development of urban areas. With the help of GIS information, it is easier for engineers and architects for development.

(D) GEO- HAZARDS:

Geological hazards are natural geologic process. Geo- Hazards includes Earthquakes, landslides, tsunamis and so on. This geohazards are harmful as it causes damage to the life, environment or property. The GIS system is important for geologists as it helps to understand the pattern of geo-hazards. This GIS system is used heavily in areas where geo-hazards occur.

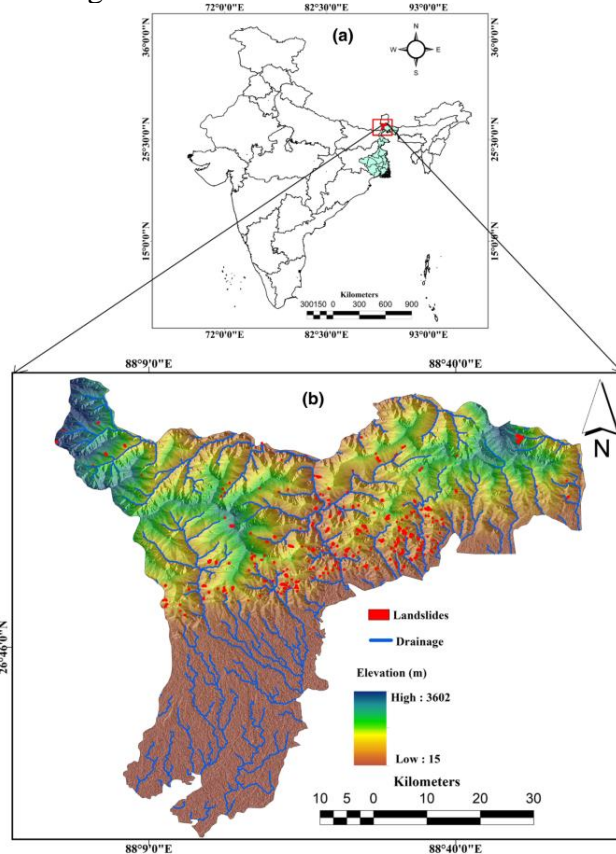


Figure: Example of GIS System providing information regarding geo-hazard

The other applications of GIS Technology are in various fields including:

- Public Health,
- Crime Mapping,
- National defense,
- Sustainable Development,
- Agriculture,
- Rural Development,
- Natural Resources, and so on.

CONCLUSION:

Geographical analysis has allowed researchers to interlink health, population and environmental data, which enables to evaluate and quantify relationships and environmental risk factors at different geographical scales. Using GIS technology people can compare the locations of different things how they are relating to each other. Understanding the spatial spread and dynamics of an outbreak it is essential for development of prevention and control methods, hence GIS can help to meet these requirements.

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