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# **Remote Sensing and GIS: Need of the Hour**

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Abstract: Victor Hugo said, 'No one can resist an Idea whose time has come'. So I can confidently say that no doubt Remote Sensing and GIS is the need of the Hour. If we want to do sustainable Development by keeping in mind about various environmental issues as discussed earlier, for the betterment of society and want to make earth a suitable place to live for our future generations to come. The role of the Remote Sensing and GIS is increasing day by day in every field of our life. From agriculture to forest fire, from drought mapping to floods, from urban planning to Forest cover the role of Remote sensing and GIS has increased since the introduction of this technology

Index Terms – Remote Sensing, GIS.

# **INTRODUCTION**

We are living in the age of Global Warming. Number of natural calamities are increasing day by day. Ozone layer is depleting continuously. Glaciers are losing their size. Ground water source is also depleting. Many kinds of Biotic Components are coming into endangered category. There is a big problem of deforestation. List of problems, which, Mother Earth is facing because of activities of mankind is endless.

These are the changes which Human cannot see by his naked eyes. The part of the electromagnetic spectrum visible to the human eye is small and covers the approx. range 0.4 to 0.7 micro meter. So there comes a need of a resource which can measure the electromagnetic spectrum beyond that limit. This problem has been solved by Remote sensing and GIS. In this paper we will discuss the role of Remote Sensing and GIS in various field of life.

## Some definitions

**Remote Sensing** is the science of obtaining information about an object through the analysis of data acquired by a device not in physical contact with the particular feature under investigation. Typically, Remote Sensing relies on measurements of electromagnetic energy emitted by or reflected from the features of interest.

**GIS** is a computerized system for storage retrieval and analysis of data about the earth landscape and environment in which we have various source of data.

**The Social Sciences** can be defined as those academic disciplines concerned with the study of society and the social life of human groups and individuals; it includes anthropology, economics, geography, history, political science, psychology, social studies, and sociology.

# Major Environmental Problems and RoleofRemote Sensing and GIS

Major environmental problems are Global climatic change, Ecosystem degradation and loss, Desertification, Environmental impact of development activities and urbanization, Wetland degradation, Mine fires, landslides, forest fires, industrial pollution, loss of Mangroves forest and Coral reefs, Threat to biodiversity, Habitat loss and destruction, Over exploitation, Pollution and contamination, loss of water bodies like lake, ponds etc.

These are the problems which we can not track round the clock and as earlier told limit of our electromagnetic spectrum is limited. Only through Remote Sensing and GIS we can get the required results. In doing so, we adopts various advanced technologies of satellite and aerial remote sensing; Geographical Information Systems (GIS); precise Positioning Systems; database and networking infrastructure and advanced ground-based survey techniques

One important contribution is the synoptic view from space that only remote sensing can provide. Remote sensing imagery can provide snapshots of phenomena over large areas, thus broadening the scope of social science inquiry. Examples include basin-scale analyses of Amazon deforestation, or scenes from space that pick up archaeological artifacts that are not visible on the ground or to the naked eye. The ability of remote sensing to pick up and then represent parts of the non-visible spectrum in visible colors (red, green and blue) uncovers aspects of the natural and built environment that were previously opaque to social scientists.

The greatest amount of research attention in the land-use and land-cover change arena has been dedicated to deforestation. Time series remote sensing imagery has been particularly valuable for this kind of research because conversion of forested land to other uses is, in comparison to other conversions (e.g. residential to commercial uses, or cropland to pasture land), fairly easy to detect. The most widespread application is simply to monitor the amount and rates of forest cover change between two time periods.

#### **Role of Remote Sensing and GIS in Social Sciences**

Remote sensing has traditionally been the province of Earth scientists and the national security community. Early civilian satellite instruments were designed largely to meet the needs of weather forecasting, earth systems science and natural resource management. Social science applications were not even considered. However, since the late 1980s, this began to change as a number of social scientists began to apply remote sensing imagery to understand the underlying social processes behind diverse phenomena such as deforestation, desertification, and urbanization.



Many researchers have included demographic variables, such as population size, density, and distribution, or household characteristics, as independent variables to explain changes in land use and land cover. The use of remote sensing imagery to estimate population size, distribution, and quality of life; and studies that utilize remotely sensed imagery to understand patterns in the landscape, which in turn can inform population dynamics such as migration, fertility, and household formation.

Data derived from remote sensing can provide dependent variables for numerous studies of human impacts on the environment. Although such studies are often focused on land-use and land-cover change (deforestation, agricultural expansion, urban sprawl, etc.), remote sensing can also provide valuable data on other human impacts such as air and water pollution (point source and non-point source), ozone depletion, coral bleaching, and land degradation, among others.

Spatial Information, images and maps, forms the foundation and basis for most planning and implementation of developmental activities; infrastructure development; disaster management support; environmental monitoring; natural resources management; business geographics and many other national activities. Even common citizen's require maps and spatial information for their localized decision-making. Generating the information on the nation's natural resources and its infrastructure; updating and maintaining

the information sets and integrating these with administrative and social datasets provides the most optimal and scientific decision-alternatives in support of national development.

Others application of RS and GIS in social sciences are study of demography, human health and epidemiology archaeology and anthropology, land use/cover change, urban studies ,Hospital management ,Traffic movement ,Crime detection,urban growth and development, quality of life, and urban population density and structure.



#### Indian contribution to Remote Sensing and GIS

India is a pioneering country in the field of Remote Sensing and GIS. India's place comes in the top country of the world. Many government organizations are working in collaborations of each other, like Department of Space, Department of science and Technology, Indian Space Research Organisation, Indian Institute of Remote Sensing , National Remote Sensing Centre. They have maintained a Bhuvan Portal, which allows users to explore a 2D/3D representation of the surface of the Earth. It also provides disaster support services, free satellite data and product download facility.

India's Remote Sensing and GIS team is working towards Forecasting Agricultural output using Space, Agrometeorology and Land based observations (FASAL),National Agricultural Drought Assessment and Monitoring System,National Wastelands Monitoring, Potential Fishing Zone, Groundwater Prospects Mapping, Accelerated Irrigation Benefit Program, Watershed monitoring and development, Water Resources Information SystemBiodiversity Characterization, National Wetlands Inventory and Assessment, Snow and Glaciers, Coastal Zone Studies, Indian Forest Fire Response and Assessment System, National Urban Information System, Natural Resources Census.

## CONCLUSION

As Victor Hugo said, 'No one can resist an Idea whose time has come'. So I can confidently say that no doubt Remote Sensing and GIS is the need of the Hour. If we want to do sustainable Development by keeping in mind about various environmental issues as discussed earlier, for the betterment of society and want to make earth a suitable place to live for our future generations to come. The role of the Remote Sensing and GIS is increasing day by day in every field of our life. From agriculture to forest fire, from drought mapping to floods, from urban planning to Forest cover the role of Remote sensing and GIS has increased since the introduction of this technology.

With the technology of Remote sensing and GIS, we can surely manage our natural resources better and uplift the life style of our citizens. So without any doubt, Remote and GIS technology is the need of the hour.

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