# Transforming Governance Through Geospatial Technologies

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## ABSTRACT
Technological progress is critical to economic growth and long-term development. Geospatial technologies with proven decision-support capabilities can effectively support governance, enable sustainable development, improve business process management, and bring about positive change. Bringing location-based information closer to the people In order to achieve its development goals, geospatial technologies' diverse and specialized capabilities will play a critical role in future information management, with applications of great societal and national importance. Geospatial technology applications are becoming more common and have an impact on daily life. The utility of this technology has piqued the interest of the general public, whether through Google Maps or geo-enabled social networks. In an emergency, the average person develops and deploys complex GIS applications, whereas businesses become more efficient through the use of technology, from strategic planning to results analysis.

**Key words:** Geo-Spatial, GIS, GPS, Geo-Visualisation, Technology.

## INTRODUCTION

As India moves towards high levels of industrialization and technological advancement, decision makers will continue to face several challenges to achieve effective governance such as Rapid population growth, environmental concerns, scarcity of resources and security issues. India will need an efficient and advanced knowledge and information regime to prepare for expected economic growth. Geospatial technologies, with their unique ability to capture, integrate, and analyse geographically referenced spatial information, have recently been recognized as an effective tool for planning, management, and decision-making at local and global scales. Among several other technologies, geospatial technologies with proven decision support capabilities would be essential for the information management of the future with applications of social and national importance. Geographic information is used in practically every area of human existence. Therefore, this technology Is applicable to a variety of sectors such as agriculture, telecom, oil & gas, environmental management, forestry, public safety, infrastructure, logistics, etc.

## RESEARCH METHODOLOGY

The paper is based primarily on secondary data. Works done by various scholars are the bases that have provided data. Various Government websites comes handy with regards to data collection. Other sources apart from book comes in the form of e-journals, newspapers. Maps in this paper is prepared by author of this paper.

## LITERATURE REVIEW

Biodiversity conservation, global environmental change and globalization issues such as climate change, land use and land cover change, and sustainable development are the key issues for nature conservation (Guide et al. 2007; Liu et al. 2011).Over the past century, humans have been changing ecosystems faster than any comparable period in history, and as a result, biodiversity, or the diversity of genes, species and ecosystems, has declined rapidly (Balm ford et al. 2003).This loss is also compounded by loss of consciousness. India is known for its genetics and species. The acquisition of remotely sensed images of the Earth from space has opened new frontiers for biodiversity conservation and management. Multispectral satellite imagery provides vegetation patch definitions associated with phenological types, gregarious formations, and communities that occur in a unique biodiversity configuration (Behera 1999). Temporal satellite imagery provides information for vegetation mapping, monitoring, and understanding of ecosystem functioning, primarily through the relationship between structure reflectance and vegetation composition (Joshi et al. ). 2003).Landsat Multispectral Scanner (MSS), Thematic Mapper (TM) and Enhanced Thematic Mapper Plus (ETM+) data have been used extensively for land cover studies since 1972, the year the Landsat program began, primarily in the areas of forest and agriculture. The rich archive and spectral resolution of satellite images are the main reasons for their use. The images also provide a digital mosaic of the spatial arrangement of land cover and land use, and the difference in area. knowledge (Garg et al. 1988).

## OBJECTIVES:

- Identify application Areas of geospatial techniques for Indian society
- Highlight geospatial technology challenges and find intelligent solutions to the problems
- Learn about the feasibility of geospatial technologies and their role in empowering Indian society

The common perception of the usefulness of Geographic Information Systems (GIS) is in the form of web applications used for maps and directions, but these tools have several capabilities that go beyond a location-based service. Geospatial technologies as decision support can represent an immense added value for planning and development. This multifaceted technology can effectively support governance, enable sustainable development, help improve business process management, and bring location-based information closer to people. In the current economic scenario, there is a growing demand for cost-effective decision-making solutions, which is likely to drive the adoption of this technology across all sectors in the near future. According to the 2009 Indian Geospatial Market Report, the market for GIS-based technologies has grown so much that it is estimated to reach US$10 billion by 2019. The geodata Sector is now an industry in its own right and not a niche area of IT. Large IT companies have launched dedicated practices in geospatial technologies.

### Geographical Information System (GIS)

Geographical Information Systems Are used to collect, store, analyse, disseminate and manipulate information that can be associated with a geographic location. It provides the ability to overlay different undefined The most widely used definition of GIS is a computerized system that collects, stores, manages, analyses and displays dereferenced (geographical) data. For example, provides ways to extrapolate observations. To automatically define and map the potential range of a given species and compare it to locations where it has actually been observed. GIS provides a database structure for efficiently storing and managing data across large regions. It also helps when looking for places to study. GIS supports spatial statistical analysis of spatial distributions. Enhances data extraction capabilities from remote sensing and provides input data and parameters for environmental protection and management.

### Global Positioning System (GPS)

The Global Positioning System has attracted a great deal of attention over the past few decades due to its broad appeal to a wide spectrum of industry and research. It is a positioning system based on GPS satellites, which makes it possible to collect information about the geographical position of any place using a network of satellites. It has great potential in biodiversity conservation and management, as well as in many other disciplines related to biological studies that require geographic locations of objects. Through integration with GIS, it acts as a powerful tool for describing the geographic features of environmental systems. GIS is the central platform for many critical infrastructure and development projects around the world and serves as a valuable tool for civil society. The holistic know-how of the complicated mechanisms that manipulate environmental systems, in addition to their spatial and temporal dynamics, calls for synergetic adoption of dimension approaches, sampling designs and technology. These technology consist of Geographic Information Systems (GIS), Remote Sensing (RS), and

Global Positioning System (GPS). There are diverse styles of faraway sensing satellite tv for pc data, having different spatial and temporal resolutions in producing inputs for assessing diverse environmental parameters. Geospatial strategies presents a effective device for assessing geospatial data for tracking land use and land cowl modifications, modifications in landscape, mapping potential, species distributions and tracking and biodiversity losses.

**Geospatial Technology**

Geospatial technology broadly includes mapping (FIG 1,2,3) and surveying techniques, remote sensing, photogrammetry, cartography, global positioning systems (GPS) and geographic information systems (GIS). With its unique ability to collect, integrate and analyse geographically referenced spatial information, this technology has recently been recognized as an effective tool for planning, management and decision-making at local and global scales. Geospatial technology has been advancing in India across various sectors in the public and private spheres. The main sectors using geospatial technology in India are: Agriculture, Telecom, Oil & gas, environmental management, forestry, public safety, infrastructure, logistics, etc. As stakeholders from all sectors recognize the value and long-term viability of deploying geospatial tools and technologies, the geospatial industry will take off in leaps and bounds in the years to come. Well-articulated political mechanisms, government support and increasing domestic demand would go a long way in popularizing geospatial technology in India and bringing it into the mainstream as an aid to effective governance and development planning.

The geospatial industry is currently seeing a great opportunity within the country as the government has initiated reform projects in various infrastructure segments such as rural development, energy, land and natural resources and mandated the use of geospatial technologies in these projects. There are various other areas such as road, railroad and waterway construction and maintenance plans, civil aviation, public utility services, education, health, command area development, flood management program, flood control, urban renewal, urban water supply, rural water supply, Integrated Watershed Management Program (IWMP), etc., which essentially use geospatial tools and technologies for spatial planning, management and decision-making. As the country hits new milestones in industrial and economic growth, there is an ongoing intense debate about development versus environment. In this context, geospatial technology is perhaps the only technology that can offer a holistic approach to understanding the interactions and linkages between the biophysical and social elements of the Earth to achieve an optimal balance between environmental and developmental goals. The spatial data market comprises four identifiable components: data, software, hardware and services. Of these two segments, hardware and services have shown significant growth in India. The major software vendors in India are ESRI, Auto Desk, Bentley Systems, Leica Geosystems, Inter Graph and PCI Geomatics. The big companies producing GIS compatible hardware in India are HP, Trimble, Sokkia, Leica and Garmin. The largest segment in the geospatial market is the services segment and top companies in this space include Rolta, RMSI, Infotech Enterprises, TCS, etc. India's geospatial industry consists of two distinct but mutually supportive segments. The largest international segment is focused on providing geospatial data and software development services to international organizations, primarily in North America

and Western Europe. The other segment, Home segment, is engaged in providing geospatial capabilities to data users/providers in India.

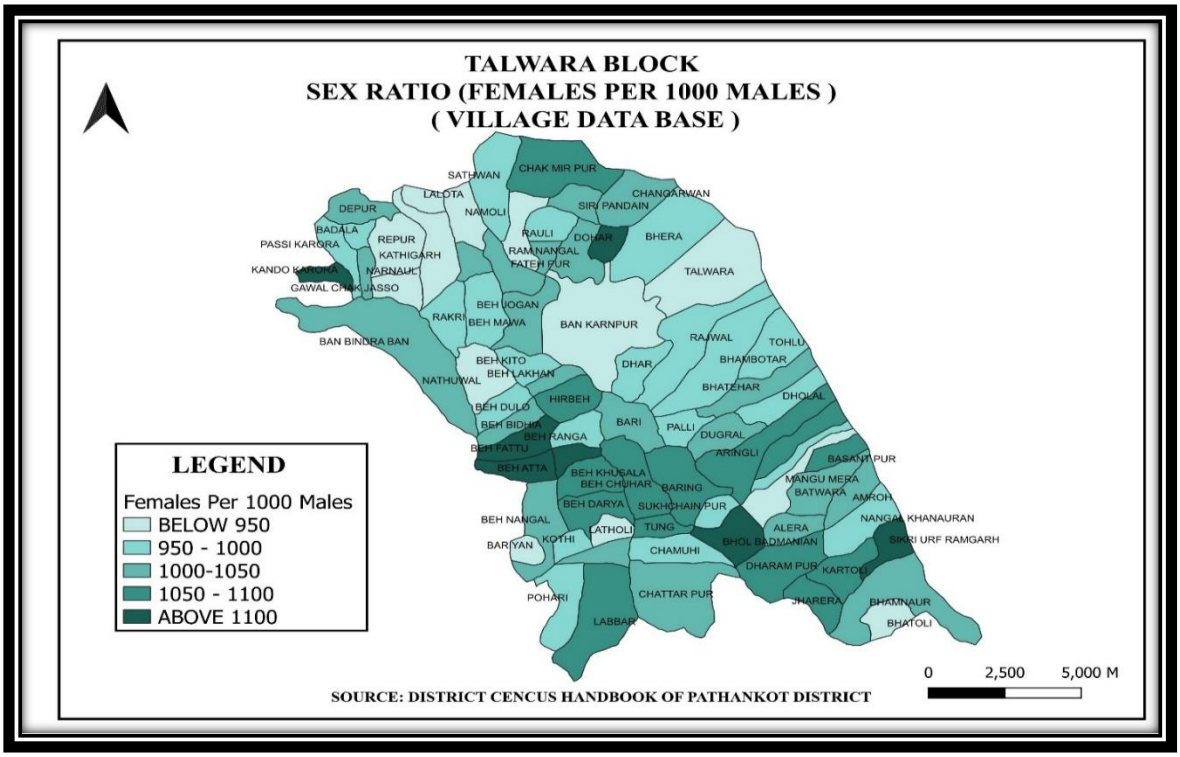


**FIG -1: MAP SHOWING SEX RATIO OF TALWARA BLOCK UNDER PATHANKOT DISTRICT OF PUNJAB**

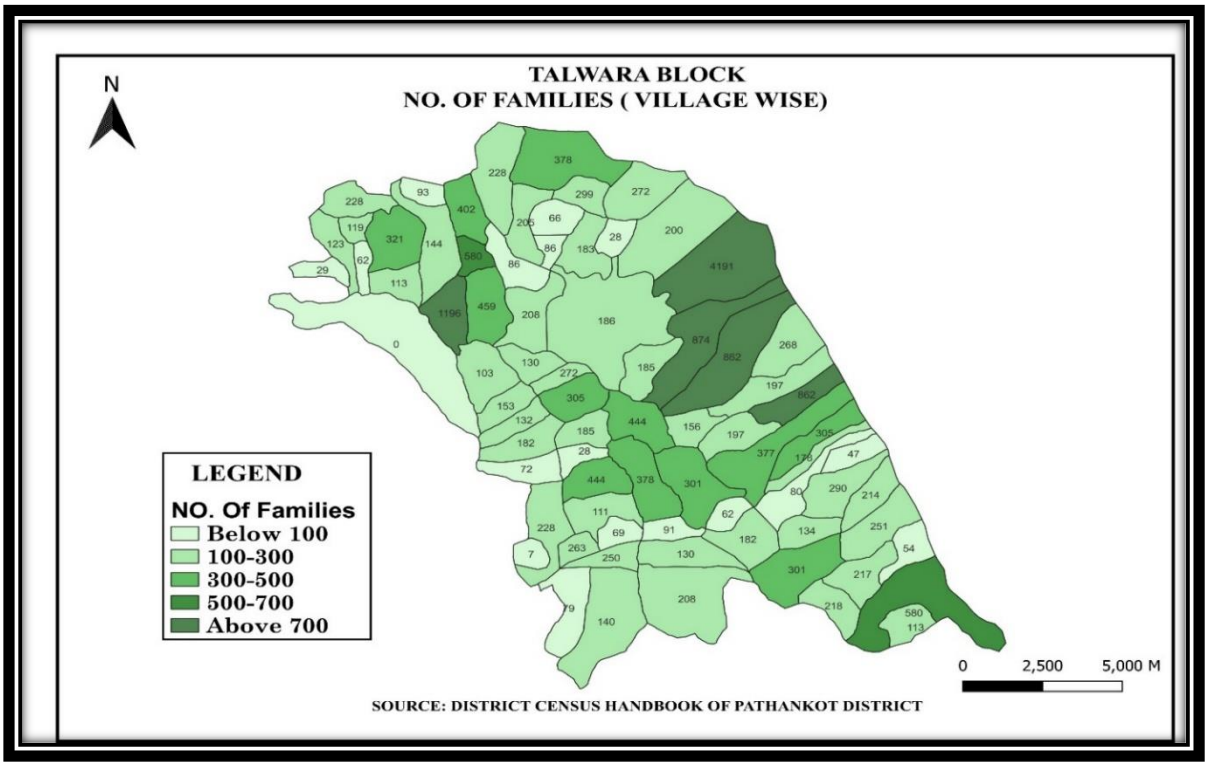


**FIG -2: MAP SHOWING NO. OF FAMILIES OF TALWARA BLOCK UNDER PATHANKOT DISTRICT OF PUNJAB**

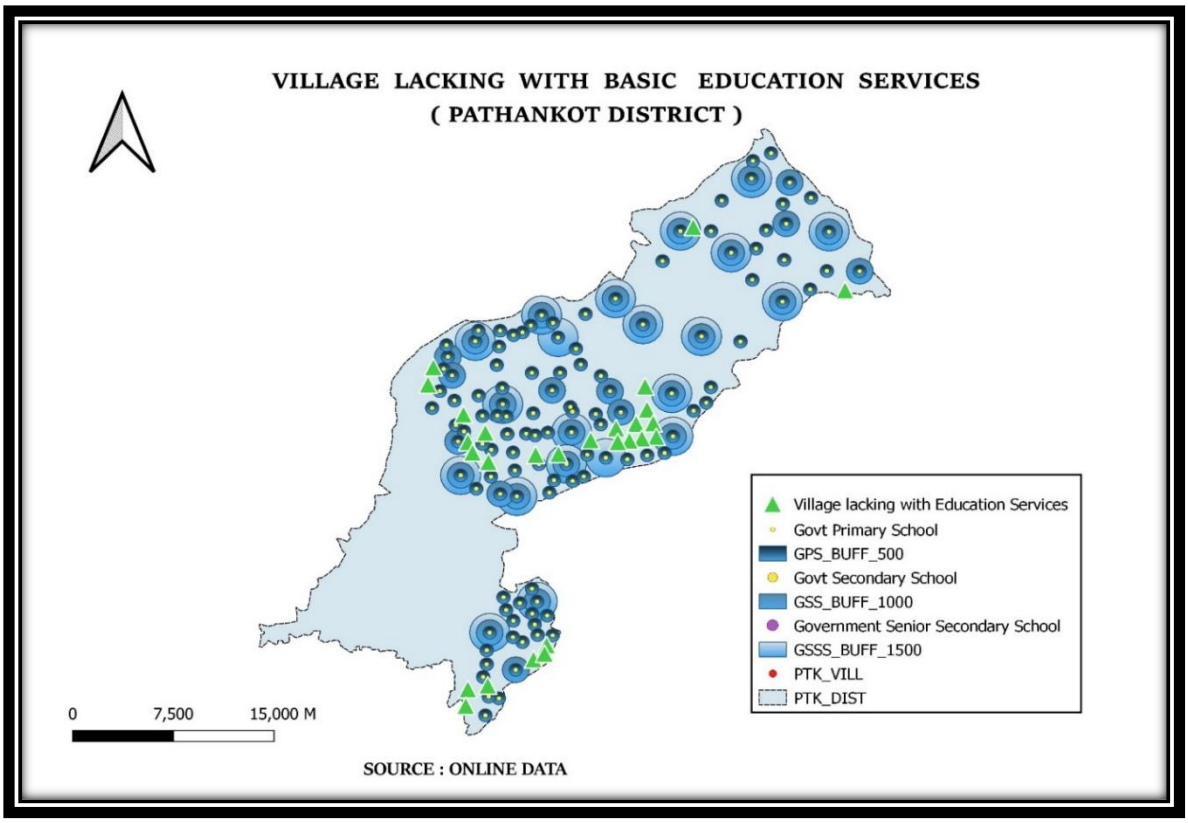


**FIG -3: MAP SHOWING VILLAGES LACKING WITH EDUCATIONAL SERVICES PATHANKOT DISTRICT OF PUNJAB**

Modern information technology has also enabled complex and advanced mathematical analysis and modelling to design management plans for natural resource conservation and environmentally sound economic development, while significantly reducing the time and cost of manual data collection, storage and processing. Continued advances in GIS functionality and the convergence of networked computing and wireless communications with geospatial technologies are expected to unlock further untapped potential for applications in development planning. Geographic information is a ubiquitous part of governance. Governments' primary role is decision-making in the public interest on geographically related issues, so GIS can play a critical role in all areas of good governance.

Various local governments now rely on geospatial technologies, not only for organizing and managing geospatial data, but also for disseminating information and services to citizens. In India, this technology is widely used for forest mapping, groundwater surveys, marine productivity, environmental impact, land and water management and disaster management. It is gradually being used by some governments and state agencies for infrastructure inventory, planning transportation routes and improving public service delivery. New frontiers for the use of geospatial technologies for governance in India are also slowly and steadily being explored. Few of the more recent applications are in tax collection, property valuation, housing, rural employment plans, local planning, encroachment control, tourism and town planning. including water supply and sewerage. Despite the acceptance this technology has found among various stakeholders and end-users in India, the benefits of this technology have yet to transcend specific projects to find applicability across the spectrum of governance, decision-making and nation-building.

## CHALLENGES

The United National Development Programme [UNDP] (1997) defines governance as the exercise of economic, political, and administrative authority to manage country's affairs at all levels. It comprises the mechanisms, processes, and institutions through which citizens and groups articulate their interests, exercise their legal rights, meet their obligations, and mediate their differences. According to Stewart (2003), governance is a process of multi-stakeholder involvement, multiple interest resolution, compromise rather than confrontation, negotiation rather than administrative fiat (p. 76). Thus, there are several alternative conceptualisations of governance that recognise the plurality of actors. Governance in this broader sense includes the legitimate authority exercised in the application of government power and in the management of public affairs.

- There is greater emphasis on participation, decentralisation, accountability, and responsiveness and even broader concerns such as those of social equity and justice. Governance, therefore, has a much broader canvass than government and envisages the roles of all stakeholders: the state, private sector, civil society, and citizens at large.
- The role of GIS in governance is immense and its use in the field of development has strong effect on transparency and effective implementation. Governance provides a platform for transactions between different stakeholders. This platform becomes a level playing field when different stakeholders have access to information for decision making.
- Awareness creation among decision makers
- Geospatial capacity building
- Formulation of State Geospatial policies
- Geospatial reference network
- Regional Centre's & institutions involved in the promotion of Geospatial Technology
- Updating and automation of base geospatial datasets
- Geospatial Curriculum

## CONCLUSION

Governments at all levels—national, State and local—need data in order to govern. They use geospatial data in a wide variety of areas, including legislative and policy development, the allocation and management of natural resources, defence and public safety purposes, spatial planning and many others. Specialist government agencies around the world have long traditions in the collection of geospatial data. Each agency employs specialists to organize the collection, updating and management of the type of geospatial data for which it is responsible. The academic study of Geospatial Technology is a cross-disciplinary research domain that draws on concepts and methods from engineering, natural and social sciences. It encompasses the methods, techniques and theories required to

(1) generate information about Earth processes from Earth observation (EO) and from data stored in geographic information systems (GIS); and

(2) examine the impacts of geospatial technology on individuals, organizations and society, and vice versa. Geospatial Technology as a field has undergone significant transformation in recent years. In the past, the process of collecting geospatial data was laborious and performed with ground-based methods.

The updating cycles often spanned several years, and the outcomes (such as paper maps) could not be easily shared across government agencies. The potential for integration and multiple applications, a key characteristic of geospatial data, could not be exploited. Recent technological advancements have changed this state of affairs. GIS uses modern software and hardware to store, access, visualize, map, analyse and disseminate geographic data. Geospatial data can now be referenced to a globally defined coordinate system. Global Navigation Satellite Systems (GNSSs) such as the Global Positioning System (GPS) use satellites to allow users to determine their exact location, velocity, and time in any conditions, making traditional positioning instruments such as tapes and theodolites obsolete. The products of these new digital geospatial technologies include digital maps, satellite image maps, topographic maps, and land use change statistics. With GIS, it is easy to combine and share these different geospatial data sets. An integrated analysis of these combined data can provide new insights into the interaction of geographic phenomena for better decision making and governance.

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