GIS AND THE VISION FOR NEW INDIA

GIS is playing a critical role in ushering in a new era of development by 2022-23

India has embarked on an ambitious journey to transform into a Rs 4 trillion economy by 2022, the 75th year of the country's Independence. Niti Aayog, the policy thinktank of the central government, charted the route of this journey by unveiling in December 2018 a comprehensive national strategy for New India that spelt out the objectives to be achieved by 2022-23.

The Strategy for New India @75 defines 41 areas of intervention under four sections: drivers, infrastructure, inclusion and governance. Drivers are the engines of economic performance; infrastructure focuses on physical infrastructure as the foundation of growth; inclusion is about investing in the capabilities of the citizens to bring about a significant change, and governance aims at streamlining and reforming the way tasks and businesses are carried out by the government.

According to the Prime Minister, the Strategy for New India @75 is an attempt to bring innovation, technology, enterprise and efficient management together at the core of policy formulation and implementation. As Agendra Kumar, the president of Esri India, highlighted at the company's User Conference earlier this

nation but also helping us to be resilient and sustainable. GIS is being used to monitor and meet the country's Sustainable Development Goals (SGDs), enabling better infrastructure, accessibility and a better standard of living.

With technology as a core foundation, the New India vision aims to solve core challenges across various sectors such as agriculture, water, health, necessary infrastructure and governance addressed across 41 areas.

Transforming the agriculture Sector

New India @75 identifies the modernisation of agriculture as vital to increasing India's annual growth rate. With a focus on technology, defining an enabling policy framework and transforming the rural economy through the creation of modern rural infrastructure and an integrated value chain system, the aim is also to double the farmers income.

Agriculture sector, though, has been facing multiple challenges such as a reduction in cultivable area, unpredictable weather patterns, droughts, and flooding driven by climate change, which are impacting the overall agricultural output of the country. Besides, the inefficiencies in the supply chain are resulting in significant post-production losses from farm to table. The way forward involves smarter agriculture practices bolstered by technology which not only helps in better yield but also helps transform the entire supply chain to minimise wastage.

The application of remote sensing and GIS techniques is significantly increasing beyond precision agriculture practices and enabling multi-agency collaboration across various stakeholders responsible for overall agricultural transformation. In addition, many state departments have setup central GIS-based portals for publishing agricultural information such as soil health cards and groundwater levels. AgriTech is emerging as one of the leading trends with more than 500-plus start-ups focused on it.

Use of GIS, integrated with IoT devices/sensors and UAVs/drones, is helping with rapid, better and near real-time information. This real-time information combined with historical data and emerging technologies such as artificial intelligence and machine learning are driving informed decision making to leverage best in class farming practices. With smartphone penetration and cheap data availability, is causing farmers to be a part of the informed decision-making process not only as a consumer of information but also sharing on-ground information. GIS is being used for a better and transparent crop insurance planning & pay-outs, thus significantly mitigating risk for farmers. GIS-based surveys via apps like Survey123 are significantly improving the productivity and transparency for insurance companies as well.

year, a transformation will bring every citizen tangible benefits in the form of ease of living; lead to broader development of states and regions thanks to new technologies, faster innovation, upskilling, and modernisation of agriculture, making India a formal economy that facilitates investment and innovation; and bridge the gap between public and private sector performance.

In technology, Geographic Information System (GIS) has a key role in driving this vision of digital transformation. GIS is already being used across various government initiatives which are not only driving the economic and social transformation of our

Ensuring sustainability of our natural resources - water

India's rapidly increasing population, urbanisation and industrialisation is driving the need for water. On the other hand, the average availability of water is reducing steadily. The government recently has formed a new Jal Shakti (water) ministry, which aims to tackle water-related issues with a holistic and integrated approach. Following this, the government has also announced an ambitious plan to provide piped water connections to every household in India by 2024.

GIS can help in a better understanding multidimensional complexities of water ecology, socioeconomic challenges of our communities to ensure renewal of our water resources, water quality, as well as define a long-term view for sustaining our water resources. Even water utilities can better understand and manage their water distribution network and minimise leakages and ensure the availability of water to all. GIS can help in effectively communicating with policymakers and other stakeholders. GIS-based operations dashboards can provide a consolidated view of achievement/progress of SDGs at the city, state as well as the country level. At city/ward level, utilities can track water conservation activities in a single application such as water outages, leaks and water violations. Selective dashboards can be exposed to citizens as well for sharing the progress of various initiatives of water conservation and management and helping them participate in the conservation efforts.

India Water Tool

India Water Tool 3.0 (https://www.indiawatertool.in/) is helping businesses, and other water users understand their water risks and plan solutions for water management across the country.
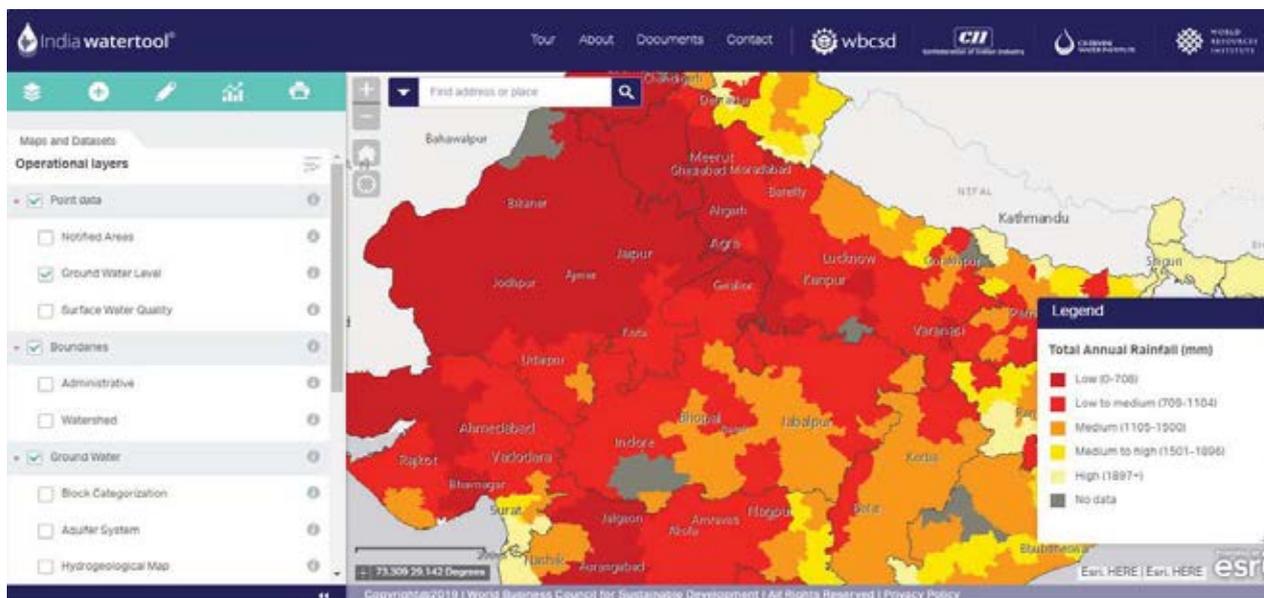
It includes:

- Over 20 datasets from key Indian government authorities and other organisations

- A dataset on real-time satellite capture of surface water availability from NASA and U.S. Geological Survey (USGS)

- Water stress models developed by the World Resources Institute (WRI) and Columbia Water Center (CWC).

- It also brings results from two local water-balance studies to give a complete picture of the watershed health and determine the potential for water recharge and demand-side management. All water users and stakeholders can openly access this data and plan management interventions.

Leading the urban transformation

The New India Vision focuses on various aspects of urbanisation with a focus on smart cities and housing for all. Various programs by Government of India such as Smart Cities, Atal Mission for Rejuvenation and Urban Transformation (AMRUT) are conceptualised towards management, property taxation, citizen engagement and utility infrastructure planning and management. With its ability to integrate various data types including imagery, 3D, big data, real-time data from sensors and unstructured data, makes GIS a core technology platform that integrates and drives planning and decision making for all aspects of city functions.

development programs such as Bharatmala, Sagarmala, Port cities and Airports development and utility programs like R-APDRP and City Gas Distribution.

From identifying the right areas of infrastructure development, environmental compliance management, infrastructure development & project monitoring to

MCGM

Municipal Corporation of Greater Mumbai (MCGM) uses Web-GIS based apps which are deployed by 16 departments including Solid Waste Management, Development Planning, Roads and Traffic, Sewage, Water, Property Tax, Vigilance, Disaster Management Planning, Tree Authority, Healthcare, among others.

meeting and preparing cities for the urbanisation trends. GIS is already at the heart of these mission programs.

GIS supports the entire city lifecycle from master planning to city development and management. In addition, GIS technology already powers various core processes of ULBs and utilities in areas such as land

An enabling backbone for the nation's infrastructure

Infrastructure is one of the core pillars of the New India vision. Given the complexity, capital requirement and long-term nature of the infrastructure development projects, the use of GIS is indispensable. GIS is already a core component in major infrastructure

infrastructure maintenance and operations, GIS plays a vital role by integrating technologies and workflows across all phases of an infrastructure project life cycle thus reducing time and cost. The studies also show that the ROI in terms of savings on project costs can be up to 7 to 10%, which is substantial, considering the scale and the total investments involved.

e-Pathai

Tamil Nadu Highway's Department uses GIS to rationalise their decision making in planning, programming, funding and allocation of resources, allowing to make the best use of public funds in preserving the road networks at an acceptable level of serviceability.
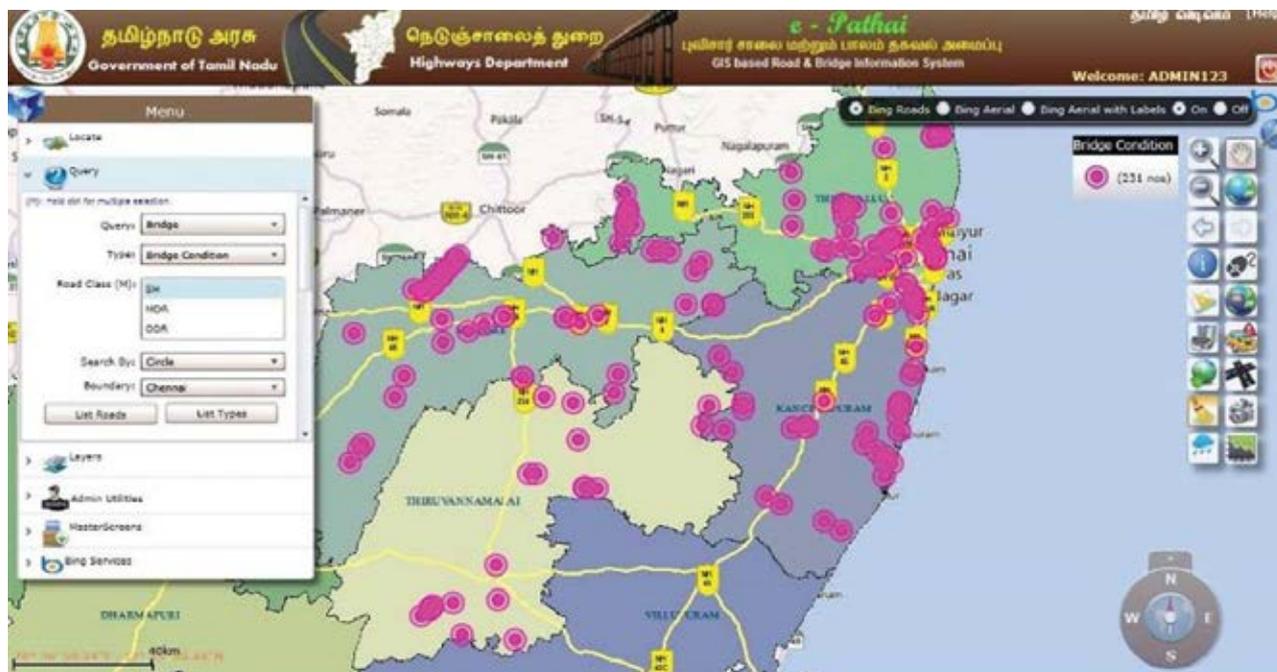
Fostering an inclusive healthcare revolution

The vision for New India focuses on Public Health Management and Action and setting up necessary infrastructure and policy framework for comprehensive primary healthcare and universal health coverage. This would include successfully implementing Ayushman Bharat programme including establishment of 150000 health and wellness centres across the country including rolling out the Pradhan Mantri Jan Arogya Abhiyaan.

GIS can support these initiatives by helping in identifying the underserved locations for establishing the health and wellness centres, thus focusing on inclusion and accessibility. In addition, it can help better understanding of the distribution of skills and capabilities available for efficient distribution and coverage of healthcare facilities. Public health centres and states already have a considerable health MIS data which can be leveraged in GIS system for deeper insights.

Beyond this, GIS can help agencies to track the effectiveness of various initiatives such as child immunisations, management, control and pre-emptive steps to contain vector-borne diseases such as dengue and malaria. In addition, GIS can help in a better understanding of disease patterns, health care service needs and service utilisation patterns.

Building the foundation for new skills for tomorrow

More than half of India's population is below 25 years, and 62% is between 15 and 59 years. This demographic dividend is expected to last the next 25 years. New India @75 focuses on making India the skill capital of the world.

Technology, specifically. GIS can not only help to ensure efficient coverage of education focussed initiatives such as Sarv Shiksha Abhiyaan. Agencies can identify the underserved locations for building new schools, define

the right mix of teacher's skills, including monitoring other important school infrastructure development such as toilets. GIS also serves as an aide in educational administration and policy, including other services to schools such as mid-day meals can be managed and tracked. Matching skill sets with industry and geographic requirements is another area where GIS can help.

Bolstering better governance

Better governance is a crucial pillar for New India vision that delves deep into how the tasks/business of government can be streamlined and reformed to achieve better outcomes. It mandates a sharp focus on ensuring accountability and a shift to performance-based evaluation with all policy interventions and decision-making driven by evidence and real-time data.

Globally, GIS is used by governments worldwide for effective governance of the key initiatives. As already discussed, GIS can help the government to track and manage the progress of SDGs, or the progress of the mission

Opepa

Odisha Primary Education Programme Authority uses GIS to ensure continuous and accurate delivery of school education to every child within the ambit of the RTE Act.

India Urban Observatory

India Urban Observatory uses GIS to visualise the impact of various urban development programs on cities by measuring factors such as ease of living, sustainability, economic development, inclusiveness and resilience.
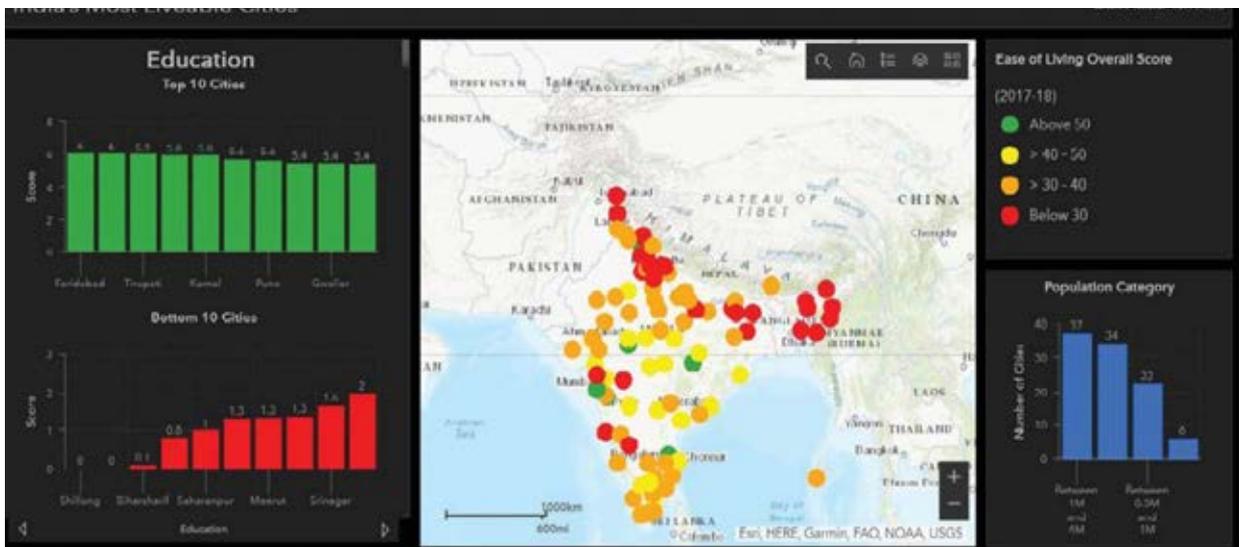
programs such as Smart cities or Swachh Bharat or the progress of infrastructure development. Integrated dashboards at central, state and district level help in a transparent view of the progress of various programs and goals. Integration with other IT systems such as ERP, BI and CRM systems can provide a consolidated view for a more transparent outlook. The dashboards can even be created and shared with citizens to engage with them and to communicate the achievements and progress.

GIS is the heart of our nation's technology vision

The government of India has recognised the importance of a data-driven approach to policy-making. It is banking on it to uplift the current

GIS system to integrate variety of data source such as databases, 3D, unstructured, LiDAR, vector, raster and spreadsheets, to integrate with systems like ERP, BI and CRM, to enable collaboration and secure sharing with multiple departments / organisations and an open architecture makes it a core of the entire technology foundation for our nation.

If information is the fourth pillar of democracy, GIS has emerged as a critical component of that pillar, helping unify information infrastructures across the country. With GIS becoming a collective and interconnected system of systems, The Science of Where has become more relevant than ever before. It is shaping India's transformation into a global economic hotspot, from classroom to hospital,

condition and meet the future demands of economic and social development. The Science of Where, a data-driven approach that uses geography to unlock understanding, is thus a key element in achieving a New India @75. GIS serves as a holistic technology to analyse almost every aspect of urban transformation, economic development, environmental protection and sustainability, and resource management and monitoring.

Emerging computing technologies like AI, IoT and ML are able allies of geospatial technology in the country's transformation mission. Ability of a

agricultural land to forest, water conservation to urban planning.

As Jack Dangermond, President, Esri Inc. said: "GIS is waking up the world to the power of geography, this science of integration, and has the framework for creating a better future." ◼