

# Dial G for Digital India

The technology revolution is sweeping the country with the launch of various initiatives under the Digital India programme. Can geospatial technology help the government usher in the digital dawn?



Ridhima Kumar

- To track illegal construction in the city, the Pune municipal corporation has turned to GIS and mapping technology.
- Gujarat has adopted GIS-based applications to make watershed development more effective and efficient.
- The draft policy on scientific mining by the Kerala state planning board pitches for geomapping of mineral resources in the state to minimise environmental damage.

Such is the power of technology, which is transforming our day-to-day lives like never before. The Modi government is laying a lot of emphasis on using new-age technological tools to give our country a much-needed facelift. As per a report by research firm Gartner, the government's expenditure on IT is expected to reach \$6.8 billion this year, an increase of 5.7 percent from 2014.

Accelerating this digital rush, the



government unveiled on July 1 an ambitious Digital India programme to make the country a digitally empowered society and knowledge economy. Technology will play a critical role in realising the vision of Digital India – to connect billions of Indians. With various technological solutions at the core of Digital India, there is a huge opportunity for IT players and the government to use disruptive technologies to redefine paradigms for delivery of services; one of them is geographic



information system (GIS).

GIS, as the name suggests, is integrating geography or location into everything. It might sound Greek, but GIS has become part and parcel of our daily lives. One can make better or informed decisions by understanding geography and people's relationship to location. It is a technological tool for comprehending geography and making intelligent decisions. "GIS is rapidly becoming a catalyst for several transformational changes; mainly in the areas of planning, decision-making and citizen engagement. It has the potential to organise complex spatial environment with tabular relationships," says RS Sharma, secretary, department of electronics and information technology (DeitY).

GIS even features as one of the empowering technologies which can have a combined economic impact of \$550 billion to \$1 trillion a year by 2025 in India, according to a McKinsey Global Institute (MGI) report.

Recognising the importance of g-tech in boosting the country's economic growth, the 11th five-year plan (2007-12) had even mandated the use of geospatial applications in some of the mission mode projects such as the national land records management programme (NLRMP), restructured accelerated power development and reform programme (RAPDRP) as well as the Jawaharlal Nehru national urban renewal mission (JnNURM) and national rural employment guarantee Act (NREGA). The plan document also acknowledges the fact that "location-specific planning using geographical information system helps in planning for sustainable development."

Having said this, it is important to note that India's tryst with GIS is not new. It has been using GIS for more than two decades in various aspects of land management, natural resource management and urban planning, to name a few. It even forms the core of several mission critical projects in the government. In fact, the GIS market in India is expected to grow at a CAGR of 8.19 percent during 2012-16, according to a report released by Research and Markets. The report further says that

## GIS BOOST

**\$40-45 bn**

annual efficiency gains of Indian businesses from geo services

**\$70-75 bn**

cost savings achieved through geo services

**8-9 mn**

jobs affected in India by geo services

**\$1.5-2 bn**

Indian consumers pay annually for geospatial services

*Source: BCG*

one of the key factors contributing to this market growth is the increasing demand from the government sector.

This clearly indicates that development and deployment of GIS in various government initiatives is the need of the hour. GIS can become a key enabler of the Digital India programme. "Almost all human activities are location-based and involuntarily we use spatial reference while performing all our activities. GIS would provide scientific base while performing these activities more efficiently. One cannot imagine Digital India without geospatial data or GIS," says Maj Gen (Retd) Dr R Siva Kumar, former CEO, National Spatial Data Infrastructure (NSDI).

"It [Digital India] is a classic case where the users, IT, ICT and geospatial technologies are going to converge," says Bharti Sinha, executive director, Association of Geospatial Industries (AGI).

### G-tech to the rescue

The vision of Digital India is based on three key areas: digital infrastructure as a utility to every citizen, governance

and services on demand, and digital empowerment of citizens. The programme aims to bridge the gap between rural and urban India by developing high-speed digital highways. The initiative aims to reach out to the remotest corners of the country to enable a two-way interaction with the government (be it the centre, state, or gram panchayat) and the citizens. Effective planning and informed decision-making are therefore pre-requisites for a programme of such a large scale. And, GIS can play a pivotal role.

Precise location of the spatial features is a fundamental element to understand the current scenario, and implement any development project. Location is an important parameter in virtually every aspect of the functioning of the government. "GIS-based decision-making is an important component of electronic service delivery. It will help bureaucrats in taking more informed decisions to strengthen governance, enhance transparency and improve citizen services," says Dr CD Murthy, senior divisional director — defence and security, Rolta India Limited.

Therefore, GIS can be used in each and every aspect of Digital India. "Technically all the three application areas [key areas] need the support of spatial data. GIS/mapping is the only technology which can handle spatial data effectively and systematically, where users can easily access, modify, and analyse the situation. The combination of readily available internet access and spatial information through GIS enables the government authorities to provide a new level of services," adds Dr Murthy.

Industry players feel that GIS is a horizontal technology which can be utilised in each pillar of the vision to bring forth a digital economy. The nine pillars range from broadband highways and public internet programmes to electronic delivery of services and information to all. "Digital India is an umbrella project but within it each of the pillars is an umbrella in itself and it [GIS] will connect all those," says Sinha.

Echoing similar sentiments a seasoned geospatial expert and adviser to Esri India, Rajesh C Mathur, says, "If



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**RS Sharma**  
Secretary, DeitY

you look at Digital India or the earlier national e-governance plan there were 27 mission mode projects (MMPs). Now we have other MMPs like smart cities. GIS will cut across all of them. The technology will provide a framework which will serve all MMPs coming from other different pillars; be it education, healthcare or land records. All of them will benefit from it.”

But which are the areas that immediately come to mind where GIS can be used?

**Service delivery:** This is the most prominent area where GIS can be utilised. Under the Digital India vision the government aims to provide various services like education, healthcare, justice, security and financial inclusion electronically. This will not only save the time of citizens but also reduce their expenses. A lot of emphasis is being put on improving the system of electronic delivery of services, and GIS can certainly help. “The GIS technology as embedded in e-governance projects would strengthen governance by facilitating faster decision-making, improve citizen services and enhance transparency in public services,” says Sharma.

“The places where it [GIS] can be

utilised are where it directly benefits citizens. It has to be able to reach a much wider audience quickly for the uptake to be good,” says Vikrant Karandikar, business development head, RMSI. The pillars of e-kranti, e-gov, information to all, internet for all and others can be deployed using GIS.

Effective citizen service delivery can also help the government in fulfilling its promise of ‘maximum governance’. The government has been using IT to improve transaction processes, electronic databases, public grievance redressal and so on. However, there are two aspects of service delivery. One is the back office, where all the governing systems require a set of decision support system which can help bureaucrats and administrators in making more informed decisions. The other is delivery of services in a G2C mode, where you deliver services directly to citizens. “In both these aspects location is extremely important,” notes Mathur.

“Across virtually any department or ministry, for instance health, if you have to review the quality of service, the coverage of the entire population of the country by the existing health-care centres like dispensaries and hospitals, location is important to them. You have to look at where people live and on top of that you overlay what kind of health facilities are available in those areas and therefore what minimum distance a person has to travel to get to the nearest clinic or dispensary. GIS has an answer to it,” says Mathur.

Also, GIS can be used in citizen service delivery. “For instance, consider farmer counselling on crop planning. The possibility of a deficient monsoon is a national concern these days. GIS can help government and agricultural scientists in counselling farmers in the deficit areas, and guiding them in choosing the crops. With the help of GIS they can isolate those pockets where different kinds of crops can be grown depending upon the climatic conditions, the water availability or the lack of it for that matter,” adds Mathur.

Moreover, with increasing penetration of mobile phones in India, citizen service delivery has taken off really



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Advisor, Esri India

well. Various government departments and many private firms have flooded the market with a plethora of apps and services which anyone can access by just pressing a button. “You can push anything through the mobile devices utilising the aspect of location,” says Karandikar.

**Decision support system:** The Digital India document states that GIS will be leveraged extensively for decision support system (DSS) and development. But what exactly do we mean by DSS? A DSS can help in accelerating the entire lifecycle of Digital India. “Decision support system is the most powerful statement in itself. If you have to take a decision you have to ensure its implementation to the last mile. For instance, if you want to see the progress of certain projects and check if there is a cost overrun or delay, all this can be shown on a single dashboard,” says Sinha.

Moreover, today the scope of GIS technologies has moved far beyond the basic map-making feature. It is opening numerous opportunities for GIS-enabled government applications. “Today’s GIS applications have the capability to integrate easy-to-use software and hardware technologies that



allow users to perform some complex tasks such as modelling patterns and trends, forecasting the impact of planning, policy of strategy initiatives, and streamlining internal business and operation process,” feels Dr Murthy.

**Bridging the divide:** Digital India envisions connecting 2.5 lakh villages through high-speed internet. This will help the rural India corner a share of the digital pie. So far only 20,000 villages have been connected. As networks grow

and become increasingly complex, the need for precise data storage will become evident. “GIS is a perfect tool with which telecom operators may integrate various data from a variety of data sources and present it in an integrated and controlled manner via intranet GIS portal. GIS solutions enhance the efficiency of network monitoring activities as they provide real-time knowledge of the network structure. The use of GIS solutions shared with the database of a network enables instant access to various information such as customer status and history, the existing network structure, signal quality in a specific demography, and any need for maintenance or repair services,” explains Dr Murthy.

The government can also prepare a map with details of the villages where the internet is required, how the fibre will be laid, the bandwidth requirement depending upon the population of that village and so on. It can put all this data together and then analyse a particular scenario to make effective decisions.

Apart from construction and design phase of connecting villages, GIS can also be used to optimise the entire network of fibre itself, which will be used to connect the villages. “You can look at other existing networks in the same area. Once you put that information in a GIS map you can see that there are three-four networks already available which can be used, instead of laying new lines. Therefore, you can optimise the use of fibre itself,” says Mathur.

Also, while providing broadband connections one should keep in mind the language in which the services are delivered. “In addition to providing broadband-driven services in English,



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they should also be offered in local languages, keeping in view the diversity of languages spoken in our country. Hence, the ability to deliver your services in local languages is going to increase the uptake of broadband as well,” says Karandikar.

**Miles to go**

Geospatial technology is estimated to deliver an annual efficiency gain of \$40-45 billion in revenue terms and \$70-75 billion in cost savings, according to a report by Boston Consulting Group. Yet, its implementation has not taken off in a manner in which it should have been. So far deployment of GIS has been restricted to the departmental level with minimal integration. Most government departments work in silos and are often closed to the idea of sharing. This leads to duplication of data which not only results in cost escalation but also delays project implementation. “The work done by various agencies present in the GIS domain such as department of electronics and IT, department of earth sciences, survey of India, department of science and technology, department of space, etc. need to be enhanced, integrated and leveraged.

**11th plan allocations for GIS**

Schemes	Amount in ₹ crore
<b>Water resources</b>	
Water resource information system	230
National hydrology project	150
Hydrology project - II	180
<b>Environment and forest resources</b>	
Forest information management and resource assessment	300
Strengthening of computer/GIS centre	5
<b>Land resources</b>	
National land record modernisation programme/ National land resource management programme (NLRMP)	1,000
<b>Agriculture</b>	
Development of national database and information for natural resource management	798
Climate change, risk and disaster management, agro climatic research programmes	170
Development of crop potential maps	10
<b>Irrigation</b>	
Application of GIS/GPS in river inflow/discharge measurements, flood forecasting, etc.	1.5
Major and medium irrigation – design, survey and investigation	350
<b>Urban development</b>	
National urban information system	9.47
<b>Transport</b>	
Maintenance of national waterways – setting up of DGPS	52
Railway information system, LRDS, MIS and other IT applications	52
Remote control and automation of light houses	2.5
R-APDRP – Part A (core geospatial)	1,500
<b>Space applications</b>	
DMS, VRC, NR management, etc.	1,752
<b>Total</b>	<b>6,562.47</b>

*Note: There was no mention of geospatial technology in the 12th plan.*

Source: FICCI

The datasets created are not usable as a service easily by e-governance applications,” admits Sharma.

Capacity building and lack of standards and policy are among the other worrying aspects which the government needs to resolve on a priority basis. Lack of GIS skilled resources is a major hindrance in most development projects. “Capacity building is a major issue and it has to happen at multiple levels. In any ecosystem you have different participants, you have decision makers, doers who will execute your decisions and then you have consumers. So when we talk about training them capacity building has to be done at all the three levels,” says Mathur.

There has to be a push and pull effect. “Push from the central government under the Digital India umbrella and pull from the various ministries which will say there is a role of GIS, so please help us in creating capacity within our own ministry,” adds Mathur.

Karandikar, on the other hand, thinks that competency exists within various departments. “What may be required is acceptance. Sometimes there is a perception that embracing technologies will lead to loss of jobs but that is not the case. The amount of work we need to do in our country is sufficient to guarantee that embracing technologies will rather create jobs. The government has to think of inclusivity and move forward with the people.”

There is also a need to revisit the whole policy framework vis-a-vis geospatial technology. Experts feel that the current policy scenario is restricting the proliferation of geospatial technology. “There is no common framework available to facilitate the collection and dissemination of the spatial data to increase its usability as service by e-governance applications,” feels Sharma.

Agrees Mathur: “There is a need for a comprehensive policy which facilitates and mandates data sharing and collaboration. All the data need not necessarily be stored at one place but a good policy framework will mandate sharing of data by process access and consumption by way of services.”



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Business development head, RMSI

However, it will be a very complex task to integrate the current policy tenets. “Rather than focusing on all the policy tenets, we should consider them individually, while keeping the big picture in mind. So, if we can update the Map Policy which allows us to accelerate the information collection process, I think that is the need of the hour. So take one step at a time rather than saying that there is a one magic wand which will fix everything in one go,” advises Karandikar.

Another big challenge according to Mathur is the inertia to change. “There is always a resistance to change. That inertia has to be broken. And you have to take both bottom-up and top-down approaches. Bottom-up means, make them understand the value of this change. And top-down is done from the mandate, the decision taken by the central or state government.”

Concedes Dr Murthy: “The personnel in government have little or no motivation to change the way they have been doing things. That can fail any well laid out processes and technologies.”

However, in the past few years there has been a dramatic change in the attitude of the government. It is taking an earnest interest and has been engaging with the industry on various aspects. “A fair amount of engagement has been

happening. In many cases government departments have invited us and in many cases we are going to them. There is willingness at the top level, and awareness is high,” says Mathur.

Also there has been an increasing effort by the government to establish a national-level repository where data can be easily stored and shared and can be a great solution to overcome most of the challenges. “There is a need to set up a national GIS which would geo-enable Digital India. Web-based national GIS will enable the central and state governments to take a more integrated view of the issues and challenges. The mission of national GIS should be to embed GIS into various electronic services extended to citizens under the Digital India project. It should provide a platform to enable consumption of spatial data by various e-governance applications, thereby bringing in geographic dimension in decision making and service delivery,” says Dr Murthy.

Agrees Sharma, “National GIS needs to be envisaged as a ‘common information infrastructure’ platform to provide data for end-user application delivery as per e-governance requirements. There is a need to assess the requirements of technology platform to arrive at suitable technology architecture and components with appropriate and sustainable service orientation.”

Moreover, the whole mission should be apolitical. As Karandikar says the government has to leave politics out of it and focus primarily on the welfare of citizens. As for the technology providers, whether the ISPs, mobile phone companies or anybody in the supply chain, they should be able to provide their facilities at a cost which people are willing to pay.

The ‘digital’ future seems promising, yet there are miles to go before we can reach the final destination. In the words of Mathur, “Digital India is a means to an end, it is not the end.” The future lies in embedding GIS in governance and service delivery and in establishing GIS-enabled governance as the next frontier, as suggested by Sharma. ■

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