aches for development and management of natural resources has been emphasized in many fora on sustainable development, including Agenda 21 of the United Nations Conference on Environment and Development. Nonetheless, it has not been brought into practice to a reckonable extent owing to the conflicting goals in different sectors of the society. On the contrary, most natural resource development research assignments are discipline-based or/and biased. Talking about the geosciences community that encompasses remote sensors, GIS professionals and data analysts, can be powerful because its theme is innately multidisciplinary. Processes such as scenario modelling, decision support systems and knowledge gateways can provide exceptionally influential tools for storage and analysis of multi-sectoral data. But they can inherit this power only when they incorporate thematic information from different sectors in a common platform, since by this approach, a central system can be developed that can facilitate analysis of trade-off scenarios at all scales and resolutions.

To evaluate the potential contribution of geosciences in the development planning initiatives, it requires asking questions such as: To what level do we conceptualize cross-disciplinary object-oriented research proposals? Does mapping at a particular scale offer operational functional management information? Can it identify key issues and change drivers, mitigation options or risk analysis? To what extent is it useful for modelling conservation and development pathways? How many times do we involve the implementation authority as a relevant stakeholder in a geospatial assignments?

The idea behind this thought is to conceptualize and model global-to-local scenarios using a wide array of spatial data that consider temporal variability (centennial, decadal, annual or diurnal), spatial scales and a host of other issues. Also, geospatial tools that present the objective result of current earth observation systems can significantly contribute toward policy recommendations that aid sustainability. These tools can access and process information from a variety of sources and display it in a spatial and visual medium, hence offering a pertinent solution for varied environmental concerns. In addition, recent advances in spatial technology have opened a new paradigm of data analysis, modelling, harmonization and access. Advances in geosciences and the new paradigm of data policies have brought the power of high-quality advanced spatial data access to institutions and individuals to resolve development and sustainability-related problems. These advances have made it promising for furthering global public-goods spatial data gateways to generate invaluable products or knowledge and hubs.

This paradigm shift has also resulted in empowering institutions such as the International Water Management Institute, to generate focused spatial data gateways (http://www.iwmidsp.org) that present chorded spatial data for its niche areas of water and land resource management. Production of the Global Irrigated Area Map and the global map of rainfed cropland areas (www.iwmigiam.org), is crucial for studies related to global food security and water use. These gateways promote independent and consistent products for the world, avoiding inconsistencies of census-based statistics. Another related study on wetland systems gave birth to the Global Wetland Inventory and Mapping (www.iwmi.cgiar.org/wetlands/), an endeavour to build a network of researcher collaborations through distributed networks aligned within the framework of agreements, such as the Ramsar Convention (www.ramsar.org). This movement is slowly but surely gaining momentum within leading corporations and government agencies. GIS is becoming part of the customary workflow of many development sectors. This type of dedication to spatial knowledge reflects a promising apparition of a nationsal government that understands the significance and application of potentially utilizing the emerging technologies to facilitate sustainable development.

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Ganga Express Way – A path of wetland destruction

Ganga Express Way is a project of the Uttar Pradesh Government. According to this, an eight-lane road is to be constructed along the left side of the River Ganga, between Noida and Ballia. This correspondence deals with a critical analysis of the project in amalgamation with environmental concerns.

This project will consume $1{,}047{,}000 \times 8 \times 7$ sq. m fertile agricultural land of doaab. This Indo-Gangetic Plain is well known for its fertility and productivity. In the light of this, in no way does it appear justifiable to sacrifice such a huge area and that too at a time when the world is facing problems feeding the exploding population.

Each year the Ganga brings billions of tonnes of fertile soil, which is deposited along the river basin. It is this soil which is responsible for high fertility of the area. Now, if a road is constructed along one side of the river, it will act as a dam or barrier for the free flow of water. As a result, huge amount of mud will be deposited on the riverbed, decreasing the cross-section area of the river. During rainy season, when excess amount of water flows through the Ganga, the water will find its way into cities, resulting in floods. After a few years, when the river bed would be almost filled, Ganga may be forced to change its path and pass through cities, i.e. perennial floods would become common.

The Indo-Gangetic Plain is fertile because it receives fertile and fresh soil each year and also the river regularly provides water for irrigation. After construction of the road, the high barrier will lead to two disadvantages. First, the off-side of the road will become waterless. Since soil of the adjoining belt is sandy, in no way does it appear feasible to perform irrigation through other sources in such a soil.

In the years to come, this will lead to desertification. Secondly, construction of the huge barrier would also require large amount of soil, as in normal practice the soil would be dug from the nearby agricultural field[1]. This will give rise to another problem. The low land generated in this way will collect the rainwater on the off-side of the river, which will promote the development of sodic and saline soil. Both the above processes will lead to progressive development of desert area. In addition, the temporary lentic ecosystem would become a source of various water-borne diseases, such as dengue, malaria, encephalitis, etc.

The planners have proposed to develop an 'investment region', along the way, under which 500 large and 7000 medium or small industries would be commissioned in 10,000 acres of land adjoining to the Ganga Express Way[2]. Not only will the agricultural land reduce, but also all the industrial effluents and garbage would be directly dumped into the Ganga.

Path of rivers are wavy. This will also increase the cost of construction, maintenance and fuel consumption in addition to the time required for the journey and cost of transportation.

Finally, our emphasis should focus on sustainable development, rather than on just development. India is an agriculture-based country, and we should aim to feed the ever-increasing population. Industries can produce bread but not grains. As an alternate suggestion, it would be advantageous to develop the Ganga Waterways. This will not only prevent the economic loss, but the water resources available to us are properly utilized. It would require less than 20% of the budget of the proposed plan towards development of the Ganga Waterways. The voyage would be economical, pollution-free as well as long-lasting.

1. Dwivedi, A. K., Shashi and Singh, J., *Curr. Sci.*, 2006, **91**, 407–408.
2. http://www.upgov.nic.in/news11.asp?idn=2726

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Running scientific institutions

This is prompted by the recent editorial[1] on Homi Bhabha and the importance of developing appropriate systems for running our scientific institutions. The editorial touches upon problems that one should expect to encounter on the way, problems whose essence lies in the absence of a shared perception on the part of scientists and administrators (including those who frame rules) concerning their mutual roles, not to mention the role of the institution itself. Often the gap is widened by the choices made during selection. On the one hand, there is the tendency to pick someone as administrative head of a teaching or research institution, or as head of a department, solely on grounds of scientific standing – or worse, seniority. There is little regard for whether the person is suited for the position by aptitude or training. On the other hand, there is the tendency to pick, for filling the next reaches of the administrative hierarchy, people who have risen in government service and are innocent of the way science works. Compounding the mismatch, the latter may be birds of passage. In that case, they cannot see why they should spend time and effort at developing empathy, either with the scientific institution through which they are transiting or with the researchers in it. The upshot is anguish and frustration – on both sides. The reason is that by tradition, in India we lean on personal connections, on people rather than rules. This applies to those of us engaged in carrying out or supporting scientific research as well. (Think of the havoc wrought by that blissfully unconcerned individual, the 'concerned' case-worker.) Unless a huge amount of effort is invested in building a new, quasi-Western, ethos, which is what Bhabha tried to do, it would seem that one has to invent ways of matching the demands of doing science today to the constraints set by our culture.

But there is another issue, more deep-set, that is relevant to the functioning of any system of administration that has an 'outsider' on the top. It must confront scientists who guide public research organizations or funding agencies; even lowly department chairs encounter it. Though not confined to India, it stands out here. I refer to the ability of administrators and bureaucrats to so manage things that the outsider, who is supposed to direct their functioning, soon ends up being directed by them. Readers who have seen the TV serials 'Yes Minister' and 'Yes Prime Minister' may recall the witty manner in which this serious message was put across. Among scientists, it is not unknown for the same person who used to complain about the administration endlessly to become, upon acquiring an administrative role, its most vociferous champion. Others, who notice the phenomenon and live with its consequences, lament the fall of a colleague and go on to place the responsibility for their woes on inappropriate procedures and the benighted ways of administrators. Perhaps there is a more innocent explanation lying hidden in the dynamics of bureaucratic systems. It may reveal itself to careful study of the sort pioneered years ago by Parkinson of Parkinson's Law fame. Unfortunately, instead of being examined seriously, his contributions too are prone to be dismissed as falling into the category of humour.

1. Balaram, P., *Curr. Sci.*, 2008, **94**, 423–424.

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