Deccan Chronicles-14 October 2021

GOOD MONSOON PROTECTED HUSSAINSAGAR, SAYS TSPCB

DC CORRESPONDENT
HYDERABAD, OCT. 13

The Telangana State Pollution Control Board (TSPCB) found out that dissolved oxygen (DO) levels at all Ganesh immersion locations showed a decreasing trend this time around. The water quality of Hussainsagar lake was monitored at three different periods – namely, before, during and after immersion of idols.

The water quality was monitored at NTR Gardens, Lumbini Park, PV Marg, Lepakshi Handicrafts and near Buddha statue from September 8 to September 28. Total dissolved solids (TDS) showed an increasing trend during idol immersion, especially at PV Marg.

The Total dissolved solids increased drastically during the period of immersion.

Dissolved oxygen was restored to normalcy after immersion.

Heavy metals were below detectable limits either before, during or after the immersion of hundreds of idols in the lake.

According to available data, all these happened due to heavy to very heavy rainfall received for almost three weeks between September 7 to September 29 that coincided with the period of Ganesh festival.

Due to heavy rainfall in Hyderabad, Hussainsagar lake received stormwater from all parts of the city. This resulted in dilution and flooding of waters, thereby restoring the lake condition to the normal state.

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Towards precision agriculture

Harnessing environmental data through tech is vital for such a shift

MADHUSUDHAN ANAND

In the 2020-21 Economic Survey, agriculture in GDP accounted to 19.9 per cent, an increase from 17.8 per cent in 2019-20. The last time the sector contributed such figures was in 2003-04. In spite of the current political climate surrounding India's agricultural sector, it has witnessed a shot in the arm through a myriad of incentives this past year. Like the ₹4,000 crore allocation towards Pradhan Mantri Krishi Sinchayee Yojana to provide irrigated water access to farmers. It's all part of the government's ambitious goal to double farm income by 2022.

At the same time, there is a dire need to confront the requirement of increased agricultural production to feed a growing population. Crop production must be increased by 60-100 per cent by 2050. The answer is not aggressive farming, but sustainable practices while soldiering through climate change, depletion of natural resources, increased erosion, and more.

To meet the future demand for food, data scientists are counting on agribusiness to fuel innovation. Today, precision agriculture is harnessing the power of artificial intelligence (AI). IoT, satellite imagery, drones, Web-GIS frameworks, Big Data, cloud and machine learning are expected to improve global agricultural productivity in the near future.

According to the *Indian Journal of Fertilisers*, precision agriculture is basically the 'right-input' at the 'right-time' in the 'right-amount' at the 'right-place' and in the 'right-manner' for improving productivity, conserving natural resources and avoiding any ecological or social tribulations.

But to arrive at these desired results, huge amounts of data collation is required. Environmental data, through technological intervention, has already fuelled better farming techniques in developed countries.

Way forward Sustainable farming

However, it's no secret that environmental data has permeated and is effecting positive change in Indian agriculture.

Sensors and analysis tools can boost crop yield. In order to do this, environmental data is collected in the geospatial format to measure quantifiable variables like weather, soil moisture, volumetric soil temperature, fertiliser rates, water run-off, agrochemicals movement and rain.

Often, precision agriculture requires the use of non-destructive measures such as remote sensing with geographic information systems (GISs) and global positioning systems (GPSs). This expanding technology enables land owners to optimise output and minimise risk combining satellite data and ground sensors that work as a network.

Companies like Tata Kisan Kendra (TKK) and Fasal are already implementing these technologies in India.

Data for conservation

Precision conservation, a subset of precision agriculture, is primarily restricted to soil and water conservation in agricultural and natural ecosystems. Spatial technologies and procedures help create conservation management practices across natural and agricultural systems.

Again, global positioning systems, remote sensing, geographic information systems are incorporated to achieve insights that can be made use of for efficient harnessing of soil and water. For instance, the Indian Institute of Maize Research undertook the 'Development of precision conservation agriculture practices in cereal-based system in Indo-Gangetic Plains'. After two years, in 2020, the project leaders unearthed notable achievements, including around 82 per cent water saving in maize-wheat as compared to rice-wheat cropping systems.

Soil test-based nutrient management practices have for long helped improve foodgrains production. However, the nutrient use efficiency has been met with roadblocks. Accordingly, scientists and researchers have shifted to crop improvement instead of working on soil.

Losses of reactive nitrogen will significantly impact the environment via emissions of nitrous oxide, ammonia emissions, nitrate leaching losses and off-site transport of surface losses of nitrogen. Using a GreenSeeker optical sensor, researchers at the Department of Soil Science, Punjab Agricultural University, conducted seven field experiments during 2004-06 to observe in-season sensor documentation and wheat production, along with the application of nitrogen fertiliser. They observed higher yields and a more efficient use of the fertiliser.

It's evident that environmental data, along with the application of analytics and AI, will certainly improve the current siloed data management.

Environmental data can help influence a paradigm shift to digitally transform agriculture using real-time dashboards that monitor crops, water requirements, fertiliser effectiveness, market and economic conditions, too. Environmental data is thus leading the way towards modernising agriculture. Of course the technologies are here, but its wide-scale implementation is still a dream to be realised.

The writer is CTO and Co-Founder of Ambee

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River rejuvenation and other innovations

The fourth in a series of weekly articles on the new National Water Policy

MIHIR SHAH

From time immemorial, the people of India have had a profoundly reverential relationship with rivers, which form an integral part of our social and cultural life. Many regard the water of rivers as holy and imbued with healing powers. However, water policy since Independence has seen rivers primarily as a resource to be deployed to serve economic purposes. This overwhelmingly instrumentalist view of rivers has led to their terrible degradation, so much so that many rivers today have significantly reduced flows and at times have become cesspools of pollution.

The new National Water Policy (NWP) gives the greatest importance to rejuvenation of our river systems. While acknowledging the invaluable economic role rivers play, river protection and revitalisation are accorded prior and primary importance. For it is now abundantly clear that without policy urgently changing course, let alone serving an economic or any other useful purpose whatsoever, the glory of our rivers will soon become a thing of the past.

Rivers are more accurately denoted as riverscapes, as they are inter-connected hydrological and ecological systems, not limited only to the main stem of the river but also include all different orders of streams and their catchment areas. The NWP suggests that river basins need to be seen as a dynamic equilibrium of Water-Energy-Biodiversity-Sediments. Thus, maintaining the integrity of various basin elements — biodiversity, landforms, drainage lines, wetlands and aquifers — is crucial.

The policy recommends that the river basin, including associated aquifers, be the unit for planning, development and management of water. River Basin Organisations must be conceived as nested organisations built in a bottom-up manner, so that they function as democratic, inclusive, multi-stakeholder platforms. Urgent steps need to be taken to restore flows in rivers: re-vegetation of catchments, strict regulation of groundwater extraction and river-bed pumping, checking indiscriminate mining of sand and boulders and release of environmental flows downstream of all structures on the main stem and tributaries. Environmental flow assessment must be done for all river basins in a time-bound manner to ensure that rivers have sufficient flows during all seasons of the year, so that they can carry out all their ecological functions, including recharge of groundwater as also nurturing unique, indigenous biota. The NWP clearly recognises that it is impossible to have *nirmal dhara* (unpolluted flow) without *aviral dhara* (uninterrupted flow) in our rivers. It also proposes extensive consultations among all stakeholders to draft a Rights of Rivers Act, so that there is comprehensive legal protection for rivers, including their right to flow, their right to meander and their right to meet the sea.

Flood policy since Independence has been focused on large dams and embankments. But the problem has only got worse over time, aggravated by breaches in embankments, poorly designed and maintained canals, as also because settlements have been encouraged on flood plains and drainage lines. Embankments have dramatically increased accumulated sediments in rivers of already high sediment load, whose roots lie in massive erosion of their upper catchments. The consequent super-elevated riverbed causes instability in the river and leads to breaches in embankments, further worsening the flood situation. What has aggravated the problem of floods is the destruction of natural pathways of water towards the river or the sea. Blocking these has resulted in flood water entering our homes and workplaces in both rural and urban areas.

Management of water is greatly enhanced when backed by credible data. Despite significant recent improvements, such as the India Water Resource Information System, serious gaps still exist in the scope and quality of data

The overall approach of flood management must, therefore, shift from "flood control" towards "building resilient life and livelihoods in the context of floods" or "flood-informed development". "Room-for-the-river" projects should be taken up in flood-prone river systems in a river-specific manner. River Regulation Zones, proposed under the Environment Protection Act, 1986, including prohibited, restricted and regulated activities zones, must be demarcated and notified to regulate development interventions on riverfronts and floodplains.

Acknowledging the pivotal role of women in the stewardship of water and in leading the "spirit of service and ethic of care" advocated by the NWP, the policy features gender in every one of its sections, each imbued with a gender-sensitive perspective, with very specific provisions in that direction. It also has a full separate section on gender, equity and social inclusion to emphasise these much-neglected dimensions. Recognising multiple potential impacts of climate change on water resources following more intense and frequent extreme weather events, the policy proposes a comprehensive agenda of action to meet these challenges. A founding principle of the NWP is that it must reflect India's enormous diversity. Keeping this in mind, special attention is given to three regions — the Himalayas, rainfed areas and coastal regions — which have tended to suffer neglect in the past, by showing why and how water policy needs to reflect their *differentia specifica*. On navigation and transport on inland waters, the policy emphasises the need to bring in better regulation, improved systems and investment to ensure safety and more efficient operations. The policy argues that priority be given to passenger and goods transportation of local communities and small trade and manufacturers, which would also boost the local economy and generate employment.

Management of water is greatly enhanced when backed by credible data. Despite significant recent improvements, such as the India Water Resource Information System, serious gaps still exist in the scope and quality of data. The NWP makes a number of recommendations including comprehensive data gathering, with progression to real-time data availability, that seamlessly flows to different stakeholders, as a joint national effort of the central and state governments, research institutions and civil society, in a way that truly represents democratisation of data procurement, analyses and application. The NWP also outlines a large but focused agenda for water research and lays out the contours of how water education needs to form an integral element of curricula from primary schools right up to the university level.

The writer is Distinguished Professor, Shiv Nadar University. He chaired the Committee to draft the new National Water Policy set up by the Ministry of Jal Shakti in 2019