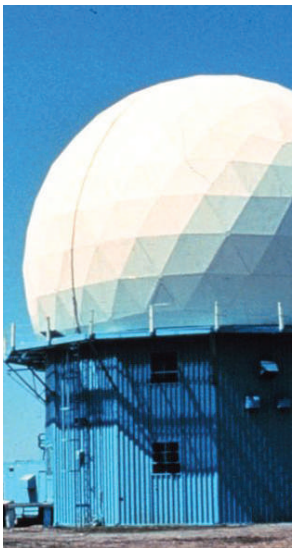


POINT BLANK

City needs Doppler Weather Radars

Weathermen from the India Meteorological Department (IMD) and Karnataka State Natural Disaster Monitoring Cell (KSNDMC) accept that the rainfall the city experienced on August 14 and 15 was unprecedented and beyond what they had assessed. But they also say that they have the best models to forecast weather.

But weather prediction is likely to improve only when the city and State gets their own Doppler Weather Radars (DWR). Considering the intensity of rainfall that Bengaluru receives, there is a need for one, says IMD Bengaluru



Director-in-charge Sunder M Metri. He had calibrated the radars installed by the state government on temporary basis for cloud-seeding.

Ten years ago, he recalls, the government had sanctioned a place in Hessarghatta to set up the radar. But now the IDM is searching for other locations in Bengaluru and Mangaluru. The head office has assured that high quality radars will come up in these areas within the next

two years.

Prof M B Rajegowda, noted agro-meteorologist and retired GKVK Registrar says although the IMD did not fail, the forecast given by the department was very general. It should have been updated later in the day. However, current models allow forecast to be made only once every six hours. Once the DWRs are in use, the forecast can be made every three hours, he points out.

Govindswamy Bala, Professor at Centre for Atmospheric and Oceanic Sciences, IISc, notes that the gradient variation is very huge within the city because of which the forecast is not accurate. The present IMD models run on a national scale. They are not mesoscale, which run on city scale. However, this scale is not available anywhere in India. Only in the United States are tornado predictions done every three hours. Bengaluru too needs a similar model where flood forecast can be given, he says.

Prof J Srinivasan, Distinguished Scientist, Divecha Centre for Climate Change, says Bengaluru does not have DWRs that can give accurate cloud range and depth. This radar can help in giving real-time distribution of liquid particles and ice in the city. This can help analyse where and when it will rain next.

These radars are now installed in all coastal states, metropolitan and cosmopolitan cities, barring Karnataka and Bengaluru. A KSNDMC official, on condition of anonymity, blames this on the centre-State politics. "Just like IMD we too had applied for DWR. But the State ministers said that there was no need as it was the domain of the IMD alone. We know that the State can easily purchase one. But they are demanding one from the Centre instead," the official says.

Bosky Khanna

Plans to disseminate rainfall forecasting

- IMD and KSNDMC are creating mobile based Apps independently for people to download and receive rainfall forecast. While the central government is designing one for the IMD, the KSNDMC has partnered with engineering students from MS Ramaiah College to design the App.
- The KSNDMC has also proposed to open call centre type flood centres in low lying areas to give detailed weather data. Officials in the centre will also announce warnings on loudspeakers cautioning them about heavy rainfall and evacuate them.
- Currently, 277 people including 250 BBMP officials are registered with KSNDMC. Chief Engineers and Superintendent Engineers are among them. The remaining 27 comprises of citizens and officials from other departments. The KSNDMC has trained the officials on how to interpret the rainfall input and forecast to exercise caution.
- The IISc has requested the centre and state governments to start a dedicated weather channel that gives details of each region, as in the United States. This proposal was mooted 20 years back by the PV Narasimha Rao government but it did not come through.

LETTERS pointblank@deccanherald.co.in

We know that soil is the best absorbent and to prevent flooding, we need to have more trees, more earth, and good drainage systems that direct the rainwater to lakes and ponds or allow it to seep into the earth. No wonder that all the old trees are uprooted with the slightest force in the wind or rain.

Disregard for our natural resources and callously destroying the remaining greenery is bound to have its repercussion in the form of flooded areas.

Patricia Preetham

Irrespective of technological advancement in the prediction of vagaries of nature, including rain forecast, what matters is the preparedness to face eventualities. With Bengaluru growing haphazardly in multi-directions, the city planning authority has done little in developing matching infrastructure which is resulting in unimaginable adversities.

Lack of scientifically designed shoulder drains apart from imbalanced Raja Kaluves on one side and encroachment of most of the lakes has been given least cognizance of by the authorities. In addition, severe clogging of most drains

adds to the miseries, for which both residents and the authorities are responsible.

Rajiv N Magal

For years, the city's civic agencies have tried tackling the flooding problem through eleven thousand, last ditch efforts that often does not go beyond desilting and clearing the storm water drains (SWDs). The drain redesign project has been going on for years, even as lake rejuvenation programmes are going nowhere.

So, what is the alternative? "To ensure visible outcomes of interventions in short term and long term, a comprehensive and integrated design, planning and management agenda is critical across scales, sectors and time," says a study that went deep into Bengaluru's urban flooding issues from a design perspective.

First, the basics. An estimated 940 Million Litres Daily

Unpredicted rain, predicted chaos

Despite advanced weather forecasting technologies, Bengalureans had no inkling of the massive downpour that flooded roads and low-lying areas.

Bengalureans were completely stumped by the 13-cm rainfall on the intervening night of August 14 and 15. Several areas and roads were completely under water in a flash that left everyone wondering: Why were we not warned? Why did the weathermen fail to predict such a massive downpour?

But even as the city came to a virtual standstill in the wake of this unprecedented rainfall, a reality came out in the open: Forget heavy downpour, the city's infrastructure cannot even handle a mere 42.2 mm of rain, the recorded amount of showers for August 23.

The weathermen could not warn the public about the record rains, which could have helped them take precautions. Despite giant strides in satellite-based weather forecasting technologies, Bengalureans had to depend on generalised statements from the Meteorological Departments.



lite-based weather forecasting technologies, Bengalureans had to depend on generalised statements from the Meteorological Departments.

Poor infrastructure

But the weathermen blames the chaos on the city's poor infrastructure. L Ramesh Babu, Bengaluru director of the In-

dian Meteorological Department (IMD), points out that the city cannot handle even 3-6 cms of rainfall (moderate to heavy) rainfall. This, he says, has been proved in two instances in just two weeks. The IMD head office before the onset of monsoon had forecast a good rainfall season.

Preferring anonymity, an

official from the Karnataka State Natural Disaster Monitoring Centre (KSNDMC) says the government was already aware of the low-lying areas and the areas prone to flooding. "They could have undertaken quick short-term measures to ensure that people are not affected. But the State decided to look the other way."

Connectivity cut off

The floods that followed the rains should be attributed to the cutting off of the connectivity between lakes and canals, contends Prof T V Ramachandra from Centre for Ecological Sciences, Indian Institute of Science. The width of drains, he points out, has been narrowed from 60 metres to 28 metres. "Who gave them (civic authorities) the power to tamper with the system? All this has been done to help encroachers. To add to this the government now wants to denotify "dead" lakes. But as per definition there are no dead lakes. All this will lead to flooding in the coming days also," he cautions.

Natural water recharging

All low-lying areas flood because they were the natural water recharging points which have now been concretised. The revised master plan-2015 also declared many low-lying areas as industrial areas, which will add to the havoc. In 1990s when there was 68% concretisation there was no flooding. But flooding has been happening since 2015 onwards when concretisation has increased to 200%.

The water storage capacity of lakes, informs Prof Ramachandra, has also been diminished by concretisation and creating infrastructure around them. If the earlier storage capacity of lakes was 35 tmcft it has now been reduced to 1.5 tmcft. He blames the government for assigning engineers the job of lake rejuvenation and not environmentalists who know the subject.

Encroached drains

What does a Sulabh toilet in Adugodi have in common with the National Games Village in Koramangala? Both are encroaching storm water drains. And, as irony would have it, the two localities were the worst-affected in the heavy downpour the city received on Independence Day.

A flood-prone city that it is, Bengaluru has over 400 kms of its 857-km stormwater drain network encroached, obstructing the natural flow of rainwater. "Let there be no doubt that flooding is the direct result of drain encroachment," BBMP Chief Engineer (storm water drains) K Siddegowda says.

Sample this: The Konanakunte Road has encroached a drain along with five homes, a commercial complex and two shed houses in Anjanapura. In Koti Hosahalli at Vidyanarayapura, asphalt roads were laid by closing existing stormwater drains. Over 200 public roads and 35 commercial/industrial establishments have encroached stormwater drains. All this the civic body has made public, backed up by Survey Settlement and Land Records

(SSLR) maps that determine the exact extent of encroachment.

"We need service roads to access drains so we can take up maintenance. We need space to at least walk around the drains. The problem is, this space no longer exists, and that is the encroachment that needs to be cleared," Siddegowda explains.

Soft encroachment

According to Whitefield Rising member Elangovan Kulandaivelu, there is also a "soft encroachment" of drains. "All the construction dust and debris end up in the drains," he says.

Citizens are primary drivers of drain encroachment. Apparently, a rajakaluve with a 66-ft width in Thubarahalli disappeared over a period of time because the residents nearby filled it up to get a better access to their land.

Demolition drive

In an infamous demolition drive last year, authorities razed dozens of homes built on stormwater drains. The drive itself was triggered by flooding that took place July last year, when the city received 213 mm rainfall, 124% more than expected. In contrast, the city receiving a whopping 267% more rainfall between August 10-16, according to meteorology data.

Till date, the civic body has cleared encroachment in 1,175 cases out of a total 1,923 identified all over the city. "We will take up encroachment clearance after we get surveyors from the land records department," Siddegowda says.

No need for surveyors

Calling the BBMP's bluff, a top official from the SSLR department says there is no need for surveyors as all encroachments have been surveyed already. The surveyed maps of encroachment are available at landrecords.karnataka.gov.in, the official pointed out.

For instance, the survey maps reveal 5.24 acres of drains encroached by the Bangalore Development Authority (BDA) and the Karnataka Housing Board's National Games Village in Koramangala. "Saying that they need surveyors is just their way of delaying encroachment removal. There's no real will," the official says.

BBMP Commissioner N Manjunath Prasad, however, maintains that "encroachment removal is a continuous process."

Meanwhile, the monsoon season is officially far from over. And as urban expert Ashwin Mahesh puts it, Bengaluru must brace for "needless suffering for the same reason, for years and years."

Bosky Khanna and Bharath Joshi



MOHAN S RAO
Environmental architect

You cannot look at scarcity of water and urban flooding in isolation. They are related. We need an integrated plan to combat flooding, water scarcity. We have a history of closing down lakes.



ELANGOVAN KULANDAIVELU
Member, Whitefield Rising

There is also a "soft encroachment" of storm water drains that link lakes in the city. All the construction dust and debris end up in the drains.



Prof T V RAMACHANDRA
Centre for Eco Sciences, IISc

The width of drains has been narrowed from 60 metres to 28 metres. Who gave them (civic authorities) the power to tamper with the system? All this has been done to help encroachers.



To solve urban flooding, start with watershed areas

For years, the city's civic agencies have tried tackling the flooding problem through eleven thousand, last ditch efforts that often does not go beyond desilting and clearing the storm water drains (SWDs). The drain redesign project has been going on for years, even as lake rejuvenation programmes are going nowhere.

So, what is the alternative? "To ensure visible outcomes of interventions in short term and long term, a comprehensive and integrated design, planning and management agenda is critical across scales, sectors and time," says a study that went deep into Bengaluru's urban flooding issues from a design perspective.

First, the basics. An estimated 940 Million Litres Daily

(MLD) of water is pumped into the city from Cauvery. Another 70 MLD of ground water is extracted every day. Eventually, 1,040 MLD of sewage is generated daily. All of this is discharged locally, both treated and untreated, mostly in the lakes / tanks and Rajakaluves (SWDs). The sewage is an additional load, something that considerably reduces the capacity of the drains. When it rains, the drains naturally overflow flooding roads, low-

lying areas and lakes.

Taking Madiwala lake as an illustration, the study recommends cleaning up of the network of SWDs and restoration of disconnected drains in the immediate micro-watershed of the lake. This should also be done in the primary and secondary valley system of Madiwala.

Cleaning / dredging the lake to increase its lost capacity due to inflow of tons of untreated sewage is another priority

intervention. "Create water swales around the tank which can carry / hold water along with the tank itself.

Remove the cemented / hard surfaced floor of the storm water drains at regular intervals to allow penetration of water into the soil while protecting the soil from eroding (by means of laying net and by creating gully plugs) Swale system at intervals."

The study wants regulated physical links from the pri-

mary and secondary valleys of Madiwala to all open spaces / parks near the valley line. This will redirect the flood waters into these open parks, which can act as sinks if the Madiwala lake / valley cannot carry the water.

Undertaking the study, environmental architect, Mohan S Rao and civic evangelist V Ravichandrar had a clear objective: To find alternative short and long term solutions to the problem

while minimising demolitions and having zero tolerance for any future violations that impact water resilience. At the heart of the idea was to respect nature's lines, realising that low-lying areas will always be at greater risk.

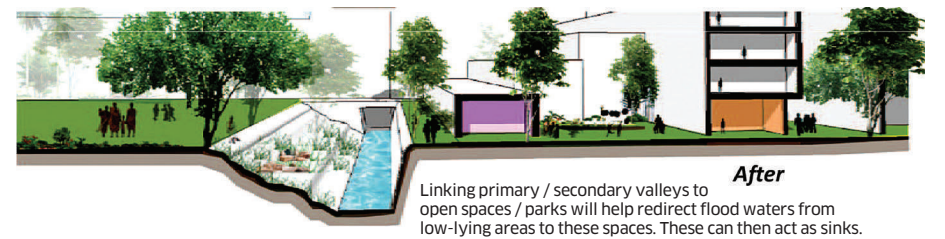
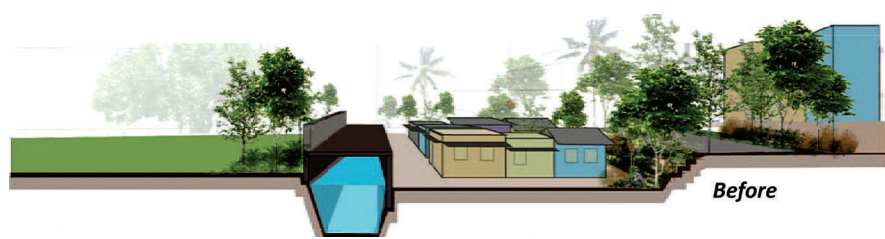
Explains Mohan Rao, "The solution cannot be exclusively about engineering. You need to take into account urban planning, natural system of lakes and drains. So, if Madiwala flooding issue is to be

solved, you need to start from Puttenahalli."

What he implies is this: "You cannot look at scarcity of water and urban flooding in isolation.

They are related. We need an integrated plan to combat flooding, water scarcity. We have a history of closing down lakes not just in Bengaluru, but in cities across the country."

Rasheed Kappan



Linking primary / secondary valleys to open spaces / parks will help redirect flood waters from low-lying areas to these spaces. These can then act as sinks.