

# CSIR in Media



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## City engineering students win top prizes at India International Science Fest

*Lab Covered: CSIR-NPL*

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Students of Sri Ramakrishna Engineering College in the city have bagged the first prize in two categories, Swastha Bharat and Strategic Application, in the second India International Science Festival.

The winning presentations were prepared by R Nishitha, R P Srinath, Gokul Shanmugam, N Ramvignesh, EVignesh and A Manikandan from the EIE, ECE, EEE, CSE and Mechanical Engineering departments.

The science fest was organised by the Ministry of Science and Technology and the Ministry of Earth Sciences in association with Vijnana Bharati (VIBHA) at CSIR-NPL, New Delhi.

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## HydroGeo Park dilutes fluoride in Yadadri dist

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*Satyapal Menon*

Groundwater sources located in hard subterranean zones can have harmful levels of fluoride and arsenic content which is released when the water reacts with some of the rocks.

Many villages in Nalgonda and the newly-formed Yadadri districts, in Telangana have since long been impacted by fluoride contamination with effective remedies to this problem yet to materialise.

### **Minimising Effects**

NGRI implemented a unique method to dilute contamination of groundwater resources in fluoride impacted Choutuppal in Yadadri district

The pilot project known as Hydro-geological Park is the first of its kind in Telangana

The project is yielding positive results, going by the interest generated among the villagers in the affected locations.

But, an innovative initiative launched by the Hyderabad-based National Geophysical Research Institute (NGRI) may, to a significant extent, prove to be a source of succor for inhabitants in the affected locations.

The NGRI has implemented a unique method to dilute contamination of groundwater resources in fluoride impacted Choutuppal in Yadadri district.

The pilot project, known as Hydro-geological Park – the first of its kind in Telangana - is yielding positive results going by the interest generated among the inhabitants of the villages in the affected locations.

Disclosing this to The Hans India, Dr Virendra Tiwari, Director, NGRI, explained that the method involved blending of fresh surface water with the contaminated subsurface groundwater.

“Groundwater contamination occurs from two sources. One is geogenic contamination, which occurs when the reaction between groundwater and some of the rocks results in the release of arsenic or fluorides.

The second source of contamination is caused by industrial effluents which percolate to the groundwater.”

The method involves artificial recharging of the groundwater with rainwater stored in surface ponds and tanks.

Artificial recharge is a process in which water from a surface tank seeps and mixes with groundwater.

The NGRI has identified fluoride contaminated groundwater aquifers – water bearing permeable rocks - in six villages in Choutuppal and created a pond specifically designed to facilitate continuous seepage of freshwater to the groundwater.

“The freshwater from the surface percolates or seeps into these subsurface aquifers and dilutes the fluoride content in the groundwater,” said Dr Tiwari.

However, he added that this process would help only in ‘diluting’ and not ‘in removing’ the contaminant.

“For instance, through this process the contaminant can be reduced by adding 60 per cent to 70 per cent surface fresh water, which then reduces or dilutes the percentage of contamination,”

he said and added, “we can also achieve another crucial objective through such interventions – ensure sustainable availability of water by providing a source to replenish the groundwater. This pilot project is being implemented as part of CSIR-800 mission.”

Elucidating on the groundwater dynamics of Telangana, Dr Tiwari expressed the view that the state needs a systematic groundwater management strategy and plan due to its heterogeneous and complex hydrological system.

Telangana is mainly positioned on the Krishna river basin where sub-surface aquifers are very complex in nature and not uniformly distributed.

The demand in the state is many times more than storage capacity. “There is lack of sufficient sub-surface space where water can be stored.

So, we need to create recharging reservoirs – to replenish groundwater sources – that are in accordance with the existing capacity,” said Dr Tiwari.

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He pointed out that surface reservoirs meant for recharging can be created only after identifying the aquifer or groundwater locations and gauging their capacities.

Moreover the plan should also encompass other factors like distribution of cropping patterns and changing requirements.

“And finally, these recharge facilities or reservoirs should have specific design and structure to enable percolation to the aquifers and in accordance with their storage capacity.

You may make thousands of reservoirs but they do not serve any purpose, if only ten are recharging.

All the others would then end up serving as surface reservoirs exposed to evaporation and consequent depletion,” he said.

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## Almost 40% of Mumbai may be submerged in next 100 years: Study

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*22<sup>nd</sup> December 2016  
Badri Chatterjee*

Nearly 40% of Mumbai could be under water in the next 100 years if sea levels continue to rise, says a research paper that looked at Mumbai's susceptibility to climate change.

The findings are from an unpublished research paper were discussed during the National Symposium on Tropical Meteorology; Climate Change and Coastal Vulnerability (Tropmet 2016) held by the India Meteorological Society at Siksha 'O' Anusandhan (SOA) University at Bhubaneswar, Odisha between December 18 and 21. The paper states that 190 sq km of Mumbai's 458.53 sq km could be flooded.

“As the population is increasing exponentially and the city is expanding fast, it is necessary to understand if our surroundings are safe,” said R Mani Murali, scientist from National Institute of Oceanography (NIO) and co-author of the paper along with Riyas MJ, Reshma KN and Santhosh Kumar.

“Going by previous studies by NIO researchers, we considered a 3mm rise (annually) in sea levels along Mumbai's coast. That, coupled with factors such as natural calamities and tidal changes, will result in an approximate increase of 3m,” said Murali.

The study is under review by the scientific community and will be published soon. The project was undertaken after the state reached out to the NIO to understand the impact of climate change and sea level rise around the city. “Global warming — taking place as a result of global carbon emissions — is raising global temperatures. Currently, this has crossed 400 parts per million on a global scale, which is very high,” said Murali. “This leads to the melting of continental ice glaciers, and paves the way for a rise in sea levels owing to the thermal expansion of sea water.”

The study area included the western coast from Colaba in the south till Mira Bhayander and along the Thane creek on the eastern coast of the city. Mumbai has an average elevation above sea level of 14 metres with some coastal areas as low as 6m to 8m, rising to over 400 metres in the hill at Sanjay Gandhi National Park. “While a major part of the south Mumbai coastline has been protected using measures such as building walls and placing boulders, low lying creek areas are vulnerable as some are at the sea level (Gorai) while others are a mere 1.5m to 3m above sea level such as Mira Bhayander and areas around Andheri, Versova at Mumbai suburbs,” he said.

## EXPERTS SPEAK

“While the projections need to be approved by the scientific community, the confidence level – low, medium, high – depending on whether the event will actually happen, needs to be included with the published study and communicated to the government, so that appropriate measures can be taken to tackle such a calamity,” said E Vivekanandan, consultant and scientist, Central Marine Fisheries Research Institute.



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Mumbai's mangrove forests that stabilise the coastline and control erosion are vital for protecting the city from the project coastal inundation, said scientists from National Institute of Oceanography. However, unabated destruction of mangrove trees continues with an average of one case every month.

“Most low-lying areas such as creeks, mudflats and wetlands that might fall prey to coastal inundation 100 years from now are protected due to Mumbai's thick mangrove cover. If this cover is reduced, it could be disastrous for the city's future as the inundation effect be severe,” said R Mani Murali, scientist from NIO.

### **How was the study done?**

To get an idea about what could be the probable vulnerable areas, the study based on the 30 metre spatial resolution digital elevation model (3 D model), which identifies that there is an elevation from sea level at every 30m distance as per theory but it may not be true on ground. “We have developed a map with probable areas where the coastline may get altered and will be publishing the same once the review process is completed,” said Murali.

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