# Advisory Committee Meeting

## Urban Flood Model for Bangalore City

## Sponsored by: Department of Science & Technology (DST)

## Agenda

**Date:** 20 February 2020

**Venue:** Interdisciplinary Centre for Water Research (ICWaR), IISc, Bangalore

**Time:** 10:00 am to 1:00 pm

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| 10:00 am– 10:15 am | Welcome and Introductions - Prof P P Mujumdar |
| 10:15 am – 10:30 am | Remarks by the Chair and the members of the Advisory Committee |
| 10:30 am-11:30 am | Presentations<br>• Prof. M S Mohan Kumar<br>• Dr. G S Srinivasa Reddy<br>• Prof. P P Mujumdar |
| 11:30 am– 11:45 am | Break |
| 11:45 am– 12:30 pm | **Input from the Advisory Committee**<br>Sh S V Ranganath, Ex Chief Secretary, GoK<br>Sh B H Anil Kumar, Commissioner, BBMP<br>Dr R K Dave, RESPECT<br>Dr Veena Srinivasan, ATREE<br>Sh S Vishwanath, Biome Solutions<br>Prof B S Murty, IIT Madras |
| 12: 30 pm – 1:00 pm | Open discussion Co-ordinated by the Chair |
| 1:00 pm | Adjourn for Lunch |

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# Minutes of the Advisory Committee Meeting

# Urban Flood Model for Bangalore City

# 20 February 2020, ICWaR, IISc

Prof. P P Mujumdar welcomed the Advisory Committee (AC) members and the project partners. A brief introduction of the AC members was given by Prof. M S Mohan Kumar. Sri S. V. Ranganath chaired the AC meeting. Prof. Mujumdar invited each member to give initial remarks on the Urban Food Model (UFM) for Bangalore city project.

- Sri S. V. Ranganath, chairman of the AC, gave initial remarks on the severity of the urban flooding scenario and shared some of the challenges faced in the implementation of the project at the ground level like multiplicity of agencies, uncertainty in prediction of extreme events, and that a pilot scheme needs to be designed.
- Dr. R K Dave gave a briefing on how urban flood is a disaster that incurs the highest costs in the country and how the scope of the UFM should be extended to address a nationwide problem. He pointed out that ground implementation will be more feasible with the highest level of clearance from the bureaucracy.
- Sri Vishwanath mentioned that the granularity of the data collected in the project gives a good database. He gave an outline on the current scenario of water in the city, with very less harvesting of the flood water and the cost of water being highest in Asia due to transportation, poor retention of rainfall in the urban basin and deterioration of the groundwater aquifers in the core BBMP area. He said that this project can act as a source control for flood, on addressing these challenges.

The meeting continued with a series of presentations by Prof. M S Mohan Kumar, Dr. Shubha Avinash, and Prof. Pradeep Mujumdar.

- Prof. Mohan Kumar presented an overview of the urban flood project, past work, and data procured from various agencies for this project. Prof. Mohan Kumar also discussed the experimental and modelling work being done in testing of compound channels that includes porous pavement.
- Dr. Shubha Avinash gave an overview of the contribution of KSNDMC to urban flood project and also discussed the monitoring of rain gauges, dissemination of flood information and the flood application developed at KSNDMC.

- Prof. Pradeep Mujumdar gave details of the work done under the ITRA project and the status of the current project. The technical presentations gave insights to the current scenario of floods in Bangalore, updating of work done under the ITRA project, two dimensional flow model developed that can capture complex topography, preliminary results from rainfall forecasts using WRF model, data availability and the importance of integrated approach in addressing urban flood issue as implemented within IISc Bangalore keeping in mind all the aspects of the urban water cycle.

Following the presentations by the partners, the AC gave suggestions/action points to take forward the project for the coming year. A detail account of the same is appended as Annexure II.

- **Shri S V Ranganath** suggested a planned pilot project for the upcoming calendar year and to implement it with a work plan. He also suggested better involvement of the governments via MoUs and to stress on working on an SOP for execution. He stressed on strategic partnerships with Dr. Veena Srinivasan and S. Vishwanath. He congratulated the speakers, Prof. MS Mohankumar, Dr. Shubha Avinash and Prof. PP Mujumdar for their conviction with which they talked about the project.
- **Dr. R K Dave** suggested documenting of project milestones and data with respective sources and a wholesome planning of future steps. He emphasized on the need to collaborate with BBMP in the recently launched lake rejuvenation schemes. He recommended to frame out 4 to 5 specific indicators in the key performance of the project that can be referenced to a time scale.
- **Dr. Veena Sreenivasan** started the discussion by appreciating the detailed modelling and the high resolution data being used. Dr Veena suggested a number of specific aspects to be analysed while modelling suggesting that what is modelled is what becomes reality. She emphasized on stakeholder involvement that may help in the identification of any possible missing processes in the models and help with better forecasts. In addition to the valuable technical and administrational suggestions, she suggested an MoU of ATREE and Biome with ICWaR to tackle various issues along with Integrated Water Management.
- **Sri S Vishwanath** started the discussion by encouraging documentation for non-scientific community. He suggested a more appealing approach like illustrations through comic strips to create awareness for water conservation and rain water reuse. He suggested increasing the thresholds of the city’s system design and the importance

of its communication to the engineers and architects involved in the same. He stressed on the inclusion of guidelines for rainwater management in the building bye-laws of BBMP. He explained about the work of the Biome solutions team at Cubbon park where, by reviving structures like open wells, the groundwater levels were controlled. He concluded with valuable technical suggestions for improvement of recharge and better use of rainwater.

- **Prof. B S Murty** suggested the study to know the details regarding the interlinkages between the storm water management system and the sewerage system. He advised on thorough examination of the implementation of all types of Low Impact Development components, initially through modelling. He suggested use of an online system to automatically manage the excess flood inundation based on the water level sensor data. He emphasized on administrational feasibility of artificial GW recharge and monitoring of the quality of rainwater to be recharged, as it is difficult to clean the groundwater. He advised on studying the necessity and value addition for the study upon usage of the high resolution LiDAR data in comparison to the alternatively available data. He emphasized on a pilot scale implementation of the work and explained about the cost saving benefits and societal impact of an integrated water supply system in IIT Madras similar to the one demonstrated in IISc. He also suggested the preparation of the DPR document which aided in scaling up of the work and in their communication with government agencies.

**Suggestions from the invitees and concluding remarks**:

Before the concluding session, Prof Mujumdar invited the participants to give feedback/suggestions regarding the project.

- **Dr. Amitha R** DAG, SS-LBA who headed an audit for the storm water drainage systems suggested the creation of a mechanism for peaceful clearing of encroachments, a system for monitoring diversion from original building plans and monitoring of points/zones where sewage mixes into the storm water. An exercise carried out by them using RRSC data for 2 zones in the city, gave a significant location of 160 points where sewage and storm water are being mixed. She suggested the UFM team to carry out the same assignment for the entire Bangalore city. She also suggested to be cautious about implementing LID such as porous pavement in the whole Bangalore city as it might have detrimental effects in areas of combined drainage system. She also suggested

looking for the blocked culverts of the smaller drains which are the primary cause of flooding during extreme events. Lastly, she recommended working on a budget to facilitate better coordination between the modeler and the implementer.

- **Mr Prahallad** gave a short presentation on the current works being carried out by BBMP. Of the 842 km of total length of drains, 400 km is lined. He said that lined drains were desilted as a part of the annual maintenance and this showed a major improvement in flood mitigation when compared to the previous year. He said that choking of bridges and culverts is a major constraint and needs to be looked into. He also discussed about the floating trash barriers that collected debris disposed in the storm water drains.
- **Ms. Bindiya** of Enzen Global Solutions Pvt Ltd urged to frame out the indicators of success for the UFM project. She suggested to get feedback from the people who used the Flood App, and point out the number of lives saved and also take into account the time saved by the commuters by using the app for an alternative route. She recommended coupling the Flood App with the Ola and Uber apps to get real time feedback.
- **Dr. GSS Reddy**, Director of KSNDMC added details regarding allocation of 500 crores in the finance budget for Urban Flood Mitigation out of which Bangalore city has received 50 crores. He also pointed out on the collection of finer Radar and LiDAR data with these funds.
- **Dr. Jay Asundi** from CSTEP suggested that the data for LiDAR is available with the Energy department and needs to be procured through a proper channel. He also suggested the integration of the route mapping and other crowdsourcing outreaches with the general google maps so that it is easily implementable without dependency on the app created through the project.
- **Dr. Arun Pande** emphasized the need for a deep interaction with the field people to get a sense of practical implementation of the model. He informed the team to determine steps required for budgeting of the model, duration taken to create it and its implementation part for the application of the model to other cities in India.
- **Prof B S Murty** suggested to map the sensitive drainages and sensitive locations and obtain on site pictures and include it in the model to study the effect of clogging of the drain causing inundation and backflows. This can be used as a public awareness campaign suggesting to the people the importance of keeping the drains free from the debris with model outputs as proofs.

Prof Mujumdar thanked the Advisory Committee and the attendees for their valuable inputs and thanked everyone for making the meeting a success with lots of inputs to implement.

Prof. M S Mohan Kumar concluded the meeting by thanking the advisory committee members and all the attendees and invited the gathering to lunch and continue the interactions.

**Annexures:**

I. Agenda for the ACM
II. Action Points suggested by the AC
III. List of attendees.