



# RAINS, DRAINS AND DELAYS: FLOOD MITIGATION IN MUMBAI

Gautam Pemmaraju

Another version of this article was first published in Waterleader Issue 04/2012 and is reprinted with the permission of the Lee Kuan School of Public Policy

The fact finding committee appointed by the Government of Maharashtra in the wake of the dramatic flooding in Mumbai on July 26<sup>th</sup> 2005 made several recommendations, including those specifically related to the rehabilitation and reorganization of urban storm water drains. The original study of the city's drains was commissioned in 1988, post the floods of 1985, and further to its report submitted in 1993, the Brihanmumbai Storm Water Drains (BRIMSTOWAD) project was initiated. Initially bogged down by a lack of financial resources, the project was revived with central government funding after the 2005 floods. The progress has been slow and civic authorities have been faced with a complex range of challenges, some of which persist to date. The Brihanmumbai Municipal Corporation (BMC) is currently handling 58 projects in two phases, of which 22% remain to be completed in the first, and 67% remain in the second, according to official sources in the SWD (Storm Water Drains) Department. The Mumbai Metropolitan Regional Development Authority (MMRDA) too has conducted work in downstream areas.

As pointed out by experts (Gupta, 2009; Ranade & Hasan, 2007), there have been many institutional challenges. Lack of coordination between different civic agencies and discretionary authorities, procedural formalities, land acquisition obstacles for pumping stations at outfall locations have contributed alongside several other macro issues,

such as rapid urbanization, increase in population, and other socio-economic factors. The importance of the Mithi River, particularly, its role as a primary channel for discharge of storm water and sewage, has been critical in studies and recommendations. Its flood plains have seen encroachments over the decades; several holding ponds and basins have also been illegally occupied. Further, contemporary research has pointed out that there has been a rapid increase in impervious land from an increase in paved surfaces, thus reducing the land cover and thereby preventing rainwater from soaking into the ground filtering through soils and gradually seeping into streams.

The Mithi River Development Authority was set up to examine and implement restoration of the river to its 'pre development conditions'. All authorities and experts point directly to the reduced capacity of Mumbai's storm water drains as the critical component of the complex problem of urban flooding. **Flood mitigation therefore, is a multi-dimensional issue and the complexity and interplay of the many layers impact implementation plans.**

Besides cleaning and regular maintenance of drains, widening of waterways, moderating the Mithi River water flow, de-silting and dredging projects, hydrological examinations and aerial surveys have been conducted towards addressing the main objective – increasing the drainage capacity

and rate. Global issues such as climate change, particularly temperature, convection and rain patterns, rising sea waters, also contribute in no small measure to the broader problem. The historic city drains, dating back to colonial era town planning, have over time grown into a "mix of simple drains and a complicated network of rivers, creeks, drains and ponds. A network of closed drains below the roads has evolved in the city – the roads have evolved by covering the old drains in the city whilst there are open drains in

the suburbs" (Gupta, 2009). As a high level official admitted, the severity of the 2005 flooding, aside from the inaction in implementing BRIMSTOWAD, and other environmental factors, overwhelmed this hierarchical network completely, and "the roads themselves had become storm water drains". Civic management of rising road levels is also a major concern and recent aerial mapping has provided a contemporary picture of gradient changes.

## SOLUTIONS AND RECOMMENDATIONS

A wide variety of solutions and responses have emerged over the interim period and Mumbai is expected to have a revamped storm water drain system by 2014. Associated institutional responses have also emerged - revamping of the disaster management strategy, upgrading of emergency control measures, and development of real time flood warning systems. As is clear from the 2005 experience (and other global events), the public health dimensions are all too obvious. Here too, measures in addressing medical/paramedical inadequacies have emerged. At the central level too, urban renewal projects, national guidelines for disaster management and storm water drainage have been formulated.

While there has been a concerted effort to address urban flooding in the city, the continuing problems of congestion,

pollution, waste and resource management, seem to often outweigh the pace of response and reform. Cost escalation of the project has also been a major concern. Originally pegged at Rs 1200 crore, current estimates of the escalation place it at Rs 3900 crore. News reports regarding delayed works and escalating costs point out also that rehabilitation of project-affected people has contributed significantly. Civic officials have further indicated that the cost escalation estimate mentioned in the Detailed Project Report (DPR) also may need to be revised along with further delays. There has also been delay in the publication of a study commissioned to consultants MWH Global, which is anticipated to recommend more pumping stations that currently envisaged. Additionally, there have been reports regarding delays in the tendering process for

the construction of pumping stations due to finalization of automatic screen cleaning mechanisms. To add to these woes, speculation regarding financial mismanagement has been widely reported and the Maharashtra Chief Minister alleged corrupt practices last year.

changes at the highest level, effective micro-management and implementation at the ground level, seem critical factors in addressing flood mitigation in Mumbai.

**A major contributing factor is illegal encroachments. Experts and new reports continue to point out that work is periodically delayed or stalled due to land issues. Land acquisition, rehabilitation of dwellers/squatters and delays due to other disputes is a recurring problem in Mumbai, and the solution, primarily juridical and political, lies also in innovative policy changes.** Major civic and infrastructure works in Mumbai consistently face implementation issues due to land related problems. The need for heightened and sustained evaluation, optimum communication, timely responses, long-term realistic policy

---

Gupta Kapil, *Mitigating Urban Flood Disasters In India*, Water and Urban Development Paradigms – Feyen, Shannon & Neville (eds), 2009

Gupta, Kapil, "Urban Flooding: Vulnerability, Preparedness and Mitigation – 944 mm Mumbai 26/07/2005 event", Presentation, International Centre for Excellence in Water Resources Management, Adelaide, 29 May 2006

Ranade & Hasan, *Increasing Storm Water Drainage Capacity of Mithi River and Mumbai City drains*, 3CD Sound Practice Manual

*Mumbai Marooned*, An Enquiry into the Mumbai Floods 2005  
<http://www.indiaenvironmentportal.org.in/reports-documents/mumbai-marooned-enquiry-mumbai-floods-2005-final-report>

Fact Finding Report on Mumbai Floods 2006

<http://www.hindustantimes.com/StoryPage/Print/261378.aspx>  
<http://www.expressindia.com/latest-news/crz-clearance-land-disputes-hold-up-brimstowad-project/792298/>  
<http://www.financialexpress.com/news/brimstowad-project-civic-body-plans-3point-approach-to-restrict-cost-escalation/928921/0>  
<http://www.mumbaimirror.com/printarticle.aspx?page=comments&action=translate&sectid=15&contentid=20120212201202111780765970835&subsite=>  
<http://www.hindustantimes.com/India-news/Mumbai/Study-on-Brimstowad-update-delayed-by-a-year/Article1-910051.aspx>  
<http://www.indianexpress.com/news/civic-body-withholds-brimstowad-tenders-delays-project/1011182/0>  
<http://www.mid-day.com/news/2012/jun/290612-mumbai-7-yrs-and-crores-later-flood-control-projects-still-incomplete.htm>  
<http://www.hindustantimes.com/India-news/Mumbai/Brimstowad-may-miss-its-2015-deadline/Article1-895835.aspx>