

Glossary

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|-------------|--|--------|---|
| AAI | Airports Authority of India | IFEJ | International Federation of Environmental Journalists |
| ACS | Additional Chief Secretary | IITM | Indian Institute of Tropical Meteorology |
| AGNI | Action for good Governance and Networking in India | ILS | Instrument Landing System |
| AIR | All India Radio | IMD | Indian Meteorological Department |
| ALM | Advanced Locality Management | ISRO | Indian Space Research Organisation |
| ANM | Auxiliary Nurse/Midwife | KEM | King Edward Memorial Hospital |
| BCS | Bombay Catholic Sabha | MCGM/B | Municipal Council of Greater Mumbai/ Bombay |
| BEST | Brihan Mumbai Electric Supply & Transport Undertaking. | MCMT | Mohalla Committee Movement Trust. |
| BEAG | Bombay Environmental Action Group | MDMC | Mumbai Disaster Management Committee |
| BJP | Bharatiya Janata Party | MDMP | Mumbai Disaster Management Plan |
| BKC | Bandra Kurla Complex. | MoEF | Ministry of Environment and Forests |
| BMC | Brihanmumbai Municipal Corporation | MHADA | Maharashtra Housing and Area Development Authority |
| BNHS | Bombay Natural History Society | MLA | Member of Legislative Assembly |
| BRIMSTOSWAD | BrihanMumbai Storm Water Drain Project | MMR | Mumbai Metropolitan Region |
| BWSL | Bandra Worli Sea Link | MMRDA | Mumbai Metropolitan Region Development Authority |
| CAT | Conservation Action Trust | MbPT | Mumbai Port Trust |
| CBD | Central Business District. | MTNL | Mahanagar Telephone Nigam Ltd. |
| CBO | Community Based Organizations | MSDP | Mumbai Sewerage Disposal Project |
| CCC | Concerned Citizens' Commission | MSEB | Maharashtra State Electricity Board |
| CEHAT | Centre for Enquiry into Health and Allied Themes | MSRDC | Maharashtra State Road Development Corporation Ltd. |
| CG | Coast Guard | MUIP | Mumbai Urban Infrastructure Project |
| CII | Confederation of Indian Industry | MUTP | Mumbai Urban Transport Project |
| CJP | Citizens for Justice and Peace | NAPM | National Alliance of People's Movement |
| CM | Chief Minister | NEERI | National Environmental Engineering Research Institute |
| CR | Central Railways | NIO | National Institute of Oceanography |
| CRZ | Coastal Regulation Zone | RAF | Rapid Action Force |
| CS | Chief Secretary | REL | Reliance Energy Limited |
| CST | Chatrapati Shivaji Terminus | RMC | Regional Meteorological Centre |
| CWPRS | Central Water and Power Research Station | R&R | Relief and Rehabilitation |
| CZMP | Coastal Zone Management Plan | SBI | State Bank Of India |
| DCR | Development Control Rules | SBTC | State Blood Transfusion Council |
| DGP | Director General of Police | SGNP | Sanjay Gandhi National Park |
| DIG | Deputy Inspector General | SPP | Shivshahi Punarvasan Prakalp |
| DMC | Disaster Management Cell | SRA | Slum Rehabilitation Authority |
| DMP | Disaster Management Plan | SRS | Slum Rehabilitation Society |
| DP | Development Plan | SSP | Slum Sanitation Project |
| DWR | Doppler Weather Radar | SWD | Storm Water Drainage Department |
| EMU | Electric Multiple Units | TDR | Transfer Development Rights |
| EOC | Emergency Operations Centre | TISS | Tata Institute of Social Sciences |
| FEJI | Forum of Environmental Journalists of India | WR | Western Railways |
| FSI | Floor Space Index | UDD | Urban Development Department |
| GIS | Geographic Information System | ULCRA | Urban Land Ceiling Regulation Act |
| GKSS | Girni Kamgar Sangarsh Samiti | YASHDA | Yashwantrao Chavan Academy for Development Administration |
| HUDCO | Housing and Urban Corporation Limited | | |
| IAS | Indian Administrative Services | | |

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I. Introduction

I. A) OVERVIEW OF EVENTS ON JULY 26, 2005

July 26, 2005 has gone down as a day no Mumbaikar will forget. A record 994 mm (37.2 inches) of rain within 24 hours (75% of the downpour – 709 mm — fell in a five-hour period between 2.30 pm and 7.30 pm), widespread flooding and the loss of lives and property, the virtual shutdown of the ‘city that never sleeps’ for two days (more in some areas) ensured that all residents will forever remember the Mumbai Floods of July 2005. One of the most crucial issues is whether this is actually ‘once-in-a-hundred-years’ incident or whether it is the first time that this phenomenon has taken place over one of the few locations where it could be measured and recorded. This is important since very heavy spot rainfall has been recorded historically throughout the Konkan districts.

Starting at about 12.30 pm on the 26th till 5:30 am on the 27th (earlier in the northern suburbs), the torrential rain caught residents unawares. A peculiar feature of the rain was that the southern island city received just 73.4 mm (2.89 inches) in the same period. Within a few hours of the rain, areas like Kurla, Kalina, Andheri, Saki Naka, Chembur, Govandi, Malad were reported flooded.

At least one-third of the surface area of the city is believed to have been flooded. Most phone lines were lost or severely disrupted, for periods ranging from a few hours to, in some cases,



weeks. Electricity supply was cut. The city’s cell phone network also faltered, leaving families with no way of verifying the whereabouts of their loved ones. Mumbai airport was closed, with water flowing over the runway and even through the terminal buildings. Public transport came to a grinding halt, marooning lakhs of people at different points in the city. All India Radio reported that 150,000 people were stranded across different suburban railway stations, some for almost 24 hours. It was only by the afternoon of July 27, 2005 that some sectors of the suburban rail system partly commenced operations. Never before have all three of Mumbai’s suburban rail lines been shut down. For 18 hours, Mumbai’s lifeline, its suburban rail system, was completely inoperable.

With the airport closed and flooding and landslides affecting rail and road links, India’s financial capital was literally cut off from the rest of the country for a day.

In some low-lying areas, the water was 10 to 15 ft deep. Open gutters and nallahs turned into raging rivers. Thousands of homes in the Mumbai’s sprawling slums were either washed away or damaged beyond repair. The middle and upper class were not spared either, with floodwaters entering and even completely submerging ground floor apartments in many areas. As can be imagined, the loss to life and property was considerable. The fact that the floodwaters did not recede for days in some areas compounded the situation and led to outbreaks of diseases such as leptospirosis, diarrhoea, malaria, dengue etc.

A reason given by most government and administration officials for the breakdown of systems on July 26 was that this rainfall was unprecedented. This is however misleading at best.

There have been other instances of daily rainfall that has approached these levels, for example the Thane District Gazetteer mentions 481 mm of rain in 1951. Similarly, the Nashik

¹ <http://www.maharashtra.gov.in/english/gazetteer/nashik/004%20General/003%20Climate.htm>

² http://www.imdmumbai.gov.in/erf_scz.htm

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district Gazetteer mentions a record of 473.7 mm at Peint on July 2, 1941.¹ On June 10, 1991, Santacruz recorded 400 mm of rain². While these recorded only about half the rainfall at Santacruz on July 26, they indicate that such abnormally heavy rainfall does occur and must be taken into account. Further, it is very possible, even probable, that other such localized ‘cloudbursts’ or ‘supercells’ have occurred over areas that have no observatories. One sometimes hears of severe ‘flash floods’ which rarely make the headlines because they occur in interior areas. Without a widespread data gathering system, it is misleading to say that the rainfall received on

July 26 was ‘the highest in a 100 years’. Moreover, this should definitely not be used to excuse shortcomings and incompetence on the part of the administration.

Despite the havoc that Mumbai faced on that day, and indeed for the next few days, the spirit of the ordinary Mumbaikar must be praised. Stories abound of strangers risking their lives and belongings to help fellow citizens, people of different communities forgetting their differences, even in areas historically prone to communal violence, wet and weary office goers trudging home being revived with tea and biscuits offered free of cost by residents en route and much much more.

In the days that followed, thousands of individuals, rich and poor alike, pitched in, in whatever way and to whatever extent they could, with the relief effort, donating clothes, food, utensils, household items and even arranging to transport these to the worst-affected areas.

Even from south Mumbai, people who were not affected rushed to provide relief. Aslam Merchant received a distress call at 4.30 pm on July 26 and called a rally in Dongri at 6pm. Within three hours, he and his fellow volunteers had raised Rs 50,000 in cash and Rs 1.5 lakh worth

Salute to Mumbaikars

Melvin Pereira lived in Amboli, Andheri (W) and went to Dominic Savio School, where he was in the 10th standard. School closed at 5.30 pm on July 26 and his mother, Blanche Pereira, told the Commission that he had called at 8.30 pm to inform his home that he had reached Andheri station. He took an autorickshaw and at one stage had to get off to cross flooded areas, which was an annual occurrence. There were five other boys from the same school with Melvin and all were never seen again. The next day, she received a message that a body had been found with a rosary and scapula, which identified her 18-year-old son.

At the Commission’s hearing in Govandi, Asha Pardi, a rag picker, testified how she had seen her five-year-old son, Vishal, being swept away by the turbulent water. His body was never traced. So traumatized was she by the incident that she had not even applied for compensation, or received any relief, when she appeared before the Commission.

Juman Ali, a hutment dweller in Azad chawl, Jari Mari, lost everything he and his family owned that day. “There was nowhere to escape,” he recounted, “even the roads were filled with water. I saw two or three corpses: it was terrifying.” However, all chawl dwellers helped people who were stranded on their roofs from 3.30 pm on July 26 till 7 am the following day. The water started rising again on July 27 and they all fled to a safer place. Juman Ali, a cart puller, lost belongings worth Rs 15,000 – Rs 20,000 and remained in the same wet clothes for seven days. He hails from Fatehpur in UP and has lived in Mumbai for 25 years.

George Abraham, a Congress corporator from Kalina who resigned in August due to his frustration with the lack of official response to the flooding in his ward, told the Commission that he had seen 25 to 30 bodies on a single road. The family of an 18-year-old engineering student came to claim his body but they were directed to Cooper hospital, where his body was only released some three days later.

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of provisions. For the next ten days, he and his band carried out repeated rescue missions to Kalyan, Mumbra and Panvel. On one such foray into Kalyan, they had to wade through waist-deep water: "It was my duty to lend a hand," he explained simply. Astonishingly, snakes clung to his legs for safety: all they wanted was something solid to cling to and when he reached land, they dropped off without harming him.

Perhaps the best testament to the way Mumbai's citizens pulled together lies in the fact that there was no widespread looting or robbery and not a single rape reported. This is in sharp contrast to the situation in New Orleans when Hurricane Katrina submerged most of that city. Despite decades of faulty administration by the political class, the indomitable spirit of Mumbai clearly survives.

B) RATIONALE FOR THE COMMISSION

As the scale of the disaster became apparent, the public was outraged at the complete lack of administration and governance. News that the government was setting up an official enquiry into the floods was greeted with almost universal cynicism. Reports of administrative apathy and incompetence, political interference in the relief distribution process, a lack of accountability and indications that the lessons that should have been learnt from the disaster were being ignored led to much soul-searching among NGOs. It was clear that if any people and their belongings were saved, it was due to the intervention of common people; not because of the government but in spite of it.

In the following days, several NGOs working in Mumbai came together with the idea of

launching a free, impartial, unbiased commission of enquiry to look into all matters pertaining to the floods. At a meeting at the Mahim Nature Park on August 4, 2005, the idea of forming the Concerned Citizens' Commission was put forward. A wide variety of people's initiatives endorsed this idea and many participated in the hearings.

Starting on September 3, 2005, for a period of three weeks, the Concerned Citizens' Commission held a series of public hearings and depositions involving members of the public as well as those at different levels of the government administration, NGO sector, experts in various fields etc.

The prime concern of the commission was to inquire into the immediate and long standing causes that led to the collapse of the city's administration, resulting in a much graver danger to lives and property than might otherwise have been expected. Issues pertaining to disaster management and city governance, public health, the role and duties of public servants as also the damages suffered by individuals and groups were explored.

C) COMPOSITION OF THE CONCERNED CITIZENS' COMMISSION PANEL

1. Justice P.B. Sawant – Chairman
2. Ms. Teesta Setalvad
3. Mr. Shyam Chainani
4. Mr. Sharad Kale
5. Prof. Pushpa Bhawe
6. Mr. Darryl D'Monte
7. Mr. Chandrashekhar Prabhu
8. Mr. Datta Iswalkar
9. Mr. Suresh Bhosle

Justice P.B. Sawant: Former judge of the Supreme Court from 1989 to 1995, he has extensive experience in all branches of law and has served as legal advisor to a number of trade unions and social and educational institutions. He has served as Chairperson to several people's enquiries on a variety of issues.

Ms. Teesta Setalvad: One of the founders of Citizens for Justice and Peace, Ms. Setalvad has been fighting communal forces in Gujarat and Maharashtra, and has also been actively involved

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in ground level relief and rehabilitation efforts in Mumbai after the floods of July 26, 2005.

Mr. Shyam Chainani: Founder member of the Bombay Environmental Action Group, Mr. Chainani has been working on issues of urban heritage and planning, coastal protection and development regulation in Mumbai for over three decades.

Mr. Sharad Kale: Former Municipal Commissioner of Mumbai from 1991 to 1995, Mr. Kale has extensive experience of the workings of the administration in the city. He is currently General Secretary of the Y.B. Chavan Pratishthan.

Prof. Pushpa Bhawe: A dedicated social activist and academic, Ms. Bhawe retired as Head of the Marathi Department, Ruia College.

Mr. Darryl D'Monte: Currently chair of the Forum of Environmental Journalists of India, Mr. D'Monte has been the Resident Editor of the Indian Express and Times of India. He is author of 'Ripping the Fabric: The Decline of Mumbai & its Mills'.

Mr. Chandrashekhar Prabhu: Former President of the Maharashtra Housing and Area Development Authority and former Chairman of the Advisory Committee, Department of Housing, Government of Maharashtra, Mr. Prabhu has been a member of the Mumbai Metropolitan Region Development Authority and the Slum Redevelopment Authority. He is presently the Editor

of Economic Digest and anchors the talk show programme "Ghatna Chakra" on Doordarshan.

Mr. Datta Iswalkar: President of the Girni Kamgar Sangarsh Samiti (GKSS), Mr. Iswalkar has been fighting for the rights of the mill workers of Mumbai, and for the socially-appropriate use of mill lands.

Mr. Suresh Bhosale: General Secretary of Friends of Society, and Activist with the Dalit Panthers, he works on housing rights issues in Mumbai.

D) ACKNOWLEDGEMENTS

The panelists would whole-heartedly like to thank the citizens of Mumbai for their active involvement and participation at every stage of the journey, the different citizens' groups and experts who came forward and shared their expertise with the commission so as to portray an authentic picture of the causes and consequences of 26/7. The panelists would also like to thank the Core Committee (Mr. Cyrus Guzder, Mr. Debi Goenka), the secretariat (Mr. Ashish Fernandes, Mr. Vivek Vaidyanathan) and the volunteers, particularly Mr. Dolphy D'Souza, Mr. Poonam Gidwani, Mr. Feroz Ibrahim, Mr. Sumit Rai and Mr. Kushal Mor whose contributions were really appreciated.

Conservation Action Trust (CAT) takes this opportunity to thank each and every one of the panelists for being part of this endeavor. We would particularly like to thank the panelists who



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participated in the public hearings and site visits. CAT would also like to acknowledge the fact that Mr Shyam Chainani delayed his travel plans to spare time for the few meetings that he could attend despite his very crowded schedule. CAT would also extend its sincere gratitude to the numerous different organizations and individuals who extended their support in every possible way for the Commission to function effectively. Special mention must be made of those who allowed us to use their premises as venues for the public hearings. The volunteers, including students from Government Law College, also deserve a special mention. We would also like to thank our many donors, who very generously supported the initiative of the CCC. Many thanks to Mr Cyrus Guzder who really did make all the difference. Finally the true heroes of this entire effort are the Mumbaikars themselves, citizens who came out in their thousands and participated in this endeavour. We salute these heroes, who coped with this crisis despite the absence of the Government and the Municipal authorities.

E) THE TERMS OF REFERENCE OF THE CCC ARE:

1. To develop a reliable picture of the floods in Greater Mumbai and document what actually took place, the extent of damage to lives and dignity of persons, along with a detailed examination of property loss and damage, linked critically to the issue of relief and compensation.
2. To determine the causes and factors that led to the flooding, including the role of the state executive, government and administration in implementing the Disaster Management Plan.

3. To understand the role of the MCGB and the State police – in pre-empting, containing and controlling damage to life and property.
4. To recommend a set of measures to better anticipate natural calamities and to minimize their impact; as also to ensure that Disaster Management Plans are implemented more effectively.
5. To identify in particular those responsible for inaction and hold them accountable.
6. To ensure effective citizen participation in the planning of the city and in Disaster Management.
7. Any other relevant matters that the Panel may decide to include.

F) METHODOLOGY

In all, 12 public hearings were held, in some of the worst affected areas — Kurla, Kalina, Jari-Mari, Bandra East, Saki Naka, Govandi, Chembur, Kandivli, Malad and Bandra West. At each hearing, members of the public filled in deposition/survey forms, either on their own or with the help of volunteers. The forms covered a range of topics: the individuals' experience on July 26 and the days following; loss of life in the family, if any; estimates of financial loss; response of state agencies and NGOs; illness; relief distribution etc. These forms were made available in Hindi, Marathi, Urdu and English. A sample of the form is available in Annexure 1.

In addition to filling in these forms, some members of the public, local leaders/activists etc would interact with and depose orally before the panel members present on the day. These depositions were recorded on camera.

From September 20 to 24, at the Bombay Natural History Society, members of the panel interacted with a variety of government officials, NGOs, citizens' groups and experts in different fields. (Annexures 3 & 4) These depositions were also recorded on camera.

This report is based on the information gained from these depositions, as well as from research undertaken by the panelists and members of the CCC Secretariat.

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II. Findings

II. A. RELIEF AND REHABILITATION

Relief and rehabilitation efforts were quite inadequate. On the one hand, there were reports of irregularities and aid being siphoned off and sold in the black market. On the other hand were the laudable efforts of those in charge of aid distribution who surprisingly did not insist on those affected by floods to produce identity proofs, which is a norm, associated with government officials. This meant that the distribution of aid reached a wider section of the population. This is not to absolve the government of its duties.

If one were to see the pattern of anomalies in aid distribution, CCC's investigations have revealed that around up to a fifth of the aid was unaccounted for; in addition, there were several areas where people not affected by the floods received aid.

The general attitude of the government towards rehabilitation is appalling. A couple of months after the floods when the state government announced a rehabilitation package of Rs 230 crores, not a single paisa was earmarked for those slum pockets of Mumbai which suffered the worst damages during the deluge, the government's contention being that a rehab package for slum dwellers would be an acknowledgement of their illegality. Also the way of calculating losses seems arbitrary and ad-hoc to say the least. Take for instance the case of Mohammed Ashrafali Ansari a resident on the banks of the Mithi River who resides on the first floor and has let out the ground floor of his house.³ During the deluge, the entire house was affected and he suffered losses of Rs 45,000. When aid finally arrived, the residents of the ground floor received Rs 5,000. When Mr. Ansari asked for his due, he was told that he was not eligible since he lived on the first floor.

Or take the case of Kamubai Gaikwad, a resident of Valmikinagar (Bandra-East). Her house was made of cardboard and was literally washed away in the deluge. She did not receive any aid simply because she did not possess a ration card, was not on the voters' list and her house was unregistered. She has been so badly impacted by the deluge that the mere mention of the floods is enough to get her hysterical.

It also seems that it is only the encroachments along a narrow point along the Mithi River, which are being targeted as illegal and unlawful structures. The government aims to remove the encroachers and develop a park there (This is not to absolve encroachments along the Mithi of their guilt.) In stark contrast, the authorities continue to look the other way when similar encroachments like the 'G' block of the Bandra-Kurla Complex (BKC) that has been constructed on the mouth of the Mithi, blocking the inter-tidal zone to the detriment of large parts of Mumbai. Similarly, the government and the authorities are silent on the taxiway on the illegally extended airport runway come up with the approval of the government authorities. Clearly the message being sent out is that only people who do not have a voice will continue to face the brunt of government action. If the government is really serious about tackling illegal encroachments, they can begin by demolishing the 'G' block of the BKC and the airport taxiway, both of which are the most glaring examples of environmentally hazardous construction.

Immediately after the floods, the government constituted a core group of NGOs and entrusted them with distributing relief. As time went by, in subsequent meetings, especially where the BMC authorities were involved in aid relating to children studying in BMC schools, councillors began openly demanding that NGOs should directly provide relief and brazenly started demanding that NGOs start contributing money to government coffers. The notion of what constitutes Relief and Rehabilitation in government parlance is extremely narrow and arbitrary. It does not take into account the damage caused to homes, household goods and even loss of daily livelihood. Whether it be natural or manmade disasters or conflicts, Relief and Rehabilitation packages is a government dole, not a basic human right.

II.B. ADMINISTRATION'S RESPONSE TO THE DISASTER

II. B. 1) MUMBAI DISASTER MANAGEMENT PLAN (MDMP)⁴:

Mumbai's disaster management plan is a comprehensive document that lists in detail the different calamities (floods, fires, landslides, road

³ "After the Deluge", *Frontline*, August 27- September 09, 2005 <http://www.flonnet.com/fl2218/stories/20050909003304000.htm>

⁴ Mumbai Disaster Management Plan (MDMP) – The Plan <http://mdmu.maharashtra.gov.in/pages/Mumbai/mumbaiplanShow.php>



accidents, industrial and chemical accidents, cyclones and earthquakes) that can strike the city, together with those areas likely to be affected. It also contains a three-fold strategy which to avert/reduce the impact of these disasters (infrastructure development, communication and public information systems and land use policies and planning). The plan then moves on to institutional mechanisms to be followed when a disaster strikes.

The Mumbai Disaster Management Committee is headed by the Additional Chief Secretary (Home) and comprises the heads of other departments.

The functions of this committee are to:

- Ensure effective inter-departmental co-ordination between all state departments
- Provide policy decisions when required
- Keep the government informed about disaster situation
- Review disaster related activity reports received from BMC Control Room, Police Control Room and Army Control Room and provide appropriate directions.
- Co-ordinate the activities of lateral, and Central Government agencies

The responsibility of execution of disaster related activities is undertaken by the BMC Disaster Management Committee with the Municipal Commissioner as its Chairman with heads of departments as members

The plan talks about the role to be played by different agencies during a disaster. The plan also says that there are sub plans for each ward, which become operational on the declaration of any disaster with the Assistant municipal commissioner of the ward assuming overall responsibility for his/her area.

Mumbai Floods and MDMP: 1. On the Chief Minister's own admission, the disaster management plan did not work: "We do believe that the disaster management plan did not work well and we have constituted a fact-finding committee."⁵

However the extent to which the plan did not work or rather failed miserably became clear when CCC spoke to different departmental heads.

Top police officials informed the CCC that on the 26th itself, there was a meeting of the disaster management group at the CM's office at 4pm, convened to discuss the floods which had hit Raigad and Ratnagiri the previous day. The group was unaware of the impending disaster looming over Mumbai. It was only during the meeting at around 4:30 pm that news regarding water-logging at different locations began to come in. The Control room at Mantralaya which should be the nerve centre of activity during any disaster was completely non-functional. Moreover, the police were not even called for any meeting on the floods held by the CM. Police officials also informed the CCC that there has been no representative from the MMRDA or the MSRDC at the joint meetings held to discuss Mumbai's monsoon preparedness. They were also absent from the Disaster Management meetings. Furthermore, despite the DMP being a costly exercise involving several crores, the police have not been provided with any resources as part of the disaster management plan.

A similar view was shared by Mr. M.Z.Ansari (GM-Western Railways) who says that there was absolutely no warning from the BMC or the IMD about the impending floods. The absence of a warning from any quarter made things worse.

Former Corporator George Abraham, who resigned on August 18th 2005, regrets that although

⁵ "Mithi river doesn't flow everywhere, blame the rain"; *The Indian Express*, August 21, 2005
http://www.indianexpress.com/full_story.php?content_id=76675

Findings

the present Mumbai Municipal Commissioner Johny Joseph served as a one-man committee to formulate a Disaster Management Plan for the state after the Latur earthquake in 1993, and though he had also held orientation courses in such management for officials at the administration's YASHDA (Yashwantrao Chavan Academy for Development Administration) academy in Pune, he did not put his principles into practice in the city. "Although Johny Joseph designed the DMP, not even 1% of it was implemented," he complained.

Even during and after the floods, the government made no attempt to warn people against travelling back to the suburbs knowing full well that these areas were flooded. The simple act of informing people through FM radio stations and pressing ham radio operators into service (as they were after the Latur quake) would have succeeded in persuading children to stay in schools or nearby homes, and people to remain at their workplaces, rather than venturing on to the roads and risking their lives. The opening up of the Mumbai Port Trust (MbPT) roads could have saved lives. When the administration should have been out in full force administering relief work, a two-day holiday was declared for all government staff including conservancy staff (35,000) whose absence was sorely felt. In fact, the staff at Mantralaya should not have been sent home at all on the 26th, since they could have been used to help tackle the disaster situation rather than become part of the problem.

In the public hearings held by CCC, there were innumerable stories of how citizens tried to approach the BMC or their elected representatives for help and were either turned away or found that the representatives were themselves missing. The local plans which were to be put into action in each ward simply did not materialize.

2. The Disaster Management Plan emphasises land use polices and planning to mitigate disasters. In consonance with the MMR Plan (1996-2011) the DMP talks about the need to rein in reclamation to protect water bodies and storm water holding ponds. The Plan argues that Mumbai has reached its capacity in terms of services and infrastructure and that a policy of decongestion of the island city should be pursued. The MMR plan 1996-2011 talks about developing surrounding areas like BKC and the Oshiwara District Centre. It also suggests the need

to develop employment in the countryside. Yet ironically, an integral part of the MMR Plan is the construction of the BKC itself, which has been created on reclaimed land by destroying mangroves, severely narrowing the Mithi River. This was a major cause of the flooding in Kurla-Kalina-Saki Naka areas. Similarly Oshiwara too is marshy, mangrove land. The MMR ignores its own warning by developing large commercial centres without paying heed to the need to maintain natural drainage, open spaces and absorption areas.

3. Composition of Mumbai Disaster Management Committee: It is strange that the Deputy Director General, Indian Meteorology Department is only an invitee and not a member of the MDMC. Considering the fact that the western coast of Maharashtra is occasionally hit by cyclones and frequent periods of heavy rain, and that the IMD plays a vital role in predicting and monitoring the occurrence of these disasters, this glaring omission needs to be rectified at the earliest. (MDMP – Institutional Arrangements Vol I- 43)

To sum up, the Disaster Management Cell of both the state government and the BMC were conspicuous by their complete inactivity on July 26. These might just as well have not been set up, and the DMP might just as well have not been formulated, as there is no evidence that it was put into effect on July 26.

II. B. 2) POLITICAL MACHINERY RESPONSE TO MUMBAI FLOODS

For the enquiry, CCC tried to reach the Chief Minister, the Environment Minister, the Health Minister, the Chief Secretary, the Additional Chief Secretary (Home) and the different Principal Secretaries (Forests, Health, UDD, Environment, etc.) However despite our repeated attempts to contact them, we were stonewalled. The Chief Secretary (Mr. R.M. Prem Kumar) expressed his inability to meet CCC as he was busy with his official engagements and could not spare the time. The Principal Secretary (Forests) Mr. S.S. Hussain informed the panel that he would be out of station and therefore could not meet the commission. He however informed the panel that he 'would be very happy if the commission could send all the information which had been gathered along with the suggestions'.

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In the almost total absence of official information and cooperation from these sources, CCC is forced to base its findings on interactions with other public figures, the depositions received at the public hearings held across Mumbai and media reports.

Presentation by Secretary, Relief and Rehabilitation: However, Mr. Krishna Vatsa, Secretary Relief & Rehabilitation, did meet the CCC subsequently on November 27, 2005. Mr. Vatsa provided the following information: Mr Vatsa began by saying that the administration had no advance warning about the torrential rains that would hit Mumbai on July 26. The impact was only seen when water in the Badlapur barrage (constructed over the Ulhas River in Thane District) which was a good 60-70 feet below the maximum level on 25th July began to overflow by the 26th evening. On the 27th morning the barrage was completely washed away.

Mr Vatsa added that till June many districts were facing drought and that the state government had submitted a Memorandum for drought relief in Vidharbha & Marathwada to the central govt on July 15. On July 21, heavy rains lashed areas like Nanded, Konkan etc. In Thane, many of the suburban tracks were completely washed away or flooded. Although in the past there had been heavy rains accompanied by heavy flooding in Thane district, none of these could be compared to the rains that lashed Maharashtra from July 24 to 26. He said that this was a 'once-in-a-100-year' event

and that nothing indicates that this would ever happen again.

Around July 23, there was heavy rain in Konkan; there were reports of long distance trains being stranded in the Konkan belt, especially Mangaon and Chiplun. Mr. Vatsa received a call from the CM requesting him to arrange for airdropping food packets to stranded train passengers. However, helicopters could not reach the flood affected areas due to incessant rain. Entire villages in the Konkan area were marooned by July 25 and villagers had to climb onto hilltops to save themselves. By the 26th morning, it had stopped raining in Konkan. On that day, Mr. Vatsa, the DGP and the Chief Secretary took off in a chopper to survey the flood-affected areas of Chiplun. They left at 11:30 am and came back by 2:30 pm; Mr Vatsa says that at that time there were no rains in Mumbai – by which he meant South Mumbai. According to Mr Vatsa, there was as yet no indication of the heavy rains, which were going to strike Mumbai.

At 4 pm, there was the meeting chaired by the CM to discuss the floods in Raigad and Ratnagiri. Mr Vatsa was asked why the Police Commissioner of Mumbai was not present considering the serious situation in North Mumbai. He replied that as the meeting was to deal with the situation in Raigad and Ratnagiri the CP had not been called. However when asked about the presence of Mr Johnny Joseph (Mumbai Municipal Commissioner) and Mr. Swadin Kshatriya of the BEST, Mr Vatsa said that towards evening, the situation in Mumbai had



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become critical and therefore Mr Joseph was present. Mr Vatsa said that the Dy. Director General of the IMD, Dr C.V.V. Bhadram was present at this meeting but he did not give any indication of the impending rains over Mumbai. When asked when the control room at Mantralaya received the first distress call about unprecedented rainfall in Mumbai, Mr Vatsa said that the first call was received 'some time in the afternoon' of July 26. It was pointed to Mr. Vatsa that according to certain reports, officials from Sanjay Gandhi National Park (SGNP) had called up Mantralaya at around 1:30 pm to report unprecedented rainfall and flooding, in spite of which there was no action taken. The CCC also pointed out that as soon as the Santacruz weather station recorded the expected daily rainfall within about 60 minutes, an alarm should have been sounded. Mr. Vatsa said that the logs of the respective departments would have to be checked in order to ascertain the facts.

Mr Vatsa said that around 4:00 – 4:30 pm, there were reports of heavy rain and suburban railway tracks being submerged, and a decision was taken to deploy additional fleets of BEST buses. This decision was taken on the assumption that the flooding would only be around 4-5 feet; however the flooding was so severe that many BEST buses themselves got stranded. Mr Vatsa also felt that in hindsight the order to declare leave for two days and allow municipal and government employees to leave office early was a miscalculation. But he added that given the circumstances, the decision was taken in order for people to leave for their homes and be with their families.

About the role played by the Met. dept., Mr. Vatsa said that there was no warning from the Met. dept. to indicate that there would be so much rain; he mentioned that at the 4 pm meeting, the Dy. Director General of the IMD Dr. Bhadram, made no mention about the rains over Mumbai. Mr. Vatsa also said that in the mid 1990s there was an offer by the World Bank to provide assistance to India to upgrade its weather forecasting systems. This offer was apparently refused by the then head of the IMD Dr. R.R. Kelkar on the grounds that the technology used by IMD was good enough and there was no need of assistance from the World Bank. Mr. Vatsa added that the technology used by western

countries was far superior to that used by India and Indian equipment needed urgent upgradation.

Mr. Vatsa said that the weather pattern that was responsible for the floods in Konkan was not the same that hit Mumbai. The pattern which caused unprecedented rainfall in Mumbai developed over North Mumbai. He added that on the 26th, when the DGP, Chief Secretary and he travelled from South Mumbai towards Konkan, which is further south, the skies were absolutely clear, indicating that the rainfall on July 26 was independent of the pattern that caused heavy rainfall in the Konkan.

As Secretary, Relief and Rehabilitation, Mr. Vatsa was in charge and had full authority to mobilize any services required. He said that he was in constant touch with the army and navy. He also added that it was the Chief Secretary who was in overall charge of the situation. (Indicating that although ACS- Home was in charge in times of disaster, in terms of authority it was the CS who normally took overall responsibility)

About the Relief & Rehabilitation, Mr. Vatsa said that every area which had been flooded had been provided relief within 48 hours All over the state, over 5 lakh people had been rescued. In Mumbai alone around 1,000 people had been rescued by search and rescue teams. By the 26th evening, the Navy had been successful in deploying rescue boats in Ratnagiri and by the 27th rescue boats were pressed into operation in Raigad.

In all the Maharashtra Government spent Rs. 476 crores on R&R (Rs. 200 crores in Mumbai, Rs. 100 crores in Thane & Rs. 176 crores in the rest of Maharashtra). Mr Vatsa added that the search and rescue team of the BMC, which consists of 32 people, is well trained and equipped but even this was simply not enough to meet this kind of crisis. Mr Vatsa pointed out that had there been boats the situation would have been significantly different. He emphasized the need for a robust communication system. He also added that the state government would need to set up special battalions of police, which are highly mobile and could be deployed in an emergency such as this.

When the irregularities in relief distribution which came to light during the CCC hearings were

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pointed out, Mr. Vatsa replied that there could have been individual cases of discrepancies, especially where local representatives had handled the distribution. He said that the distribution of monetary relief had been stopped only after considerable time. This was a government decision as it was felt that claims (false) would keep coming in.

In conclusion, Mr. Vatsa said that it was the obstruction of natural drainage systems, unbridled commercialization compounded with lack of low income housing which compounded the tragedy. These are the problems that should be tackled on an urgent basis. However he also said that the rainfall on that particular day was so unprecedented that even with the best drainage system and appropriate social housing, it would have been very difficult to escape the floods altogether. He said that the government needed to urgently invest in a disaster management plan that is effective, can be implemented and is backed up by necessary resources. He called for reducing Mumbai's vulnerability by removing people from unsafe areas, and parallel investments in low cost housing.

Mr. Vatsa was also very critical of the role played by the media, who according to him were only concentrating on Mumbai while the situation was as bad or even worse in the interior areas of

Maharashtra. He said that the moment the situation in Mumbai became better, the media searched for other news stories inspite of the situation in the interior being far worse off. He added that no section of the media covered the relief work carried out by the Government.

Presentation by State Government: According to a presentation prepared by the State Government on relief and rehabilitation and obtained by CCC, the Maharashtra Government claims to have taken immediate steps to respond to the situation. Some of these steps include:

- Meeting of all state government functionaries of the state government at 4 pm on 26th July.
- Control Room on full alert: Secretary-level officers assigned to Control Rooms
- Chief Secretary convened meetings of all the secretaries at 11am every day.
- Evacuation of over 5 lakh people to safer locations
- Community kitchens started, free food grains provided for these kitchens
- Restoration of power and water supply
- Immediate monetary relief to the deceased and injured.



maharashtra.gov.in/english/gazette/

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- Dispatching doctors to affected areas and distribution of necessary medicines
- Deployment of Army, Navy and Air Force

Control Rooms: The state government claims that there was a meeting of all state government functionaries at 4 pm on the 26th and that from the next day the chief secretary held meetings of all secretaries every day to monitor the situation.

However, it is now well known that the meeting called on July 26 was to take stock of the flood situation in Raigad and Ratnagiri districts. The government till this time was unaware that heavy rains had hit Mumbai. It was only at 4:30 pm that news about different suburbs being waterlogged and the railways having suspended services began to trickle in. That day Mantralaya and BMC ordered their offices to close early and private offices in south Mumbai followed suit. Since this decision was taken at the highest level of Government, it showed a complete failure to anticipate the probability that Mumbai would also be hit by the same heavy rains that had flooded Raigad and Ratnagiri.

Apparently, no attempt was made to even obtain the latest met data from the IMD officials who were present at that meeting about the likely impact on Mumbai.

One would have expected the government to swing into action and deploy government personnel; however it did just the opposite; it declared a two-day holiday for all state government officials including around 35,000 conservancy staff who should have been at the heart of rescue and relief efforts. As a result, the common citizens had no one to turn to in their hour of need.

The government claims to have deputed secretary level officers to the various control rooms and having daily meetings of different secretaries to review the situation.

However, according to police sources, there was no functioning Control Room in Mantralaya during the crisis. The police themselves were not called to meetings held by the CM to discuss the floods.

Evacuation, restoration of power & water supply, supply of essential commodities, monetary assistance and health camps: The government claims that over

5 lakh people were evacuated and housed at municipal schools, municipal structures etc. However in most of the areas where CCC held the public hearings, people told us a completely different story. In areas like Govandi (Tata Nagar), people went to higher floors to seek refuge. In certain areas there was nothing left, so people simply came on to the roads and waited there till the water subsided. Amina Shabbir, 45, recalled how her home collapsed like a pack of cards. “No one from the government came to help us,” she complained bitterly. “Some neighbours fed us. It will take Re 1 lakh to repair our house.” She still walked with difficulty when she deposed.

In Orlem (Malad), people went to the municipal office only to be told to go back. Here relief was provided by the Orlem Church where people stayed for two days at a stretch. Similar stories emerged from other places — the involvement of government departments in evacuating people or providing relief was rarely heard of. At the Central Railway Colony in Kurla, Roger Pereira cited how “only people came to help those in need; had information been available, it would have helped.” The entire colony was flooded, much higher than the ground floors, which were perennially vulnerable in the monsoons. “There was no light or water; the media didn’t know we existed – we were totally isolated.”

The government provided rations and monetary help to victims, but this came much later. However, here too there were massive discrepancies in the relief distribution process, discussed in the section on Relief and Rehabilitation. Aid was not distributed uniformly. In many places, people were told that rations had simply run out, in other places that the money had run out. Juman Ali in Jari Mari alleged that half the food grains had been pilfered. CCC encountered many cases where different households in the same locality had got differential aid. CCC encountered cases where pockets of people who supported the sitting corporator or MLA got preferential treatment. In places like Saki Naka there were open clashes between supporters of the corporator Ms. Lalita and the MLA Naseem Khan, both of whom wanted to claim credit for relief work. The fact that certain areas got more relief supplies than required while certain areas went without aid for days together needs to be probed.

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Jawahar Prajapati from Bachidevi chawl in Khar East testified that he went to complain about the haphazard distribution of relief to the office of the Collector (Suburban District). He was asked to identify himself and was given the run-around by different officials. He alleged that there were 'agents' supervising the distribution of money. Similar complains were made by Salvador Swami of Khar West, who named Prakash Bobde, a corporator, and Baba Siddiqui, a cabinet Minister, disbursing relief to those who had not been affected.

In Bandra East, many residents of government colonies near the Kherwadi police station openly confessed that they had received food and kerosene as compensation even though they had not been affected. Those who told the distributing authorities that they had not been affected were still asked to take the material as 'it had to be distributed anyway.'

When the CCC visited Jari Mari on September 8, it was greeted with news that showed the political forces in the area were worried that their failures would be exposed. As word of the CCC's visit spread, local corporators got into their face-saving act. Coupons for aid were distributed by local politician Anna Malai, whose wife Sau Lalita is a corporator. This was obviously aimed both at assuaging the residents' anger and at attracting people away from the CCC hearing.

As if this were not enough, Anna Malai also got garbage from some of the worst-affected localities cleared up. Ironically however, this garbage was then dumped in the Mithi river. This enraged local residents such as Ram Dulvai, Naguma and Baba Tanvi Sheikh, who immediately objected, knowing that such dumping and blockage of nallahs and rivers was a key cause of the flood in the first place. In response the contractors got abusive and threatened the women. A local activist of Citizens' Option named Yasin then took the threatened women to the police to lodge a complaint. Constables were immediately sent to the site to bring the situation under control.

The government also claims that immediately after the deluge, they dispatched medical teams

to distribute essential medical supplies, chlorine tablets etc. However, from the information gathered by the CCC, almost all medical camps conducted were by NGOs and charities. Even when the number of leptospirosis (borne by rats) cases began to shoot up, the government tried to hide the issue saying that these were only stray cases. It was only after a sustained media campaign that the government acknowledged that there was a problem. Many areas were totally cut off for days on end without access to power or safe drinking water. In areas like Kurla, residents did not have power and drinking water for an entire week. It was only when these residents resorted to protests and *rasta rokos* that the authorities took note. In other areas like Kalina and Govandi, although there was no major water shortage, the water continued to be muddy for an entire fortnight.

The Political Game: Almost immediately after the floods, the game of gaining political mileage began in right earnest. BJP leader and former MP Kirit Somaiya filed a criminal complaint against chief minister Vilasrao Deshmukh, chief secretary R M Premkumar and other officials, accusing them of culpable homicide not amounting to murder for their negligence which resulted in the deaths of hundreds of people in the recent floods. However, Somaiya has not included municipal commissioner Johny Joseph in his list of "guilty" persons. Perhaps this is because the BJP controls the BMC along with the Shiv Sena and a plaint against Joseph would have been embarrassing for the party.⁶

In Kherwadi (Bandra), those picking up their apportioned relief also had a 'token' thrust into their hands, with their name and address scrawled in. "From Government of Maharashtra, arranged by Prof J C Chandurkar (MLA)".

According to an article in *The Indian Express*, in the far western suburbs, four MLAs (two Shiv Sena, one BJP and one Congress), a former MLA and a couple of corporators showed up when the relief trucks made their way into Borivali. They claimed later that they had been protesting the short supply of the relief rations, but sources in Kandivli police station differed. First, the MLAs offered to

⁶ "Somaiya's Criminal Complaint against CM"; *The Times of India*, August 4, 2005 <http://timesofindia.indiatimes.com/articleshow/1191630.cms>

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'assist' the rationing officers. But local corporators from other parties wanted their slice of the action too, leading to long-winded arguments among the groups at Kandivli police station.⁷

Multiplicity of agencies: Certain experts like (Mr. V. Ranganathan – former municipal commissioner) point out that the different agencies with different agendas and different styles of functioning mean that there is no one authority in charge of the city⁸. The existence of different agencies like the Slum Rehabilitation Authority- SRA, MHADA (Maharashtra Housing Area Development Authority, MMRDA (Mumbai Metropolitan Region Development Authority) and MSRDC (Maharashtra State Road Development Corporation), all of which report to different departments, means that there really is no synergy and that these different agencies are always upstaging each other and working at cross-purposes.

The basic question of why this multiplicity has been created and whether it has been done with malafide intentions on the part of successive state governments needs to be addressed. It is no secret that each of these agencies come with their own perks and benefits for office bearers (vehicles, housing allowance, payment of telephone bills etc.)

Moreover, it is also convenient for those in power that organisations such as the MSRDC, for example, by virtue of being corporations, do not need approval for their projects from the Finance Department. As a result we have 'glamorous' and hugely expensive projects such as the Trans-Harbour Sea Link and the Bandra-Worli-Nariman Point Sea Links being proposed and undertaken by the MSRDC with no accountability.

Similarly, the (SRA) Slum Rehabilitation Authority by virtue of being a separate authority is able to bypass planning standards and BMC procedures.

Another classic case is that of the BMC and the MMRDA. While the BMC is the Municipal body for Mumbai city and Suburbs, MMRDA is the

regional planning agency with special powers to execute infrastructure work in the city. There is an ongoing power struggle between these two agencies. The BMC has gone on record proving that it repeatedly advised the MMRDA to provide adequate storm water drains on the road corridors that the MMRDA has taken up for improvement. In many cases, MMRDA work has affected the storm water drains. However this advice was ignored or implemented partially. The BMC is equally to blame, as it okayed the quality of the work completed in joint inspections of the MMRDA and the BMC staff in areas that needed urgent work before the monsoon.⁹

Many, if not all, of these corporations and authorities appear to have been set up expressly to avoid accountability and bypass planning norms and regulations. The presence of many different agencies with conflicting or overlapping roles hinders transparency in planning and decision-making, benefitting those who wish to take advantage for illegal gain.

Greed, greed and more greed: When questioned as to why there was such enormous flooding, the CM blamed the flooding on the unprecedented rains and the high tides, which coincided with the heavy rains. However, the flooding in the city is more the result of bad planning than unprecedented rains or high tides. For instance, Diogo Fernandes, an 80-year-old former Tata hockey player, who lived for 17 years in the Air-India Colony in Kalina, told the CCC how floods were an annual visitation due to the construction of runways on the course of the Mithi River. The airport boundary was barely 100 metres away from the colony. He alleged that Golden Builders was currently constructing a seven-storey building on a nallah in nearby Sunder Nagar, where he now lived. During the floods, he could not get out of his house for three days. According to R.B. Morade, General Secretary of the Indian Airlines Colony & Ideal School Association, the collapse of the extension wall of the airport caused 25 deaths; one body was recovered after ten days.¹⁰

⁷ "Mumbai: Everyone loves a good flood"; *The Indian Express*, August 6, 2005 www.expressindia.com/fullstory.php?newsid=52222

⁸ "It's a clash of civil bodies", *The Times of India*, August 4, 2005 <http://timesofindia.indiatimes.com/articleshow/1191628.cms>

⁹ "Why 944 mm took two days to drain out", *Indian Express- News line*, September 23, 2005 http://cities.expressindia.com/archivefullstory.php?newsid=149838&creation_date=2005-09-23

¹⁰ "Why Mumbai Choked", *Frontline*, Vol.22, Issue 17, Aug 13 - 26, 2005 <http://www.frontlineonnet.com/fl2217/stories/20050826004601700.htm>

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Over the years, the builder-politician nexus has knowingly and intentionally strangled the city's open spaces, wetlands, mangroves and salt-pan lands for commercial purposes. This loss of and subsequent commercialization and concretization of open spaces has meant that water, which previously could seep into the soil has practically nowhere to go, leading to flooding. Reclamation, legal and illegal, by private parties and government departments, have wreaked havoc on the city's drainage.

These issues have been dealt with in greater detail elsewhere in this report, but what is crucial to note is that even after 26/7, the political machinery has shown no inclination to accept its mistakes, learn from them and avoid repeating them.

The best example of this is the proposal of Mr. Ganesh Naik, Minister for Environment, Government of Maharashtra, to sell off all open spaces in Mumbai to pay off the state's accumulated debts of Rs 1,10,000 crores. This would include the Mahalaxmi Race Course, Aarey Milk Colony, gardens, parks, salt pan lands, mangroves etc. This was widely reported in the papers barely three weeks after the floods.

Similarly, the government has shown no willingness to rethink projects such as the Bandra-Worli and Worli-Nariman Point Sea Links, or the Trans-Harbour Sewri-Nhava Sea Link, which will again involve reclamation and loss of mangroves. Repeated requests to change the alignment of the Sewri-Nhava link have been ignored. [See Section III.B.5, "Pending and proposed projects and their impacts – Sewri –Nhava Sea Link"]

Perhaps the only predictable response of the government has been the setting up of a number of committees to look into issues related to the flooding of Mumbai, the Mithi River, etc. The Mithi River Committee is headed by irrigation and hydrologist expert Mr. Madhav Chitale. It remains to be seen what recommendations the committee makes and if these are accepted and implemented by the government.

In the course of its enquiries, the CCC has found that there were early warning signs reported by different wings of the administration. The BEST



has reported receiving a message at 12.45 pm on July 26 that the Central Railways trains beyond Thane had ceased running due to flooding. Mr. P.N. Munde, Field Director of the SGNP, informed his superiors at Mantralaya between 2.30 – 2.45 pm that a flash flood in the park had flooded his office with three feet of water. The police log for North region (Zone XI and XIII shows that the at 1.57 pm, a call went from the North Region Control Room to all police stations in zones XI and XII warning that heavy rain had commenced, flooding was being reported from some places, and there was a likelihood of tree falls and short circuits. At 3 and 3.06 pm respectively, the BEST received messages that the Malad and Dahisar subways were flooded. At 3.50 pm, the police were informed that there had been discharge of water from a dam near Titwala which had submerged the tracks. If water had to be released then the Irrigation Secretary should have been informed of it. If these reports had been passed on to, and collated by one central source, such as the Disaster Management Cell, they would have provided an indication that abnormally heavy rain was hitting the city. Precautions could have been taken and lives could have been saved.

II. B. 3) POLICE RESPONSE TO MUMBAI FLOODS

Throughout its interactions with the public and most experts and citizens, the lack of a visible police presence in most of the flood-affected areas was repeatedly stressed. There were a few honourable exceptions where heroic police personnel actively rescued people. Police Constable Pradeep Nimbalkar and Assistant Inspector (Special Branch) Tushar Kadam both rescued several people in the

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Kurla and Kalina area respectively, and Nimbalkar died while attempting another rescue. However, these seemed to be exceptions. At many of the CCC's public hearings, allegations were made that the police were either not seen or did not or could not render any help at the height of the crisis. Many police chowkies when approached were found locked and empty.

Many citizens felt that the mere sight of a police uniform helps to bring a sense of order to chaotic situations, but this was lacking on the 26th. To the extent that Kadam intentionally donned his uniform in order to rally people around him during rescue operations. Clearly, in a disaster it is not only important that those in positions of authority do something; they must also be "seen to be doing something."

The CCC was able to piece together a fairly comprehensive and coherent picture of the events that occurred on July 26 based upon information received from reliable sources who desired to remain anonymous.

▪ **On the charge of police being absent from duty:** The CCC was told that many police stations were completely inundated. 33 police stations waterlogged with between three to 11 feet of water. The Vakola and Saki Naka stations had ten to eleven feet of water. Jogeshwari and Nehru Nagar had eight feet. As a result, the lockups in many stations had to be evacuated. The police force was almost completely immobilised by the flood waters, with 60 odd police vehicles stranded. As a result, police personnel were sent out on foot into the floodwaters to help people. He also added that in many places the police personnel were either in plainclothes or had to remove their uniforms to swim through the floodwaters, as a result people could not distinguish them from others. The CCC was told of a police team that responded to distress calls and rescued 13 people from the top of a bus at Air-India Colony, Kalina.

Reports were received of buses stuck in the rising waters at Air-India Colony, Kalina and Kurla. A police vehicle attempted to reach the Air India Colony but got stuck. Finally 13 people were rescued from the top of a bus at around 11 pm. There was another bus further ahead but the

police team could not reach it as the water was even higher at that point. The people on the second bus were finally rescued on the 27th early morning, with the help of a navy boat. At Kurla, the police obtained a boat and rescued 3 busloads of people.

▪ **On the charge that the police was caught unawares and were totally unprepared for this calamity:** The CCC was informed that in case of impending heavy rain, the IMD sends out warnings to the BMC, Police etc. However for the period July 22 to July 29, the IMD had predicted 'Rather Heavy' to 'Heavy Rain', which translates into between 35 and 65 mm, whereas 944 mm was actually received. There was no indication from the IMD that a calamity of this magnitude was impending.

Each day's forecast is received around 1 pm, effective for the next 24 hours. The forecast received for the 26th at around 1.30 pm was for "Rather Heavy to Heavy" rain. The same forecast was also made for every day till August 4, but on many of these days there was no rain or very little rain. The police are also given a list of dates when heavy rains and high tides are expected to coincide, but going on the basis of these one cannot close down the city and ask people to remain at home, as the forecasts are very often not accurate.

The Railways normally inform the police and BEST in advance if they are likely to suspend services, but this time there was no warning as the Railways themselves were caught unawares.

The police were of the view that while all other civic authorities pleaded helplessness, the police force was the only agency that undertook rescue operations round the clock, to whatever extent possible given the circumstances. Most police stations were without electricity and telephone connections. Though they were equipped with wireless sets, these need recharging. The wireless batteries are supposed to last for 12 hours. However, because of the intensive use, many batteries got drained within a few hours. In many places, recharging was a problem as there was no electricity. Thus while the police wireless communication system did not break down, it was patchy in some areas.

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▪ **On the charge that the police should have prevented traffic congestion on the city's arterial roads:**

Once Mantralaya was closed at about 5 pm, other private offices followed suit. As the gravity of the situation in the northern suburbs became apparent, attempts were made to get the traffic stopped from heading towards the suburbs from south Mumbai, by about 7 pm. However, most vehicles had already passed Haji Ali heading north. Further, it was hard to convince motorists of the situation in the northern suburbs and many insisted on trying to get home, arguing with police personnel and evading them by taking side roads.

Falling trees also disrupted traffic. Jt. CP, Traffic Control Branch Satish Mathur had warned the BMC of the danger this monsoon because of the road digging and construction work in many areas, without any protection are being taken of the roots of trees. Ultimately, 54 trees fell in a span of three to four hours on the 26th evening, adding to the chaos. Before the monsoon, the police had requested the BMC to depute an officer to sit in the traffic control room during the monsoons, but they had refused.

▪ **On the role of the Police in the Disaster Management Plan (DMP):** According to Mumbai's Disaster Management Plan, the police role is limited to:

1. Cordoning of area to restrict movement
2. Shifting affected to hospital
3. Providing easy access to rescue personnel

4. Corpse disposal
5. Law and order maintenance
6. Divert traffic from blocked routes
7. Coordination with BMC Control Room

In reality on 26th July the police were called on to go far beyond their prescribed role. The police are not equipped to save lives, but in an emergency this is a role they can and do play. Once the gravity of the situation became apparent, they sent instructions to the various stations and teams were sent along the main roads to locate stranded buses, vehicles etc. They reported back and rescue operations commenced.

However, despite all these efforts, senior police officers felt that not enough was done by the entire government machinery and even the police. 17 people died in stranded vehicles on the roads and this should have been avoided. The police did their best, but it wasn't good enough.

The state's Disaster Management Cell came in for strong criticism. The control room at Mantralaya, which should have been the nerve centre during the crisis, was non-functional. Though the police have become both the first and last recourse in such cases of public emergency, they have not been given any statutory role in such situations. They need to be given a statutory role and equipped and trained accordingly. Senior officers said that despite the crores spent on Mumbai's DMP, no money has been given to the police to purchase equipment, train personnel etc. The Commissioner of Police had not been invited to any of the meetings held by the Chief Minister to discuss the floods.

Dr P.S. Pasricha (Former Mumbai Police Commissioner and presently Director General of Police, Maharashtra) in an interview to rediff.com has said that the "In the disaster management plan, the police is not there at all." Though the police are represented on the Mumbai DMC and the BMC DMC, as the first recourse of the public, the police need to be given a greater role with statutory authority and increased resources to function effectively in times of disasters.¹¹

¹¹ <http://www.rediff.com/news/2005/aug/24inter1.htm>

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The police also criticized the MMRDA and MSRDC for their irresponsible attitude to the city, despite the significant role both these bodies play in the functioning of the city. Neither agency bothered to send a representative for the joint meeting held to discuss monsoon preparedness, held. It would also appear that neither of these two bodies are represented on the Mumbai Disaster Management Cell or the BMC- DMC.

▪ **On the charge of the police being absent during the Saki Naka landslide:** On the specific

charge that police were not present to help during the Saki Naka landslide, senior police officers informed the CCC that there had been a minor landslide on the 26th evening and that the police warned people to leave the place. However it was on the 27th that a major landslide flattened hutments at the base of the hillock killing over a hundred people. He claimed that the police sent personnel from other areas and they were the ones removing the debris. Very few personnel were available. A JCB was brought to the site. On the 28th morning one company of RAF (Rapid Action Force) turned up and on the 28th afternoon, the Fire Officer arrived.

The CCC's conclusions:

- The police's claim that police personnel were present but in plainclothes might be true in many cases, but the overall fact remains that the police presence was not what it should have been. To a large extent this was unavoidable, given the circumstances, as the police themselves were immobilized and not equipped to tackle an emergency of this sort. However, the police force needs to be trained

THE SAKI-NAKA LANDSLIDE

Regarding the Saki Naka landslide episode, there are significant discrepancies in the story put forward by the police and that as told to the CCC by residents of the area concerned, which is as follows:

It was the first landslide on the 26th evening at around 4:30pm that claimed the large number of lives, flattening hutments at the base of the hill. By the time the second landslide occurred early on the 27th morning, people had already moved away from the area. Residents of this locality (Khadi No 3- Saki Naka) have informed

representatives of the CCC that they went to the nearest police Chowki (90 feet road police Chowki) attached to the Saki Naka police station which is 5 minutes from the accident site. The Police personnel on duty refused to/could not help. There were attempts to call the Saki Naka police station but the phone was not answered. On the 27th morning, a few police personnel from the nearby chowki came to inspect the scene. Finally, on the 27th morning, more members of the police force turned up, as did the Fire Brigade, both of whom took part in the rescue operations. However, the local residents insist that it was the fire brigade that undertook most of the work, not the police.

The Saki Naka landslide was a disaster waiting to happen. CCC's investigations have revealed that local politicians (read slum lords) along with unscrupulous government officials turned a blind eye to unauthorised settlements and in many cases actively abetted in the setting up of shanties atop unstable terrain which resulted in the death of countless innocent people. When CCC went to the area, local residents were extremely wary of talking to us fearing a backlash from vested interests. However certain residents on condition of anonymity revealed how the slum atop the hill had developed over the past decade despite the full knowledge of the civic authorities and elected representative. When pressed for details, they revealed that it was the local MLA, Naseem Khan and his henchmen who in fact controlled land supply in the entire area and no shanty could have come up without their approval. They further revealed that in the past there had been instances of boulders falling from the hilltop, which had been brought to the notice of municipal authorities whose only answer was to tell them to move away from that site without any talk of resettlement. Finally people also said that the official death toll in the landslide was far less than the people who had actually perished.

“NIMBALKAR DIED SAVING OUR LIVES”

He managed to save two people from being sucked to death but lost his own life in an attempt to answer a third cry for help. The body of Pradip Nimbalkar, a constable with the Local Arms Unit-I, was recovered five days later in Kurla where he drowned trying to save a man whose body is yet to be found. A 28-year-old bachelor, on July 26, Nimbalkar was on his way home after receiving a phone call that his room at the Nehru Nagar Police Lines was under water. At Kurla he saw two men (later identified as Vijay Ambure and Hemant Satam) floundering in the water. Nimbalkar, a good swimmer, pulled Ambure out by his collar, and dived in again to rescue Satam. On hearing another cry for help, he swam out a third time but was pulled under along with the man crying for help. Nimbalkar's body was recovered on August 3.

Commissioner of police, Mumbai, AN Roy has announced compensation due to a policeman who dies on duty. The chief added that rewards would also be given to those who saved people during the flood. According to the police, 440 people, including two policemen, have died as a result of the heavy rain. At least 66 people, including a constable, are still missing.

Ambure and Satam were called to police headquarters to relate their stories. Satam, who owns a flower shop near Kurla station, said he knew Nimbalkar since they were both from the same neighbourhood. “When I heard that a police constable was missing, I went to the Nehru Nagar police and they showed me a photograph,” said Satam. “It was Nimbalkar. He died saving our lives.”¹²

and equipped to handle natural disasters such as floods, earthquakes, tsunamis, chemical disasters etc.

- The police have been assigned a very limited role to play in the DMP. Considering the fact that they are the wing that is directly in contact with the people and spread throughout the city, the police needs to be given a greater role with correspondingly greater powers and infrastructure as part of the DMP.
- Though the police may be faulted for being unable to provide help in many areas on the 26th, they appear to have played a significantly better role, above and beyond the call of duty, in the relief efforts over the next few days. Just as their absence in certain areas must be pointed out, the positive role played in the relief efforts must be lauded.

On the 27th evening, a message was sent to all police stations asking them to gather volunteers, local NGOs, and donors and make local arrangements for distributing relief materials and provisions to those affected. On the 28th morning, the police started holding health camps in some areas and from the 29th onwards, they started distributing provisions, clothes etc. According to the Police Department, in all

36 health camps were held and over 2 lakh people helped.

The State Bank of India (SBI) contacted the police and offered their help, giving aid worth about Rs 20 lakhs. The Confederation of Indian Industry (CII) also contacted the police department and were assigned the Kurla area, where they distributed relief kits. The Sidhivinayak Trust also gave aid worth about Rs 20 lakhs. Teen Challenge (NGO) sent five vehicles with materials to police headquarters every day starting on the 29th. By police estimates, about Rs 60 lakh worth of material must have been distributed by Teen Challenge in the eastern suburbs of Ghatkopar, Vikhroli and the North region.



¹² “Hand in Hand”; *Communalism Combat*; August – September 2005

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II. B. 4) BMC

The CCC encountered universal condemnation of the BMC from all quarters post July 26. From the police hierarchy, the railways, and the common citizens, the BMC's negligence leading up to the floods and its complete absence during the crisis has been severely criticized. The BMC's Disaster Management Committee was conspicuous by its absence. This is all the more shocking as Municipal Commissioner Johny Joseph, Chairman of the BMC's DMC, also drafted the Disaster Management Plan for the State Government whilst he was Secretary (Relief & Rehabilitation) and was actively involved in the Latur earthquake rehabilitation a decade earlier. He ought to have been best equipped to deal with the crisis.

The state government declared two-day holiday on the 27th and 28th meant that BMC staff and conservancy workers were absent when the city needed them most, and this badly hampered efforts to restore normalcy.

The BMC did not take a firm enough stance with MMRDA when it found that MMRDA's road upgradation work under MUIP and MUTP was affecting drainage. While the MMRDA is mainly to blame, the BMC's willingness to turn a blind eye also cost the city dearly.

II. B. 5. MMRDA

MMRDA is the regional planning agency with special powers to execute infrastructure work in the city. The role of the MMRDA has come under severe scrutiny after the Mumbai floods. The MMRDA has shown an alarming disrespect for sensible planning norms and ecological spaces. Nothing typifies this as much as the Banda-Kurla Complex and the extensive reclamation it has entailed, much of it taken up after the CRZ norms came into effect in 1991. This has been directly responsible for the flooding of areas such as Kurla and Kalina. R.B. Morade, General Secretary of the Indian Airlines Colony, held the concreting of roads responsible for the extensive flooding of the seven-acre colony.

With regard to Mumbai's natural rivers, including the Mithi, the MMRDA has shown shocking

ignorance, apathy and neglect. Nothing exemplifies this as much as the fact that the Mithi river and the inter-tidal region in the estuary is not shown in MMRDA land use plan for 1996-2011.

The MMRDA is also undertaking the Mumbai Urban Transport Project (MUTP) and Mumbai Urban Infrastructure Project (MUIP). The BMC has held the road repair work taken up by MMRDA under these projects responsible for flooding many areas, according to an *Indian Express* report. According to the BMC, the MMRDA and its consultants failed to provide adequate storm water drainage systems on the roads where the work for these two projects was being undertaken. To list a few instances:¹³

- Along the western express highway (Kala Nagar Junction to Jogeshwari- Vikhroli Link Road), the existing open channel (5.5 metre x 1.2 metre) was disturbed. In its place, a new box drain (1.9 metre x 1.2 metre) was constructed. In January, a letter was sent by the BMC (SWD Dept) to the MMRDA about the discrepancy.

Suggestions were also made to the consultant to construct an additional drain along the service road and a sewer along either side to serve roadside properties. Neither suggestion has been implemented.

- On Link Road, for the stretch from Samant Chowk in Bandra (West) to Juhu Tara Road, the SWD department had issued remarks to the consultant in November 2004 to construct a 9-sq ft drain and construct or modify culverts at every road-crossing to 15 sq ft. Work has been done only on one stretch, while culverts across the road are not constructed/modified and some culverts along the road are not of the size prescribed by the BMC. At least two points on this stretch saw heavy flooding.
- For two other stretches along Link Road – from Oshiwara Bridge to Katchpada junction and from Annabhau Sathe Udyan to Shastri Nagar nullah – the BMC had given remarks to consultants as far back as October 2003, suggesting box culverts of reinforced cement concrete. Neither box culvert was constructed, and in both cases,

¹³ "Why 944 mm took two days to drain out", *Indian Express- Mumbai News line*, September 23, 2005
http://cities.expressindia.com/archivefullstory.php?newsid=149838&creation_date=2005-09-23

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the drains are only partly ready and connectivity with larger drains is incomplete.

- In certain places such as Prem Nagar in Jogeshwari (W), work on drains lies incomplete and elsewhere in an area opposite Landmark Hotel, a new drain doesn't have connectivity.

It is significant that while all the road projects that are being implemented have gone through a detailed process of environmental impact assessment, no such attempt has been made in the case of any of the road projects under MUIP even though several of its projects are planned through environmentally sensitive areas.

The Bandra–Kurla complex is yet another example of how the MMRDA abused its powers. The MMRDA was fully aware that reclaiming swamps and constructing the Bandra-Kurla complex near the mouth of the Mithi River would reduce its width and could lead to flooding, especially in times of heavy rainfall, yet it went ahead. As a result, the mangroves where the Mithi River exits at Mahim are now one-third their original size. The MMRDA contends that the Bandra–Kurla complex reclamation has been approved of in a study conducted by CWRPS (Pune)¹⁴.

However, Mr. Rakesh Kumar (Dy Director, National Environmental Engineering Research Institute or NEERI) informed the CCC that it had warned Central Water and Power Research Station (CWPRS) and MMRDA of the negative impact of the Bandra-Kurla Complex on the Mithi. The MMRDA's contention that the complex was built only after environmental approval is misleading, as the complex is a CRZ violation. As the agency in charge of the development and planning for Mumbai, MMRDA should have altered its plans as soon as the illegalities and the risk involved were pointed out.

The BMC has also criticized the MMRDA and the SRA for creating blockages in the 'Dani Wooltax Nalla', which joins the Mithi, leading to flooding in the area along CST Road near Gujarat Ambuja Company.¹⁵

During the crisis of 26/7, MMRDA was completely absent and played no role whatsoever. There is a state government directive that all agencies concerned with roads should have a control room. Police sources informed the CCC that the MMRDA does not yet have a functioning control room, or, in any event, did not at the time of the floods. MMRDA itself has earth moving and construction equipment (either directly or through its contractors) and these could have been invaluable in clearing the roads and at the site of the Saki Naka landslide. But since MMRDA itself was non-functional, these resources could not be tapped. The fact that the Head Office of the MMRDA was itself marooned is an apt commentary on its working and indifferent approach to planning.

The final nail in the coffin for the MMRDA comes from the N. V. Merani Committee set up by the Maharashtra Government to study the flooding and make suggestions. This committee recommended that widening the 17 arterial roads could wait; what was more important was to conduct a review of drain designs for the 17 roads which the MMRDA is improving. The message being sent out is to first fix the drains and only after that is done, to continue with widening roads. The report goes on to say that 'the MMRDA's consultants were casual in their approach. Drain designs were very sketchy and prepared without taking into account the sites' geographical configuration'.¹⁶

It would also be pertinent to point out here that the MMRDA, supposedly the city's apex planning body, was completely bypassed by the BJP-Shiv Sena government during its rule in the late 1990s. This government entrusted the planning and execution of a slew of road projects to the Maharashtra State Road Development Corporation (MSRDC). MSRDC is purely an engineering and construction agency and has absolutely no expertise to take an overall view on the merits of such schemes and their desirability for the city as a whole. Indeed, the anomaly of such an agency taking all the major decisions regarding fly-overs, sea links and other major road schemes has long been adversely commented upon.

¹⁴ "Flooding caused by Maharashtra Government's greed, not God", *Hindustan Times*, July 31, 2005
http://www.hindustantimes.com/news/181_1448058,000600010004.htm

¹⁵ Presentation by MCGM H/East Ward to Maharashtra Government Fact Finding Committee

¹⁶ "Roads can wait, fix drains first"; *The Indian Express, Mumbai News Line*. November 30th, 2005
http://cities.expressindia.com/archivefullstory.php?newsid=159465&creation_date=2005-12-01

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II. B. 6. FIRE BRIGADE

The Chief Fire Officer did not respond to CCC's request for a meeting, so we have been forced to rely on press reports and information from eyewitnesses and third party sources.

With reference to the Saki Naka landslide, where the Fire Brigade was the one agency best equipped to rescue survivors, it took 15 hours for the Brigade to arrive at the scene. Clearly, the Mumbai Fire Brigade, like all other government agencies, was not prepared to cope with this emergency. Added to the Fire Brigade's woes is the inaccessibility of most of the worst affected areas due to narrow congested roads at the best of time. This is another consequence of the poor planning and enforcement of regulations in the city.

II. B. 7. COAST GUARD

Deputy Inspector General A. Rajshekhar, Commandant, Mumbai region informed the CCC that the Coast Guard has no mandatory role in the case of a terrestrial disaster such as the floods of 26/7. Rivers and lakes do not come within their jurisdiction, which is restricted to the offshore waters. However, in case of emergencies they can and do provide assistance, as far as possible given their capacities and other duties.

Commandant Rajshekhar's view was that the BMC needs to be given the training to respond to disasters such as floods. Given the Coast Guard's ongoing responsibilities of patrolling, search and rescue etc, it will not be able to fulfill a permanent role in this area.

The Coast Guard (CG), being a wing of the Defence Forces, has systems in place to ensure 24-hour readiness to tackle emergencies, and lessons can be learnt from this. Despite Mumbai having come to virtual standstill on the 27th, the CG was able to respond to the ONGC Bombay High oil well fire with admirable speed. One of the main reasons for this is that at any given time, 1/3rd of the crew or personnel are always on call. As a result, despite Mumbai's transportation problems on the 27th evening, a CG ship was ready to sail for Bombay High within three hours of the distress call coming in.

DIG Rajshekhar opined that the high tide had little or no role to play in the floods, as the tide was not particularly high, and had receded by 6 pm, though the floods continued till the next morning. The CG also had no warning about the heavy rain that would hit Mumbai. The CG's communications are not affected in such situations, as they are equipped with satellite phones at the Headquarters and on their ships.

Regarding the possibility of using CG helicopters to survey affected areas and/or for rescue operations, the DIG believed that the CG's single-engined aircraft that the CG has are not suited for operations over land. In any event, he was not approached for help by the government and by the 27th evening the CG was busy with the Bombay High platform fire.

At no point in the Mumbai floods, or those that hit the Konkan, did the state government make any attempt to approach the CG for help. A team of CG divers was sent to Raigad, but this was only after the Navy approached them.

II) B. 8. METEOROLOGICAL DEPARTMENT

The head of the Meteorological Department, Mumbai, expressed his inability to meet with the CCC on the grounds that 'the matter is sub-judice'. In this situation, the CCC has no option but to base its findings on opinions received from others and press reports.

There is overwhelming agreement that the IMD failed miserably to provide any warning of the intensity of rain that struck Mumbai from the 26th afternoon onwards. Other departments such as the BMC, Police, Airport Authority etc were all unanimous in this regard. The forecast received from the IMD from July 22 to July 29 was similar for each day, predicting 'Rather Heavy to Heavy'. According to the IMD standards, this means between 35 to 125 mm of rain. (Rather Heavy rain is between 35 to 64 mm, Heavy rain is 65 to 125 mm and Very Heavy rain is anything above 125 mm.)

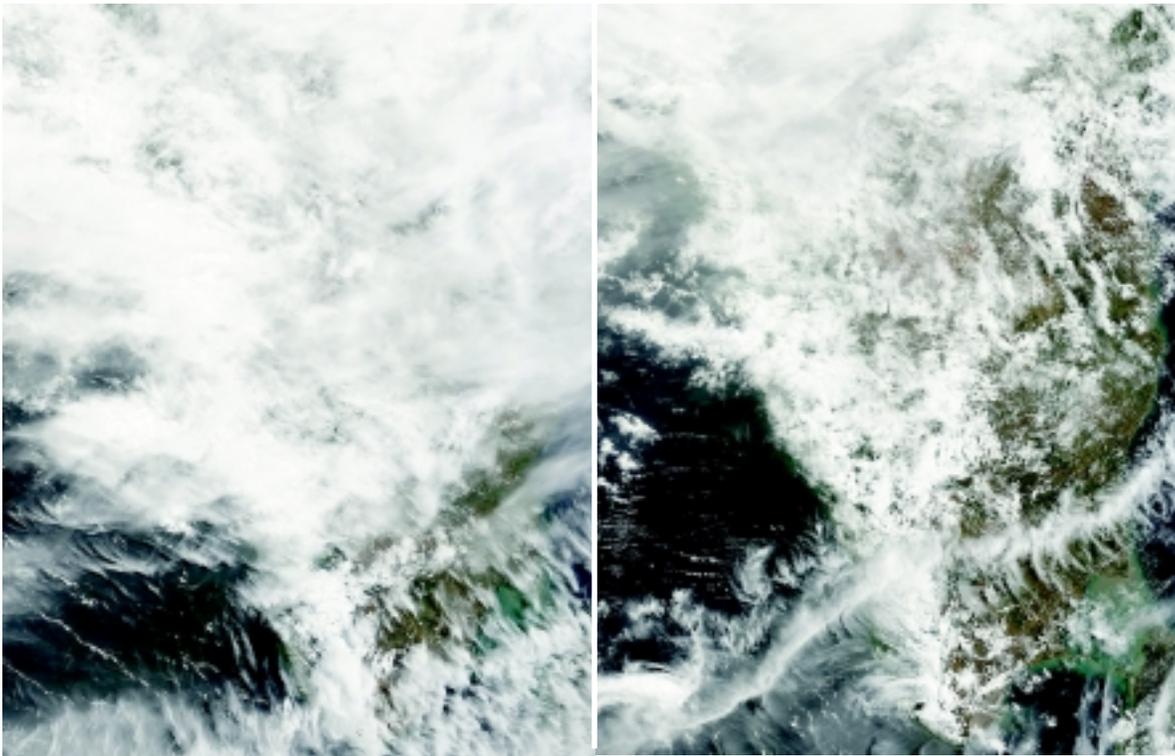
In actual fact, 482 mm of rain fell in just four hours from 14.30 hours to 18.30 hours on July 26, and a total of 944 mm in 24 hours, far in

excess of the IMD's forecast. Going by press reports, the IMD has said it could not do any better with the equipment it has, and it would need sophisticated Doppler radars, which would have given a 3 hour prior warning as they are able to give indications of cloud direction and speed of movement.

The CCC was informed that the Santa Cruz office informed the Colaba HQ at 1700 hours about the very high rainfall.

It is also not clear why the IMD failed to issue a priority alert when the hourly rainfall at Santa Cruz far exceeded its daily forecast.

According to *Frontline* the first indigenous Doppler Weather Radar (DWR), fabricated by BEL with the support of the Indian Space Research Organisation (ISRO), was installed at the Sriharikota launch complex in 2002. This project cost a total of Rs 9 crores. Two DWRs, imported from a German firm at Rs 13 crores each have also been installed at the Regional Meteorological Centres in Chennai and Kolkata.¹⁷



¹⁷ "For Reliable Cyclone Detection"; *Frontline*; Volume 19 - Issue 16, August 3 - 16, 2002 <http://www.frontlineonnet.com/fl1916/19160880.htm>

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II. B. 9. AIRPORT AUTHORITY OF INDIA

The CCC's main concern with reference to the AAI pertains to the diversion of the Mithi River and this has been discussed in Section (II H 1 c)

With reference to the performance of the AAI during the floods, the Director of the Mumbai Airport, Mr. Sudhir Kumar, deposed before the CCC. The salient points from his testimony are:

The last flight landed on the 26th at 14.15. Due to poor visibility landing and take off was not permitted after this. Heavy rain then led to water logging of the operations area. Water even started flowing through the international terminal building. The power supply was cut and the standby generators could not be switched on because of safety concerns. How badly the airport was affected could be gauged from the fact that the airport was non functional for a period of close to 48 hours and over 1100 flights were cancelled.

The intersection area of the runways had as much as six feet of water at one point. Around 1.1 km. of the 8-foot-high wall around the operations area was breached, allowing water and debris to cover the runway. As a result of submergence, the Instrument Landing System (ILS) system was not working.

The debris on the runways were cleared by 5 pm on the 27th. Runway lights were restored and by the afternoon of the 28th the ILS was functional. Flights resumed but only as long as visibility was 1,500 m. The airport was not operational from 2.15 pm on 26th till 1 pm on 28th. It is not clear why the IMD officer at the airport did not trigger off an alert so early on 26/7.

Mr. Kumar informed the CCC that learning from the experience of July 26, the AAI intends to construct steps/ramps at the entrances to the powerhouses and generators, so that water cannot enter easily. All entry and exits of underground areas will be redesigned to keep out water. Electrical connections will not be at ground level. There is also a need for an alternate, independent source of lighting. The ILS system can also be put on hydraulic platforms that can be raised in case of flooding.

Mr Kumar stated that he was not aware of any work carried out by the AAI in the recent past that had resulted in the diversion or narrowing of the Mithi River. In fact, he stated that the encroachments downstream of the airport had led to the flooding of the airport.

II. B. 10. HOME GUARDS, CIVIL DEFENSE AND OTHER AGENCIES

The Home Guards comprises of men and women from all walks of life who come forward to receive training in various specialized subjects such as Weapon Training, Arms Drill, Fire Fighting, Rescue, Communication, First-Aid, etc. They can be called upon to assist the State and its citizens in times of need. The Home Guards function as the nucleus of the Civil Defence Services. They are meant to assist in managing transport communication, water supply and other essential services in times of crises and breakdown of such services.

Satish Sahney, former Police Commissioner, former Commandant General, Home Guards and Director, Civil Defense Organisation, spoke to the CCC. He informed the panel that in his tenure, there were 28,000 trained personnel in Bombay. However, Civil Defense volunteers can, by law, only be called out in terms of declared war. This pool of trained civilians should be tapped in such emergencies. However, the Civil Defense training is in many respects outdated.

The Home Guards Act stipulates that Home Guards must be volunteers and must have regular employment. Each volunteer needs to bring a letter from his/her employer showing willingness to relieve him/her in times of emergency. It is up to the District Authority to requisition the Home Guards. However, the system has suffered because governments have been using it to provide employment, which is not the purpose. There are approximately 5,000 Home Guards in Bombay. The HG commandant posts have also become politicized. As a result of this, the Home Guards is no longer a potent force. If the structure and functioning is revitalized, they can play an important role in times of emergency and natural disaster.

II C) STORM WATER DRAIN SHORTCOMINGS

Mumbai's drainage system was designed in the early 20th century for a maximum rainfall of 25 mm per hour, with a 0.5 runoff coefficient — that is, assuming that half the rain would be absorbed and only half would flow into the drainage system. Moreover, according to the BrihanMumbai Storm Water Drain Project (BRIMSTOWAD) report, the capacity of many drains is even less than 25 mm/hr,

particularly when downstream levels are considered.

With the onset of rampant and indiscriminate urbanization, most areas are now either paved or concreted or asphalted, as a result, the runoff coefficient is now virtually 1, with very little rainwater being absorbed at all. Thus even at one inch per hour, the drainage system is having to cope with almost twice its intended capacity.

The Development Control Rules require 15 to 25% of a plot to be maintained as recreational open space in both residential and commercial zones. In practice this open space is paved/concreted, increasing run off and preventing percolation. Where basements are permitted for parking, almost the entire plot is covered by a basement and hence percolation of rainwater is prevented.

Large flat areas in the city were once the intertidal flats between the original islands. The drainage system developed following the flat land around the islands and consequently some drainage routes are up to 5 km long, even though no part of Mumbai is more than 2 km from the coast. According to testimony received from architect and town planner Nandan P. Mungekar, the water from the Lalbaug/Parel area is discharged at Reay Road, instead of at Worli/Love Grove, which is much closer. Similarly, storm water from Dadar TT and King's Circle is taken to Dharavi. Such flat areas together constitute 56% of the island city of Mumbai.

There are many obstructions and blockages in the drains due to other services passing through the drains, such as water and sewer pipes. These pipelines cause blockage and siltation. The BRIMSTOWAD report found that 23% of all drain defects were associated with such obstructions.

Many of the city's drains are in poor structural condition, because of age and poor workmanship, as well as interference by other services. Access for maintenance is also restricted, frequently by unauthorized development.

The drainage situation in the suburbs is characterized by illogical or unplanned development, without keeping drainage requirements in mind.

Firstly, the BMC has degraded all the natural rivers and creeks in Mumbai by calling them all "nallahs". The concept of maintaining the flood plains of these natural water systems has been completely forgotten, and in fact, all attempts have been made to narrow and "train" these natural water systems. The banks of 'nallahs' or erstwhile streams/rivulets/rivers/creeks have been developed on with no regard for the storm water capacity required. Whilst in absolute terms much of the development is of a temporary and informal nature, some large 'pucca' structures, both government and private, also restrict water flow.

The BRIMSTOWAD report put forward several proposals to remove obstructions and deepen/widen existing nallahs, or realign them to remove restrictive bends. 'Training' (concretisation of nallahs from the bottom and sides to ensure smooth flow of water) of nallahs was also proposed, not only to improve capacity and maintenance, but also to prevent encroachment¹⁸.

This problem is not recent but has been identified as far back as 1993 by the BRIMSTOWAD report. 'Much of the drainage system, particularly in the suburbs, is restricted by unauthorized development contrary to the development plan or the development control rules. This restriction sometimes infringes into the drain itself and sometimes only affects access for maintenance. MCGM has adequate powers in law to remove such encroachment and prevent new ones but has in practice been unable to enforce those powers. Many of the proposals rely on the removal of unauthorised development and this must happen if substantial reduction of flooding is to be achieved.'

The MCGM's constant flip-flops on the BRIMSTOWAD report (first saying that it is doing away with the report and then later on saying that it will spend Rs 250 crores in the current fiscal for implementing the BRIMSTOWAD report doesn't help matters).¹⁹ The project was estimated at around Rs 600 crores at 1992 prices. Till date, the MCGM has been unable to implement the major components of the plan despite claims that Rs 200 crore has been spent over the years on a gradual implementation of the BRIMSTOWAD recommendations.

¹⁸ "Master planning for Greater Bombay Storm Drainage & Sewer Rehabilitation (BRIMSTOWAD Project – Executive Summary"; *BrihanMumbai Mahanagarpalika*, February 1993

¹⁹ "We won't err again: Joseph", *Daily News & Analysis*, January 26, 2006 <http://www.dnaindia.com/report.asp?NewsID=1009690>

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Interestingly, the 1993 BRIMSTOWAD report Executive Summary says: “We have assumed no development will take place on land which is presently undeveloped and zoned to remain so. Most of the substantial areas zoned for no development are sited in the suburban catchments either in the upper ends, in and around the National Park, or the lower ends close to the shore. If unplanned development takes place in the upper end, run-off will increase and the downstream drainage system may be inadequate.”

Unfortunately, this is precisely what has happened. The last decade, since the BRIMSTOWAD report was prepared, has seen the rapid urbanization of the northern suburbs and the spread of illegal encroachments, especially in the region from Bandra northwards and eastwards. These were the areas worst affected by flooding, together with places like Goregaon, Malad and Kandivli. Since the GoM and BMC have not only failed to check haphazard development, but in fact, have permitted this, it is no surprise that they now claim the BRIMSTOWAD report to be outdated.

II D) SANITATION AND WASTE MANAGEMENT

It is widely acknowledged that Mumbai’s notoriously poor hygiene and sanitation played a role in the large scale illnesses and diseases that followed the floods. With large areas of the city inundated, the floodwaters mixed freely with garbage and human waste, which is normally scattered indiscriminately, in the absence of proper waste management and adequate sanitation facilities.

All health experts and professionals who interacted with the CCC primarily blamed the lack of sanitation and hygienic conditions (in normal times) as the reason for the spate of illnesses and diseases that followed 26/7. Higher levels of sanitation and waste management and disposal would have reduced the health impact that the floods had on Mumbaiers.

By some estimates, as much as 60 per cent of Mumbai resides in slums, which typically have inadequate or no toilet facilities. The BMC’s World Bank-aided Slum Sanitation Programme (SSP), launched in 2000, aimed at providing toilet facilities in Mumbai’s slum areas. By 2003, about 9,700 of public toilet blocks (about 77,550 seats) had been built in various parts of the city. WB surveys showed

that about 80 per cent of these were not functioning. Even if they were, they could only meet half the demand. The SSP, which entails constructing community toilet blocks, run by Community Based Organisations, has had mixed results, with some positive examples. This scheme aims at providing a facility that will be owned and managed by the local community, and not open to the general public. The user will pay a minimum charge, which goes towards maintenance and water, electricity supply etc. According to the BMC, by December 2003, about 300 toilet blocks were completed, and about half handed over to CBOs. Aside from improving hygiene, the system also results in lower recurring expenditure on the part of the BMC.

While the population of the city has been increasing steadily, and significant investments have been and are being made in increasing water supply, the parallel investments in sewage treatment and disposal have not been made. This is illogical and dangerous for the health of the city.

Waste Management: According to official BMC figures, Mumbai generates about 7,800 tonnes of solid waste daily. However, this figure is probably significantly inflated by the contractor lobby. NGOs working in the field of solid waste management state that no one seems to have an accurate figure of the amount of solid wastes generated in Mumbai. In any event, Mumbai does generate very large amounts of waste, posing a problem for collection, transport and disposal. In many areas, again particularly the slum and unauthorised housing areas, garbage is collected only occasionally, and large mounds of refuse are common, causing unhygienic conditions. With such conditions the norm, flooding and such disasters provide the perfect opportunity for the outbreak of epidemics.

The BMC is also forced to spend large amounts on cleaning choked drains and nallahs every year before the monsoon, when the ideal option would be to prevent the waste from entering the drainage system in the first place. By their very nature, many drains do not lend themselves to proper cleaning once blocked. Hence an effective waste reduction, collection and disposal system is key to the optimum functioning of any drainage system, aside from improving the overall quality of life of all residents.

The CCC has found that large areas of the city are improperly serviced by the official waste collection

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machinery. In the absence of proper waste collection, residents invariably use the nearest drain/nallah as a waste dump and this has devastating consequences during the monsoons.

Only a fifth of households in Mumbai are covered by house to house garbage collection facilities. Thus a large proportion of the city's waste is collected from community collection bins, creating unhygienic conditions.

One of the significant allegations that emerged from the hearings was that the BMC deliberately does not clean pockets that are being eyed by builders for their projects since it makes it easier for the builders to "persuade" residents to sell and move out.

Another significant finding is the fact that though the average daily collection of waste is supposed to be 7,800 tpd, from July 26 till August 21, almost a month, the average daily collection shot up to 10,000 tpd. This implies that the BMC's waste collection in normal circumstances is not efficient enough. system is key to the optimum functioning of any drainage system, aside from improving the overall quality of life of all residents.

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Plastic bags: The CCC has received testimony from officials in the BMC and Railways which makes it clear that plastic does play a major role in choking drainage and causing floods during high rainfall periods. This factor, combined with other issues to do with the toxicity, non-biodegradability and problems associated with plastic recycling are reasons enough to curb and reduce their use to whatever extent possible, especially where alternatives exist.

In the CCC's opinion, the decision of the government to ban plastic bags is welcome and much needed. At the same time, it would be wrong to place the entire blame for Mumbai's flooding on plastic bags. There are many other issues, such as poor urban planning and unchecked growth that are also to blame but more difficult for the political machinery to tackle.

Moreover, after announcing the plastics ban, the state government now appears to have withdrawn it pending a report from an advisory committee set up to look into the issue. Thus in effect no action at all has yet been taken.

The CCC received suggestions that it would make eminent sense for the Government to ban not just plastic bags but all single use plastic and thermocol products, and to force manufacturers of such products to buy these back on a mandatory basis.

II E) PUBLIC HEALTH SYSTEM

The aftermath of the Mumbai floods saw a much higher incidence of diseases such as leptospirosis (borne by rats), malaria, diarrhoea etc. Most citizens who interacted with the CCC reported sickness or disease within their family in the days following the

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floods. In very few instances were there reports of government interventions such as the organisation of health camps, distribution of essential medicines or fumigation to prevent the outbreak of diseases.

Respondents in nearly all the flood affected areas where public hearings were held vouched that the response that they received from the civic health department was negligible or non-existent. The few medical camps, which were held, were mostly organized by NGOs.

To what extent the outbreak of diseases and illnesses could have been prevented? Could lives have been saved if the government's health authorities had taken quicker action?

CCC's interaction with health experts has led it to conclude that the magnitude of the outbreak could most certainly have been reduced, even if it could not have been prevented altogether, had the administration taken appropriate steps. Immediately after the floods, when people fell ill due to dirty drinking water, it was expected that the health administration would provide chlorine tablets and other basic medicines. This did not happen in most areas. Large sections of the population who had been stranded had been exposed to dirty sewage water for a number of hours. The hazard of these people contracting water borne diseases was very real and yet the administration did not issue directives to the health department to take preventive measures. It was only after the outbreak of leptospirosis and the subsequent media attention that was generated that the health minister declared an epidemic. This declaration was also subsequently withdrawn a few hours later. This will be elaborated on later in this section.

A look at the annual budget of the BMC over the years reveals that the spending on public health has taken a back seat. In the early 1990s, expenditure on public health was between 25 – 30% of the budget. In the post-liberalization, privatization and globalization era, this figure has fallen to 17%. Of this 17%, only 2% of the money is actually spent on capital investment (purchase and upgradation of medical services and equipment). Private hospitals are supposed to dedicate 20% of their services to poor and needy patients, but in practice the beneficiaries of this provision are usually politicians, public figures and 'connected' individuals.

Mr Ravi Duggal, Centre for Enquiry into Health and Allied Themes (CEHAT) informed the CCC despite the introduction of user fees at public hospitals, the quality of service provided at public hospitals has fallen. As a result, people have moved to the private sector for treatment.

Specifically about 26/7, Mr. Duggal pointed out that given the constraints that the public hospitals were under, the personnel at these hospitals performed remarkably well as doctors were treating patients round the clock. It was only after a few days that the lack of resources began to show. Dr Alka Gogate [Former Head of Department – Microbiology – Sion Hospital and Public Health Expert] adds that in the public health system, paraprofessionals like ANMs (auxiliary nurse/midwife) and community health workers are supposed to refer patients with mild ailments to dispensaries; instead we find that patients are invariably referred to the hospitals, resulting in an overload of patients.

Mr. Duggal informed the CCC that the role of ANMs and community health workers has unfortunately been reduced almost exclusively to implementing family planning and immunization programs. There is absolutely no information regarding diseases in a particular area communicated to the higher authorities. Mr. Duggal also pointed out that the private sector (both hospitals and general practitioners) for the most part made no effort to keep a record of diseases, or pass this information on to the state health authorities. With increasing numbers being forced to seek private medical treatment, it is hard to get an idea of the spread of diseases or impending epidemics.

Mr. Duggal also stressed that while there might not have been a lack of medicines needed in the aftermath of July 26, the problem lay with the cumbersome procedures required to obtain them. Hospitals have to indent drugs and this procedure takes a lot of time, making responding to a crisis difficult. The combination of frustration caused due to red tape and poor salaries is forcing many doctors to move to the more lucrative private sector with the result that many posts are vacant.

The BMC also used to publish a Public Health Report, but this has either been discontinued or is no longer public.

However in the midst of this gloom, there are stories which touch the heart, one being that of Dr Jayshree Sharma of KEM Hospital and Dr. Jadhav of State Blood Transfusion Council.

KEM HOSPITAL: DR. JAYSHREE SHARMA, BLOOD BANK CHIEF DR. JADHAV, STATE BLOOD TRANSFUSION COUNCIL

It was on August 11 that Dr. Jayshree Sharma, chief of the Blood Bank at KEM Hospital, saw the writing on the wall and alerted the State Blood Transfusion Council (SBTC) through its assistant director, Dr. Jadhav, who set the alarm bells ringing. As a result, 54 per cent of those struck by leptospirosis and dengue who were admitted to the city's hospitals could be saved.

Call it intuition or foresight, but that is what disaster management is all about. The state government, which has been held guilty on several counts, swung into motion to ensure a ready and adequate supply of platelets. Platelet units were airlifted from sources in Nashik, Aurangabad, Ahmedabad and Bangalore to meet the demand.

"In a situation where there was a frightening lack of communication and parts of Mumbai were blacked out for days, the authorities response to the platelets demand was prompt," says Vinod Shetty, a resident of Kalina who is a representative of Citizen, an NGO that works for victims of thalassaemia and AIDS. "It was Dr. Jayshree Sharma from KEM who alerted Dr. Jadhav, SBTC, and decisions were immediate – platelet units were flown in and distributed free."

Rauf Lala from the Kausa-Mumbra Relief Committee agrees. Dozens of persons affected by the flood came down with dengue and leptospirosis, their blood count started falling drastically. We alerted the minister for Medical Education who responded with a big heart. His entire team immediately diverted much-needed platelets to Mumbra. Still, we lost 11 of our young boys who had bravely helped in relief, wading through water without a thought for the risk they were taking."

Says Dr. Sharma, "It was on August 11, 2005 that the extent of the post-deluge crisis could be observed by us at KEM. Normally in the monsoon the demand for platelets at KEM's Blood Bank, the largest and most efficient in the city, is for about 100-140 units per day. But this year, it was as if the whole city's patients were pouring into KEM. We needed 300 platelet units every day. Patients were bleeding like taps. It was heartbreaking. It was the poor that were the worst sufferers. They would say, '*Paani mein sab chala gaya... bas ek jaan hi bachhi hai, usko bacha deejije...*' ('We have lost everything in the flood... only our life is left, please save that at least...'). The rich can manage somehow... what do the poor do?"

"I immediately alerted Dr. Jadhav from the SBTC. He responded very promptly. Stocks were airlifted from Nashik, Aurangabad, Ahmedabad and Bangalore. Free of cost – the SBTC bore the entire cost – platelet units were provided to all hospitals, public and private. Wherever there was a crisis, Mumbai or Mumbra, supplies were reached.

"The process of acquiring platelets is expensive and complicated, a time-consuming one. Donors need to be bled and tested. The platelets are then separated from the plasma and red blood cells, which are then given back to the donor. A platelet donor can donate platelets twice a week. This needs machines, which were also in short supply. The kit used in this process costs Rs 7,000 per patient. Two extra machines were also provided to the KEM Hospital, all at government cost. We used these machines continuously from August 11 to August 30, 2005."

Pressing the panic button in time saved hundreds of lives. As a result 54 per cent who came in could be saved. The rest unfortunately were already critical when they came in.

Dr Sharma, remembered by many for her foresight, is dismissive, "It was my duty to do what I did. Anyone in my place would have done it. It had to be done. God gave me the insight to press the panic buttons at the right moment."²⁰

Was it an epidemic? Leptospirosis, the disease spread through rat urine, shot into prominence after the floods. One is in danger of contracting the disease when open wounds, bruises etc come in contact with the urine of rats. During the floods people had to wade through dirty water and not surprisingly after the gestation period, people began to exhibit symptoms of 'lepto'. Initially the government tried to dismiss reports of leptospirosis as stray cases, however with increasing numbers

being reported, the administration was forced to 'be seen taking action.' On August 12, the MC declared that there had been a 'faecal outbreak. Later on in the afternoon, the Health Minister Ms. Vimala Mundada held a press conference where she declared that certain pockets of Mumbai were facing a lepto epidemic. Soon after this the Dr Subash Salunke, the DG of Health, added to the confusion by adding that only the BMC had the authority to declare an epidemic. The CM had the second-last

²⁰ "Hand in Hand"; *Communalism Combat*; August – September 2005

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word in the matter when he said that the BMC had invoked an emergency clause that made it compulsory for all private hospitals to report cases of fever to the BMC. The confusion was completed when the DG of Information and Public Relations Mr B. Gagrani declared that neither the state govt nor the BMC had declared any epidemic. All this inspite of the fact that several people had already died of water-borne diseases and over 600 suspected cases were admitted in different hospitals. Probably the authorities were not brave enough to admit that they had failed to prevent an epidemic in Mumbai, India's commercial capital, as this would have entailed a further loss of face.²¹

In the CCC's opinion, whether or not an epidemic was declared, the necessary steps should have been taken to first control the outbreak of disease, and secondly to gauge the extent of the disease and then treat victims.

The example of Surat is worth looking at in this connection. After the plague-like epidemic in the city, the administration took the opportunity to thoroughly cleanse the city, a cleanliness drive, which has now lasted years. Mumbai has clearly missed a golden opportunity to clean up its act.

II F) TRAVEL AND TRANSPORTATION

Given Mumbai's geography, its longitudinal north-south axis and the central business districts in south and central Mumbai while commuters live in the northern suburbs, transport is a key area in Mumbai's capacity to tackle a natural disaster.

The July 26 deluge snapped the city's lifeline — its suburban train system — used by millions every day. From the afternoon onwards, the train services on both Western and Central Railway were inoperable. The millions of commuters who normally rely on the trains were forced to either wait out the rains in the overcrowded stations of CST, Churchgate and others in south and central Mumbai, or attempt to return home by road. Since there was no accurate or authoritative information available on the scale of the problem, many attempted the latter option and were soon stuck in traffic snarls amidst rising

floodwaters. This led to further road congestion and the complete blockage of the city's arterial roads, the Eastern and Western Express Highways, S.V. Road and L.B.S. Marg.

This dangerous situation could have been avoided to a large extent if there had been proper communication to the public, warning them to stay indoors and at their places of work, as all travel and transport was seriously disrupted due to the heavy rain. By taking no measures to prevent commuters from resorting to road travel, the government is indirectly responsible for the loss of lives, injuries, illnesses and the damage to vehicles that had to be abandoned to the floodwaters.

Decongestion of the city's roads must be the topmost priority for all agencies concerned with Mumbai's development and administration. The CCC has observed that there is no shortage of reports and studies recommending various measures to achieve traffic decongestion, dating as far back as the 1987 Paranjpe Committee, followed by the Atkins study in 1994. However, these reports have been totally ignored and in some cases, specific activities warned against have been undertaken by successive state governments, leading to the current severely congested nature of the city.

For instance: The recommendation: The Atkins report warns against the construction of the West Island and East Island Expressway, on the grounds that they would only attract additional traffic to south Mumbai, worsening traffic congestion in the Tardeo, Bombay Central, Opera House, Nana Chowk and Kalbadevi areas. The new expressways would only shift bottlenecks around have little impact on overall system capacity. The report has stressed that demand management is the only solution to Mumbai's traffic congestion. It also emphasized rail transport as the most cost-effective way to solve Mumbai's transport problems, with the least environmental costs and highest economic returns.²²

Quotes from the Atkins report (Executive Summary, Pg XII Para 11)

(Tests with the model showed that the effect of major roads in the Island city such as the West

²¹ "Lepto Mania", *Mid-Day*, August 12th, 2005 <http://www.mid-day.com/news/city/2005/august/116037.htm>

²² "Comprehensive Transport Plan for Bombay Metropolitan Region- Final Report", *Bombay Metropolitan Region Development Authority*, July 1994

Island Expressway and East Island expressway would be to attract considerable additional traffic to south island destinations in the Tardeo, Bombay Central, Opera House, Nana Chowk and Kalbadevi areas to be worsened. Thus these new expressways would tend to shift the bottlenecks around and have little impact on overall system capacity)

(Executive Summary, Pg XII Para 13)

The study recommends that the Bombay divisions of the two present zonal railways be combined into a new Bombay regional railway corporation as a subsidiary corporation of IR. This is the optimal feasible means of serving the bulk of the future passenger needs of BMR and catering to the projected 47% increase in peak public transport demand

What has happened: The state government has gone ahead with building the prohibitively expensive Bandra-Worli Sea Link, as Phase I of the West Island Expressway, estimated to cost Rs 1,300 crores, though this is likely to go up still further as the project is delayed. Not only will this link have a negative impact on traffic congestion in Bandra, Worli and South Mumbai, unplanned reclamation for the project by MSRDC has also played a role in blocking the Mahim Creek and causing flooding in parts of Bandra and upstream areas (see section on BWSL, Section II).

To compound matters, the government-contractor nexus is determined to go ahead with the Trans Harbour (Sewri-Nhava) and the Worli-Nariman Point Sea Links, at a cost of Rs 4,000 crores and Rs 2,545 crores respectively. (Incidentally, the international consulting group McKinsey which recommended the project estimates that the Sewri-Nhava link, both road and rail combined, would cost Rs 8-10,000 crores). These amounts, if invested in public transport systems can make cheap, economical and comfortable travel for all Mumbaikars a reality, simultaneously avoiding the environmental problems that the sea links pose.

While such large amounts have been provided for private transport, public transport – the rail and

bus system, have seen negligible increases in investment.

Recommendation: The Paranjpe committee also stressed that restrictions on FSI and Development Plan Proposals should be strictly enforced and no new reclamation are allowed in Bombay.²³

(Quote from the Paranjpe Committee Report)

The Committee recommends the following preventive measures:

1. Overall integrated plan needs to be drawn for decongestion of Bombay Island.
2. No additional jobs should be allowed to be created in Bombay Island.
3. The restrictions on FSI and Development Plan Proposals should be strictly enforced
4. All big markets and wholesale markets should be shifted out of the Island city
5. No new reclamation should be allowed in Bombay
6. Permission for conversion of residential premises into commercial premises should not be granted.

What has happened: FSI has been increased through schemes such as TDR and SRA. FSI in gaathan areas, which are traditionally prone to congestion, has also been increased. Reclamation has been carrying on in different parts of the city and the state government is even contemplating permitting development on saltpan lands, which are CRZ I area and within a no-development zone.

One major step that could and should have been taken as the events of July 26 unfolded was to open up the Bombay Port Trust Road, otherwise closed to public and private transport, along the city's eastern waterfront. This single measure would have enabled thousands to reach their homes in safety. The failure to open this road is a lapse on the part of the Traffic Department.

With respect to the transport situation in Mumbai relevant to the events of 26/7, the CCC records the following findings:

²³ "Report of the High level Committee for Prioritisation of road works in Greater Bombay ", Government of Maharashtra, May 1988

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1) BEST: 3380 BEST buses carry 45 lakh passengers daily on 335 routes. Over 80% of these passengers travel short distances of up to 7 km. However, when the train system malfunctions, people rely on

BEST for long distance travel as well. On July 26, of the BEST's 3380-strong fleet, 768 buses were rendered inoperable due to flooding.

In all, the BEST operated over 500 extra buses on main routes, especially from CST and Churchgate, on the 26 and 27. On 26/7, 362 extra buses were operated and on 27/7, 147 extra buses were plied.

The BEST suffered extensive losses due to the floods.

Damage to buses: Rs 3.34 crore

Damage to property: Rs 0.22 crore

Damage to equipment: Rs 1.22 crore

Total: Rs 4.78 crore.

It would appear that there was little that the BEST could do given the circumstances. However, the BEST has suffered due to inadequate resources provided to it over the years, and this must be seriously addressed. Resources must be generated/diverted to enable the expansion of the BEST bus fleet to discourage the use of private transport.

There is a school of thought both within and outside the BEST that believes it is best not to operate more buses in such a situation as they add to congestion. However, the solution is not to take buses off the roads but rather to keep private vehicles off the roads while simultaneously deploying additional buses, which take up less space per passenger transported. The traffic jams on July 26 were caused not by BEST buses but by the large number of private vehicles and taxis on the roads. In future, if in such emergency situations private cars are kept off the roads, the complications caused by congested roads and traffic jams can be substantially reduced. Private vehicles could be allowed to ply only when filled to capacity.

Why did buses break down on July 26? BEST officials also commented very strongly about the adverse role of private vehicles in 26/7. They said that if public transport catered to 84% of the population, it was obvious that it should be given higher priority. The tremendous increase in the growth of private vehicles had put a considerable strain on the city's infrastructure, reducing the average speed of vehicles to 12 km per hour. Asked if it would help to keep private vehicles off the road during emergencies, they said they were not sure about the feasibility but asserted that during any emergency there should be a dedicated lane for public transport. This time around (26/7), private vehicles veered towards the centre and the right of the road, pushing buses to the left where the water levels were considerably higher. Both buses and vehicles were stranded. CCC was told that that any move to control movement of private vehicles in an emergency was always welcome.

They (BEST) emphasized the need for dedicated lanes for public transport. They added that BEST were in talks with the MMRDA, which had promised to dedicate lanes while expanding the Eastern and Western Express Highways and creating the east-west corridors. These would be on the left, though the BEST had tried to reason with the MMRDA that the lanes should be in the centre where the height of the buses would be the highest and had been successful in cities like Bogotá. The MMRDA had refused, citing that historically, bus shelters were always next to footpaths which were on the side of the road and creating new footpaths in the centre would not be viable. BEST officials cited the instance of Moscow, where traffic in lanes dedicated to public transport moved much faster than traffic on the other roads.

What happened to BEST control room? The first information trickled in between 14:55 and 15:06 when it came to BEST's notice that Malad subway, Dahisar subway and Mulund check naka were flooded. Immediately, routes of several buses were altered and in some cases terminated. The BEST's GM sent out warnings to officers to expect heavy rains with strong winds and told them to be alert on line. By 15:40 it became apparent that other areas like Dadar workshop and the entire stretch of LBS road in Kurla were flooded. The consensus till around 5 pm was that this was one of those heavy

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On the charge by the traffic police that BEST cranes did not help in clearing the stranded vehicles, CCC was told that the BEST had only two cranes which were busy in clearing their own vehicles. In fact the BEST themselves had to hire additional towing vans and cranes to clear their vehicles.

On the second charge levelled by the Traffic Police that once BEST vehicles broke down, it was only engineers from the home depot who could repair it, BEST officials clarified that this was not the case. Engineers from the nearest depot would attempt to repair the bus and if it could not be repaired, it would then be towed to the nearest depot.

rain days but levels would subside with the ebb of the tide. At the 4 pm meeting with the CM on the 26th, it was learnt that the railways had stopped working and the BEST decided to run additional buses.

Asked were any alarm bells ringing and warnings shared between the BEST control room and other control rooms when it became apparent in the early afternoon that several suburbs were flooded, sources said that at that point the general belief was that the water level would go down with the low tide. About reporting the matter to other control rooms, it was pointed out by the BEST that the normal practice was to report any emergency to the BMC control room, the police control room and the Traffic control room. When asked whether this had been done on 26/7 afternoon, BEST officials said that they were confident that it had,

Asked whether there any communication breakdown at BEST depots, and what the BEST proposed to improve communication systems, CCC was informed that the BEST has an exclusive Disaster Management Plan independent of Mumbai's. This was put into action at 15:30. In any disaster, each depot and each person knows what their role is. Therefore, even during 26/7, many depots coped well. Each depot has wireless sets, which, if fully charged, can work for more than 24 hours. Communication with three depots — Kurla, Bandra and Santa Cruz — was severed. In the Kurla Depot, water completely submerged the ground floor. The CCC was also told that the entire Kurla depot was in the process of being remodelled.

Asked where the communication equipment was kept, CCC was told that most was kept on the ground floor. Asked if after the floods, there were any lessons learnt – eg moves to shift these communication devices to higher ground and to make sure that they functioned in emergencies – it

was stated that this had not been considered, but was now a possibility.

CCC was told that the BEST was planning to introduce FM radio stations in buses which are dedicated to regular traffic bulletins – this is for one way communication. BEST is at an advanced stage in installing these radio stations and has invited bids.

It is also installing wireless sets in all the 3,391 buses so that the driver and conductor can keep in touch with the nearest depot or control room and vice-versa. In fact it was stated that this idea had been already put forward to the government and was awaiting sanction.

Sources also indicated that the need of the hour was a dedicated traffic management centre which needs to be set up where it is possible to relay two-way information to different agencies so that they might monitor and focus the traffic situation in different areas and act promptly.

2) RAILWAYS: Mumbai's suburban railways – Central & Western — carry about 6.4 million passengers every day, which must be one of the largest networks in the world. It is also one of the cheapest urban mass transit systems, charging about 5 paise per kilometre for season ticket holders. Despite this, the suburban rail system manages to break even due mainly to the high volumes of passenger traffic; trains carry four to five times their capacity in the peak hours in what is termed “super crush” capacity.

Mumbaikars have come to expect that the city's train services will be thrown out of gear at least once or twice every monsoon, for a few hours each time. The normal reaction of commuters is to wait until the water recedes, once the high tide is past, after which time services resume. According to the testimony of Mr. M.Z. Ansari, GM of Western Railway - WR), he and his officers were satisfied

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with the BMC's clearing of drains before the monsoon, which was ahead of schedule and better than normal this year. In addition, WR had itself cleaned some of the drains along its right of way (area adjoining tracks on either side right up to boundary walls). In fact, it hoped to get through the 2005 monsoon without any disruption of services. The GM of the Central Railway (CR) in fact had gone on record that there would be no disruption of the CR services in the monsoons due to the precautions that they had taken.

On July 26, rail traffic on the WR was stopped at 3.30 pm. According to Mr. Ansari, there was no opportunity to warn the BEST, police and other agencies, as is normally done, as water levels rose in a matter of minutes between Mahalaxmi and Bandra. His suspicion is that the large volumes of water suddenly flowing down the Mithi from the north, coupled perhaps with a release of water from the Powai or Vihar dams, raised water levels.

WR was disrupted completely from 3.30 pm. on 26/7 to 8.05 am the next day. Services were partially restored on the Churchgate-Mahalaxmi and Bandra-Virar on the 27th morning. By 9.50 pm that night, services were completely restored.

Suburban and long distance services on the Central Railway were suspended from 4.15 pm on 26/7. Suburban services on the main line and Harbour line were partially restored the following day. Suburban services on the Kalyan-Karjat section were restored from 4/8. Long-distance trains towards Pune were restored that day. Long distance trains towards the Konkan Railway line were restored from 9/8, and towards Nasik, from 17/8.



maharashtra.gov.in/english/gazetteer/

Overall, WR suffered a loss of approximately Rs 33 crores. CR lost much more, Rs 160 crores approximately. Half WR's EMU [Electric Multiple Units] fleet was damaged. In the 1990s after similar flooding, it took three months to restore the EMUs, but this time they were restored much faster. A target date of Aug 30 was set for the restoration of all rakes, but by August 22, most were operational. WR normally runs 1,007 trains every day.

Mr. Ansari, who was given additional charge of CR on August 1, also informed the CCC that 49 EMU rakes on the CR had been damaged, together with 22 electric locomotives and 15 long-distance rakes. Approximately 11 km of track on CR was washed away and 1,900 metres were affected by landslides.

The longest breach in the tracks was in the Kalyan-Igatpuri section. A bridge over the Ullas on the Diva-Vasai section was severely damaged when it was hit by a runaway barge swept downstream by the raging river.

Mr. Ansari also stressed that there was absolutely no warning or indication of any kind from the IMD that such heavy rainfall could be expected.

The railway's communication (telephone) system was slightly affected on the 26th evening but was fully restored by the next morning. WR and CR source their power from Tata Electric and MSEB; there is no dependence on Reliance, hence they were unaffected by Reliance's power blackout.

Mr. Ansari came out strongly in favour of the ban on plastic bags, saying they were the single biggest cause of blocking the drains. The ubiquity of plastic makes cleaning drains an impossible task, no matter how many are employed.

In some places, Mr. Ansari opined that the construction of buildings on what was formerly open or low lying ground, led to flood waters surging on to the tracks. He particularly mentioned a section of track after Kalyan station. When the track bed was restored, the railways incorporated a culvert to ensure that this would not happen again. Interestingly, this culvert construction was objected to by locals on the other side of the tracks. Mr. Ansari stressed that the raised railbed serves as a flood protection embankment in many places, but this is not their primary duty and in fact threatens

the integrity of the tracks in times of heavy rain. As part of their repair work post July 26, the railways has built several culverts in different places.

Mr. Ansari stressed that enhancing and properly maintaining the drainage capacity of the city's storm water drains was essential if the 26/7 tragedy is not be repeated.

Mr. Ansari was of the view that the electronic media did not handle the situation effectively. There was a significant time lag between information being passed on from the railways and the telecasts. News that the trains had stopped was not carried fast enough, leading to more people coming to stations. Once skeletal services were restored, the media gave the impression that all trains were running, leading to huge crowds gathering at some stations, for example, Bandra. And after services were restored, channels continued to say that the trains were affected.

When asked what impact construction on low lying or open lands adjoining rail tracks could have, Mr. Ansari first said he was not qualified to say. When the issue of salt pan lands was specifically raised, he said this would make the adjoining rail tracks more prone to flooding. He also said that given Mumbai's geography, the metropolitan region was not capable of holding 2 crore people. As long as people commuted from Thane district, Dahanu, Pune, Panvel etc to the city daily, transport would remain a problem.

There is not much scope to further increase the capacity of the suburban rail system. Trains now run at a frequency of about three minutes on WR, so there is not much scope for increasing train frequency, according to Mr. Ansari. It has introduced 12-coach rakes. The only other ongoing plan to increase capacity is the quadrupling of tracks on the Borivali-Virar stretch, which is being funded by the World Bank under MUTP. This has been delayed because of rehabilitation problems and the latest scheduled date of completion was November 2005.

Regarding the possibility of running double-decker trains, he said that such trains would not carry more passengers, as both floors would only provide seating, as the overall height of the carriage

cannot be raised. Moreover, space would be lost for staircases etc.

Mr. Ansari believed that the only option available for Mumbai's rail transport was an underground metro. But he cautioned that even this would not help in the long run if the current policy of encouraging people to travel 2-3 hours between home and office continued. As long as Mumbai remains the main job centre for people from the hinterland, the transport crisis would worsen.

3) PRIVATE TRANSPORT: The high vehicle density on Mumbai's roads is a major setback during natural disasters and crises. The W.S. Atkins report [in 1994] showed that Mumbai was unique in that 83 per cent of the passenger trips in peak hours were by public transport (train and bus), another eight per cent by taxis and three-wheelers and only nine per cent by private transport (both cars and two-wheelers).

There are about 12 lakh vehicles in Mumbai today. The number of vehicles is growing at about 6 per cent per year. Vehicle density is about 700 vehicles per kilometre. Approximately 200 new vehicles (two and four wheelers combined) are added to Mumbai's roads daily. This does not include vehicles registered in Thane.

The congestion caused by the volume of private transport vehicles hinders free movement, especially in disasters. While the population has grown 1.8 per cent annually from 1981, the car and two-wheeler population has grown at the annual rate of 5.5 per cent and 18 per cent respectively.²⁴

None of the various traffic decongestion measures proposed in the Paranjpe report have ever been implemented (cars with even number plates on even dates/separate bus lanes/one way traffic during rush hours etc). What the city has experienced has been haphazard engineering and supply-side solutions that have ignored the root problem, that is, the high number of private vehicles, lack of a comfortable mass transit system and the continuing concentration of employment opportunities in the southern extremity of the city.

Several urban planners and architects expressed to the CCC their concern that the ongoing

²⁴ 'Pay for Road Use'; *The Hindu- Business Line*; Sept 09, 2005
<http://www.thehindubusinessline.com/life/2005/09/09/stories/005090900180400.htm>

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Certain facts with regard to Mumbai's traffic situation were brought to the CCC's notice:

- 42 lakh people come to south Mumbai every day, by train, bus and car.
- The total working strength of the Traffic Police is 2228, but on any given day, the available strength on any given day is 1643, divided into two shifts.
- The number of vehicles has increased 34 times from 1951 to 2004. Private vehicles occupy 84 per cent of the road space but carry only 17 per cent of people.
- The number of traffic police works out to just one man per two kilometres.
- There are a total of 467 signals in Mumbai; another 130 are needed.
- The government spends Rs 13 crore as fines every year.
- Private vehicles should no longer be subsidized by tax benefits, like depreciation. This is encouraging the growth of private vehicles in the city even though there is no space on the roads.
- Shopping complexes/residential high rises that are coming up do not require an NOC from the Traffic Police, even though these complexes invariably lead to traffic jams.
- Parking charges and the fines imposed for traffic offences have not been increased for several years Mumbai is one of the only mega-cities to have diminishing parking rates on a telescopic basis (i.e. parking charges are reduced for longer periods).
- Unless these basic issues are addressed, the city will only lurch from one crisis to another, each worse than the previous.

construction boom in central Mumbai following the sale and development of mill lands, would worsen transport significantly. Neither roads nor rail were capable of handling more passengers.

The role played by the MSRDC also came in for criticism. Primarily a construction agency for roads (as its name reveals), the MSRDC now virtually decides on road schemes, without even consulting the MMRDA, which is supposed to be the supreme planning agency for the Mumbai region. Their continuing insistence on 'glamorous' projects such as the Bandra- Worli-Nariman Point Sea Link and the Sewri-Nhava Sea Link at phenomenal costs (currently estimated at over Rs 8,000 crores totally), while the state government professes that it is unable to fund much-needed improvements in public transport, is strangulating the city and rendering it increasingly prone to disasters. Both these projects will lead to increased congestion in south Mumbai. This is the main reason why a succession of reports and experts have warned against wasting funds on these expensive non-solutions. The only lobby to benefit from these projects will be construction firms, corrupt officials and car-owners, a vocal minority.

II. G) HOUSING

The housing crisis that plagues Mumbai is partly responsible for the destruction wrought by 26/7. The housing policy is now being determined by the government and builders, with no consideration of people's own initiatives, according to testimony from architect and activist P.K. Das from the Nivara Hakk Suraksha Samiti. There was a conscious effort to undermine the entire planning process. With the current emphasis on privatization, the main players in the housing market – the builders – were calling the shots. The public could not participate in any decisions in this sector due to the lack of information and accountability. This has led to the proliferation of slums that unofficially account for a majority of the population – 55 per cent.

A large proportion of the lives lost were of those living in unauthorized, irregular, makeshift structures, in areas with little or no infrastructure, thus making them more prone to such disasters. According to the 2001 census, Greater Mumbai has a slum population of 58,23,410 as compared to a non-slum population of 60,90,888. Only 2,88,967 slum dwellers are eligible for rehabilitation up to the January 1, 1995 official cut-off, according to government figures.

That millions in Mumbai are forced to live in such locations and structures is a reflection of serious failures in the city's planning, administration and implementation of development regulations. The main reasons for Mumbai's housing crisis are summarized below:

1. Exemptions granted under the Urban Land Ceiling Act: The Urban Land Ceiling Act was introduced to enable the government to acquire land at low rates in order to provide low cost housing to the poor. Only a few hundred acres were acquired in Mumbai. For any exemption granted under the ULCA, the builder has to provide 5 per cent of the tenements built to the state, for allotment to the needy. In practice however, this quota is either never given to the government or is used by the political forces of the time to grant favours. This is in effect a loss to the city and one source of cheap housing for the poor is lost.

2. Failure of the Slum Redevelopment Scheme: The Slum Redevelopment Scheme is little more than a carefully crafted scheme to benefit builders at the cost of the city. The scheme provides for 2.5 FSI in situ in addition to TDR. In August 2001, the state government-appointed S.S. Tinaikar committee on slum rehabilitation submitted its report, exposing the Shivshahi Punarvasan Prakalp (SPP), (as the slum rehabilitation scheme was then known) as a fraud designed to enrich Mumbai's construction lobby at the expense of the poor and by sacrificing public assets. Despite such strong condemnation, the scheme has been continued.

The bulk of the lands on which private builders were allowed to start projects were public lands, handed over at a pittance of between Rs 1,000 to Rs 4,000 per square metre. "The private builders," the Tinaikar report records, "picked up premium lands of public authorities, which had been grabbed by encroaching slums, and got a quick clearance from (the) SRA. Clearance from the land-owning government departments - the Maharashtra Housing and Area Development Authority (MHADA) or the Municipal Corporation of Greater Mumbai (MCGM) — was not a precondition. It was to follow within 30 days of the SRA approving the project of redevelopment. Lease or similar authority in respect of land was not insisted (on) by (the) SRA from the developer.

"The size of problem is of a magnitude with reference to which the achievement over the last ten years of the slum rehabilitation scheme is so minuscule; the gains derived by some developers by grabbing premium plots of public authorities for a song, so high; and excessively liberal development control rules to 'facilitate' the developers to make unlimited profit at the cost of integrated development of (this) metro city so brazen; that the continuation of this policy... is bound to be disastrous."

Buildings coming up under the slum rehabilitation scheme are being planned without any relevance to infrastructure, even though massive amounts of FSI are available on these plots. Slums invariably come up on sites which were occupied by natural drainage systems, and being "low-lying" sites, were misused for waste and refuse disposal. This has blocked the nallahs (eg. along Mithi, Dahisar, Poisar rivers and other natural creek and streams). In many cases, when these slums are handed over for redevelopment under the SRS, buildings have come up on or abutting these rivers and nallahs. For example, in Shivaji Nagar Santa Cruz (East), two buildings built under the scheme have encroached on the Mithi River. Shree Ganesh Society in Kandivli has encroached on the Poisar river.

According to Mr Das, builders have even tried to exploit the concern regarding unauthorized hutments along the Mithi after 26/7. They have been offering 'parcelled' projects, rehousing the existing dwellers in situ with 2.5 FSI, which exonerates the government from providing alternative accommodation. According to rough estimates from an official survey conducted by the Collector (Suburban District), around 90% of the 20,000 slum dwellers along the Mithi are eligible for rehabilitation. The housing rights organisations demand that such surveys be conducted jointly with the affected colonies so that the room for manoeuvre is restricted.

The Tinaikar report notes: "It is well established, after ten years' experience, that utilising the agency of private property developers for construction of formal houses for slum dwellers in replacement of hutments has failed miserably."

Hundreds of applications for ownership of land under the Slum Act are still pending, but instead of guiding people to become the owners of the land, the administrative and political machinery is only

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interested in introducing builders into the equation, and handing over the land to them, enabling them to make massive profits and in many instances not even benefiting the slum dwellers.

In the mid-1970s, the Slum Act empowered slum dwellers by handing over the property on which the slums were to residents to construct their own houses. However, this was realized and implemented only in a few isolated cases in the late 1970s. Wherever this model was followed (about 65 instances), the slums did not proliferate, as those who now had proper homes had a vested interest in upgrading and improving their surroundings.

The builder-centric model being followed at present has met with very limited success, with a significant percentage of rehabilitated slum dwellers selling their new dwellings. Allowing people to develop the land themselves is the better option, as ownership will give them incentives to take care of the area, prevent further encroachments and construct better tenements for themselves, as long as the costs are met. Instead slum dwellers are being forced to choose between two bad options: a builder or staying in slums.

While redeveloping slums, natural drainage must be maintained but this has not happened. In many cases this will mean that buildings cannot be built in areas presently occupied by slums. The current scheme however conveniently ignores these ecological imperatives.

3. Vote-bank politics: It is no secret that Mumbai's slums survive because of their function as vote banks. It is in the interest of politicians and political parties

to keep people on the edge of survival so that promises for electricity connections, water supply, sanitation, pucca houses, regularization, ration cards etc can be made each election, in return for votes.

In most areas, slum lords allied with political forces play an important role to prevent people from gaining control over the land. Public funds under the Slum Improvement heading are diverted for roads and pavements, water supply, drainage lines, electrification of roads, constructing toilet blocks etc.

There are large-scale irregularities in the fund allotment and use, especially in the construction, repairs and maintenance of toilet blocks. Many of the toilet blocks are intentionally made non-functional and allowed to degrade, so that after a period of two years or so, a fresh contract could be awarded to demolish and construct a new block. However, since the basic structure is intact, superficial restoration is carried out and the building passed off as new, enabling contractors to make large profits.

4. High real estate prices and lack of low-cost housing: It is in the interest of the builder lobby to keep real estate prices artificially high to maximize their profits. As a result, low and middle-income groups are forced to either encroach on public spaces or seek housing further away from the main city (Virar, Dahisar and beyond). Public spaces such as the banks and beds of creeks and rivers, mangrove areas, low-lying ground, open spaces etc are encroached on. People who are forced to live in distant suburbs invariably have to travel three hours in the day to and from their work places, exerting further strain on the city's transport infrastructure.

The failure of successive governments over the decades to provide for the housing needs of the middle and lower income groups is the single biggest cause of the problems of illegal, unauthorized housing structures in the city today. With privatization, MHADA has stopped building for the less-privileged. Worryingly, despite much debate over encroachments and their removal, the root causes, including the lack of affordable housing, are being ignored by the government and the media.

The availability of reasonably-priced housing is a fundamental right and the responsibility of the government. It must be enforced for an improvement in the quality of life for all Mumbaikars.

5. Grant of excess FSI: The proliferation of housing for the middle and upper classes in congested areas is placing an immense load on the city's transport, water supply and sanitation infrastructure. The builder-politician nexus is constantly seeking ways to increase the buildable area and make big profits, at the cost of the city. Among the methods being followed are:

a. Reconstruction of cessed buildings:

The irregularities in the reconstruction of cessed buildings has been addressed by the Bombay High Court's recent judgment. The HC has observed that most tenants shown on record in such reconstructions were bogus and hence the existing scheme must be amended and replaced by one which is more transparent, judicious and capable of proper monitoring. In many cases, houses meant to accommodate the tenants of cessed buildings have ended up becoming the servant's quarters for the rich house owners who moved into the reconstructed buildings. By showing bogus tenants, builders have been able to load huge amounts of FSI in areas that are essentially congested and where the infrastructure is already struggling to cope with the population burden. As high as 35- and 40-storeyed buildings have come up in congested areas such as Nana Chowk, Grant Road and Girgaum. Some buildings have had as much as 11.4 FSI constructed. There are about 19,000-odd cessed properties in the island city.

b. Usurpation of MHADA land by builders:

MHADA has joined the list of government agencies colluding with builders to take over open spaces and gardens on MHADA land. Since the open spaces on MHADA's lands have not been shown as designated open spaces, MHADA is now handing these over to builders. Existing MHADA colonies are also being targeted by slumlords/builders. By encouraging slums in these areas, the FSI can be increased and the existing building added to or a new building constructed. The MHADA redevelopment policy needs to be looked at afresh.

c. Reconstruction of BMC acquired properties:

In the 1950s and 1960s, the BMC acquired private properties that had chawls or legal or illegal slums, with the idea of constructing buildings to house the slum dwellers. Paucity of funds resulted

in the BMC being unable to develop the areas and so the slums remained and spread. Further, most of these properties are only ground floor structures and hence not dangerous. Now under DC Regulation 33/7, builders have been given 2.5 FSI for the reconstruction of such properties. This should never have been permitted as they are not by nature dangerous and can easily be repaired without involving the builder lobby. Handing over the property to builders and permitting increased FSI has resulted in a further load on the city's infrastructure.

What is more, a further 1.5 FSI can be added to the plot if the builder gives 40 per cent of this to the BMC. This would bring the total usable FSI to 4, on structures that are in the first instance not dilapidated. These BMC properties are capable of earning thousands of crores for the builders, with no thought given to the city's capacity to handle the additional load, or the fact that slum dwellers will not benefit.

d. Sale of Municipal markets, schools, offices etc:

The issue of excess FSI loading is prevalent here too. These are again mostly ground storey or ground plus one storey structures. Under the scheme to reconstruct these structures, existing stall holders get the same amount of space in the new market free of cost. An additional 60 per cent of this space is sold commercially by the builder. Further, an additional 2.5 FSI (over and above that given to existing stall owners and the incentive commercial area) is given to the builder. From this 2.5 FSI, 60 per cent of the residential area built is given free to the BMC and the remaining sold by the builder.

For example, in the case of the Dadar Municipal Market, the existing Floor Space is about 30,000 sq. ft. The developer will get 20,000 sq. ft as incentive commercial area. The cost of construction of the 50,000 sq. ft will not be more than Rs 4 crores. The selling price will at a conservative estimate be Rs 15,000 per sq. ft. as the market is adjoining one of the city's busiest railway stations. The revenue fetched on this sale of commercial area alone will be Rs 30 crores. In addition, 70,000 sq. ft. of residential area is constructed, of which 40,000 is given to BMC and 30,000 sold at market rates. The cost of construction of 70,000 sq. ft will be approximately Rs 6 crores and the sale proceeds

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from 30,000 sq. ft. at the rate of about Rs 8,000 per sq. ft. is about 24 crores. The developer will thus gain about 45 crores from this one development project alone.

This scheme will further exert additional pressure on the city's infrastructure. There are over 300 such markets in the city.

e. Gaothans, koliwadads, agriwadads and bhandarwadads:

Gaothans have a separate set of rules governing development, which were approved only recently. These rules do not have much respect for organic growth of the gaothans and their heritage aspects. The new rules are fairly lopsided and heavily in favour of builders, resulting in the original residents of these areas being put to a lot of inconvenience ultimately resulting in their forced eviction from the area.

Since gaothans are essentially villages that have been engulfed by the city, these areas typically are congested and with limited infrastructure. On this basis they should have an FSI equal to or lower than the rest of the city, but the opposite has been allowed, with gaothans being given a higher FSI of 2, as opposed to 1.33 or 1 for most of the city. Koliwadads, agriwadads and bhandarwadads have been the worst affected by the DC rules and most of these original settlements have now been categorized as slums.

For example, at the Sion Koliwada, the residents live on a piece of land allotted to them by the British, who took over almost 363 hectares of land belonging to this community. The then British government gave them smaller alternative lands and paid for the construction of their houses. The slum authority has now approved slum rehabilitation schemes on this land, making these original residents entitled to just 225 sq. ft carpet area when the actual area they are occupying is more than 2,000 sq. ft. each.

A slum in the neighbourhood has been shown as amalgamated in this scheme and bogus tenancies have been created to deprive all the residents of this area from their legitimate rehabilitation package by showing them as non-consenters to the scheme. The figures have been manipulated in this case to show them as less than 30 per cent of the total residents. The factual

position is that none of the original residents support this scheme.

FSI must be subject to infrastructure: The argument advanced by the builder-politician lobby in favour of schemes that allow extra FSI is that this is needed in a city where housing is in short supply. This argument does not hold good for the following reasons:

- a. The majority of the housing being provided through these schemes is aimed at upper or upper middle class buyers and is unaffordable for the poor.
- b. Expansion in terms of housing can only be allowed if the infrastructure (water supply, traffic, sewerage, green spaces etc) is capable of supporting that expansion.

Instances of other large cities such as Tokyo are often quoted to justify granting higher FSI for Mumbai. However, there is a vast difference between the infrastructural capacities of cities such as Tokyo and Manhattan in New York as compared to Mumbai. The provision of public transport, parking space, sanitation and sewerage are able to handle the larger population concentrations that are generated by higher FSIs in these cities, whereas the same services are in serious danger of complete collapse in Mumbai. To increase FSI in such a situation would be disastrous, as these services would be unable to cope with higher total populations and higher population densities that increased FSI will generate.

A pre-requisite to any increase in FSI would thus have to be the creation of socially beneficial infrastructure: water supply, sanitation and sewerage, public transport.

II H) INTERFERENCE WITH ECOLOGY

- 1) The Mithi river/Mahim Creek
 - a) Worli-Bandra Sea Link
 - b) Bandra Kurla Complex
 - c) Airport
- 2) Dahisar, Poisar and other rivers/nallahs
- 3) Reclamation and filling of marshy land, creeks
- 4) Encroachment
- 5) Quarrying

Drainage has emerged as the most crucial issue facing Mumbai city post July 26, 2005. Though drainage is traditionally taken to mean the provision of pumping stations, storm water and sewage drains and marine outfalls, this section will dwell on the much larger, more important and almost completely neglected role of natural drainage.

The 437 sq. km. of Greater Mumbai is drained by several small and large rivers, from the now-famous Mithi to others such as the Poisar in Kandivli, the Dahisar river and others. Creeks such as the Malad Creek also play an important role in storm water drainage.

From the CCC's visits to the affected areas, it began to emerge that a common thread was the manner in which the city's natural drainage channels – its rivers, creeks and nallahs – have been abused and systematically choked if not destroyed.

II H 1. THE MITHI RIVER/MAHIM CREEK:

The Mithi river was once a commercial channel for areas that are now the central suburbs of Mumbai. With the rapid growth of the city in the last two decades, the once extensive mangrove ecosystems along the Mithi river and the Mahim creek have been destroyed. Hundreds of acres have been reclaimed for construction. These ecosystems serve as a buffer between land and sea. It is estimated that Mumbai has lost about 40% of its mangroves between 1995 and 2005,

some to builders and some to encroachment (slums). Sewage and garbage dumps have also destroyed mangroves. Much of the Bandra-Kurla complex was created by replacing such swamps and mangrove areas.

The Mithi river is a confluence of the discharges of Powai and Vihar lakes. Originating at Powai, Mithi river flows through Saki Naka, Safed Pool, around Santacruz airstrip, passing through thickly populated residential and commercial areas like Jarimari, Bail Bazar, old airport road, Kalina (CST road), Vakola, Bandra-Kurla complex and Dharavi, before becoming the Mahim creek. The river bed is narrow in the initial stretch and is about 10 meters wide. Its total course covers about 15 km. It serves as combined sewer for the area carrying sewage, industrial waste and garbage as well as storm water to sea.

The mouth of the original Mithi river was once several hundred metres wide. Today, due to a number of interferences, the mouth is only about 40 m. wide. The river's catchment area covers about three-quarters of Mumbai, from the Sanjay Gandhi National Park in the North to Dadar TT in the south. The unplanned growth of Mumbai and the consequent sacrifice of the Mahim Creek holds lessons for all large cities of the world.

In 1930, the marshy land in this area covered over 700 acres. The upgradation and broadening of the Mahim Causeway and the construction of

the railway bridge to connect Bandra and Mahim involved filling in parts of the creek, narrowing the mouth. Similarly, a bridge was built for the water supply pipes from Tansa and Vaitarna. Finally, a large patch of mangroves was reclaimed for the Dharavi-Bandra link bridge, once again blocking the river's exit to the sea. Another section of the creek was filled in for the construction of a drive-in theatre near what is now the Bandra-Kurla Complex.

Further west, the area immediately adjoining the



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mouth of the river was blocked by the Bandra reclamation in the 1970s, as well as reclamation for the Bandra Kurla complex and the Bandra-Worli Sea Link (1990s) and for the Bombay Sewerage Disposal Project. During High Tide, it is now more difficult for seawater to enter the river for these reasons, increasing water level at the mouth. This also makes it more difficult for rainwater from land to drain out to the sea, further aggravating the problem. This leads to inundation in Dharavi, Mahim, Bandra East, King's Circle, Kurla, Nehru Nagar and Dadar TT, as well as Kurla, Ghatkopar, Kalina and Saki Naka.

Illegal activities such as washing oil and chemical drums, discharging hazardous waste and dumping garbage can also be observed along the river. This constant abuse has reduced both the depth and the width of the river in most places. All sections of the river visited by the CCC (Bandra-Kurla complex, CST Road, Vakola, Jari-Mari) showed clear evidence of such illegal activities.

'Channelisation' of the Mithi river: The path of the Mithi river that flows into the Mahim creek has been reduced by reclamation carried out by the MMRDA. The original course of the river has been changed and the river has been "trained" to follow an artificial route by the creation of bunds on its sides. This 'channelisation' programme as it is termed by the MMRDA is contrary to the basic nature of an estuary: free mixing of river and sea. This has destroyed the mangroves in the area and has also made the area less capable of absorbing flood surges.

NEERI had objected to the reclamation of BKC and also MMRDA's channelisation programme, warning of heavy floods in surrounding areas. The National Institute of Oceanography's former Deputy Director Dr. AG Untawale had urged MMRDA to stop channelisation and to remove the bunds.

In the CCC's opinion, there are three main interventions that have interfered to varying degrees with the Mithi's free flow, causing the destruction witnessed on July 26. Each of these interventions are an indication of the faulty planning that has become the norm in Mumbai, either because of skewed priorities or vested interests.

II H 1 A) BANDRA-WORLI SEA LINK

The Worli-Bandra Sea Link exemplifies bad planning and in the CCC's view played a contributory role in the serious flooding that occurred along the banks of the Mithi river, Kurla, Kalina and neighbouring areas.

Despite experts' and authorities' warnings against these projects (Paranjpe Committee report in 1987 and the Atkins report in 1994 to name two), the state has stubbornly ploughed vast sums of money into this 'non-solution' for the city's traffic.

The Summary Initial Environment Examination of the project was conducted by foreign consultants in 1993. Though they were in favour of the project, they warned that "... the Project can be a successful part of such a plan, which should include consideration of improved mass transit, parking restrictions, alternative travel modes, computerized traffic signal management and land use controls. In the event that these larger issues are not addressed appropriately... the project will most likely add to the environmental problems of the city."²⁵

After visiting the area in question and hearing individuals and NGOs involved with the project, the CCC finds that the BWSL and activities undertaken in its name have narrowed the mouth of the Mithi and contributed to the flooding.

The project currently under construction is substantially different from that for which environmental clearance was granted in 1999. Around 27 hectares of land have been reclaimed though permission was granted for just 4.7 ha. This additional reclamation has taken place at the very point where the river exits into the Bay, narrowing its mouth. The MSRDC subsequently attributed this to an "an inadvertent error in correspondence with the MoEF". Shockingly, the MoEF subscribed to this explanation and in a letter in 2000, amended its original clearance to state that reclaimed land should not exceed 27 ha. However, this change should have necessitated a fresh Environmental Impact Assessment and fresh permission to be sought, in keeping with the 1994 EIA notification.

Moreover, the 90-odd pillars that will be constructed for the bridge will in effect obstruct 670

²⁵ 'Summary- Initial Environment Examination, Worli-Bandra Link Project', prepared by Balloffet and Associates, Inc, August 31, 1993

m. of the 1600 m. width of the mouth of the bay, more than one-third. With siltation already posing a serious problem, any additional blockage will worsen the situation. The next deluge could see an even higher toll of death and destruction in the areas drained by the Mithi river/Mahim creek. The July 2001 Indian People's Tribunal (IPT) report on the BWSL specifically warned that the reclamation for the BWSL could cause serious flooding in areas adjacent to the Mithi. This prediction, sadly, went unheeded.²⁶

Under the original plan, the proposed bridge was not supposed to disturb the sea, yet on the Bandra side, a road stretching more than one kilometre has been built by reclaiming land. According to the report of a public enquiry conducted by the Indian People's Tribunal, this is contrary to one of the original recommendations made in a 1992 MMRDA report on the project stated that no further reclamation should be allowed on the Bandra side, to prevent siltation in the Mahim Bay and creek area.²⁷

Health impact: An estimated 800 million litres of sewage enters Mahim Creek every day, in addition to an unknown quantity of industrial effluents released by small scale, unregulated industries located along the Mithi's banks. Tidal action and flushing with seawater is the natural filtration mechanism that is keeping the mangroves in the creek alive. If this tidal action is blocked or reduced by the sea link and other forces, the mangroves will slowly die and this natural filtration will no longer be possible. The sewage will stagnate and accumulate, posing a tremendous health risk to a large segment of Mumbai's population.²⁸

Aside from its role in the narrowing of the mouth of the Mithi river, the BWSL also attracted the CCC's attention because of the role it will play in increasing traffic congestion in south Mumbai. The BWSL will do nothing to remove bottlenecks in the city's traffic system. Rather, it will merely shift bottlenecks around and create newer, worse congestion problems. In particular,

traffic congestion in Worli and South Mumbai will increase. The W.S. Atkins report was specifically commissioned by the MSRDC to study the feasibility of the BWSL, and the report clearly showed that the effect of both the West Island Expressway and the East Island Expressway would be to attract considerable *additional* traffic to South Mumbai, increasing congestion in Tardeo, Mumbai Central, Opera House, Nana Chowk and Kalbadevi areas.

Irregularities with regard to BWSL:

1. It is ridiculous that the BWSL, construction of which commenced only in 1999, is based on the 1984 report by the Central Water and Power Research Institute, which itself used data collected 20 years earlier. This report was a purely hydraulic study based on a model, and did not take into account tidal variations, current patterns, impact on marine life, other parts of Mumbai's coastline, seasonal changes etc. Thus 40-year-old data was used to justify this project and dismiss its environmental impacts as negligible.
2. No detailed Environment Impact Assessment study has ever been conducted for the project.
3. No public hearing has been conducted.
4. Location of the proposed toll plaza changed by about 1.5 km. even though environmental clearance was only given for the first location.
5. Excess land reclamation over and above that for which permission was granted.

II H 1 B) BANDRA KURLA COMPLEX (BKC)

Though the stated objective of the BKC, which was to decongest the south Mumbai business district, was laudable, the fatal flaw is the complex's location – on the banks and partly on the bed of the Mithi. There is enough evidence to show that the MMRDA and planning authorities were aware that the reclamation that would be required for the BKC could flood the Mithi river basin, but an attempt was made to tackle this by 'channelising' the river. That this approach has failed is now clearly proven.

²⁶ 'Hydraulic Model Studies for the Proposed Bridge between Worli Point and Bandra Point Across Mahim Bay on West Island Freeway', CWPRS, Pune. Specific Note no. 2168 dated 15-2-84

²⁷ 'An Enquiry into the Bandra-Worli Sea Link Project', Indian People's Tribunal, July 2000

²⁸ 'Environmental Status Report of Brihanmumbai'; MCGM 1998-991

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The MMRDA's "Environmental Review of Bandra-Kurla Complex" in 1996 Mumbai states: "In the early days, the low-lying marshy land on either side of the river served as the flood absorption reservoir during the monsoon. The indiscriminate reclamation of low-lying land over the years and dumping of solid waste by the BMC progressively reduced the flood absorption capacity of the Mithi River basin, thereby causing flooding of the adjoining areas including major transport arteries such as LBS Marg, part of Western Express Highway and the Central Railway tracks."

Yet despite this accurate analysis of the reasons for upstream flooding, the BKC, which itself involved large-scale reclamation, was proceeded with. End-of-pipe engineering solutions were sought to an ecological problem, in order to permit development to go ahead. Hence the 'channelisation' programme and proposals to construct dykes along the river's channel. While the channelisation programme as specified by the (CWPRS) was reportedly largely completed before 1991, the dykes and bunds along the river have not been built. Under no circumstances must this be done as it would effectively transform the river into a drain. In times of high rainfall, such dykes would also lead to severe flooding in upstream areas. The 'channelisation' of the river itself probably played a role in the flooding, by preventing water from flowing into the main stream of the river.

The BKC proposal identified a core area of 430 hectares, out of which 370 hectares was for 'Direct Action'. According to the plan, 283 hectares of this area needed to be reclaimed from the intertidal zone of Mahim Bay.



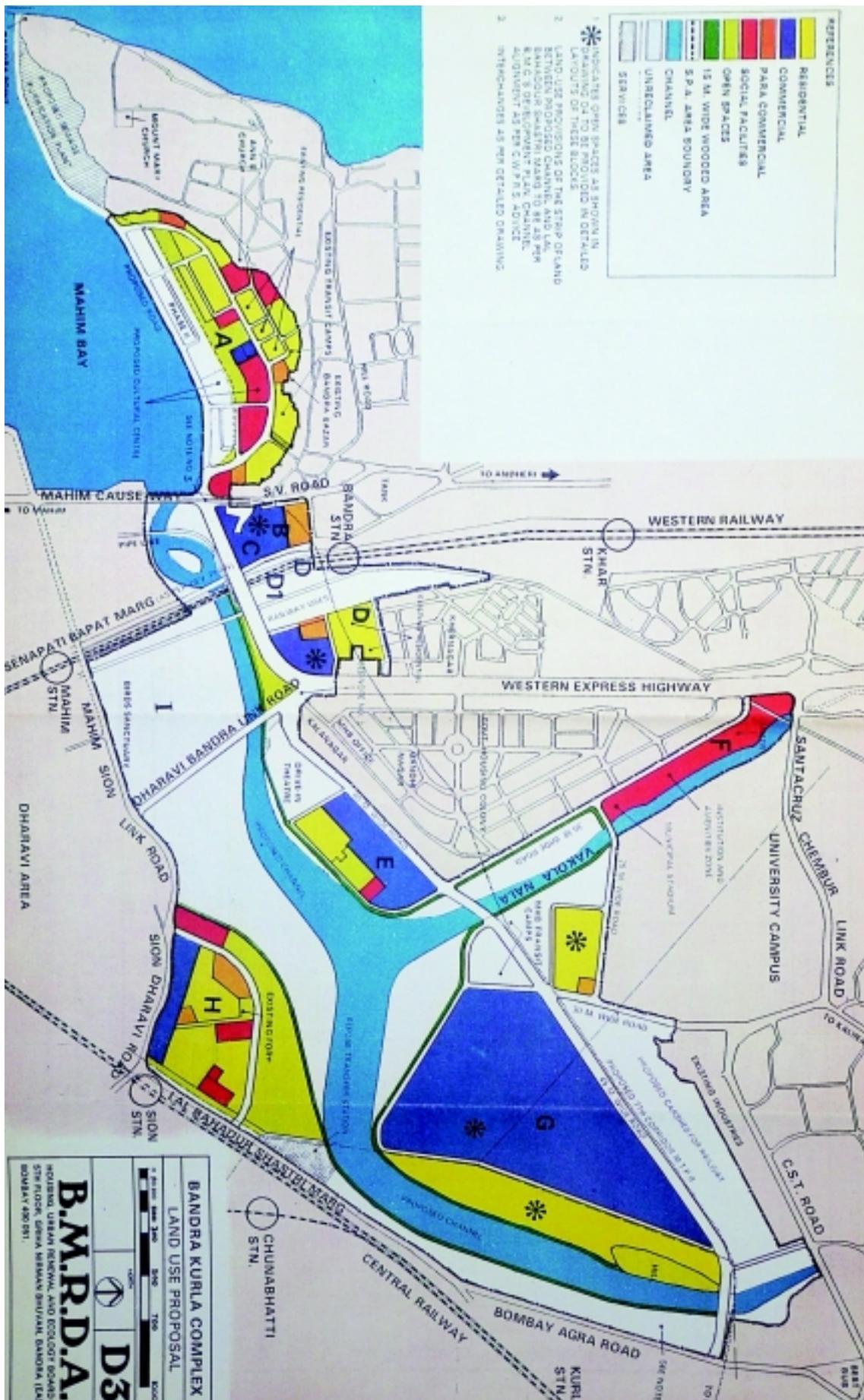
The National Stock Exchange and surrounding buildings that form a part of the G Block of the Bandra-Kurla Complex are built exactly on the original course of the Mithi River, as does the MMRDA office in the adjoining E Block. This is ironically the agency that is supposed to look at the overall development of the city.

Between 1994-96, G Block was reclaimed on the course of the Mithi. In 1995, the gap between the coffer dam walls west of Mahim Causeway was narrowed for the Marine Outfall project by MCGM. In 1996, there was heavy flooding in the Kurla-Kalina-Sion-Matunga area. After Kalina, the main river joins the Mahim Creek. Here the mouth of the river has been reclaimed by the BKC. Of the total of 332 hectares of wetland reclaimed for BKC, about 113 hectares lie in G block .

These various reclamations at different points in time have gone against the advice of several committees appointed by the Government. The only support the reclamations have received is from a report by the CWPRS, Pune. Interestingly, this report has been criticized by several experts who deposed before the CCC, on the grounds that it is a purely model-based report, for which no actual studies have been conducted.

In 1993, a technical group of the state Mangrove Steering Committee warned that ongoing reclamation from Band Stand (Bandra) to Mahim Causeway would affect the mangroves in the creek and accumulate pollutants in the river, as their outward flow would be obstructed. The group also warned against dumping excavated material in G zone block, cautioning that the creek area with its mangrove ecosystem should not be used for 'trial and experiment'.

The CCC's conclusion is that the extensive reclamation of over 318 hectares carried out by the MMRDA for the BKC, particularly in the G block, has played a major role in the flooding. The MMRDA, by its shortsighted, commercial and technocratic outlook is thus responsible for the loss of lives and hardship and damage to property that could have been avoided.



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II H 1 C) MUMBAI AIRPORT

To extend the taxiway at Sahar Airport, a bridge is being built over the Mithi river. According to information gained from Sudhir Kumar, Director of the airport, the width of the bridge will be 45 m., with the river flowing under it. However, on July 26, the bridge was being constructed. To facilitate this work, the river had been diverted by the construction of a temporary earthen wall, bending it 90 degrees. This would have severely blocked the flow. It is the CCC's view that this diversion was partly responsible for the flooding that occurred in adjoining and upstream areas. Mr George Abraham, the Corporator who resigned over 26/7 over his frustration that Mr Johny Joseph had done nothing to prevent floods – his last letter was dated June 15, 2005

— alleged that due to the construction of the airport facilities, covering 181 hectares which earlier used to hold excess rain, four of the five drains in Kalina were choked. Mustaq Khan from Rafiq Nagar slum near the airport, who lost his one-year-old son Mohammed Hanif in the floods, described the nearby stretch of Mithi as having been reduced to a 'gutter'. He lost all his belongings and escaped with only the clothes that he wore, claiming that three-quarters of his fellow slum dwellers had lost their homes.

Mr. Kumar denied that the runway had diverted the Mithi. The river, he said, flows under the main runway, beneath a 22-m.-wide bridge. The new bridge

over the river which is being constructed to extend the taxiway is twice as wide.

With regard to the other apparent diversions, for the secondary runway and near the airport building, Mr. Kumar said both these were constructed decades ago (the secondary runway 35 years ago and the airport building near the first bend in the river in 1981) and he had no information about them.

When specifically asked again whether the airport authorities had diverted the river to extend the taxiway, Mr. Kumar said they had not. When shown pictures of the ongoing work and diversion, he conceded that in the process of construction, the contractor might have temporarily diverted the river.

The CCC concludes that the Mumbai Airport has played a crucial role in July 26. The very location of the airport on low lying reclaimed land around the Mithi river is to blame and is in fact believed to be responsible for the annual submergence of parts of Kranti Nagar and Bail Bazaar in the Kurla-Kalina area.

The AAI has also extended the secondary runway eastwards, near Kalpana Theatre. This is believed to have been extended in the mid-90s. Thus from Kurla, the Mithi has been forced to turn four right angles in a very short length of its course. In 1990, the construction of walls without adequate drainage flooded Kurla-Bail Bazaar in 1991. Walls built by the AAI between the Air-India and Indian Airlines Colonies obstruct water flowing down the east slope of the Kalina hill.



maharashtra.gov.in/english/gazetteer/

2) OTHER RIVERS

Poisar River: The Shamshan road, Kandivli East, runs along the course of the Poisar River. This road was recently (2004) broadened by approximately 8 ft by dumping debris on the river, thus constricting the channel. Further, a large slum colony now exists in the river bed itself. This entire area was submerged by the rains of July 26, and the heavy rains on September 10 also saw additional flooding, though to a lesser extent. The building Shree Ganesh society, built as part of the Slum Rehabilitation Scheme, also appears to have encroached on the river bed itself.

From the Kandivli-Malad link road, it is clear that a river bed that was formerly over 200 feet wide has now been reduced to just about 20 to 30 feet, through encroachment for housing/household industries.

Similar stories exist in the case of most nallahs, streams, rivers and creeks. In Kandivli East, Damunagar, Barkya Compound, Rajaram Gupta provided information about the Himalayan Stone Crushing Company that has allegedly dumped debris across a 15-foot nallah to enable the company's trucks to cross, leaving only a three- to four-foot-diameter pipe for water to flow through. As a result, July 26 forced the nallah to change course and flow into the adjacent Barkya compound.

Dahisar River: The Dahisar River originates at the Tulsi lake in the SGNP. The river flows for roughly 4 km outside the park. It crosses the Western Express Highway and most of its course is in Dahisar West, hence the name.

Though the Dahisar River is in no way connected to the Mithi, their stories are similar – encroachment, neglect and abuse. This came back to haunt locals on 26/7, as the areas near the Dahisar river were severely flooded. The Krishna Nagar & Shantivan areas had 5 to 6 feet of water in the ground floor houses. This is the point where the river exits the national park. A wall constructed all along the river bank from the point it leaves the National Park till the Krishna Nagar gate has narrowed the river's width.

From here the river crosses under the Western Express highway at Shantivan. The low arches through which the river flows are heavily silted and



blocked with accumulated garbage. Further downstream, the pillars of the Borivli-Dahisar flyover also impede the flow of water in the Dahisar river bed.

A retention wall further narrows the width of the river in the Prem Nagar (Borivli East stretch). Both sides of the river are lined with huts for over two kilometres, especially in the Dahisar West stretch. Many of these structures are now pucca in nature and have encroached on the river bed itself. According to local citizens' groups, a building called Sarika near Rustomjee Residency has also encroached on the river.

3) RECLAMATION AND FILLING OF MARSHY LAND, CREEKS, MANGROVE AREAS, OPEN SPACES

The 'reclamation' of land by dumping either in the sea or on mangroves, mudflats and creeks invariably results in poor drainage on the landward side. This was brought to the notice of the CCC by local residents in Bandra and Malad. In Bandra, residents of the Chapel Road area and the Bandra Reclamation are affected whenever it rains heavily for three or four hours. Mangroves in areas such as Seven Bungalows, Kanjurmarg, Link Road (Goregaon), Gorai and Malvani village have been massively destroyed alongside creeks. The case of the Usha Madhu Development Co-op Hsg. Society which has filled about 250 hectares of mangroves for the construction of a golf course on land belonging to the Byramjee Jeejeebhoy group is also well known. There are similar examples of other real estate deals proceeding after first 'reclaiming' mangrove or inter-tidal marshland.

A recent paper in the *Indian Journal of Marine Sciences* by V. Vijay, R.S. Biradar and others has

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concluded, on the basis of remote sensing, that from 1990 to 2001, a total of 37 sq. km. of mangroves has been lost in the city. This amounts to a decrease of almost 40% in the area under mangroves and an average loss of over 3 sq. km every year. Between 1996 and 2001, mangroves decreased from almost 67 sq. km. to 56 sq. km., a decline of over 15%.²⁹ Interestingly, the paper also quotes earlier studies estimating the city's mangroves at 249 sq. km. in 1954 and 200 sq. km in 1975.

Mangroves and their mudflats act as a buffer between sea and land. During heavy rainfall, excess water from the land naturally drains into such areas. When these locations are reclaimed, natural drainage is ignored, with foreseeable consequences for the areas that were in the hinterland.

In this context, the CCC welcomes the recent Mumbai High Court judgment ordering the cessation of all dumping and construction on mangroves. This order needs to be strictly enforced for the benefit of the city.

According to the Development Control Rules of 1991, no land shall be used as a site for construction of building:

- If it is within 9 m. from the edge of the watermark for a minor water course or 15 m. from the edge of the watermark of a major water course, unless arrangements to the satisfaction of the Commissioner are made to drain the flow of water course.
- Provided that where a water course passes through low-lying land without well-defined banks, the Commissioner may permit the owner of the property to restrict or divert the water course to an alignment and cross section determined by him (commissioner)

Clearly, this regulation has either been flouted or there have been widespread exemptions granted.

De-reserving open spaces: The city's development plan has earmarked lands for gardens and playgrounds within the city limits. These are however being de-reserved at phenomenal rates, by successive state governments from the time when Sharad Pawar was Chief Minister. During his

tenure, he de-reserved 285 plots; Manohar Joshi went a little further, de-reserving 300 plots. In his eight-month rule, Narayan Rane de-reserved about 180 plots, (one of which covered (264 ha) in Mankhurd, an area that was severely affected by flooding with water rising to 12 feet). Sushilkumar Shinde de-reserved 67 plots and Vilasrao Deshmukh is continuing the trend.

According to some estimates, this would cumulatively amount to almost 50 per cent of the space for amenities. On paper, the development plan's amenity spaces ratio is 0.2 acres per 1,000 population. Of this, 82 per cent is taken over by slums so that the actual ratio is 0.03 acres per 1,000 population. This is the lowest in the world. The international norm is 12 to 14 acres per 1,000 population, and by Indian standards it should be 4 acres per 1,000 population.

Mumbai's target was to have a ratio of at least 0.4 acres per 1,000 population. But this is actually dropping – the current figure is 0.03 acres per 1,000.

Pure greed that is driving the de-reservation spree. When a plot is reserved, it has no commercial value since nothing can be built on it. But when it is de-reserved, the price shoots up to the level of land values in the area. This is thus a major source of illegal income for politicians. When more FSI is given on that plot its worth increases further. The builders and the politicians are the only ones to profit, while the city and its inhabitants lose out.

Given below are details of land dereservations by successive governments.

| Sr No | Chief Minister & Party | Number of Plots de-reserved. |
|-------|---|------------------------------|
| 1. | Mr. Manohar Joshi Shiv Sena | 300 |
| 2. | Mr. Sharad Pawar Congress(I) | 285 |
| 3. | Mr. Sushil Kumar Shinde Congress(I) | 67 |
| 4. | Mr. Narayan Rane Shiv Sena | 180 |

²⁹ Vijay.V. et al, "Mangrove mapping and change detection around Mumbai (Bombay) using remotely sensed data", *Indian Journal of Marine Sciences*, Vol. 34(3), September 2005, pp. 310 -315



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It comes as no surprise that Mumbai experiences annual floods and with the accelerated de-reservation of open spaces, which are then built on and paved over, one can only expect that the flooding will increase over the years to come. These spaces act as sponges to absorb water. Their development and concretization has meant that the surface run off increases.

Reclamation under the guise of infrastructure projects has become a deliberate strategy to make more land available to builders. An example is the BWSL, for which reclamation could easily have been avoided. Finally, instead of the permitted 4 hectares, over 20 hectares have been illegally reclaimed. When this was objected to, instead of prosecuting MSRDC, the MoEF regularized this reclamation post facto.

4) Encroachment: Encroachment on public spaces is a significant reason for the worsening civic situation in Mumbai, and played a role in the Mumbai floods. Encroachments are caused directly by Mumbai's unplanned development, and fostered by vested political interests who seek to benefit from them. Along the entire length of the Mithi river, encroachments have come up, in

many places right up to the bank of the river. The same is true of other rivers such as the Dahisar and Poisar. Since the river banks are marshy and of soft soil, debris is usually dumped first and then rough shelters constructed. This of course narrows the width of the river, interfering with natural drainage.

Since these settlements have little or no civic infrastructure, the river becomes the easiest waste disposal site, further interfering with the water flow and water quality.

The CCC is clear in the opinion that the BMC, successive state governments and the spectrum of political parties are responsible for this situation, in many cases tacitly or overtly encouraging those desperate for housing to settle on the banks of the river and in the floodplain areas. By encouraging or tacitly permitting such illegal settlements, those responsible not only condemn millions to substandard living conditions, they are also responsible for the loss of lives and property that occurred in these areas on July 26 and 27.

5) Quarrying: Several experts such as Mr. Vivek Kulkarni felt that the widespread and indiscriminate quarrying that has been taking

Chaos at Guzdar Bandh

Residents of the Guzdar Scheme, Santa Cruz (West) deposed before the CCC on Monday September 19 at Bandra-West. This is one of the better documented cases of encroachment and disruption of natural drainage patterns causing threat to life and destruction of property. Within the last 15 years, over 8,317 hutments have come up on the Guzdar Creek. Of these, according to documents received from the Guzdar Scheme Residents Trust (GSRT), 5,154 are pre-1995 and thus eligible for rehabilitation.

These dwellings have destroyed over 11 hectares of mangrove and are occupying an area that is notified as CRZ I and a No Development Zone, to the west of the Guzdar Bandh. This area was formerly a mangrove and mud flat stretch known as the Guzdar Bay/Creek. By dumping and constructing hutments, the level of land west of the Bandh, that is the seaward side, has been raised above that of the land on the eastern or landward side causing a "Saucer Effect". With the result that rainwater, instead of flowing westward to the sea, now flows back to the land. The encroachments have blocked the free flow of water to the sea, resulting in serious flooding every monsoon. Ground floor residents now have flood water entering their homes every monsoon as a matter of course. Overflowing toilets and polluted underground tanks, electrical short circuits in the meter rooms and flooding of lift wells are also common. This is the situation during normal monsoon rains, so of course the July 26 deluge led to a much worse scenario, with over 5 feet of water in some ground floor residences.

In June 2000, the BMC demolished the four sluice gates that have been fitted on the Guzdar bandh since the early 1900s, to keep the seawater out at high tide. As a result of the removal of the sluice gates, there has been regular flooding of roads and

place in and around the city for over two decades is affecting the city adversely. Quarrying Mumbai's hills causes erosion and siltation in downstream areas. For example, the Thane creek, the main channel of which was 50 feet deep around 1950 is now just 10 to 15 feet. One of the main reasons is the quarrying on both sides of the creek.

Quarrying and construction around Powai lake has resulted in the silting up of the lake. The water surface of the lake has been reduced by over 60 hectares, and the siltation has also reduced the depth of the lake and has reduced its capacity to store rainwater. Obviously, this accentuated the flow into the Mithi on July 26. The deluge also triggered off a massive landslide within the Hiranandani Gardens complex, which led to additional debris being washed into Powai.

The regular landslides during the monsoon are the other consequence of quarrying. Quarried hills are traditionally unstable (due to blasting, drilling etc) and unfit for human habitation. Yet once abandoned, these quarried hills are soon covered by slums, often perched precariously on the hill slopes or the foot of the hill. The landslide that claimed over 100 lives at Saki Naka took place at one such abandoned site.

THE BORIVLI NATIONAL PARK AND ITS VALUE TO MUMBAI CITY

The existence of the 103 sq. km. Sanjay Gandhi National Park (SGNP) came as a godsend on July 26. This forested, hilly and largely ecologically intact area served to ensure that the high volumes of water that fell over its expanse were to a large extent absorbed. Large amounts would have percolated into the ground and into the Vihar and Tulsi lakes. Using the rainfall recorded at Santacruz, a total of 94,400 million litres of water would have fallen on SGNP. A significant proportion of this would have been absorbed by the soil. If the SGNP did not exist and this area was developed, this huge amount of water would have come rushing down from a height into the low-lying areas of the city, making the flood a lot worse than it was.

This emphasizes the importance of having ecologically intact areas such as forests/mangroves in and around an urban conglomeration, as these spaces act as buffers against nature's extremes and man's mistakes.

residential compounds during the high tides. The only reason given by the BMC for removing the sluice gates was that they are 'no longer technically required'. The sluice gates kept the high tide waters out, and this led to floods in the hutments (formerly inter-tidal zone) on the west of the Guzdar bandh. It would seem probable that this was the reason for the removal of the sluice gates.

In 2001, the citizens of the area approached the High Court for relief vide Writ Petition no 743/2001. On October 31, 2001, the Court directed the Government of Maharashtra to take corrective steps as "immediate relief". However little has changed on the ground. The BMC protests its inability to clean the nallahs and drains in the area until the encroachments are cleared. To date, 696 hutments have been demolished and 356 hutments have been rehabilitated, at no cost to themselves, at Anik Nagar, Chembur. This is against the High Court Orders of 31st Oct 2001, 4th Oct 2002, and 24th Feb 2004.

About Rs 5.5 crores has been spent for the development of 2.7 hectares of land at Malwani, Malad and each of the 780 pre-1995 encroachers were to pay the government Rs 30,000 for a 10' x 15' plot of land. Political interference forced the GoM to rehabilitate 356 hutments free of cost at Anik Nagar, Chembur.

The latest development is a proposal to develop an SRA scheme in the Guzdar Bandh Creek of about 2.8 million sq feet, that is in CRZ I area and a No Development Zone. Proposals have been submitted to the SRA by M/s Gala Builders and M/s Deewan Builders. The Guzdar Bandh Residents Association has applied to the SRA for information in this respect under the Right To Information Act, but no reply has been forthcoming thus far. Legal action would appear to once again be the only option left.

The Guzdar Bandh example typifies the manner in which open spaces and natural topographical features have been interfered with or destroyed across Mumbai city, in this case by illegal encroachments.

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COASTAL EROSION IN MUMBAI

Mumbai cannot escape its history as a reclaimed city. At the same time, the excesses of the past must not be repeated. The city has witnessed and continues to witness large scale reclamation, from the Backbay and Nariman Point reclamations of the 1960s & 1970s, to the Bandra reclamation in the 1970s and 1980s, Bandra-Kurla Complex in the 1980s and

1990s, Bandra-Worli Sea Link of the 90s and ongoing decimation of mangroves on both east and west coasts.

A succession of experts (Dr. M.D. Zingde of the National Institute of Oceanography, architect Nandan Mungekar, ecologist Girish Raut, mangrove expert Vivek Kulkarni among others) told the CCC that these historic and ongoing reclamations are having a direct impact on the city's shoreline, causing mild to severe erosion in many parts.

Due to the reclamation in the Mahim creek by the MMRDA for BKC, combined with the Bandra Reclamation and the reclamation carried out at the mouth of the river for the Sewerage Disposal Project and BWSL, the sea cannot enter the creek as easily as it once could. As a result, the force of waves at Dadar has increased. The Mahatma Gandhi Swimming Pool and the Hinduja hospital are under serious threat from the sea. The Ambedkar Samadhi at Dadar is also being eroded by the sea. The historic Mahim fort is also being destroyed by higher waves and their intensity.

The erosion faced at Marine Drive and Nariman Point are well documented. Since these are reclaimed areas themselves, this is perhaps to be expected. But over the past few years, coasts are being eroded at areas that hitherto did not face this problem, such as Dadar and Versova. Versova is now severely threatened and the compounds and foundations of several buildings are now under siege in the monsoon. There seems to be a prima facie connection between the BWSL reclamation and the increase in erosion at Dadar and Versova, however much this might be denied by the MSRDC.³⁰

In the wake of 26/7 and the tsunami that hit the southern and eastern coasts on December 26, 2004, there have been proposals to construct a 'sea wall' around Mumbai. The CCC is strongly opposed to this proposal and feels that it is nothing more than a clever ploy by politicians, builders and contractors to rake in crores, at the city's expense, from direct construction and by attempting to skirt the CRZ rules. The only logical, sustainable and economical way to tackle the problem of erosion is to respect our coastline, stop all reclamation without exceptions, protect and regenerate mangroves and keep our creeks and estuaries healthy and free from encroachments.

However, ever since its inception, the CRZ notification has been overtly targeted by the politician-builder lobby. The new development plans passed in 1992 (soon after the CRZ came into force) for Mumbai showed roads in certain areas almost touching the sea, for example in Versova. No such road exists in reality, but it was inserted into the plan so that wherever exemptions for construction were desired, a road would be built, on the justification that it was in the original plan. The development would then be permitted on the landward side of the road.³¹

Rather than opposing the CRZ notification and asking that it be further relaxed or scrapped, it would be desirable if the state governments appreciate the importance of protecting the coastline. The basic approach should be to restrict new development within the CRZ to the bare minimum and allow only those activities that are essential.

II.I.) COMMUNICATIONS SYSTEM

The almost complete breakdown of communications in the city on July 26 was unprecedented. As the gravity of the situation came home to Mumbaikars, the cell networks began to be overloaded with people frantically trying to get in touch with their families and loved ones. With Reliance

Energy shutting down power to many areas, most people could not rely on TV channels for news either, and before long, MTNL landlines began giving trouble in many areas.

Eventually, with widespread electricity failures, most cellular networks were shut down completely or in certain localities, either due to equipment failure,

³⁰ "Reclamation leads to erosion along coastal Mumbai", *The Times of India, Mumbai*, 18 October 2000. [C.E32b.181000TOI]. http://doccentre.org/eldoc/urban_issues/uu1_M041.html

³¹ "Why Mumbai Choked", *Frontline*, Vol.22, Issue 17, Aug 13 - 26, 2005 <http://www.flonnet.com/fl2217/stories/20050826004601700.htm>

overloading or as they did not have sufficient back up batteries to run in the absence of electricity from the grid. A city used to uninterrupted electricity supply was ill-prepared to cope with hours and in some cases days without electricity.

This communications failure affected almost all government departments to one extent or another. Perhaps the least affected was the Police, whose wireless systems proved to be the most reliable. Eventually however, as their batteries died down and with electricity a problem in many areas, even this system was affected.

A report by IAS official Rani Jadhav following the floods in Mumbai on July 11-12, 2000 has recommended that at least 44 electronic display boards be set up from Cuffe Parade to Borivli and Thane to enable dissemination of information during disasters. On July 26, however, there were only two information boards, one at Chowpatty and the other at Haji Ali; neither were working. Similarly, the use of SMS by the Disaster Management Authorities was also advocated as an instantaneous and foolproof communication in the event of natural disaster or calamities. Obviously, neither the Maharashtra Government nor the BMC were aware of the necessity to use this tool to tackle the 26th flooding. [See section (II.M.) Rani Jadhav Committee Report & Annexure 7 for further details]

The lack of accurate and timely information played a crucial role in the unfolding disaster, leading to a sense of panic and chaos in many areas. The dissemination of accurate information of the gravity of the situation and the areas affected could have kept many people off the roads and safe in their homes/offices.

II J) ELECTRICITY SUPPLY

As soon as waterlogging began to occur in many areas, Reliance Energy, which supplies electricity to most of the suburbs (22.23 lakh consumers, population of over 9 million) took the decision to cut off power supply in order to avoid electrical accidents and possible deaths. This move was necessary and probably saved lives.³² However, the company has come in for severe criticism for its excessive tardiness in restoring power to large parts

of the city, even after the waters receded. There are also several instances where the same locality received uninterrupted power supply from the Tata Power Company where the Reliance Energy had ostensibly shut down its power to prevent short circuits and electrocutions.

Kurla was without power for almost five days, parts of Kalina were without electricity for a week and certain areas in Ghatkopar did not have power for a week to 10 days. Other areas in Bandra, Andheri, Thane etc were without power for periods ranging from 24 to 30 hours. The upmarket Hiranandani complex at Powai was without power from Reliance Energy from the 26th evening up to the 27th morning – thereafter, though power was restored for a few hours, most parts of the complex did not receive electricity from Reliance Energy during the day for 8 days.

The absence of electricity also affected water supply, as water could not be pumped. While REL was quick to laud its achievement in shutting down the power to save lives, its silence in the days following the floods was deafening. The company did not even set up a functional helpline to offer information about the power situation. In stark contrast, the state run MSEB which services most of Maharashtra was able to restore power within 24 hours in most areas and were constantly imparting information to the press. In fact, there were also almost no complaints about the performance of the other private power utility in the city, Tata Electric, even granting that the island city was not much affected.

It was only with public opinion rapidly turning ugly and after the Mumbai Suburban Collector issued a show cause notice to REL asking why no action should be taken against it that the company made some public statements and began to take visible action. A helpline was set up and Anil Ambani promised to set aside Rs 100 crores towards a disaster management plan, assuring the public that REL was working overtime to restore power.

The issue however is what took REL so long to restore services? How was a state-run MSEB able to restore power the next day while a supposedly efficient, profit-making company like REL was unable to get its act together for days on end? It would appear that in its quest to boost profits and cut back on

³² <http://www.rel.co.in/aboutus/systemdata.asp>

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expenditure, REL, which bought over BSES in 2003, cut back on resources such as manpower and back-up transformers. This meant that Reliance quite simply did not have the resources to handle this crisis.

According to Minister for Energy Dilip Walse-Patil, REL declined the MSEB's offer of assistance. But eventually, MSEB's gangmen were roped in to pull out cables and clean up transformers. The Chief Minister himself publicly criticized REL and this spurred them into action.

REL has about 4,050 transformers in the city and almost all of them were affected. The equipment can be restarted only when it is clean and dry. Further, it would appear that REL had no back-up equipment, due to its practice of cutting down on inventory. When it took over BSES, REL got rid of old transformers to cut costs.

REL's personnel were also unable to cope. According to media reports, four years ago, BSES had 4,600 employees, but today REL has barely 3,000, again a result of economies. Disaster preparedness implies the need to keep reserve resources — human and material — even if this is not commercially viable.

In the CCC's view, Reliance Energy's actions, or lack of them, caused needless suffering to millions, including the sick, aged and infants. There is prima facie evidence for the government to impose punitive damages on REL, and for private citizens to take legal action against REL seeking punitive damages.

Reliance Energy in fact should take a cue from the electricity wing of the BEST. BEST's insistence on regular quality checks and storage of adequate amount of spares including transformers meant that even though certain areas were without electricity as electric supply had to cut off to prevent electrocution, when the supply was restarted there were no problems and none of the transformers short circuited. That was what was lacking in Reliance Power, which did not keep enough back up of equipment in the name of cost cutting. BEST in fact lent more than a dozen transformers to Reliance Energy to restart its operations. BEST officials added that the focus now would be on raising the height of pillars where the electric equipments are placed to protect them water logging.

II.K.) ROLE OF THE MEDIA

Of the lack of so many essentials on 26/7 and the days following it, information figured among the top of the list. While the media — TV in particular — is guilty of dumbing down these days and even national broadsheets tend not to report as much on the environment as they used to, TV news channels and newspapers made amends in the aftermath.

On Tuesday itself, the media was caught unawares, like everybody else. For years, newspapers had reported the flooding of areas during the monsoon, particularly in the island city, as sporadic events, rather than the culmination of years of neglect in draining these chronically affected spots. To compound the confusion, in many areas in the suburbs, cable TV was disrupted because of the electricity was switched off.

Because communications were down that day — land lines and cell phones — and roads were jammed, it was difficult for a section of the media which has tended to become South-Mumbai centric, to get an idea of the calamity that had gripped the rest of the city, where the majority of people live.

Due to the central government's inexplicable ban on FM radio stations — barring AIR — carrying news, this vital potential source of information, which was functioning throughout the deluge, was not put into operation. The simple expedient of telling people not to leave their offices on July 26, or children to stay in school or go to their friends' nearby homes rather than risk returning home, would have saved enormous anxiety, hardship and, in some cases, lives.

Ironically, Mumbai's ham radio operators, who have volunteered to provide information in the Latur earthquake in 1993 and several international disasters, were not contacted. Nor were the more contemporary tribe of bloggers: Dina Mehta, living in Khar, actually helped with tsunami victims throughout Asia and, more recently, helped put victims of Hurricane Katrina in contact with those who were providing relief in Louisiana.

Had the media been more pro-active, it would have taken more notice of the report of the Indian People's Tribunal on BWSL which warned that the sewerage and road schemes that blocked the mouth of the Mithi in the Mahim Bay could one day prove

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disastrous, as was the case. The fact that in the SGNP, stretching over 104 sq km – almost a quarter of Greater Mumbai – nature had provided the city one of the best sponges and regulators of water was completely ignored by the media.

Unfortunately even the media, which is usually supportive of projects for the benefit of common Mumbaikars, has not focused significantly on the undue emphasis in Mumbai on private motorized transport, which ground to a complete halt on 26/7. The fact that the state is spending upwards of Rs 12,000 crore on such schemes, to the neglect of public transport, has seldom been commented upon by a media so obsessed with celebrities day after day

Indeed, the 'north-south' divide in the media was accentuated after 26/7, when many editors became conscious of areas of darkness like Jari-Mari for the very first time. It also showed how the slum population was most vulnerable to these events. The celebrity Delhi-based editor of *The Hindustan Times* was caught in the deluge himself and did some soul-searching in a Sunday column with the observation that there was nothing that cleared the mind more effectively than having to wade through waist-deep water in the Mumbai floods, which caught rich and poor alike for once.

However, the media recovered soon after and became the prime source of information in a confusing situation. In the absence of anything apart from platitudes being disseminated by official authorities, it was the media which informed people of what the city was going through. Star TV, in particular, being the only cable news channel to be based in Mumbai, dispatched its reporters to remote corners of the suburbs, from where they conveyed what was happening. The business channels also highlighted the economic losses faced by the city and country.

TV channels were also enterprising enough to commandeer helicopters to present a bird's eye view of the tragedy on the ground. Star, for instance, showed how the water was flowing just a few feet below the railway bridge at the mouth of the Mithi at Mahim; had the level risen a little more, it would have severed north from south Mumbai on this crucial lifeline. Not that the media itself, like much of Mumbai, was aware even of the existence of Mithi, let alone its role in flushing the city during a flood.



That week-end, TV channels conducted debates about the tragedy. Questioned regarding the justification for declaring a two-day holiday for government officials, Chief Minister Vilasrao Deshmukh argued that government employees were also affected and had to look after the well-being of their own families. This prompted a lady in the audience to remark that it was like a jawan exonerating himself from going to the front in a war on the ground that his first duty was to protect his family. Even the Chief Minister's later excuse that only clerical staff was given the holiday while senior officials were on duty, did not wash: among other things, it implied that such junior staff had no role to play in an emergency. They could surely have provided back-up support for relief operations that tumultuous week.

TV channels, by exposing the lethargy of officials, played a significant role. In such emergencies, officials have to be *seen* in action, not confined to their cabins. Perhaps the exception was the Police Commissioner, A.N. Roy, who was the first senior official to be actually witnessed surveying areas in a boat. Other officials, from the Chief Minister downwards, were conspicuous by their absence. The media can help enforce such accountability on the part of the state, even while it highlights the role of ordinary citizens who filled the breach.

After a couple of days, the newspapers also reported and analysed the situation in great detail. Indeed, as has happened in previous disasters – particularly after the Bhopal gas tragedy in 1984 – dailies and periodicals conducted the first on-the-spot analysis of the causes and consequences of the flooding, given the sphinx-like silence on the part

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of the government, which could only repeatedly seek refuge in the fact that this was an unprecedented downpour.

Dailies interviewed experts and provided infographics to explain to the public – and politicians and bureaucrats as well – how the city had been caught on the wrong foot in July. The role of the Mithi, and that it was part of a natural watercourse that begins in the SGNP, and flows through the three lakes, was highlighted in great detail, which has helped the public to comprehend the ecological base of this metropolis for the first time.

Some reporters went into greater detail. *The Times of India* reported, for instance, how the Indian Institute of Tropical Meteorology in Pune described the event as a “supercell”, one of the rarest and worst kinds of thunderstorms:

“Scientists have found a name for what happened on July 26 this year, when a record-breaking 94 cm of rain submerged Mumbai in a day. The deluge wasn’t a cloudburst, as some thought, or divine retribution, as others feared, but something more improbable: a supercell.

“Supercells are the rarest, worst kind of thunderstorms, invariably wreaking disaster in the form of hail, torrential rain, floods and even tornadoes. Hidden in the heart of the supercell — which looks like a tall, dense cloud with a rim at the top - lies a vertical column of air spinning at speeds of over 50 miles per hour to keep the storm alive.

“It’s this hyper-efficient wind-and-rain machine that was squatting over Mumbai’s suburbs for the better part of 26/7, claim scientists from Pune’s Indian Institute of Tropical Meteorology (IITM) in a report to be submitted shortly to the state government. A supercell, say scientists at the institute, is the best explanation for why so much water poured down in such a short span of time over such a small area.”

The newspaper went on to report whether this was a freak occurrence or not:

“Is the city likely to see more disastrous days like 26/7? It’s hard to predict but a look at rainfall patterns over the last century shows that the number of heavy-rainfall days in Mumbai is certainly increasing.

“The total rainfall we receive during the monsoon is now due not so much to steady drizzle over the months but to a few days of heavy downpour. And most of these days are likely to occur in July...

“The 26/7 downpour ranks ninth among India’s heaviest-rainfall days since 1876 and is the second among such days in the plains (as opposed to hilly regions). It also has the distinction of being the highest one-day rainfall since 1882 in Maharashtra.”

Whether this was a supercell – a phenomenon which not even climate change experts are familiar with – or not, the point is that such media exposure is extremely educative. (Not that this prevented other dailies recapitulating the events of 2005 on New Year’s eve from claiming that 26/7 had witnessed the heaviest rain ever recorded in India.) Moreover, as extensive reporting in the US media after Hurricane Katrina has shown, even natural phenomena can either intensify due to human-induced factors or, even more significantly, such information can help both the authorities and the public at large take precautionary measures in future.

The media even carried articles by city historians to trace how from the 19th century, the city’s reclamation schemes had been bogged down by the failure to provide adequate drainage. Dailies also unearthed the Brimstowad report, which had been gathering dust for 13 years. All such information subsequently enabled the public to learn that the wrath of nature had been compounded by the folly of humans in the country’s commercial capital.

II.L. LOSS OF LIFE AND PROPERTY

By and large, the estimates of loss of life are fairly accurate in a city like Mumbai, even though this would be lower than actual figures, given that many slum dwellers, who constitute more than half the population, may not have reported dead or missing family members, as the CCC found during its hearings. Since many children in particular were swept away into drains, their deaths may not have been recorded.

There are no accurate estimates of the financial losses incurred during 26/7 – by way of homes destroyed or partly damaged, belongings, earnings, medical expenses and the like. The first response from people who testified was that they could not calculate the loss, since they were poor and often

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complained that all 89 buildings in the complex were flooded year after year; 26/7 was worse. He and his family moved to the second floor for six days. He lost a TV and fridge and clothes were sodden; he estimated his loss at Rs 30,000. Amina Sabbir, who is 46, told the CCC in Govandi that her house completely collapsed; it would take Rs 1 lakh to repair.

In most such disasters, there are official sources of financial loss, which are generally an underestimate and estimates by trade and industrial interests, which tend to be inflated. Insurers are a good source, though in disasters like 26/7, where most affected were slum dwellers, their homes and belongings would obviously not be insured and therefore such estimates are on the lower side.

illiterate. In the weeks after the deluge, they were also not in the state of mind to add up the figures.

The deluge affected not only slum dwellers but middle class families who lived on the ground floor. Sambhaji Bagul from Railway Colony in Kurla

STATISTICS RELATED TO LOSS OF LIFE AND PROPERTY

| 1. Loss to Life - Mumbai and Surroundings | | | | |
|---|------------------|------------|-----------|-----------|
| Sr.No. | District | Deaths | Injured | Missing |
| 1 | Mumbai | 447 | 16 | - |
| 2 | Mumbai (Railway) | 7 | 4 | 14 |
| 3 | Navi Mumbai | 66 | 22 | 1 |
| 4 | Thane | 180 | 19 | 3 |
| 5 | Thane(Rural) | 44 | - | 12 |
| 6 | Raigad | 166 | 4 | 3 |
| Total | | 910 | 65 | 33 |

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2. TOTAL FINANCIAL LOSSES IN MAHARASHTRA (SECTOR WISE) Figures in Rs lakhs

| Sr. No. | Sector | Asset Losses | Output Losses | Fiscal Losses | Cost of temporary Restoration | Total Losses |
|--------------|---|------------------|-----------------|-----------------|-------------------------------|------------------|
| 1 | Agriculture | 410.6493 | 624.0906 | 0.0400 | 204.7880 | 1239.5679 |
| 2 | Animal husbandry, Dairy development and Fisheries | 719.4670 | 227.0700 | 4.6150 | 24.9070 | 976.0590 |
| 3 | Co-operation, marketing and textiles | 382.3780 | 1.3900 | 0.000 | 0.0000 | 383.7860 |
| 4 | Finance | 0.0275 | 0.0000 | 0.0000 | 0.0000 | 0.0275 |
| 5 | General Administration | 0.2670 | 0.0000 | 0.0000 | 0.0000 | 0.2670 |
| 6 | Home | 147.9748 | 11.6203 | 0.0000 | 0.0048 | 159.5999 |
| 7 | Public Health Dept | 10.6600 | 0.0000 | 0.0000 | 43.6500 | 54.3100 |
| 8 | Public Works Dept (Roads & Building) | 617.1600 | 0.0000 | 0.0000 | 320.7900 | 937.9500 |
| 9 | Public Works (National Highway) | 139.2900 | 0.0000 | 0.0000 | 24.3850 | 163.6750 |
| 10 | Rural development and Water Conservation | 718.8300 | 0.0000 | 0.3700 | 21.8800 | 741.0800 |
| 11 | School Education Dept | 17.1040 | 0.0000 | 0.0000 | 0.0000 | 17.1040 |
| 12 | Urban development | 580.7375 | 17.3681 | 513.7326 | 36.0989 | 1147.9371 |
| 13 | Water resources | 501.2320 | 0.0000 | 7.0650 | 2.8900 | 511.1870 |
| 14 | Water Supply & Sanitation | 47.7077 | 3.9155 | 4.5608 | 6.1026 | 62.2866 |
| Total | | 4293.5648 | 885.4545 | 530.3834 | 685.5143 | 6394.9170 |

(Source: Chart 1 & Chart 2, Maharashtra Floods Status Report 2005, Department of Relief and Rehabilitation, Government of Maharashtra)

3. TOTAL LOSSES (MUMBAI)

| Sr. No. | Nature of Losses | Extent of Loss (Rs crores) |
|--------------|------------------------|----------------------------|
| 1 | Infrastructural Losses | 1000 |
| 2 | Livestock loss | 100 |
| 3 | Housing Loss | 300 |
| 4 | Loss of crops | 600 |
| 5 | Export loss | 800 |
| Total | | 2800 |

4. EXTENT OF INSURANCE COVERAGE

| Sr. No. | Nature of Insurance | Amount (Rs crores) |
|--------------|------------------------|--------------------|
| 1 | Insurance for cars | 30 |
| 2 | Insurance for Property | 20 |
| 3 | Insurance for shops | 50-60 |
| 4 | Insurance for Godowns | 200 |
| Total | | 310-20 |

(Source: Chart 3 & 4 www.fnst.org whose statistics have been compiled from *Financial Times* and *Economic Times* August 4, 2005.)

II. M) RANI JADHAV COMMITTEE REPORT FINDINGS & RECOMMENDATIONS

It would be worthwhile looking at a similar report which was published by the state government on the floods which hit Mumbai on July 11-12, 2000. This committee was headed by an IAS officer Ms Rani Jadhav and the findings are revealing. It shows that old habits die hard.

It becomes apparent that many of the problems which plagued Mumbai on 26/7 (communication systems, weather forecasts, administrative responses) were witnessed five years previously as well. That time too several recommendations were made and yet it appears that none or very few of these recommendations were actually implemented.

SOME INSTANCES:

Communication systems: “The fax machines of the Traffic Police, City Police, Mumbai, Western Railway Control Room, Central Control Room, and EOC Mantralaya were found to be out of order. The DMP requires that the communication system between the line departments should be upgraded. The Plan does not mention the agency which would undertake these tasks of up-gradation. From the reports made available by the various line departments, it appears that there is no direct communication system between these departments (except for the normal/telephone connection) and no program of any kind is underway.

Further the report states that of the 44 locations where Electronics display boards were supposed to be displayed, it appears that that no display boards were set up or activated during the occurrence of the disaster”.

26/7: Nothing seems to have changed. At the 4:30 pm meeting when it emerged that Mumbai was also inundated, the traffic police team tried to stop traffic heading from Haji – Ali heading north. By that time it was too late. The lack of display boards along major arterial roads to warn people of the flood situation is another glaring example of the how successive governments refuse to learn from mistakes.

Rescue Efforts: Another important fact which comes to light is the point that, consequent to the

overflowing of the Tulsi and Vihar lakes on July 12 & 13, residents in the adjoining areas including those on the banks of the Mithi were alerted. Naval boats were immediately requisitioned and people along the banks of the Mithi were immediately rescued.

26/7: One seriously wonders as to why during the floods of 26/7, the government pleaded its inability to requisitioning naval boats and there was no warning to people along the Mithi, leave alone rescuing them.

About the IMD: “No weather warnings are reported to have received by Home Guard & Civil Defence Control Rooms, Collector Mumbai Suburban District and Collector Mumbai. The BMC & western Railways have observed that the weather intimation from the IMD did not indicate the intensity of rains which would have helped them to prepare better for the heavy downpour”

Recommendation: It may be advisable to require the IMD to communicate weather warning messages to all Control Rooms instead of just the EOC and BMC Control Rooms

26/7: In spite of the above recommendations, nothing seems to have improved. There was no prior warning from the MET dept about the impending floods, different arms like the railways and the police were not informed about the intensity of the magnitude. The equipment used by the MET department for weather forecasting is woefully inadequate and there seems to be no sign of installation of state of the art Doppler Radars which would ensure better forecasting. The warning given by the MET dept was ‘rather heavy to heavy’ rain which ranged from 64 to 125 mm of rain which was nowhere close to the 944 mm of rain on 26/7.

Disaster Management: “The BMC have suggested provision of punitive measures for ensuring strict compliance with the DMP procedures. BMC have also proposed proper training for all concerned and authority to requisition private vehicles lodging, engaging labour, hiring machinery on the same lines as those available to Collectors. These suggestions may be considered at the appropriate level in the BMC”.

26/7: Even today the power of requisitioning vehicles etc lies exclusively with the Collector. There has been no decentralization of authority and

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responsibility which would be extremely critical in times of a disaster. Even the traffic police whose role is absolutely crucial in any disaster does not even find a mention in the DMP.

Disaster Preparedness Meetings: “From the BMC report it is noticed that not all departments responded to the preparedness meetings etc held at the ward level. For example, the railways did not attend A, B, G/N and T ward meetings. The Tehsildar did not attend any of the ward meetings except the T ward meeting. The fire brigade did not attend the P/S and R/S ward meetings”

26/7: The CCC’s investigations show that the Mantralaya Control room was not functioning during the crisis and that the police was not called in for any of the meetings on floods held by the CM. In fact an agency like the MMRDA which is in charge of mega projects does not even have a control room to deal with disasters.

[A full account of the Committee’s findings and recommendations is in the Annexures.]

III RECOMMENDATIONS

Before coming to the specific recommendations that the CCC wishes to make, it is pertinent to deal with a serious, underlying issue, which is the root of much of the city’s problems, which in turn exacerbated that consequences of July 26.

Corruption has become so much a part of our life that many of us no longer stop to question it, or deal with it as a separate issue. Yet corruption is the underlying reason behind the open flouting of development norms, building violations, ecological destruction in the name of development, an ill-equipped fire brigade/police/BMC, inadequate, badly constructed or maintained roads, sewerage and sanitation. The roots of almost any problem in Mumbai can be traced back to the twin bedfellows of corruption and politics. The common Mumbaikar has been forced to endure this, with tragic consequences, for too long.

The politicization of development issues has also led to Mumbai’s long term interests being sacrificed at the altar of short term benefits, that too, for a few. An example is the rampant building of flyovers that the city experienced in the 1990s, to the neglect of the city’s mass transport systems.

This continues even today, with successive governments keen to take credit for the BWSL and eventually the Sewri-Nhava Trans-Harbour Sea Link. These are glamorous projects that will benefit a tiny elite, but it is easy to put a political spin on them, while more vital improvements in the bus and train networks are ignored.

Similarly, the grant of higher FSI, de-reservation of open spaces, reclamation of inter-tidal land etc are justified by successive political parties as being ‘pro-poor’ and for ‘public housing’ despite the fact that such measures have increased Mumbai’s vulnerability, lowered the quality of life for all sections and, to boot, have brought little or no benefit to the poor.

Development issues need to be analysed clearly, objectively and in an unbiased manner. It is necessary for the political class to take a long term view of problems and not be just concerned about short term gains. They also need to understand that the wealth producing status of Mumbai needs to be sustained and enhanced.

If we are to bring about lasting solutions to Mumbai’s problems, these underlying core issues of corruption and politicization have to be rooted out of our system of governance.

Citizens’ Commission to monitor implementation of recommendations: The CCC also suggest that NGOs and civic-minded citizens come together to form a citizens’ commission to monitor the implementation of the recommendations made in this report, as well as to oversee the recommendations made by the various committees set up by the government, and their implementation.

III A. SHORT TERM RECOMMENDATIONS

III A 1) DISASTER MANAGEMENT CELL RECOMMENDATIONS

1. Stockpiling of essential items: The DMP clearly lists down items which must be kept ready at all times with the authorities. However, due to lack of funds or other reasons, many of these materials are either missing or not usable. Periodic inventories and inspections of these essential items must be undertaken. A ready provision of inflatable boats, ham radio sets, tents, demolition equipment, toxic gas masks, diesel and electric pump sets must be

kept ready, working and available at all times with the municipal authorities/police/fire brigade at the community level. It would also be necessary to add batteries, hand and cycle operated battery chargers, etc. to this list.

2. Location of emergency centres: Schools, temples, churches, mosques, hospitals etc must be identified on ward wise basis as emergency centres to cater to the surrounding population. These venues to be equipped to deal with emergencies, provided with essential supplies, and basic life-saving and communication equipment. The surrounding population must be instructed, as a matter of course, that in case of an emergency, they should make their way to the nearest such centre. (Had such instruction been imparted to slum colonies around Union Carbide in Bhopal in 1984, many lives would have been saved.)

3. Upgrade Communication systems: In theory, there also exist comprehensive communication and public information systems that are supposed to warn citizens of disasters and keep them updated during one. Some of these information systems include wireless communication, display boards, the public address systems in local trains, railway and bus stations, FM radio, cable TV networks, ham radio operators etc. Many of these systems have not been set up and those that exist were not effectively used during the floods. The lack of information can be directly blamed for the many lives lost as people tried to reach their homes or loved ones unaware of the severity of the situation. Ensuring and fast, effective and flexible information dissemination systems will go a long way in mitigating disasters.

4. Incorporating GIS in DMP: Geographic Information Systems (GIS) is a technology that manages, analyzes, and disseminates geographic knowledge. GIS software converts physical maps into digital maps and can link these maps with a variety of data fields (roads, hospitals, municipal offices, electrical substations, topographical features etc). In the case of flood control, GIS can be synchronized with topographical data and expected rainfall to give a real time flood modelling forecast. With this, one can simulate flood-prone

areas for varying rainfalls, tidal levels etc. However, proprietary GIS software and technologies are expensive. The focus should be to develop a public(domain) GIS based on open source codes, which can be integrated with regular infrastructure projects so that it can be used during emergencies and to guide planning decisions.³³

5. Institutional mechanism: There are too many agencies involved in disaster management, with no clear chain of command. This leads to confusion and duplicity. The Emergency operations centre headed by the Additional Chief Secretary is overall in-charge, but the question of who kick-starts the entire process is not clear. The fact that the CM himself was attempting to manage the 26/7 disaster underlines the complete failure of the DMP. There should be a dedicated Disaster Management authority headed by a professional that will be overall in charge of disaster relief. This authority must include representatives from different arms of the administration who are specially earmarked for this purpose. This authority must also include experts in the area of different disasters as well as NGOs and this committee must be empowered to take decisions and action. The state government and BMC must not declare holidays as it did on July 27 and 28, or claim that it could do without the services of the clerical staff in such emergencies. If the nature of the disaster is such that government employees can be pressed into undertaking relief measures or contributing in any way at all, this has to be done.

6. Financial Independence: A significant finding was that in many places relief efforts by state agencies were hampered because the required material to launch relief attempts was simply missing. This is a serious flaw. The proposed disaster management authority must be financially independent. A disaster fund must be established which will be separate from the normal BMC budget. Money once allocated to this fund must not be diverted for other purposes. The disaster management authority must also be empowered not only to requisition the resources that it requires but also demand co-operation from the agencies that control and operate these resources.

³³ "Post-flood, Mumbai slowly turns to 'GIS' for disaster management"; *The Hindu-Business Line*, August 25, 2005
www.blonnet.com/2005/08/26/stories/2005082602911900.htm

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7. Training Programmes: In developed countries which are prone to disasters, there exists a comprehensive disaster management training programme for citizens. For instance in Japan, which is prone to disasters like typhoons and earthquakes, there are nine different kinds of sirens which warn citizens of different disasters. As a result, people know what to expect based on which siren is sounded. Such training programs help reduce casualties when a disaster does strike.

It is equally important is to train citizens to respond to disasters differently. A training manual which will act as an Standard Operating Procedure will be of immense help in this regard. Voluntary agencies and citizens groups can be entrusted with the work of training citizens. Once training is imparted, there must be periodic mock drills for different disasters. Mock drills for earthquakes are extremely common in Japan and such drills equip people with practical knowledge of how to protect oneself and others in disaster situations.

8. Legislation: The Disaster Management Committee and its members and their roles must be backed by statutory, legally mandated powers, with emphasis on disciplinary action in case of abdication of duty. In fact, the disaster management plan should be accorded the highest priority and should form the basis of the development plan.

9. Decentralisation: It is essential that the DMP for Mumbai should be reformulated in a manner that it is possible for the bureaucrats, technocrats, and other decision makers to implement in a decentralised manner if there is a breakdown in communications. There is a great need to provide serious hands on training to all levels of Government and Municipal agencies. Mock drills also need to be conducted. The Government must also encourage the Corporate Sector, hospitals and educational institutions to prepare their own DMPs.

10. Citizens' helpline: A citizens' helpline set up and run by NGOs' must be set up to disseminate information such as telephone numbers of police stations, hospitals, ambulance services, fire stations, government departments, the control rooms of various departments etc, aside from giving information on basic first aid measures, steps to be taken in case of different emergencies and eventualities etc. The telephone numbers of various

control rooms could also be simplified so that they are easier for citizens to remember.

III A. 2) RELIEF AND REHABILITATION

1. The entire approach towards calculation of loss of property needs to be re-looked at extremely seriously. Time-bound public hearings by authorities in localities—in full view to ensure transparency—should record from citizens the details of losses suffered, orally and in writing. Prompt and immediate payment of losses should happen also in full view with monitoring of local and citizens' groups since deep-rooted corruption is the reality of Mumbai's city administration and government departments. Innovative and realistic schemes should be outlined by government for people who have lost their livelihood in order to ensure meaningful rehabilitation.
2. The most urgent recommendation is that all people who suffered damages must be compensated to the fullest extent. The state government's actions not to rehabilitate people whose houses were illegal is deplorable and needs to be condemned. It is the violation of the most fundamental human right. Instead the government must focus its efforts to break the politician- builder nexus in mega projects as also the politician-builder-slum lord nexus which leads to the creation both of granite and glass illegal buildings and unauthorised slums in the first place.
3. The government relies on public memory being short. It was only in the immediate aftermath of the deluge that meetings between authorities



and civic groups were being held regularly; as time passed and people picked up the pieces and got back with their lives, these meetings became a rarity. A mechanism to ensure that regular meetings to take stock of disaster preparedness at the local level must evolve and this should become a norm rather than an exception. These must be public with criticisms and comments from the public being invited and publicised. Moreover, the government and civic authorities must issue open invitations to all groups to join these hearings; not play favourites with convenient groups or those with close access to the authorities.

4. R&R is seen as a dole rather than a right and this is an issue which needs to be tackled on a war footing in the long run. An appropriate beginning would be to base the entire issue of R&R on rights. Any person living in the city has a right to a decent living and the onus to provide these rights rests with the civic authorities. Any attempt to curtail this right must be challenged.
5. What was also witnessed during and after the deluge was a total lack of transparency during R&R. Badly affected areas went without relief for days on end and other pockets which were well connected got more than their share. What is urgently required is a public audit of R&R with the active involvement of citizens'.
6. As a matter of principle, public audits must be woven into the system to bring about a sense of transparency and give the citizens a chance to actively participate in the democratic process of planning the city. This is not the sole preserve of the elected representative, cabinet minister or chief minister, nor even the Municipal Commissioner or Building Department. The deep and corrupt nexus that have come to rule the city's planning agencies need to be cleaned up in a gargantuan operation resembling an amputation. Only then can the sleaze and filth be excised and new life and blood be breathed into government departments and the city's administration.
7. Participation in city planning is also every citizen's right. It cannot be done within the shadowy corridors of the Mantralaya or the BMC's headquarters. Plans and policy

decisions must be made available to the public of the localities where such planning changes or buildings/constructions are planned. Time must be given for objections from localities and groups.

8. Planning must be decentralized. There must be a bottom-up approach which is transparent and involves all sections of the residential communities and should not favour the builder lobby that has deep pockets.

III A. 3) ADMINISTRATION

a) Fire Brigade:

1. The Fire Brigade must have the resources and training to respond to a variety of crises, (floods, earthquakes, landslides etc) and not just fires. Mumbai's fire brigade has considerably experience in dealing with collapsed buildings and the periodic landslides, but has never before had to deal with a flood situation of such magnitude. Life jackets and boats should be included as part of the brigade's standard equipment and kept at each fire station. High clearance vehicles and earth moving equipment should be part of the regular equipment.
2. Fire stations should be equipped with their own wireless network that is kept in working condition as standby in case the phone lines fail. Each unit/fire engine should also be fitted with a mobile wireless set.
3. More weightage should be given to safety concerns before granting permissions for apartments/ shopping complexes etc, as many of these are coming up in congested areas that are difficult for rescue teams and equipment to access.
4. An incentive scheme to encourage a core team of firemen at each fire station to be ham operators must be explored.

b) Police

1. There are 14 State Reserve Police battalions all over Maharashtra, totally with 40,000 people. According to Dr. PS Pasricha, the police has taken a decision that each battalion will have a company of around 100 people who are equipped and trained for disaster management.

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This will be a very useful source of trained manpower and the state government needs to support this initiative in whatever way deemed necessary.³⁴

2. Manpower must urgently be increased in all branches of the Mumbai Police.
3. Power suppliers should be made to inform the police if they are shutting off power to any area.
4. The CCTV and Area Traffic Control system must be implemented. The CCTV system will cost Rs 8 crores. Even though this project is being funded by the Centre, the file has been gathering dust in Mantralaya since March 2005. The Area Traffic Control project originally involved 53 signals in south Mumbai, has now been increased to add 100 in the suburbs.
5. The Police should have at least one helicopter (to start with) that can be used for traffic/law and order/rescue operations.
6. The Police should be equipped with high ground clearance vehicles.
7. Life jackets should be kept in each police station.
8. The Variable Messaging System needs to be introduced, wherein certain categories of messages will get priority.
9. Internal Communication systems need to be upgraded and made fail-safe. The option of satellite phones at certain police stations should be explored, in addition to modern wireless equipment.
10. The opinion of the Traffic Control Branch should be sought before orders are given to deploy additional buses when the trains stop. It is not physically possible to carry all train passengers by bus, and bringing more buses on to the roads might only add to congestion in some situations. Certain situations might necessitate that private vehicles be ordered off the roads. This decision would have to be taken by the Traffic Police.
11. The police should have the power to requisition premises, transportation vehicles, earth moving

vehicles (public and private) and capacities of other agencies, private companies, bodies etc. For example, using schools, hotels, private grounds, maidans, etc for emergency rescue centres, to house people, parking lots, etc.

12. The Police must be given a statutory role as part of the Disaster Management Plan, as they are the first agency the public approaches and are also the only agency to be on the ground, throughout the city, as part of their normal duties.
13. The Police needs to be equipped to handle disasters such as floods, earthquakes, landslides, chemical disasters etc. All field level personnel should be given such training.
14. Each police station should have basic rescue equipment (lifejackets, ropes, ladders, shovels, small boats, oxygen cylinders etc). This will enable each station to function as a decentralized rescue and relief centre in times of natural disasters.

c) Meteorology Department:

1. Regardless of cost, the Doppler Weather Radar system should be installed for Mumbai. All metropolitan cities, particularly those on the coast, should have these systems. The argument that cities cannot afford such systems is demolished if one factors in the economic costs of any disaster. One can well argue that it is bad economics to avoid such expenditure.
2. There is a need to increase the number of rain water monitoring stations within the city. These should ideally be automated and connected to a central control room so that any abnormal patterns can be detected instantly.

d) Home Guards and Civil Defense Organisation:

1. The Home Guards and Civil Defense Organisation are (or should be) a valuable pool of trained manpower to help deal with emergencies and natural disasters. The law must be amended to enable Civil Defense volunteers to be called out in times of natural disasters and other calamities, and not just in times of declared war.

³⁴ <http://www.rediff.com/news/2005/aug/24inter1.htm>

2. The training imparted to Home Guards and Civil Defense volunteers needs to be updated and made more contemporary and broader in scope to include dealing with natural disasters such as floods, earthquakes etc.
3. The institution of the Home Guards must be revitalized and given a statutory role to play in times of emergencies and natural disasters.

e) Role of Coast Guard/Armed Forces:

1. The Coast Guard and Armed Forces must be looked on only as a last resort as far as providing relief and rehabilitation in such situations. However, these trained and equipped forces are a valuable source of manpower and the state government should call upon them in case of need.
2. The Coast Guard should have a twin-engined helicopter capable of carrying out inland rescue operations in case of floods. On July 26, the Coast Guard helicopter could have been utilized to survey the worst affected areas and help coordinate rescue operations.
3. Similarly, the Army and Navy posts at Colaba and Kalina must be used in such emergencies.
4. There should be regular meetings on a bi-annual or quarterly basis between the Coast Guard, Army and Naval forces, the civic administration, so that each is aware of the others' capacities and shortcomings in case of emergencies.

III A. 4) INFRASTRUCTURE

a. Storm Water Drainage:

1. The MCGM must stop doing its flip-flops on the BRIMSTOWAD report and must implement it in right earnest. It should be analysed to determine which sections can be implemented given the changed circumstances in 13 years.
2. The city's storm water drainage capacity needs to be augmented, strengthened and renovated.
3. Other utilities and departments must under no circumstance be allowed to pass their lines/pipes etc through the storm water drainage system, as this causes blockages by trapping debris and waste, aside from affecting the structural integrity of the drain.

4. DCR 23, which requires 15 to 25% of plot area to be maintained as recreational open space, should be amended to specify the maximum percentage of this open space that can be paved/concreted. This should be kept to a minimum. Open parking areas and driveways must also use pervious paving that allow percolation of water. Similarly, the maximum basement area should be prescribed, as existence of a basement necessitates that percolation cannot take place.

b. Sewage and Sanitation:

1. The provision of adequate toilet facilities and proper sewerage is one of the main responsibilities of the BMC and the government. Its failure to provide large sections of society – mainly slum dwellers – with these facilities poses a threat to the entire city. However, the provision of such facilities should not be a reflection on the legality of unauthorised dwellings.
2. The BMC's Slum Sanitation Programme for the construction of community toilet blocks managed by Community Based Organisations has shown some positive results but must be widened and strengthened as there remain large areas where such facilities have not reached. Of course, unless the proliferation of slums and unregulated housing is checked, this will be a losing battle.
3. The filtering, reuse and recycling of domestic waste water must become a priority. At the housing society level, this water can be used for toilets, gardens etc. and only the excess, if any, allowed to enter the sewage system. This will help reduce the water demand as also the load on the sewerage system.
4. While the population of the city has been increasing steadily, and significant investments have been and are being made in increasing water supply, the parallel investments in sewage treatment and disposal have not been made. This disparity must be addressed and increases in water supply must be matched by a parallel increase in sewage treatment and disposal capacity.

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c) Waste Management:

1. Reducing the quantum of waste generated must be the first priority. A high tax on products with excessive packaging has been repeatedly proposed and is now long overdue. The state government should work out the modalities of imposing such a tax. The revenue earned should be ploughed into the waste collection and management system.
2. All plastic carry bags should be banned. The ban on other uses of plastic (milk pouches/ packaged foods/meat products etc) can be delayed for a period of six months during which time alternatives are put in place.
3. Producers must be made to take back and re-use/recycle their packaging such as PET bottles, tetrapaks etc. This has been successfully implemented in European nations and in some states such as Goa. Soft drink manufacturers in particular must be made to take back and re-use or recycle their 'disposable' PET bottles so that these do not enter the waste stream.
4. The next stage is to dispose of as large a quantity of waste as possible at source, through composting of biodegradable waste and segregation and reuse/recycling of non-biodegradable waste. Several ALMs in Mumbai have established efficient systems of composting and recycling and these efforts need to be strengthened and spread to other parts of the city.
5. All new housing societies must compulsorily have dedicated areas (equivalent to the number of housing units) for composting of wet waste. A suitable time frame should be given to existing housing societies/colonies to establish their own composting areas. Since the space required is not large, most societies will be able to comply with the directive. In the case of those that are not able to, their wet waste should be sent to composting sites established in each ALM. The manure generated from these composting sites can be used locally/sold/used in public gardens etc.
6. According to BMC figures, 54% of the city's waste is wet waste, which can be composted. This would in effect reduce the landfill demand by 50 per cent, as well as the cost incurred by the BMC on transportation of this waste to landfills. Such a management system will result in considerable savings for the BMC, eliminating the need to transport waste to the dumping grounds, whose capacity is fast being exhausted.
6. Non-biodegradable waste can be diverted for recycling/re-use at the community level itself through rag pickers and small-scale recyclers. The BMC estimates that 18% of Mumbai's waste is recyclable.
7. Construction debris, silt etc forms a substantial part (2,000 tonnes per day according to the BMC) of waste. This debris is also used to illegally fill low-lying land and mangroves. Construction debris such as concrete, cement and brick rubble can be used as road base and crushed and re-used to cast concrete blocks etc. These practices are legally mandated and in place in many developed countries. The recycling of construction debris should be legally mandated in Mumbai, and if necessary the required infrastructure (crushers etc) can be set up by tapping funds from the construction lobby.³⁵
8. Incineration of municipal waste either as a disposal option or to generate electricity must not be an option due to the well-documented pollution and air quality impacts. 'Clean' incineration plants are extremely expensive and there are other cheaper, employment generating options available, as discussed above.
9. There is a situation of diluted accountability on the part of the BMC because of the separate handling of SWD, Sewerage and Conservancy Services at ward level. Mechanisms to have a single authority responsible for these three departments must be examined.
10. The building debris/construction debris should be stored separately and recycled into bricks using flyash.

³⁵ www.mcgm.gov.in

d) Transport

1. Given that over 85% of the travelling population relies on public (train/bus) transport, these systems must receive the bulk of future investment and funds aimed at improving Mumbai's transport system.
2. The job of constructing flyovers over the remaining level crossings on the Western and Central lines must be expedited to enable smoother train travel.
3. From its discussion and deliberations, it is clear to the CCC that the only hope for significantly improving the transport situation for Mumbai's millions lies with Mass Rapid Transit Systems. Investments in increasing road infrastructure must only be taken up where absolutely necessary, the priority, especially in terms of funding must be for mass transit systems that benefit the majority of residents, and not only those who travel by car. The Comprehensive Transport Strategy prepared by WS Atkins for the MMRDA also reflects an overwhelming emphasis on rail transport as the only viable solution to Mumbai's transport problems. Rail transport would also be the most cost-effective use of money, with the highest economic returns, aside from being more beneficial from environmental and social perspectives. To quote the report: "Economic analysis shows that the aggregate economic return is highest for a strategy with substantial investment in the metropolitan railways system and a modest investment in the road system, along with demand management." The Atkins plan allocated 69 per cent of expenditure on railways, 9 per cent on buses and ferries and only 22 per cent on highways, of which 2.7 per cent was on road over and under bridges to replace level crossings.
4. The BEST bus fleet should be increased, diversified and its capacity increased. The state government needs to take measures to ensure the financial strength of the BEST in view of the vital role that it plays in the city, both for electricity provision and public transport.
5. It is unlikely that there will be any one solution to the city's transport problems; a variety of approaches is needed. The construction of the Mumbai underground metro rail is one option available. Phase One of the metro plan includes building three lines: Colaba to Charkop, Versova to Ghatkopar and Bandra to Mankhurd. The Colaba-Charkop route, which is 38.24 km. long, will cost an estimated Rs 8,726 crore.
6. Priority must be given to removing bottlenecks on the existing suburban railway routes (level crossings etc) so that the frequency of train services can be maximized.
7. The feasibility of additional East-west links such as the Versova-Ghatkopar mass transit light rail system must be seriously explored.
8. The monorail system could be another option to improve the city's mass transport systems and coverage.
9. Konkan Railways' 'Sky bus' system which is currently being tested must also be explored for certain routes. The Sky bus system will also generate a clear walkway (on top of the Sky bus rail), which will allow for easy pedestrian movement. Especially in times of floods/electrical breakdown, this route would be invaluable, enabling pedestrians to get back to their homes with minimum inconvenience.
10. The CCC strongly recommends that pending mega road projects such as the Worli-Nariman Point and Sewri-Nhava link projects, estimated to cost close to Rs 7,000 crores, be abandoned, on the grounds that they will not serve the common man, will only increase traffic congestion in south Mumbai, and will serious environmental consequences. This money would best serve the interests of the city if it were invested in mass transit systems such as the metro, and to make existing train and bus travel more comfortable and reliable, as this would benefit a much larger section of the population, and with no environmental losses.
11. The BWSL, currently much delayed and still under-construction, should be abandoned before more public money is wasted on it, for the same reasons as above. Since construction on the Worli-Nariman Point link, now believed to entail tunnelling through Malabar Hill, has not begun, this would save a few hundred crores.

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12. The Area Traffic Control System must be implemented immediately. Sources have informed the CCC that the file has been lying with Mantralaya since April 2005, even though the system does not place any burden on the state exchequer.
13. All tax benefits on private cars must be withdrawn.
14. Many elements of the Singapore model of traffic management can be followed in Mumbai. These include:
 - a) A ceiling on the total number of private cars registered in the city at any one time. Under the Vehicle Quota System, anyone who wishes to register a new vehicle must first bid for a Certificate of Entitlement (COE) in monthly public tenders. The government pre-decides the number of new vehicles allowed for registration based on the transport system's current capacity
 - b) Incentives are given to scrap or export cars older than ten years, to ensure a young and less polluting vehicle fleet.
 - c) For any vehicle license to be issued, the prospective vehicle owner must show proof of off-road parking space, to ensure that valuable road space is not consumed by parked vehicles.
 - d) A Park-and-Ride Scheme provides parking lots where drivers can leave their vehicles and board buses into the CBD.
 - e) The Off-peak Car Scheme grants discounts in registration fee and road tax to owners who agree to restrict the use of their cars to off-peak hours.
 - f) These measures are of course backed by an efficient and comfortable public transport system.
 - g) Many of the world's major cities (London, Singapore) have imposed a fee on the entry of private cars into the Central Business District. This could be imposed in Mumbai.
15. Parking charges are ridiculously low for a city with Mumbai's traffic congestion problems. The CCC recommends that parking charges be increased by 200 per cent. Additionally, parking rates should be incremental and not decremental as at present.
16. The option of sea transport along the east and west coast of the city has been discussed for many years and tried out. Catamaran and hi-speed launches will always be high expense and low volume services and in the CCC's opinion, public money should not be diverted to these schemes. However, if private operators want to attempt such services, they should be allowed to, as long as reclamation for the building of jetties etc is not involved.
17. Office timings should be staggered location-wise.
18. The system of separate bus lanes must be implemented on all the arterial roads of the city.
19. The Change of Use from Residential to Commercial should not be permitted without the Traffic Police's approval as such changes often result in significant increases in the volume of traffic in the area.
20. During disasters that result in a stress on the transport system, the plying of private vehicles with less than 75 per cent occupancy should be banned in order to reduce traffic congestion.

III A. 5) HOUSING

1. Suspend the Slum Rehabilitation Scheme and amend it so as to curtail the role of builders in the scheme. The original idea of handing over the area to slum dwellers under the Slum Act is the preferred option. However, slums that have come up on ecologically important spaces (river beds and river banks, in nallahs or on the banks of nallahs, in mangrove areas, CRZ areas, salt pan lands etc) cannot be redeveloped in the same area but will have to be relocated elsewhere, for their own safety and that of the city.
2. Amend the DC regulations 33/6, 33/7, 33/8, 33/9 and 33/10, as all of them result in increased FSI irrespective of infrastructure and carrying capacity constraints.
3. Put an end to the practice of loading TDR.
4. FSI in gaathan areas must be kept at 1.
5. Exceptions to the limits on FSI must not be made within the municipal limits of Mumbai

city. The recent High Court judgment on clause 33/7 of the DC regulations has this to say with regard to FSI: "Allowable FSI must bear a rational relationship to the availability of civic infrastructure including water supply, sewerage, transport, electricity and open spaces. An increase in FSI is liable to result in an increase in the density of population. It has an important bearing on the quality of urban life." The court noted that the availability of 'incentive' FSI is surprisingly "irrespective of... availability of civic services, the density of population, the ability of the area to sustain a surge in residents, the impact on the quality of life on traditional neighbourhoods."

6. Limits must be placed on the incentive FSI given to developers and this FSI must be buildable only in areas that have scope for additional development. These areas to be decided by a panel that includes bureaucrats, town planners and NGOs.
 7. In case of any proposal to grant higher than normal FSI, a public hearing should be held in the area, after giving sufficient publicized notice, to invite objections and suggestions from existing residents of the locality.
 8. Ensure proper monitoring of the 33/7 clause to prevent irregularities such as the creation of bogus tenants.
 9. Affordable housing for lower income classes must be provided by the state government. This is one of the most important measures to be taken to achieve a permanent solution to the problem of encroachment on public spaces.
 10. To prevent the growth of new slums/expansion of existing ones, it is also essential that measures are taken to check migration into Mumbai by investing in the countryside. Some suggestions are discussed under Section III B. 8.
2. The long overdue erection of electronic information display boards in the city and suburbs must be expedited within three months.
 3. **Satellite phones:** Satellite phones, usually used only by the armed forces, coast guard and in remote and inaccessible terrain, must be incorporated as an integral part of the disaster communication systems. Major police stations, fire stations, ward offices, Mantralaya control room etc should be equipped with satellite phones. Unlike cell phones, communication based on sat phones is independent of local telephony infrastructure and so less prone to disruptions because of power failures or other events common in disaster areas. For instance during Hurricane Katrina, it was only sat phone services which were running. On account of their expense and the likelihood that they will be required only on rare occasions, they should not form the backbone of communication systems but be used as a back up to more conventional networks. If technically possible, an integrated network can be set up in which calls are automatically rerouted to satellite phones when terrestrial networks are non-functional.³⁶
 4. **Ham Radio** One of the oldest forms of communication is the Ham Radio. Typically anyone with a radio receiver or a radio scanner can listen in on ham radio communications, but only a licensed operator can transmit the signals. Typically, ham radio operators, or hams, do not use ham radio to broadcast in the way radio stations broadcast to large audiences at once. Ham transmission is usually two-way or with groups of people using a transceiver, meaning that two or more hams talk to each other instead of everyone listening to a single ham's broadcast. This technology can be useful in spreading information during emergencies when other services such as

III A. 6) COMMUNICATIONS

1. Wireless systems are perhaps the most reliable of communication methods at such

³⁶ "Senate Looks at Benefits of Satellite Phones in Disaster Zones", *Space News*, September 26, 2005
http://www.space.com/business/technology/050926_business_monday.html

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telephones, television or the Internet fail. There exist several amateur radio operators and their clubs in Mumbai and these should be given a role to play in times of disaster.

5. Private cell phone services must increase their capacity to avoid problems associated with overloading. They must also ensure they have a sufficient 12-24 hour battery backup at each tower.

An officer of the rank of DCP should be given the power to direct local cable TV operators and channels to carry announcements and information in times of emergencies and disasters.³⁷

III A. 7) ELECTRIC SUPPLY

1. All power suppliers, state owned and private, must be required to follow norms of disaster preparedness. Failure to do so must be legally punishable. Equipment must be kept in good condition and back up equipment must be present or easily available at all times.
2. A system of localizing power failures especially during emergencies must be evolved.
3. In the event that power companies for any reason have to cut off the supply of electricity, the police and municipal authorities must be informed in advance.
4. In case of a service breakdown, the public must be kept informed through a system of information dissemination, help lines etc till such time as power is restored.

III A. 8) PUBLIC HEALTH SYSTEM

- a) Invocation of Notifiable Diseases Act: Under-reporting of diseases is a significant problem in Mumbai. The fact that private hospitals do not report diseases and illnesses is shocking, as it does not allow authorities to gauge the magnitude of the problem, if any. The invocation of the Notifiable Diseases Act would make it mandatory for all private hospitals and medical practitioners to report cases of illnesses for a certain time period. The invocation of this act

immediately after July 26 would have helped authorities to deal with the situation more effectively.

- b) Accumulated garbage should be removed from the streets and drains so that water flows and prevents stagnation and mosquitos. Where stagnated water cannot be drained, adequate measures should be taken to prevent mosquito breeding.³⁸
- c) The government should provide a health worker for every 2,000 people. Attempts should be made to involve the community through formation of health committees in the bastis for monitoring basic health services and creating awareness in the community about preventive health and also link it with referral health posts. Local NGOs should be involved.
- d) The shortage of staff in the Health Department, especially in health posts and dispensaries, should be tackled with utmost urgency and outreach services should be given priority. More effective functioning of the peripheral health centres ensuring the presence of staff and doctors during the duty hours should be ensured.
- e) Meaningful growth monitoring and care of childhood illness should be done and it should be ensured that service reaches to each and every child of the area. Ensuring food security of women and children by strengthening the public distribution system and all different types of Anganwadis/Balwadis under various projects must provide supplementary nutrition regularly.
- f) No differences should be made in relief material and services on basis of caste and religion. All types of services including health services should reach to all types of slums irrespective of the fact that they are registered or unregistered.

III A. 9) NATURAL DRAINAGE

- a) **Mithi river:** The restoration of the flow of the Mithi river is essential if the tragedy of 26/7 is not to be repeated. The CCC recommends the following measures be taken without further

³⁷ http://www.webopedia.com/TERM/H/ham_radio.html

³⁸ " Report on Status of Health and Health Care Services In Flood Affected Slums of Mumbai ", CRY, August 2005

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delay and substantially completed before the monsoon of 2006.

- 1. Bandra-Kurla Complex:** No further construction development on the remaining vacant and unsold lots. The flow of the river/creek should be widened as near to original state by removing dumped debris and earth from the channel/river banks/mangrove areas. The costs should be borne by MMRDA from the funds it has gathered from BKC, since MMRDA's lack of foresight and contempt for the law brought this situation about in the first place. Areas that have been reclaimed post CRZ without environmental clearance should be restored to their original condition.



- 2. Bandra-Worli Sea Link:** MSRDC must be financially penalized for its excessive, unnecessary and illegal reclamation for the project. The mouth of the river must be widened by removing the dumped debris and earth. The cost of this should be borne by the MSRDC. Construction on the BWSL must be halted to prevent further blockage of the river's exit to the sea via the Mahim Bay, and the project should be redesigned accordingly.

- 3. Mumbai Airport:** Since the diversion of the Mithi by the airport authorities is a fait accompli, there appears little that can be done to remedy it. The authorities must however ensure that the ongoing work on the taxiway extension, for which the river was temporarily blocked, be finished by April 2006. From the last week of May onwards, the airport authorities must deploy a team to ensure that the grates across the river where it flows under the twin bridges of the runways are kept clear of debris, so that the flow of the river is not interrupted. There should also be mechanisms to clean the area under the bridge, usually inaccessible for security reasons.

- b) Other rivers:** Similarly, efforts must be made to restore and preserve the free flow of Mumbai's other rivers.

1. Dumping of waste (solid or effluent) in rivers and nallahs must be punishable by a fine and/

or imprisonment. Within a year, the BMC should provide adequate waste disposal facilities to these areas or relocate those it cannot provide services to.

2. The BMC must compulsorily undertake desilting and clean ups of all Mumbai's rivers and nallahs at least twice a year.
3. Encroachments on the banks of the rivers must be removed and regular patrols must ensure that they do not recur. The help of local citizens' groups and ALMs should be sought. Politicians who seek to interfere with removal of encroachments should be disenfranchised and barred from contesting elections for at least 10 years.
4. Detailed surveys must be carried out to identify blockages and obstructions to the flow. These can then be prioritized for removal and flow restoration.
5. Enquiries should be launched into those SRA schemes that have encroached on riverbeds (Shree Ganesh Society on Poisar river and Sarika building on Dahisar river, to cite a few).
6. The practice of building retention walls along the river course must not be allowed. Such walls invariably also lead to encroachments. Other options, such as wire-mesh fences, low walls flanked by gardens/trees can be explored. In times of excess rainfall, this will provide dispersal area for floodwaters.

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7. When constructing bridges/flyovers etc over nallahs and rivers, pillars should as far as possible not be sunk in the channel. If they must be, they should be designed in such a way as to cause minimum interference with the water flow.

c) Open spaces, Salt pans, Mangroves, Creeks:

1. As discussed earlier, Mumbai has already sacrificed too many of its open spaces, even ignoring and flouting Development Plan stipulations. This trend must be arrested immediately, for the survival of the city and the quality of life of its inhabitants.
2. Strict enforcement of a ban on all reclamation is necessary, along the coast, creeks, nallahs, mangroves and salt pan lands.
3. The discretionary powers given to the Commissioner in case of DCR 16 of 1991, restricting construction within 15 m. and 9 m. of major and minor watercourses must be revoked in the interests of transparency and enforceability.
4. There should be a blanket ban for a period of two years on the de-reservation of lands reserved for public use.
5. All construction on designated open spaces/gardens/parks/de-reserved public lands etc must be halted immediately and no new constructions allowed to get underway. There should be a complete ban on de-reservation of open spaces, recreational grounds and playground areas
6. The Slum Rehabilitation scheme must be amended to prevent the construction of buildings on open land and land reserved for parks gardens etc. Slum Rehabilitation schemes should only be allowed on areas where there are existing slums, provided these do not fall within CRZ or No Development Zones.
7. Salt pan lands, important rainfall absorption areas, must remain free of development as they are integrally part of the inter-tidal zone and are CRZ I areas. Abandoned salt pans will be restored to mangroves in due course of time, if they are not interfered with.
8. All Mumbai's remaining mangroves should be strictly protected, as per the recent High Court order.
9. The MMRDA, MSRDC and BMC should contribute to the establishment of a mobile mangrove inspection squad, administered and staffed by the Forest Department. This squad will patrol mangrove areas and respond to reports of mangrove destruction, dumping, hacking etc.



10. Mumbai's network of rivers and erstwhile streams, if restored to ecological health and well-being, can restore a unique character to the island city and lead to an overall improvement in the quality of life for all citizens. Any restoration and protection programme, if it is to be successful and widely accepted, must be designed such that it is open to all sections of society, irrespective of economic or social status. Private clubs or recreational parks in these areas must not be permitted. The restoration of these ecosystems will also be a boon to the city's struggling traditional fishing population.
11. Most importantly, it is evident that the drainage system of the city cannot handle more than 25 mm of rain per hour and that too during the low tide periods. It is therefore imperative that the capacity of those natural features and systems that exist that can absorb and retain rain water should be preserved and even augmented. The continued destruction of open spaces, reclamation of ponds, wetlands, mangroves, low-lying areas, etc. would amount to the greatest tragedy.

d) Quarrying

1. The state government should immediately end all quarrying within municipal limits.
2. Unsafe and unauthorised slums/hutments/other structures built on or near hills should be cleared and provisions made for rehabilitation.
3. All hills and abandoned quarries in Mumbai should be kept clear of development and constructions and instead utilized to provide much needed open space/ gardens/tree cover/ etc.
4. The necessity and implications of dredging of the main channel of the Thane creek to the required depth should be looked into and the opinion of ecologists and hydrologists sought.

III B. LONG TERM RECOMMENDATIONS

1. **Carrying Capacity:** All recommendations made by this commission and other government and non-government experts for improving the quality of life in Mumbai city will come to naught unless the question of carrying capacity is first addressed.

The city is already facing a large shortfall in terms of water demand, of 550 million litres a day. Traffic jams, mushrooming slums, pollution are worsening. Measures to boost urban infrastructure will at best buy us a few years grace time, if the population growth of the city is not first addressed. Indeed, any improvements in infrastructure could simultaneously be nullified if the population growth increases rapidly (distinctly possible due to increased employment opportunities).

The CCC is convinced that prima facie Mumbai has passed its population carrying capacity at current levels of infrastructure, both natural (green areas, water availability etc) and man-made. A comprehensive carrying capacity study for Mumbai city and the MMR region as a whole is long overdue. This should be undertaken by a reliable, qualified and impartial agency without further delay and also should consider the costs (financial and ecological) of infrastructural increases. All major infrastructure projects (expansion of Mumbai Port Trust and JNPT, sea link projects etc) should be suspended pending the results of this study.

Such a study must look at issues pertaining to the project and possible growth rates in Mumbai's population, housing availability, existing capacity of transport infrastructure and potential for addition to this capacity. Existence of basic services such as water supply, sewerage, sanitation, waste management and disposal, pollution levels etc.

Present conditions in Mumbai indicate that the infrastructure is inadequate to support current population. In this case, the first priority is to prevent further growth of the city, at least until the gap between population needs and infrastructure provision is bridged. This then is the over-riding principle behind the recommendations made by the CCC, and must be the guiding principle for all decisions related to the city.

An exception must of course be made for socially beneficial projects such as the genuine provision of low-cost housing for the poor, expansion and streamlining of public transport

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systems, increasing sewerage, sanitation and storm water drainage facilities etc.

The focus of planners, administrators, industry and citizens must shift from a purely statistical growth-based approach to an approach that looks at maintaining and enhancing the quality of life of all citizens of the megapolis.

2. **Transparency:** July 26 has been the perfect example of how planning decisions taken by government bodies and people in power have profound implications for millions. It is essential that all information pertaining to public projects, proposed and ongoing be freely available in the public domain.

As soon as a project is proposed, the government should ensure that local people are aware of its details, possible impacts, drawbacks and benefits.

In the case of private projects too, the local community should be made aware through a hoarding or some such device, details such as the name of the developer, nature of the project, size etc.

3. Health:

- a) **Autonomy of Medical Personnel in case of emergencies:** One of the major problems with the public health system is the red tape. Following the floods, medical professionals in the public hospitals could not take crucial decisions pertaining to the procurement and distribution of life-saving drugs. They had to follow the time-consuming indent process. During emergencies heads of medical institutions (Deans or medical superintendents) should be empowered to take decisions that can save the lives of countless people. Decentralization of responsibility and authority is the key to cutting the red tape.
- b) **Strengthening Information systems:** Field medical staff (ANMs & community health workers) should be mobilised to gather information from communities and inform the medical officers in case of any impending outbreak of diseases so that appropriate action can be initiated. Outbreak of diseases can be minimized and prevented to a large extent if there is an effective communication channel between the

field staff and the medical officers in the health department. Also these ground staffs are supposed to refer patients with common ailments to dispensaries. However it is often found that since dispensaries are lacking in medicines, they refer the patients to larger hospitals creating a bottleneck at the secondary hospitals. This situation needs to be remedied.

- c) **Increasing Public Health Sector Spending:** Over the past decade, spending on health has fallen considerably both at state and national level. At the state level, around the early 1990s the government was spending close to 30-35% of the budget on health; over the decade, this spending has reduced and today the amount spent hovers around 15–16% with non-capital expenditure cornering a large chunk. Expenditure on capital investment has reduced to just 2%. Nobel Laureates like Amartya Sen have long since argued that health is one focus area, which should not be privatized in the name of efficiency. There should be increased government spending both in real terms and as a percentage of GDP, and a significant proportion should be on capital investment. In all government hospitals all investigations and essential drugs should be provided free of cost. User fees should be removed at least for 3-6 months in all these hospitals. Efforts must be laid on strengthening the functioning of public health posts. Laboratories which are equipped to detect the outbreak of health hazards must be established

4. PUBLIC AMENITIES AND OPEN SPACES:

Keeping in mind the severe shortage of open spaces/recreational grounds/wooded areas/parks in the city, as and when future BMC plots (school buildings, municipal markets etc) fulfill their valid life and need to be torn down, these spaces should not be handed over for re-development, but instead used exclusively for public amenities (hospitals, schools, playgrounds, parks etc).

The one-third of mill lands that will be made available to the city as open spaces will be an invaluable asset to the congested central areas of the city.

5. Pending and Proposed projects and their impacts:

a) Slum Redevelopment Scheme: The slum redevelopment scheme in its current form is severely worsening the problems faced by the city, rendering it even more prone to and incapable of dealing with disasters and emergencies. The CCC came across several instances of slum rehabilitation projects either planned or that have already come up in ecological spaces such as watercourses, nallahs etc. Overall, the SRS in its current form is increasing congestion and the loss of open spaces, and in most cases has not benefited actual slum dwellers. The only sector that is gaining is the developer-builder lobby.

The SRS must be re-evaluated and amended to reduce to a minimum the role of builders and developers. The emphasis should be on allowing people to become owners of the land and undertaking the construction efforts themselves, with government assistance. Certain areas should be identified where slum redevelopment is not permissible in the interests of the city (inter-tidal areas, erstwhile mangroves, in and near nallahs and riverbeds, areas that fall under CRZ regulations etc). Slums in these areas will have to be relocated elsewhere.

b) Bandra -Worli- Nariman Point Sea Link: The Worli-Bandra and Worli-Nariman Point Sea Links exemplify bad planning. Despite a series of well-recognised experts and authorities warning against taking up these projects (Paranjpe Committee report in 1987 and the Atkins report in 1994 to name two), the state has stubbornly plowed vast sums of money into these non-solutions.

These projects will do nothing to remove bottlenecks in the city's traffic system, merely shifting them around and creating newer, worse congestion problems. In particular, they will further increase traffic congestion in Worli and South Mumbai. The W.S. Atkins report was specifically commissioned by the MSRDC to study the feasibility of the BWSL, and the report clearly showed that the effect of both the West Island Expressway and the East Island Expressway would be to attract considerable

additional traffic to South Mumbai, increasing congestion in Tardeo, Mumbai Central, Opera House, Nana Chowk and Kalbadevi. The continued construction of the BWSL will also further block the mouth of the Mahim Bay. A repeat of 26/7's rainfall could lead to even higher death and destruction if the bridge is completed.

c) Sewri-Nhava Trans-Harbour Sea Link: As in the case of the Bandra-Worli-Nariman Point sea link, the Sewri-Nhava link will also increase congestion in south Mumbai, though the stated intention is exactly the opposite. If the large amount of money being raised/diverted for the project is instead invested in public transport or in projects in the hinterland, it will provide a viable, effective and lasting solution to Mumbai's transport problems.

The sea link will also involve some reclamation and mangrove destruction, at the starting point of Sewri. Clearly, the state and central government are only paying lip service to the issue of mangrove protection, simultaneously approving projects that harm them.

d) Mill Land development: The approximately 272 hectares of mill lands lying idle in central Mumbai are a ray of hope for the island city. Recently, the Mumbai High Court reinstated the original 1/3rd land sharing formula (1/3rd of the land to go for open spaces, 1/3rd to MHADA for low cost housing and the remaining 1/3rd to be used by the owner to sell or develop the land to revitalize the mills, settle workers' claims etc). The court thus deemed the state government's alteration of the rule in 2001 to apply the formula only to vacant and not all land to suit the mill owners and developers as illegal. If the state government, mill owners and builders have their way, almost all of this land would have been converted to commercial use or residential upper class high-rises, drastically increasing congestion in central Mumbai and in no way helping address the shortage of low cost housing. The order once again gives Mumbai's citizens and planners an opportunity to draw up a holistic plan for this area, ensuring a healthy proportion of open space and public amenities, while also ensuring that the rights and interests of mill workers are protected.

Findings

- 6) **Checking inward migration:** This is a politically-charged and tricky issue, but one that the CCC feels must be addressed for the sake of the city and the millions who call it home. Mumbai simply cannot expand further unless and until the already existing yawning gaps between infrastructure requirements (transport, water supply, sewerage and waste treatment and disposal, open spaces, housing etc) are first bridged. To enable this, the growth of the city's burgeoning population must first be stemmed. Mumbai's growth in absolute terms – not the rate — over the last two decades is a direct result of the neglect of rural areas by state and central governments, leading people to come to Mumbai in search of employment and better opportunities.

It is undemocratic, unconstitutional and impractical to keep Indian citizens out of Mumbai by force and this is not what the CCC is suggesting. The solution lies in developing rural areas by revitalizing the agricultural sector, investing in small-scale irrigation, avoiding mega-projects which displace thousands and promoting employment opportunities in rural centres and smaller cities etc, so that people are not forced by circumstances to move towards the big cities. The inhumane demolition of slum dwellers' hutments before 26/7 was compounded by the floods.

Exemptions under the Urban Land Ceiling Act

The Urban Land Ceiling Act was introduced to enable the government to acquire land at low rates in order to provide low cost housing to the poor. The state government has introduced a scheme whereby builders putting up residential or commercial projects, can apply for exemption from the ULCA. In return, 15 per cent of the tenements are to be given to the state. These tenements are then allotted, ostensibly to the needy. However, this allotment is controlled by the Chief Minister and is not used to provide housing to the needy. This is in effect a loss to the city. The practice of granting exemptions to builders under the ULCA must be stopped.

- 7) **Planning for climate change:** The latest research

from the UN Intergovernmental Panel on Climate Change projects an increase in mean temperature of up to 5.8°C from 1990 to 2100, greater than that experienced in the last 10,000 years. The global mean sea level is projected to rise by 0.09 to 0.88 m. over the same period – the result of a combination of factors: thermal expansion of the oceans and melting of glaciers and polar ice caps. This will bring about an increase in the frequency and intensity of “natural disasters”, such as the cyclones that have hit Kandla and Orissa in recent years, claiming thousands of lives.

According to current scientific projections, such freak weather events are likely to become more common. The area prone to flooding and tidal erosion will increase significantly. In such a situation, the precautionary principle demands that development, infrastructure and habitations be kept away from low-lying areas of Mumbai city: along the coast, creeks, mangroves, salt pans etc. The threat posed by climate change is the strongest argument for implementing the CRZ Rules restricting development along the coast. This would also imply greater prudence in the investment of public money.

*Excerpt from **Climate Change 2001: Impacts, Adaptation and Vulnerability**, report by the Intergovernmental Panel on Climate Change.³⁹*

“The most widespread direct risk to human settlements from climate change is flooding and landslides, driven by projected increases in rainfall intensity and, in coastal areas, sea-level rise. Riverine and coastal settlements are particularly at risk, but urban flooding could be a problem anywhere that storm drains, water supply, and waste management systems have inadequate capacity. In such areas, squatter and other informal urban settlements with high population density, poor shelter, little or no access to resources such as safe water and public health services, and low adaptive capacity are highly vulnerable. Human settlements currently experience other significant environmental problems which could be exacerbated under higher temperature/increased precipitation regimes, including

Findings

water and energy resources and infrastructure, waste treatment, and transportation.

Rapid urbanization in low-lying coastal areas of both the developing and developed world is greatly increasing population densities and the value of human-made assets exposed to coastal climatic extremes such as tropical cyclones. Model-based projections of the mean annual number of people who would be flooded by coastal storm surges increase several fold (by 75 to 200 million people depending on adaptive responses) for mid-range scenarios of a 40-cm sea-level rise by the 2080s relative to scenarios with no sea-level rise.”

CRZ I areas in particular, must be strictly protected. Any proposed fresh investments along the coast must be critically examined keeping in mind the fact that significant

stretches of our coast- line would probably be submerged or badly affected by tidal erosion within the next 30-50 years as a consequence of global warming. Damage from strong weather events such as storms and cyclones is also likely to escalate.

The NIO should be entrusted with the task of preparing a report for the Mumbai Metropolitan Region, one of the world’s most populous, to ascertain the impact of the projected sea level rise (going by IPCC data) on Mumbai city and its surroundings. This will enable the city to plan ahead and minimize losses. Incidentally, this information is already required to be collected by the state governments as stipulated in the conditional approval of the Coastal Zone Management Plan (CZMPs) by the MoEF in 1996.



III. Conclusions



July 26, 2005 marks – literally – a watershed in Mumbai’s history, almost like 9/11 did to New York. Things may never be quite the same in the country’s commercial capital. It made Mumbaikars realize how vulnerable the city was to the wrath of nature. But this wrath was greatly compounded and complicated by the folly of humans.

As this citizens’ report makes abundantly clear, the government was conspicuous by its absence on all fronts during and after the deluge. Mumbai already had a disaster management plan in place, and the Municipal Commissioner, Mr. Johny Joseph, had been involved in drafting such a plan for the entire state as a former Secretary for Rehabilitation in Latur, after the earthquake in 1993. However, the entire administration was inexplicably paralysed and immobilized during the flooding of Mumbai.

To add insult to injury, the Chief Minister declared a two-day holiday that week for the entire administration – precisely at a time when it was urgently required to help Mumbaikars get back on their feet. This yet again underlines how the state government and municipal corporation, along with the police and other services were – with notable exceptions – missing when the city needed them desperately. This is a stinging indictment of all official agencies, whatever their protestations to the contrary.

People – the richest to the poorest – were put to endless trauma and tribulation as they were stuck at home or at their workplaces, children in schools. Due to the abysmal absence of that most vital element in such emergencies – information – there was panic as people rushed to reach home, only to be stranded midway. There was no way of knowing whether their near and dear ones were safe. Since the bulk of the rain fell over suburban Mumbai, which also happens

to be where the majority reside, the dislocation commuters faced can well be imagined.

Later, as this report underlines, there was no way of knowing who was entitled to relief, where it was available and how much was due. Those who had lost members of their family or suffered severe illness, including depression and fear of water, or had their prized possessions simply swept away, were further harassed when they attempted to get medical or other relief. As for rehabilitation, the less said, the better.

As is clear from countless other examples from around the world, including 9/11, officials have to be *seen* to be doing something in such emergencies, in addition to actually doing something – as distinct from merely talking about taking measures. In retrospect, there is even some criticism of former New York Mayor Rudolph Giuliani for being lionised by the media after 9/11 when he spent most of that fateful day only looking for a command centre in lower Manhattan. In Mumbai, there was not even any visibility of anyone in authority taking charge of the situation, unlike in New York that fateful September.

As is clear from the 13,890 written and 200 videotaped depositions that this commission took in all the affected areas, ordinary people came to each other’s help – *in spite* of the government. Indeed, it was the poorest of the poor who seemed the most resilient, despite having lost lives in some instances and in others, all their personal belongings, including their homes.

This is the greatest tribute that can be paid to the common citizen, who rose to the occasion. Many who could scarcely afford to do so, even provided relief to those stranded in their cars and on the roads and trains, despite all odds. The contrast between the situation in Mumbai and what happened in New Orleans a little later cannot be forgotten: the poor citizens in that US city were stranded, physically and psychologically, without any external or internal resources to cope with the situation.

The Commission also noted that given the recent decline in the strength of communal forces in the city, the Mumbaikar’s natural instinct to come to the aid of his fellow citizen, irrespective of caste or creed, came to the fore. We heard instance after instance of people accommodating others, giving

Conclusions

them food and clothing, and generally being sympathetic to their plight. This was a source of tremendous solace when the administration was virtually on a prolonged vacation, if not actually a dereliction of duty.

The report also emphasises that there had been warnings that such a breakdown in the life of Mumbai could well occur due to such schemes as the Mumbai Metropolitan Region Development Authority's Bandra-Kurla Complex, which has been built on mangroves. Or the ill-advised Bandra-Worli Sea Link, which narrowed the mouth of the Mithi river, as did extensions to the airport runways several years earlier. The Commission cannot but comment that the future of Mumbai is being strangled by the politician-builder nexus, which has vitiated even the redevelopment of slums.

There will be the inevitable official self-justification after this report is released – that this was an unprecedented occurrence, that relief could not be delivered because the deluge had brought transport to a halt, that the administration lacked early warning devices as well as rudimentary equipment like boats and vehicles that could brave the floods, and so on. The administration will also argue that it did not have the financial resources to put a proper disaster management plan in place.

However, as the rough assessment of the financial loss suffered by millions of people in what is one of the world's populous cities shows, it actually cost the government and ordinary citizens a great amount in terms of losses of life, health,

belongings, workplaces and earnings. In other words, the city cannot afford *not* to spend on measures to prevent or mitigate natural disasters, because this deluge cost them dearly a far bigger amount. What is more, there are isolated instances of flooding virtually every monsoon, which the city treats as 'normal', but which also take a heavy toll in human, material and financial terms. Imagine the overwhelming chaos if there is a major chemical or nuclear accident instead, on the lines of the Bhopal gas tragedy 22 years ago.

Given the recent boasts about making Mumbai a Shanghai and a 'world class city' – much of which hype has been drowned out after 26/7 – the administration should realize that no city which seeks to crown itself in this self-serving manner in the 21st century can falter at the very first step, as it were. It must first provide every citizen with housing, health facilities, education and infrastructure, so that Mumbai can be modernized in the truest sense of the word, not just for the elite which deludes itself that it can rank with the best in Asia.

We in the Commission believe that the report speaks for itself in assigning blame for the causes and consequences of the events which unfolded on and after 26/7. We earnestly hope that all official agencies take cognizance of the report and carry out corrective measures to ensure that Mumbai is not caught on the wrong foot in this catastrophic manner ever again. If there is one message that this report delivers, it is that there is no price which is too high to be paid for the safety and health of the citizens.



Annexure 1

SURVEY FORM

Concerned Citizens' Commission
C/O Citizens for Justice and Peace
Nirant, Juhu Tara Road,
Juhu, Mumbai – 400049

An enquiry into Mumbai Floods 2005

Deposition Note from CCC:

This information is being sought to both record the real and painful impact of the recent deluge on all citizens in an effort to determine whether, if, with more responsible management of the city, the impact of the flood could have been reduced. We request that you give all the details of what you experienced and saw so that we could draw the most complete conclusions of what happened.

1. Full Name: _____
Surname First Name Middle Name

2. Address: _____

2.1. Residential: _____

2.2. Workplace: _____

3. Details of Family:

How many family members etc

| | | | |
|----|----------|----|----------|
| 1. | Relation | 2. | Relation |
| 3. | Relation | 4. | Relation |
| 5. | Relation | 6. | Relation |

4. Residential Status: (in Mumbai since...): _____

5. Testimony regarding Floods/Deluge: _____

Where were you on 26th July 2005: _____

7. What you saw [full details]: _____

8. How you survived: _____

9. What was/were your detailed impressions of those suffering around you? _____

10. What was the condition of the roads, sanitation, homes etc around you? _____

Annexure

11. Did you try and approach the authorities? Yes _____ No _____
12. If so, when and which authority? Please give full details (BMC, Police, Fire Brigade, Collector, State Government, etc): _____
13. How many times? _____
14. What was the response? _____

15. Were you satisfied with the response? _____
16. If so, how? _____
17. If not, why not? _____
18. Did you or your family suffer any personal damage or loss of life or property? Yes ____ No ____
19. Can you describe the details? (Loss of lives, injuries, damage to house/office, vehicles, furniture, household goods, etc.): _____

20. What do you estimate the financial loss to yourself is? _____
21. What compensation do you expect from government? _____

22. What should be done to avert such disasters in future? _____

23. Did you receive any aid in terms of relief and rehabilitation? If any, in what form? Yes ___ No ___
24. If yes, was it from an official or non-governmental source? _____
25. What was the source? _____
26. Has there been any outbreak of illness in your area of residence or work after the deluge?
Yes _____ No _____
27. If yes, please provide details. _____

28. Was there any medical camp in you area of residence or work? Yes _____ No _____
29. Who held it? _____
30. How often do the civic authorities clean the garbage in your area of residence and work?

Annexure

31. Are there any nullahs near your house/office? Yes _____ No _____
32. How often are they cleaned? _____
33. When were they last cleaned? _____
34. What is the condition of your residential area and the roads around it? _____

35. Do you go to a public civic hospital for medical treatment or to a private one? _____

36. What school do the children in your family attend, BMC/private? _____
37. Please give details about electricity availability from July 26- August 10, 2005 _____

38. Please give details about phone connections from July 26- August 10, 2005 _____

39. Please give details about water availability from July 26 to August 10, 2005 _____

40. Any Other Details that you may think are relevant _____

Place:

Date:

Volunteers Name:

Signature:

Annexure 2

SCHEDULE OF HEARINGS

| Date | Area | Venue |
|-----------------|--------------|---|
| September 3 | Kurla | Social Welfare Centre Hall, Central Railway Colony, Opp. Bldg no. 99, Kurla (E), near Kurla Station. |
| September 4 | Kurla | Social Welfare Centre Hall, Central Railway Colony, Opp. Bldg no. 99, Kurla (E), near Kurla Station. |
| September 6 | Kalina | Community Hall, Old Air India Colony, Kalina, Mumbai 400 029. |
| September 8 | Jeri-Meri | St Jude's High School, M.V. Marg, Andheri-Kurla Road, Jeri-Meri, Mumbai 400 072 |
| September 9 | Bandra East | New English High School, next to Kherwadi Police Stn., New English High School Road, Mumbai. |
| September 10 | Kalina | St Mary's Junior College Hall, Church Road, Kalina, Santa Cruz [E], Mumbai 400 029. |
| September 11 | Sakinaka | Sakinaka, St. Anthony's School Hall, Kherani Rd., Sakinaka Mumbai 72. |
| September 13 | Govandi | Tata Nagar Social Welfare Centre, Tanaji Malusare Chowk, Govandi (W) near Govandi Station, Mumbai 43. |
| September 14 | Chembur | TISS, Sion-Trombay Rd, Deonar, Opp. Deonar Bus Depot, Mumbai 40 088 |
| September 16 | Kandivali | 1 st Floor, Shyam Bhavan, Devji Bhimji Lane, Mathuradas Road, Kandivli West, near Station. |
| September 18 | Malad | St. Anne's High School, Marve Road, Malad West, Mumbai 64. |
| September 19 | Bandra | St. Joseph's High School Hall, Hill Rd, Bandra West |
| September 20-24 | South Bombay | Bombay Natural History Society |

Annexure 3

LIST OF GOVERNMENT OFFICIALS INVITED TO DEPOSE & RESPONSES

| Sr. No. | Name & Designation | Response |
|---------|---|--|
| 1 | Mr. Vilasrao Deshmukh Chief Minister (Maharashtra) | No Response |
| 2 | Ms. Vimal Mundada, Minister of Health (Maharashtra) | No Response |
| 3 | Mr. Ganesh Naik Minister of Environment (Maharashtra) | No Response |
| 4 | Mr. Johnny Joseph Municipal Commissioner (MCGM) | No Response |
| 5 | Mr. Sanglikar Deputy Municipal Commissioner (Environment and Waste Management) | No Response |
| 6 | Mr. A.L. Patankar Assistant Municipal Commissioner, MCGM | No Response |
| 7 | Mr. R.M. Prem Kumar Chief Secretary (Maharashtra) | No Response (Cited official engagements as reason for not deposing) |
| 8 | Mr. A. P. Sinha Additional Chief Secretary (Maharashtra – Home Dept) | No Response |
| 9 | Mr. B.P.Pandey Principal Secretary (Maharashtra – Environment) | No Response |
| 10 | Mr. S. S. Hussain Principal Secretary (Maharashtra – Forests) | No Response(Cited official engagements as reason for not deposing) |
| 11 | Mr. Krishna Vatsa Secretary, (Relief and Rehabilitation) | Deposed |
| 12 | Dr. C.V.V.Bhadram Dy. Director General of Meteorology (Regional Meteorological Centre, Mumbai) | No Response (Said that matter was sub judice and therefore could not depose) |
| 13 | Mr. A.D. Jhandwal Chief Fire Officer (MCGM) | No Response |
| 14 | Mr. Ramanath Jha Managing Director, MSRDC | No Response |
| 15 | Mr. Sudhir Joshi Metropolitan Commissioner, MMRDA | No Response |
| 16 | Mr. Pathak Deputy Chief Engineer (Storm Water Drainage Dept - BMC) | Deposed |
| 17 | Mr. S.Y. Hankare Chief Engineer (Mumbai Sewerage Disposal Project) | No Response |
| 18 | Mr. Palav Dy. Chief Engineer, (Mech & Elect.), Sewerage Project. | No Response |

Annexure 4

EXPERTS WHO DEPOSED BEFORE CCC PANEL

| Sr. No | Person and Organization |
|--------|---|
| 1 | Dr. M.D. Zingde, National Institute of Oceanography |
| 2 | Mr. Ravi Duggal CEHAT |
| 3 | Mr. Rakesh Kumar NEERI |
| 4 | Mr. Prakash Aptey Ex-Head, HUDCO |
| 5 | Mr. Sudhir Kumar Director, Mumbai Airport |
| 6 | Mr. Girish Raut Social Activist |
| 7 | Mr. Nandan Mungekar, Architect and Town Planner |
| 8 | Mr. Satish Sahney Former Police Commissioner & Mohalla Committee Movement Trust |
| 9 | Mr. Soli Arceivala Chairman Emeritus, AIC Watson Consultants Ltd. |
| 10 | Ms. Neera Punj Citispace |
| 11 | Mr. Rajkumar Sharma, AGNI & CLEENSWEEP |
| 12 | Mr. Vivek Kulkarni, Pirojsha Godrej Foundation |
| 13 | Mr. P.K. Das, Nivara Hakk Suraksha Samiti |
| 14 | Mr. P.A. Sebastian Human rights lawyer |
| 15 | Dr. H. Samant, Lecturer in Geology, St. Xavier's College |
| 16 | Mr. Arun Ranade, G Block, Bandra-Kurla Complex |
| 17 | DIG A. Rajasekhar, Coast Guard, W. Region |
| 18 | Mr. Jekisan G. Bhatia, Citispace |
| 19 | Mr. M.Z. Ansari, GM, Western Railway |
| 20 | Ms. Medha Patkar and others, NAPM |

Annexure 5

TOTAL NUMBER OF DEPOSITIONS

| Sr No | Date | Venue | Total Depositions |
|---|------------|--|-------------------|
| 1. | 03/09/2005 | Kurla Central Railway Hall, Kurla(E) | 600 |
| 2. | 04/09/2005 | Kurla Central Railway Hall, Kurla(E) | |
| 3. | 06/09/2005 | Air India Colony, Santa Cruz(E) | 700 |
| 4. | 08/09/2005 | Jeri Meri, St Jude's High School, Andheri-Kurla Road | 1000 |
| 5. | 09/09/2005 | Bandra(E), New English High School, Next to Kherwadi Police Station | 60 |
| 6. | 10/10/2005 | Kalina | 8000 |
| 7. | 11/10/2005 | St Anthony's School Hall, Kherani Road, Saki-Naka | 1200 |
| 8. | 13/10/2005 | Govandi(W), Tata Nagar Social Welfare Centre, Mumbai - 43 | 800 |
| 9. | 14/10/2005 | Tata Institute of Social Sciences, Deonar(E), Mumbai - 88 | 600 |
| 10. | 16/10/2005 | Kandivili (W), 1 st Floor Shyam Bhavan Mumbai | 400 |
| 11. | 18/10/2005 | Malad(W), St Anne's High School Marve Road | 400 |
| 12. | 19/10/2005 | Bandra(W), St Joseph's High School Opp St Peter's Church, Mumbai | 130 |
| Total Depositions across 12 hearings | | | 13,890 |

Annexure 6

TESTIMONIALS OF KEY EXPERTS

1. Ravi Duggal (CEHAT):

- § Role of private medical sector needs to be looked into especially in terms of reporting of cases.
- § The public health sector with all the limited resources coped pretty well. The response of the Public health sector was rather a problem caused by the administration and red tape
- § There should be more autonomy to deans and medical superintendents in case of emergencies.
- § Invocation of “Notifiable Diseases Act” which will give an accurate estimate of diseases reported over the last 2 months.
- § In the long term, increase spending on health sector with special emphasis on capital investment.

2. Hrishikesh Samant (Lecturer - Geology, St Xavier’s College)

- § Originally Mithi had 3 channels, Mahul Creek, Mahim Creek and Thane Creek; today only one channel i.e. the Mahim Creek remains
- § The Mumbai Airport has altered the course of the Mithi River at a 90° turn and has reduced the width of the river considerably due to which the river does floods different areas.
- § Existence of slums i.e. ‘tolerant structures’ along the banks of the Mithi River and in many cases small scale industries depositing tremendous waste has also had its toll on the Mithi River.
- § Outdated technology by the MET dept was another reason for the lack of warning. The Met dept should have conducted simulations of maximum possible rain to foresee the situation
- § Ultimately it is the lack of monitoring of floods plains and existence of ‘tolerant structures’ which has resulted in 26/7.

3. Satish Sahney (Former Municipal Commissioner and MCMT)

- § Although, the Mumbai Police force has a strong 37000 force; at any given point of time not more

than 10,000- 11,000 cops can be mustered to fight a disaster since this operates on an 8 hour shift. Normally the police presence is significant at the rush hours around 9:00 am in the morning to around 11:00 am and 4:00pm in the evening to 7: pm. The rains began to pound the city in the afternoon and the police in a way were caught unawares.

- § The Home Guards could have been called out, however this system over the past few decades has been used by politicians to provide employment and rendered it ineffective.
- § The Civil Defence volunteers by law can only be called when a state of war has been declared.
- § The structure and functioning of these 2 arms should be revitalized in order to make it a potent force.
- § The State Reserve Police must be pressed into action and must be immediately provided with training and equipment for flood situations.

4. Nandan Mungekar (Architect and Town Planner)

- § The AAI has extended the runway at Santa Cruz Airport exactly at a perpendicular angle to the Mithi River course by blocking it by a wall, as a result the water from the river flooded areas like Airport runway, Air India Colony, Kurla etc.
- § The mouth of the Mithi River which was originally 1.6 kms is today only around 40 mtrs and the flow of the river has been blocked due to Bandra –Worli Sea Link reclamation, reducing the Mahim Bay. Further during high-tide water cannot enter the Mithi River Basin. There is no mangrove cover to safeguard the land and so it enters the roads of Mahim, Dadar. Also since the sea water level has increased, it does not allow to rain water from the land to drain out into the sea aggravating the problem further.
- § The reclamation of 331 hectares of swamp land and marshland for the Bandra –Kurla Complex meant that an area which was a natural water holding tank has been done away with and this water finds its way into Kurla, Ghatkopar, Dharavi and Bandra.

Annexure

5. Rakesh Kumar (NEERI)

- § Commercial activities in & around the Mithi River have reduced the carrying capacity of the river.
- § The fact that BKC was a water holding area and that destruction of mangroves here to construct a business district would result in displacement of water was warned by NEERI to CWPRS; in spite of which CWPRS gave the environmental clearance to BKC. Also the construction of BKC is a clear CRZ violation.
- § The first step is to look at planning holistically and see if a particular project is in sync with the city's development plan.
- § The next step would be to segregate the sewerage and storm water drains which exists in the Island city.
- § Creation of holding ponds which could store rainwater during times of high tide and which could be released during times of low tide should be taken up.

6. Prakash Apte (Ex HUDCO Chief)

- § The entire city of Mumbai has been concretized, there is no space for the water to percolate, added to this the course of the Mithi River has been severely altered and narrowed down at many places. Water cannot find its way into the sea and these were the main reasons why the Mumbai floods occurred.
- § The failure of the civic administration in discharging its mandatory duties has led to the situation that exists today. For instance there is no proper de silting of nullas, people use nullas as dumping grounds; as a result these drains are perennially choked.
- § The first step is to encourage the use of perforated tiles along pavements so that water can percolate into the ground. Also roads should be asphalted instead of concretization. This is another way of increasing percolation of water.
- § Dereservation of opens spaces be if for commercial purposes or social housing should be immediately halted.

7. Girish Raut (Social Activist)

Due to massive commercialization in Mumbai

and unabated construction activities, there are hardly any open spaces left for the water to percolate, in this situation the role played by rivers which act as natural storm water drains becomes even more important. However in spite of knowing this, the Mithi River has been choked by various vested interests over the decades.

The course of the Mithi River has been obstructed at several places.

- § AAI walls obstruct the flow of the Mithi River.
- § G-Block of the BKC directly suppresses the Mithi River. Buildings like NSE & IL&FS are on the course of the Mithi River.
- § Channelisation of the river by introduction of bunds especially in the Mithi River – Arabian Sea estuary by the MMRDA has severely affected marine biology.
- § The Worli-Bandra Sea Link (WBSL) is the last nail in the coffin. Reclamation of Mahim Creek which prevents the tidal waves from following their natural path will have a significant impact on North Mumbai. The sea water now finds its way into North Mumbai. Areas like Dadar, Prabhadevi, and Mahim Fort are now regularly inundated with sea water. Several buildings in the area have suffered damages due to corrosion. The Mahim fort which survived for over 600 years is now in a dilapidated state and there is constant pounding of waves in this area.

- § The 1997 report by BNHS commissioned by MoEF warned against the reclamation of land for the WBSL; in spite of this the MoEF gave the go ahead to the WBSL with massive reclamation.

8. Vivek Kulkarni (Phirojsha Godrej Foundation)

- § The BKC area was an estuary for the Mithi River which acted as a natural flood control area. When water could not find any area it destroyed anything which came in its path.
- § The MMRDA has undertaken a process of training the smaller creeks which essentially means construction of cement bunds. What the authorities do not realize is that these bunds destroy the eco-system and do more harm than good.

- § How the BRIMSTOWAD report has been implemented is an aspect which needs to be probed.
- § Sanjay Gandhi National Park (SGNP) was one of the reasons why Mumbai wasn't inundated completely. The SGNP absorbed tremendous amounts of water and this saved the city further catastrophe.
- § Wetlands should be treated as ecological indicators of the entire city and their condition should be monitored continuously.
- § The city faces a real threat of floods, Tsunamis etc; to protect the city from these disasters, natural protection mechanisms like mangrove lands & salt pan lands need to exist and be nurtured.

9. Depositions of flood victims:

a. Asha Rai Naik (husband lost): Asha Rai Naik a resident of Anna Sathé Nagar, Mankhurd (W) lost her husband (name not mentioned) who went to save their children who were caught in the deluge. Her husband used to do odd jobs. She says that he was swept away and his body was never recovered. Her tragedy did not end here. When she sent to the Police Station, the police personnel did not file an NC and sent her back saying that her husband's body was not amongst the bodies which had been recovered and that she would be intimated as soon as her husband's body was found. It was only after the intervention of Medha Patkar that the police registered an NC. She continued to go to the police station in the hope of some news regarding her husband; when she was told not to come to the police station again and again. She also says that while houses in the neighborhood who were close to the corporator got assistance, her family did not receive any assistance from the government. Not a single government official has come till date to listen to their grievances.

b. Blanche Alves Pereira (son lost): Blanche Alves Pereira a resident of Andheri lost her son Melvin Pereira, a Xth student at Dominic Savio High School when he was swept away from under a nullah while returning from school. She says that he had called her up at around 8:30 p.m. on the 26th saying that he was near Andheri station. That was her last conversation with him. He did not arrive home in

the night and his body was found the next evening in a nullah. The only way he was recognised was because of his uniform and the holy cross across his neck. The bodies of five others who went missing along with him were not recovered. Ms Pereira went on to say that this particular area where Melvin was last seen is always flooded and the floods of 26th July was just too much for the area. She said that she did receive Rs 50,000 from the collector's office; small consolation for a mother who lost her youngest child.

c. Testimonies of Malad – Marve residents:

Residents of Malad Marve faced unprecedented flooding for the first time in many decades. An investigation carried out by CCC revealed exactly why this area was inundated. Originally this area had several open spaces comprising of playgrounds, parks, mangrove patches etc. However the construction boom along the western suburbs has ensured that these open spaces has been steadily encroached upon. The natural drainage flow, which would have otherwise found its way into the Manor Creek, does not have any outlet; added to this is the indiscriminate dumping by builders on open spaces to increase the height; in such a situation the water finds its way to those places which are at the lowest height which happen to be the original inhabitants of the area.

c.1. Case study of Evergreen Housing Society and Oasis Housing Society: Evergreen Hsg Society has been in existence since a long time adjoins the Link Road at Malad (W) and is an area, which has never witnessed flooding thanks to the vast open spaces, which surround it. Recently however all this changed. During May 2005, around 50 to 60 trucks dumped garbage in an adjoining plot. This plot of land was low-lying and had been acting as a natural sponge. Over three days, around 200 trucks dumped debris and raised the height of this plot significantly. A builder called Hemant Parashuram Puria had been increasing the height of the plot with an intention of constructing a building. Another plot of land in the vicinity that was covered with mangroves was hacked to make way for an SRA scheme. For this too, the level of the plot was raised significantly. On July 26, water from the adjoining plot whose height had been increased broke through the compound wall and Evergreen Hsg society was completely inundated with water levels reaching around 10 feet.

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When the residents complained to the builder, he instead of helping them accused them of breaking the wall. Till date the matter has been unresolved and the residents live in the fear of being inundated yet again during the next monsoons.

c.2. Case study of Guzdar Scheme (Also incorporated in the main report Section II H 4 - Encroachments): Residents of the Guzdar Scheme, Santa Cruz (West) deposed before the CCC on Monday September 19 at Bandra-West. This is probably one of the better documented cases of encroachment and disruption of natural drainage patterns causing threat to life and destruction of property. Within the last 15 years, over 8,317 hutments have come up on the Guzdar Creek. Of these, according to documents received from the Guzdar Scheme Residents Trust (GSRT), 5,154 are pre-1995 and thus eligible for rehabilitation. These dwellings have destroyed over 11 hectares of mangrove and are occupying an area that is notified as CRZ I and a No Development Zone, to the west of the Guzdar Bandh. This area was formerly a mangrove and mud flat stretch known as the Guzdar Bay/Creek. By dumping and constructing hutments, the level of land west of the Bund, which is the seaward side, has been raised above that of the land on the eastern or landward side causing a “Saucer Effect”. With the result that rainwater, instead of flowing westward to the sea, now flows back to the land. The encroachments have blocked the free flow of water to the sea, resulting in serious flooding every monsoon. Ground floor residents now have flood water entering their homes every monsoon as a matter of course. Overflowing toilets and polluted underground tanks, electrical short circuits in the meter rooms and flooding of lift wells are also common. This is the situation during normal monsoon rains, so of course the July 26 deluge led to a much worse scenario, with over 5 feet of water in some ground floor residences.

In June 2000, the BMC demolished the four sluice gates that have been fitted on the Guzdar bandh since the early 1900s, to keep the seawater out at high tide. As a result of the removal of the sluice gates, there has been regular flooding of roads and residential compounds during the high tides. The only reason given by the BMC for removing the sluice gates was that they are ‘no longer technically required’. The sluice gates kept the high tide waters

out, and this led to floods in the hutments (formerly inter-tidal zone) on the west of the Guzdar bandh. It would seem probable that this was the reason for the removal of the sluice gates.

In 2001, the citizens of the area approached the High Court for relief vide Writ Petition no 743/2001. On October 31, 2001, the Court directed the Government of Maharashtra to take corrective steps as “immediate relief”. However little has changed on the ground. The BMC protests its inability to clean the nallahs and drains in the area until the encroachments are cleared. To date, 696 hutments have been demolished and 356 hutments have been rehabilitated, at no cost to themselves, at Anik Nagar, Chembur. This is against the High Court Orders of 31st Oct 2001, 4th Oct 2002, and 24th Feb 2004. About Rs 5.5 crores has been spent for the development of 2.7 hectares of land at Malwani, Malad and each of the 780 pre-1995 encroachers were to pay the government Rs 30,000/- for a 10' x 15' plot of land. Political interference forced the GoM to rehabilitate 356 hutments free of cost at Anik Nagar, Chembur.

The latest development is a proposal to develop and SRA scheme in the Guzdar Bandh Creek of about 2.8 million sq feet, that is in CRZ I area and a No Development Zone! Proposals have been submitted to the SRA by M/s Gala Builders and M/s Deewan Builders. The Guzdar Bandh Residents Association has applied to the SRA for information in this respect under the Right To Information Act, but no reply has been forthcoming thus far. Legal action would appear to once again be the only option left.

The Guzdar Bandh example typifies the manner in which open spaces and natural topographical features have been interfered with or destroyed across Mumbai city, in this case by illegal encroachments.

Annexure 7

FINDINGS AND RECOMMENDATIONS OF THE RANI JADHAV COMMITTEE REPORT

Rani Jadhav Committee Report PART IV

5. ACTION TAKEN REPORTS

5.1 In this part we examine the actual action taken by the various agencies in terms of their functions as mentioned in Part III and the extent to which these actions were taken either in line with the DMP or at least in consonance with the responsibilities laid down in the DMP. It may be mentioned at this stage that Action taken Reports (ATRs) were called by the Committee from all the concerned agencies not only through a detailed questionnaire in the first instance but by a number of follow up communications and discussions with the concerned officers from time to time. A list of these communications may be seen at Annexure VIII. The reports of all the agencies have also been included verbatim and can be seen from Annexure IX-A to Annexure IX- J. In the light of the above the Committee feels justified in presuming that where no action is reported this is because no action is actually taken. The ATRs are examined in the same sequence as the provisions of the DMP viz.

1. Institutional Arrangements
2. Risk Assessment And Vulnerability
3. Mitigation Strategy And Measures
4. Coordination Mechanism And Control Room Functions
5. NGOs and Voluntary Agencies
6. Reporting Systems
7. Plan Dissemination
8. Ward Level Response

5.2. INSTITUTIONAL ARRANGEMENTS

5.2.1. INDIAN METEOROLOGICAL DEPARTMENT (IMD) (Annexure X):

9th July, 2000: Local forecast for Mumbai and suburbs regarding heavy to very heavy rain with gusty winds was sent via fax / phone / both to the EOC and the BMC besides other Control Rooms between 1.00 p.m. to 3.30 p.m. *The fax machines of the Traffic Police, City Police, Mumbai, Western Railway Control Room, Central Control Room, EOC*

Mantralaya were found to be out of order. Landline Telegrams conveying the message "Rainfall reaching 15 cm (equal or more than your limit) at a few places with heavy fall exceeding 15cm at isolated places is likely in your area till the morning of 11th July, 2000" were also sent to above authorities.

10th July, 2000 : Local forecast indicating "light to moderate rain! showers" and "heavy rainfall warning was given in respect of isolated places in Konkan Goa for the next 48 hours" was transmitted to Principal Secretary to CM , Chief Secretary, Addl. Chief Secretary, Principal Secretary (Revenue), and the Control Room.

11th July, 2000 : Moderate rain showers, at times heavy, accompanied with gusty winds was forecast for the districts of

Mumbai, Thane and Raigad in the morning of 13th. All offices as per details for 9th July above were intimated by fax/telephone. *The fax machines of City Police and Mantralaya (Control Room - 2850919) were not functioning.* Further fax messages indicating "Heavy rainfall at few places with very heavy falls at isolated places over Konkan Goa during next 48 hours" were transmitted to PS to CM, CS, Revenue Secy. and Mantralaya Control room.

5.2.2. EMERGENCY OPERATIONS CENTRE (EOC)

The IMD sent the following messages to the EOC 9th July, 2000 (between 1 pm and 3.30 pm) : a) Local forecast for Mumbai and suburbs: "Heavy to very heavy rains with gusty winds", b) "Heavy rainfall is likely at a few places with very heavy falls at isolated places in the districts of Mumbai, Thane and Raigad till morning of 11th July, 2000." This message was sent by Fax and phone between 1 pm and 3.30 pm. The fax was found to be not working. The message was received on phone by Mahandale. c) Heavy rainfall warning :- Heavy rainfall at a few places with very heavy falls at isolated places is likely in Konkan Goa in the next 48 hours.

10th July, 2000 (between 12 noon and 1 pm): Fax and phone message: Heavy rainfall warning: "Heavy rainfall at isolated places is likely in Konkan-Goa in the next 48 hours". 11th July, 2000 (between 12 noon and 1 pm) : "Heavy rainfall warning: Heavy rainfall is likely at isolated places in the districts of Mumbai, Thane and Raigad till the morning of 13th July, 2000." The message was sent by fax and

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phone. Once again the fax was not working. The phone message was received by Patil.

12th July, 2000: (between 12 noon and 1 pm) "Heavy rainfall warning: Heavy to very heavy rains in the form of more or less continuous showers accompanied by strong gusty wind expected over city of Mumbai, its suburbs and districts of Thane till morning of 14th July, 2000." This was sent by fax and phone. "the phone message was received by Narvekar.

Apart from the IMD the EOC received other disaster (downpour) related information. Details of information received and action taken as gleaned from the register are as follows:

12.7.2000:

| INCIDENT | ACTION |
|---|---|
| 1) Overflow of Tulsi lake leading to release of water. Warning to surrounding areas | No action. Details of who sent the report, people in etc., not mentioned. |
| 2) One Rajesh Raghunath Patil was washed away at Deonar | As Above |
| 3) House collapse behind Vikram Glass company ,some people Injured | As Above |
| 4) 2 children drowned at Vakola, Santa Cruz | As Above |
| - A time of 1600 hours is entered for all these entries | |
| 5) At 1600 hours Deore, wireless operator informed that there is a landslide on Bombay Ahmedabad highway. "Asked to take necessary measures." | |
| 6) 17 00: Normal | |
| 7) At 17.30 BMC control 'room has informed that trains are closed to Vashi, Bandra and Thane. | |
| 8) 18 00: Normal | |
| 9) 18 00: Information received from the Main Control Room that at 16.20 hours that there are landslides at Ghatkopar, Narayan nagar and Azadnagar. 19 people were injured and | |

they have been admitted to the Rajwadi hospital for treatment.

10) 9 other messages were received.

In all cases the only action taken by the EOC was to send this information to various senior officers and other departments concerned.

5.2.3. DISASTER MANAGEMENT COMMITTEE (STATE LEVEL ACTION)

- (i) The DMP envisages the setting up of a Disaster Management Committee (DMC) at the state level under the ACS (Home). The Coordination Committee set up vide GR dated 24.7.1998 is more or less on the lines of the DMC. Two meetings of the coordination committee were chaired by the ACS (Home) on 4th May and 5th June and detailed instructions were issued to the concerned agencies for preparation for such contingencies as flooding etc. due to monsoons. (Minutes of these meetings maintained by R & R may be seen at Annexure XI). All control rooms were asked to be fully prepared with details of various activities and functions expected to be carried out by them. They were asked .to maintain and up to date list of important telephone numbers. Pre-emptive actions by way of cleaning / desilting of nallas / drains with special attention to critical points was emphasized. The committee stressed the importance of checking and maintaining all equipment including communication equipment in proper working order. The Police control room was entrusted with the function of keeping the public informed of various arrangements made in case of a disaster. The committee noted that the EOC has not yet been activated and since the EOC is to act as nodal point for all communications with the state level coordination committee the need to post a competent full time DS in charge of EOC was mentioned. Instructions given in the meeting on 4th May were reviewed on 5th June.
- (ii) In the meanwhile on 16th May, 2000 the Chief Secretary (CS) also held a pre-monsoon meeting which was attended by all concerned departments of the GOM, Commissioner Police,

Director Regional Meteorological Centre, Director DD, Director AIR, Commander Navy etc. Their attention was drawn to the responsibilities of the concerned agencies in handling of the crisis arising out of heavy monsoons and instructions were given to remove short comings wherever noticed.

- (iii) In so far as post-disaster actions at the state level are concerned information regarding weather forecasts was received from the met office through the EOC at 1.00 p.m. on 11th July and 11.45 a.m. on 12th July.
- (iv) According to the Home Department report as also Principal Secretary R & R's report, ACS (Home) was constantly in touch with all concerned agencies including Commissioner of Police Mumbai, Jt. Commissioner of Police (Traffic), Municipal Commissioner (MMC), BEST, Railway authorities and even contacted Ward Officers in charge of 'A' and 'B' Wards who were asked to make arrangements in school premises for stranded passengers through out the day and monitoring arrangements on the ground. The Ghatkopar Landslide site in which many persons lost their lives was visited thrice by ACS (Home) personally and rescue and relief operations supervised through the Collector M.S.D.
- (v) An emergency meeting of officers of R&R and other Secretaries was called by the CS on 13th July, 2000 and requisitions made to Army and Navy seeking their services for evacuating the affected persons from the Ghatkopar Landslide site and the banks of the Mithi River which was overflowing.
- (vi) Instructions were issued for issue of hourly bulletins on DD and radio. Principal Secretary R & R has confirmed that the absence of an activated EOC was not felt at the state level since regular signals were received from the meteorological office regarding possibility of heavy rains on 11th, 12th and 13th July, 2000. And this information was relayed to all concerned officials including Secy. to CM, CS, and ACS (Home).
- (vii) According to this report also, ACS (Home) as well as Principal Secretary R & R were in touch with BMC including BEST, Commissioner Police Mumbai and the Central. & Western Railways

to be in readiness to handle any situation arising out of the heavy downpour. Fax messages were sent to AIR & DD to relay bulletins regarding flooding in the city and their effect on rail and road transport.

- (viii) In summation the reports of both ACS (Home) and Principal Secretary R & R state that all possible actions as required at the state level *for* mitigating difficulties of the affected persons was taken.
- (ix) The only lacuna seen is that adequate publicity particularly on the 11th and 12th. July could not be carried out and public could not be kept suitably informed. Had the EOC been active and been performing its functions as per the EOC manual this lacuna may not have occurred.

5.2.4. DMP (Mumbai)

- (i) On receipt of the weather warning from the Met department all the concerned control rooms were informed of this and the control rooms of the wards/line departments were asked to remain in readiness. This was done through *four* pre-monsoon circulars were issued by the Additional Commissioner, BMC to all concerned line departments of the BMC with instructions for :
 - a) Setting up well equipped departmental control rooms with delineated functions.
 - b) Provision of shelter arrangements to be made in schools and other public buildings for slum dwellers incase of flooding.
 - c) special attention to low lying areas prone to water clogging.
 - d) Issued of notices to owners of unsafe structures to vacate.
 - e) Removal of encroachments from rivers and nallas.
 - f) Nature of care to be taken in the event of flooding and landslides.
 - g) Checking the wireless equipment in time.
 - h) holding meetings of the Crisis management Group and giving them requisite training; and
 - i) Drives were undertaken by various wards to cleanup the storm water drains and sewerage pipes.

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- (ii) The BMC report further states that these instructions were followed by all concerned and in this way they were fully prepared as per the Disaster management Plan
- (iii) On 3.6.2000 the Commissioner held a meeting of all agencies concerned with disaster relief and ensured that pre monsoon preparedness got underway. All Ward Officers were given 15 copies of the ward level DMPs for distribution to the concerned agencies / organisations along with names, addresses and telephone numbers of important officers, information relating to high and low tides. Ward level DMPs were also handed over to the concerned corporators.

It would thus appear that as far as institutional arrangements are concerned the arrangements envisaged in the DMP at the BMC Commissioner level were operationalised.

5.3 RISK ASSESSMENT AND VULNERABILITY

5.3.1 The Mumbai DMP envisages undertaking comprehensive risk assessment and vulnerability studies with a view to taking mitigation actions that would reduce/prevent disasters. The Mumbai DMP itself contains a detailed account of the areas likely to be affected by various types of disasters including floods and landslides. Action expected here is that detailed risk assessments and vulnerability studies be carried out in respect of the identified areas, settlements and spots with a view to taking mitigation actions that would reduce / prevent disasters. From the sample ward plans provided by the BMC it appears that risk assessment and vulnerability studies have been carried out in each ward and details of the same have been given in the ward plan document. Eg. areas prone to flooding/choking have been listed along with other vulnerable sites in the case of earthquakes, fires, etc. etc. These have been described in detail including, in some cases, the names of buildings likely to be effected.

5.4 MITIGATION STRATEGIES AND MEASURES

5.4.1 The BMC report details the pre-monsoon preparations undertaken of which Nallah training, soling and cleaning are important ingredients. However, there is no mention of any specific program

of training, soling or cleaning of storm water drains being undertaken by the BMC as a pre monsoon activity. However, it is generally mentioned that drives were undertaken by various wards to clean up the storm water drains and sewerage pipes.

5.4.2 The DMP also requires that a program should be undertaken to increase the capacity of storm water drainage (para 4.6.1(i) above). In this regard BMC does have a long term plan known as the BRIMSTOWARD PROJECT which was prepared between 1989 - and 1993 by consultants from England.

The objective was to tackle the constraints faced by BMC in the management, inter alia, of waste / storm water and to improve / upgrade the civic infrastructure to tackle this problem on a permanent basis. The project envisages a total expenditure of Rs.616 crores (1992 prices) and a time span of 12 years. Though some action under the project has been initiated this has been in a piecemeal manner and only about Rs.160 crores have been spent in the last 6 years. Due to lack of funds it has not been possible to implement the project in a systematic manner.

5.4.3 The DMP requires that the communication system between the line departments should be upgraded (Para 4.6.1(ii) above). The plan does not mention the agency which would undertake this task of up-gradation. From the reports made available by the various line departments it appears that "there is no direct communication system between these departments (except the normal telephone/fax system) and no program of any kind of up gradation (duplex or otherwise) is underway. The BMC report states that communications sent to various control rooms via wireless sets did not elicit any response. The report received from the Railways shows that the VHF set installed in the Emergency Control Room of the Western Railway has not been used since the time it was installed. No information was either received on the VHF set or sent to the Mantralaya / BMC Control Room on 11th, 12 & 13th July. Information regarding flooding of tracks was communicated to BMC via telephone. The railway report claims that constant liaison was maintained by the PRO of Western Railway with the Press, Television and Radio. The traffic police have reported

that one hotline has been installed at the Traffic Control room to communicate directly with the BMC control room and the same is working properly. During the disaster this channel proved very useful in that it enabled BMC officials to immediately remove fallen trees blocking road traffic and to open the covers of gutters to let accumulated water drain off. The BEST report has generally stated that the communication and operation systems “set up under DMP were working satisfactorily” and “were used to communicate messages to other utilities”. Similarly, the Commissioner of Police has also stated that the communication systems and the communication equipment was operating perfectly.

5.4.4 The DMP identifies 44 locations where Electronic display Boards should be put up for the general information of the public. This obligation is cast on the BMC and the traffic police. From the reports received from the BMC as well as traffic police it appears that no electronic display boards were set up or activated during the occurrence of the disaster. In fact the only 2 display Boards already set up at Charni road and Haji Ali to display wireless messages were under repair.

5.4.5 Regarding the public address system in the trains the report from the western railway states that information was relayed on the central announcing system installed on the suburban section of the railways. This possibly refers to the public address system on railway stations and not to any public address system installed in rakes as stated in the DMP. The central Railway report also refers to activation of Public address systems at the “affected station”. Further, neither of the two railways make any reference to wireless contact being established and maintained between the guard and the railway stations as required by the DMP.

5.4.6 Regarding cable channels on a ward wise basis, the report from the DG (I & PR) states that efforts were made for hourly news bulletins on DD and AIR to keep people informed esp. about railway movements and about the low lying areas which were flooded. While the report specially appreciates the response received from Doordarshan and other TV channels there is no mention of cable TV operators being involved on a ward wise basis as required by the DMP. Among the other agencies

both the western and the central railway reports state that information was relayed/flushed on TV channels but does not specify cable channels through cable operators. The reference is most likely to Doordarshan and other TV channels as in the case of DG (I&PR). However, the traffic police report does mention “in-cable” network as being used for dissemination of information along with the various TV channels. The Police Commissioner’s report also states that on 13.7.2000 citizens were kept informed through press releases and cable TV ‘broadcasts.

5.5 COORDINATION MECHANISM & CONTROL ROOM FUNCTIONS

It is clear from the reports of the Principal Secretary R & R, ACS (Home) and the Earthquake Rehabilitation Cell that during the disaster which struck Bombay on 11th, 12th and 13th July, 2000 the Emergency Operations Centre at Mantralaya did not play any role at all in terms the functions envisaged for it in the DMP. The various reasons which led to this situation are dealt with in Part IV of this report. Suffice it to say here that the coordination mechanism at the state level continued to remain the same as in earlier years viz. the Coordination Committee of the ACS (Home). The EOC did not perform either its normal time function as mentioned in para 3.3.4 or its post occurrence functions mentioned in para 4.3 of the DMP. This matter has already been dealt with extensively in Para 5.2.2 to para 5.2.4 dealing with institutional mechanisms and it will be clear from the same that the main coordinating role in the actual management of the disaster was played by the BMC through its Control room which is charged with the task of not only performing its own functions in terms of managing disasters within the managerial capacity of the BMC but also with coordinating the BMC’s other control rooms (i.e. line departments), its ward level control rooms and other state and central departments concerned with the disaster.

5.5.1. BMC CONTROL ROOM: (Annexure IX-A)

The BMC report states that after receiving the weather forecast on 11.7.2000 directly from the Met department the same was conveyed to all control rooms as well as the respective line departments inside and outside the BMC. It appears that BMC set up a “Crisis management Group” which took

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action in respect of certain specific instances as below:

The Ghatkopar Chiragnagar, Azadnagar Landslide: The Mantralaya Control Room and other concerned agencies including hospitals were alerted. Field officials reached the spot and carried out rescue operations. A make-shift access road had to be constructed by demolishing 14 constructions to reach the site. This enabled heavy vehicles including fork-lifts, fire brigades, ambulances etc to reach the spot.

Disruption of rail and road traffic: BMC officials actively assisted the rail and BEST officials in keeping the public informed about alternative transportation arrangements for stranded passengers on 12th of July at 7.00 p.m. about 3000 passengers were stranded at CST and about 2000 at Churchgate and were transported to their destinations. Help was also rendered by the railway police force.

Overflowing of the Vihar Lake: The water level rose to 73.915 meters on 12th July due to heavy rains. Water levels in the Mithi river also rose sharply. When the Vihar Lake started overflowing excess water was released in the Mithi river, there by flooding many low lying slums along the Mithi river. Four Naval boats were requisitioned from the State govt. to rescue the affected persons. Shelter arrangements were made for a total of 1965 families involving 2425 slums. 340 families were given shelter on account of the flooding of the Vakola River by shifting them to safer places; mainly school buildings in the vicinity. A total of 2287 families were given shelter by BMC through their schools and other buildings Rajwadi and Sion hospital staff was involved and a makeshift dispensary set up. Excavation work was done under floodlights and the affected persons were sent to hospitals after giving them first aid treatment. The BMC report also states that the Indian navy was alerted and 80 jawans of the Indian navy played an important role in the rescue operations.

NGO's: Each ward had prepared lists of NGO's who's assistance was to be requisition in case of disasters during monsoons and NGO's had been provided with details of institutional arrangements that would be in place at such time. Joint meetings were held with NGO's to enlist their support and

the response from some NGO's is reported to be encouraging viz. Young Stars Krida Mandal (YSKM) and the Dignity Foundation.

AIR & Doordarshan were contacted on 12th July to relay messages to citizens not to leave their homes where ever road /rail services were affected. The press - were also contacted to inform the public against use of plastic bags and the importance of safe drinking water and food.

In the end the BMC report states that the Disaster Management Plan was received only on 11th July, 2000 and, therefore, could not be implemented fully.

- (ii) The BMC report further states that all 24 ward control rooms had started working from 1.6.2000. Orders had already been issued that all line departments of the BMC at the ward level would work under the directions of the ward officer during disaster situations.
- (iv) From the BMC report it is noticed that not all departments responded to the preparedness meetings, etc. held at the ward level. For example, the railways did not attend the A, B, G/N, and T ward meetings. The Tehsildar did not attend any of the ward meetings except the T ward meeting. The Fire brigade did not attend the PIS and R/S ward meetings.

5.5.2. THE POLICE CONTROL ROOM

- (i) The Police Control Room activities are seen from the Report from the office of the Commissioner of Police, Mumbai (Annexure IX-B):
 - § As on 15th July 2000 84 persons had died, 44 persons were injured and property worth Rs.1 crore approximately was damaged consequent to the heavy rains in Mumbai from 11th onwards. Communication was received from the Meteorological Department on 12th & 13th July at 0900 hrs.
 - § Action under the Disaster Management Plan was initiated and all Mobile Police patrolling in Mumbai were put on alert. Specific instructions were given from 1800 hrs. onwards to render all possible help to the rain affected people by making available a) transport b) medical aid c) food and d) shelter.

§ Wireless messages were sent to ensure proper bandobast at sensitive points through the traffic police.

§ Regular contact was maintained with the Traffic Police, BMC Control Room, Fire brigade, Railway Control Room, BEST, Mantralaya and all police stations.

§ Consequent to the over flowing of the Tulsi and Vihar Lakes on 12th / 13th July all residents in the adjoining areas including those on the banks of Mithi River were alerted.

§ The provisions of the Mumbai Disaster Management Plan were put into operation .mainly in South in the Bombay Police stations where arrangements were made to transport office goers to their homes in the suburbs by means of private trucks and buses after the water had receded. .

§ Assistance of the media and the private persons was taken to keep citizens informed through press releases and cable TV on 13/7/ 2000. Assistance of NGO's and other private persons was taken in making arrangements for transporting the effected people, arranging for food packets and also for providing temporary shelter to the affected persons.

(ii) The Police Report states that although suitable instructions were given to the police stations on the mobiles, no feedback / information was received by the Control Room regarding actual actions taken in the field.

(iii) The Police report does not contain any reference to cordoning off of the affected area and setting up of an information centre, which the Police Control room is, expected to do under the DMP in a flood situation.

5.5.3 REPORT OF JOINT COMMISSIONER OF POLICE - TRAFFIC (Annexure- IX-C)

§ It is the normal practice of the Traffic Control Room to obtain weather forecasts three times a day during the monsoons. Intimation regarding heavy rains was received both on 11th & 12th of July, 2000.

§ Anticipating water logging at previously identified sites diversion plans were implemented. All concerned officers were

alerted for taking necessary actions to carry out diversion plans and to maintain smooth flow of traffic.

§ Information regarding the likely traffic situation was released through TV, Press and AIR.

§ No major traffic diversion plans were necessary on the 11th. On 12th however, almost all internal and major roads and junctions were flooded including many of the diversion roads. Traffic movement was consequently seriously affected.

§ No failure in the communications / operation systems was reported. The hotline with BMC installed in the traffic control room was useful in coordinating the removal of fallen trees and lifting of covers of manholes during heavy rains.

5.5.4 THE FIRE BRIGADE CONTROL ROOM (Annexure IX-D)

§ No warning was received from the IMD.

§ According to the report received from the Fire Brigade, the guide lines prescribed under the DMP were not acted upon in any great detail. However, as per normal practice all fire stations! fire appliances were kept in readiness to deal with flood related eventualities. Adequate manpower was available to handle crisis situations.

§ The Fire Brigade Control Room has not been provided with a wireless system and the chief mode of communication was telephones.

§ Non availability of portable boats, sufficient life jackets and other appliances are stated to be the main handicaps.

§ No help of NGOs was taken; however, TV, media, etc were kept informed of relief actions taken.

5.5.5 THE RAILWAYS CONTROL ROOMS

(i) Reports of activities undertaken by the Railways have been received both from the Western and Central Railways (Annexure IX-E and IX-F). As will be seen from Part I large sections of both railways were under water and passengers were stranded in thousands at a number of important junctions on both routes.

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(ii) REPORT OF WESTERN RAILWAY

- § Regular reports are received from the IMD indicating “warnings for rains of more than 12 cm at one or two places almost since the onset of the monsoons”. No specific warning was received for 11th, 12th & 13th July, 2000.
- § During high tides the sluice gates of the drainage system are closed by the BMC resulting in accumulation of water on tracks and low lying areas.
- § Owing to heavy rains there was flooding of the tracks at Mumbai Central, Matunga Road and between Virar and Vasai Road. Train services were stopped between Churchgate and Bandra between 10.00 a.m and 2.00 p.m. on 12th July. Train services beyond Vasai Road were suspended from 1.00 p.m on 12th to 9.50 a.m. on 13th July.
- § All possible arrangements were made to assist the stranded passengers by evacuating them to safer places, providing them with food and clean drinking water and coordinating alternative transportation arrangements with the help of BEST and other agencies.
- § No buses however could be arranged at Vasai Road to evacuate passengers from Vasai Road to Nalla Sopara, Virar and beyond due to heavy water logging.
- § The VHF set installed in the Emergency Control Room of the Western Railway has not been used since the time it was installed. No information was either received on the VHF set or sent to the Mantralaya Control Room on 11th, 12 & 13th July. Information regarding flooding of tracks was communicated to BMC via telephone.
- § Constant liaison was maintained by the PRO of Western Railway with the Press, Television and Radio. The public announcement system of the railways installed on the suburban section was also widely used to relay messages to the public.
- § No help of NGO's was taken / received for providing assistance in the management of the crisis.

(iii) REPORT OF THE CENTRAL RAILWAY

- § Timely warning was received from the IMD and timely action was taken by way of deputation of officers and staff to various stations to help commuters and passengers (nature of help has not been mentioned).
- § Public address systems were activated at the affected stations. Buses were requisitioned for transporting the commuters.
- § News was flashed over Radio and TV channels.
- § No help was taken from NGOs
- (iv) The reports of both Western and Central Railways do not contain any reference to the following activities which are envisaged in the DMP for the Railway Control Rooms
 - a) Coordinate with the BMC control rooms for draining of flood waters from the railway tracks
 - b) Coordinate medical first aid with railway hospitals; and
 - c) Communicate with BMC control room for additional resources

5.5.6 THE DISTRICT COLLECTORS CONTROL ROOM (MUMBAI AND BSD)

- (i) REPORT OF COLLECTOR, MUMBAI (ANNEXURE IX-G)
 - § Ward Plans in respect of only 3 wards were sent to the Collector's office by the BMC.
 - § IMD warning regarding likely rainfall of 10 to 12 cm was received on 9.07.2000. Necessary arrangements were made on the ground for dealing with all eventualities.
 - § The wireless system provided functioned well and was used to communicate with other Control Rooms.
- (ii) REPORT OF COLLECTOR, MUMBAI SUBURBAN DISTRICT (ANNEXURE IX-H)
 - § No warning was received from the IMD.
 - § Information regarding Azadnagar, Ghatkopar landslide was received at 0930 p.m. from the Police Control Room i.e. 5 hrs after the actual incident.
 - § The Control Room, manned by a clerk, driver and peon, was in position and necessary action

under the DMP could be initiated. The Collector along with other officials reached the landslide spot where BMC officials were already in action.

- § Revenue Minister, Guardian Minister, Chief Secretary and the Local MLA guided and supervised the rescue and relief operations.
- § The wireless equipment could not be used as this equipment was not shifted to the new location of the Control Room in Administrative Bldg. Bandra (E). The wireless set in the Tahsildar's office was also not working. Neither had any training regarding the use of wireless system been given by M/s. Global Tele-Systems Ltd. The fax machines provided in Tahsildars' offices were also not working. The main mode of communication was by telephones.

5.5.7 HOME GUARD AND CIVIL DEFENCE (ANNEXURE- IX-I)

- (i) No information was received either from the BMC or the IMD regarding the weather conditions. Anticipating disruption of normal life in Mumbai owing to heavy rains both the Home Guards and Civil Defence maintained a high level of alertness and preparedness on the 11th & 12th and the concerned staff were rushed to the affected places to undertake rescue operations. Details of the work undertaken are as follows:
- (ii) Attempts were made to reach an ambulance to the Chiragnagar, Ghatkopar site on 13.07.2000. However, due to heavy flooding on the way the ambulance could not reach the site.
- (iii) 50 Home Guards were mobilised to evacuate and relocate the affected persons near the Vihar lake area on the 13.07.2000. On 14.07.2000 an ambulance was deputed to the Chiragnagar - Ghatkopar site for assisting in relief actions. Wireless equipment installed in the Civil Defence Control Room was not used during the period 11th-14th July.
- (iv) The Dy. Commandant General, Home Guards & Dy. Director of Civil Defence, Maharashtra has mentioned serious deficiencies both in the, equipment and the enrolment of requisite numbers of Civil Defence Volunteers and Home Guards.

5.5.8 THE BEST CONTROL ROOM (Annexure - IX-J):

The Mumbai DMP document does not list the BEST control room among the control room with whom the BMC control is required to keep liaison (Section 7 of the Mumbai DMP) However, the flow chart in the EOC Manual as also in the DMP document mentions the BEST Control Room as an important control point for flow of information and for mitigation action for tackling transport bottlenecks caused due to flooding etc. The report of the BEST shows that this was one of the more active control rooms in tackling the crisis of stranded passengers. The report is summarised as follows:

- a) A fax message was received from the Meteorological Department on 11th July at 1400 hrs. indicating heavy rains in isolated areas of Mumbai, Thane and Raigad Districts till 13th July, 2000
- b) On 12th July the Western and Central Railways informed BEST around 0930 hrs. about disruption of rail services. Concerned officers and supervisory staff were posted at strategic places for clearing stranded passengers and operating extra buses from CST and Churchgate railway junctions. In all 426 extra buses were operated all over the city to clear stranded passengers including 206 buses which were operated from CST and Churchgate stations. Buses could not be operated in Central and Northern parts of the city owing to water logging. No bus service could be operated on the Central Corridor, that is, B.E. Road.
- c) Consequent to heavy rains and water logging in Kurla and Santa Cruz depots on 12th July BEST could not operate normal services on the 13th. 304 and 271 buses were held up on line on 12th and 13th July respectively owing to breakdowns due to Roods.
- d) The DMP guidelines were-put in practice on 12th and 13th July 2000. However due to water logging in several parts of the City normal services were affected and stranded passengers could not be cleared.
- e) There was no failure of communication and operation systems set up under DMP. These systems served BEST well in coordinating with the suburban rails, Mantralaya Control Room,

BMC and Police Control Rooms.

- f) Public Announcements were made at Churchgate, CST, Andheri and Dadar stations about the operation of BEST services.

5.5.9 THE ARMY CONTROL ROOM

Since the EOC was not operational there is no information about the interaction between the Army Control Room and others. The BMC report states that Naval boats were requisitioned to evacuate some of the marooned but there is no information of the work done by these boats or whether they were deployed at all. The BMC report states that 80 naval jawans gave valuable help in the rescue and relief operations at the Ghatkopar landslide. The DMP envisages assistance from the army to the BMC upon receiving requisition from the EOC. In this case direct interaction appears to have been established between the ACS (Home)/BMC Control Room and the Defence services.

5.6 NGOS AND VOLUNTARY AGENCIES:

The BMC report states that all the Ward Officers had invited all the listed NGOs and voluntary agencies to the meetings of the Crisis Management Group and Simulation drills held by them. However, only the following NGOs/ Agencies responded

- 1) Dignity Foundation (P/South ward);
- 2) Young Star Kreedha Mandal (R/South ward); and
- 3) Dignity Foundation (R/North ward).

The Police Commissioner's report states that help from NGOs and other private persons was taken in making arrangements for transporting the affected persons, arranging for food packets and providing temporary shelters. Details of the precise work done by the NGOs and the names of NGOs involved are not available.

The Western Railway report states that the help of NGOs was neither sought nor made available.

5.7 REPORTING FORMATS

As mentioned in para 4.8 above, 6 (six) Status and Action taken Reports have to be submitted to the EOC (by BMC, Police, Fire Brigade, BEST, Railways and Medical Assistance agencies) in the formats prescribed. From the information submitted

by the various agencies it is clear that they were neither aware nor did they send any such formal reports. The MC, BMC has categorically stated that the DMP itself was given to the BMC only on 11th July afternoon and therefore, the question of sending any such reports does not arise and that the reports can only be sent in future.

5.8 PLAN DISSEMINATION

According to the DMP the Plan is to be widely disseminated at all levels mentioned in Para 4.9 above. This work is to be done by the BMC. However, the BMC Commissioner has stated that the DMP itself was received by him on 11th July and therefore, it can be concluded that the plan has not been disseminated to any of the agencies identified. The Earthquake Rehabilitation Cell from whom the Plan should have been sent to the BMC Commissioner is silent on this issue. The only plans that were available with the implementing agencies were the Ward Plans and these are dealt with below.

5.9 WARD LEVEL RESPONSES

5.9.1 Ward wise details of responses in terms of action taken have not been made available by the BMC. Similarly, the other departmental reports also do not contain any reference to responses at the ward level. From the reports of the line departments it is not clear whether activities were controlled and monitored at HQ and responses at the ward level recorded.

5.9.2 The BMC report states that anti-flooding activities were managed with the help of anti-flooding gangs which were kept ready in all wards. These gangs worked along with the staff of the storm water department to clear the water accumulations at various places. The increases in water levels of Mithi River and Vihar lake affected Wards L, HIE, K/E and RIN wards.

5.9.3 The ward officers shifted 1967 families from 2425 affected huts to Municipal schools and private schools. Also, although preparations were made to evacuate 340 families from the banks of Vakola River, they were not eventually shifted as the water had started receding. In this operation 3 boats with divers and officers of the Navy were kept ready.

PART V

6. EVALUATION OF ACTION TAKEN REPORTS - GAPS AND ACTION POINTS

This part contains an evaluation of the actions of the implementing agencies on the basis of a comparison of the functions laid down in the DMP with the activities of the various agencies/ departments/ organizations indicating gaps in action taken as compared to the functions. Suggestions and action points for plugging the gaps and making the DMP more effective are also incorporated. The parameters mentioned in Para 3.2.3 of the EOC Manual are thus covered in relation to the DMP and in the context of the ATRs.

6.1 INSTITUTIONAL ARRANGEMENTS

6.1.1 EOC and DMC

- (i) According to the DMP on receipt of information from the IMD the EOC should pass on the warning to the BMC control room and the Police control room. It should also pass it on to the mass media, TV and radio. The BMC is required to pass on these warnings to all the other agencies / control rooms. In fact the records show that when the weather warnings were received from 9th July to 12th July) the information was sent by the EOC only to senior officers/ministers viz. CM, CS, ACS (Home), PS to CM, DG (I&PR) and some other departments of the government. In respect of none of the entries contained in para 5.2.2 (Part IV) is there any mention in the register of the action taken by the EOC in terms of its functions mentioned in the. EOC manual viz. passing on information received to the BMC Control Room, Police Control Room and media, etc. In one case there is a notation to the effect that an attempt was made to contact Secretary (PWD) which failed and in another case the information was passed on to Principal Secretary (R&R). It was not passed on to either the Police Control room or the BMC Control Room.
- (ii) The EOC is expected to function as the hub of all communications received and for issuing necessary guidelines to the District DMP authorities. The report of Principal Secretary

(R & R) makes it clear the EOC has not yet been fully activated and action to post permanent staff in the EOC is yet to be taken. No proper record has been maintained of the action taken on the various messages received by the EOC. Prompt intimation of messages to the concerned agencies is a pre-condition for ensuring timely action by them but the messages received by EOC were not only not passed on in all cases but were being sent after a gap of a few days in some instances. A message received from IMD centre at 1300 hrs on 09.07.2000 was sent to Div. Commissioners only on 11.07.2000 at 1300 hrs.

- (iii) The DMP requires that EOC should have obtained feedback from the Police control room and the BMC control room on a regular basis throughout the 4 day period but the EOC records show that this was not done. In fact the essential function of the EOC to expand itself and take control of all coordination activities (under the guidance of ACS , Home) was not performed and the EOC was not any where in the picture throughout the crisis.
- (iv) It can be argued that the dimensions of this particular crisis did not warrant any state level coordination and the DMP provides for the BMC Commissioner as the District Disaster Manager for Mumbai to tackle the crisis within the managerial capacities of the BMC. Although this was to a large extent true, it is significant that this was not a conscious decision within the framework of the DMP i.e. by the State Level Disaster Management Committee (DMC) under the chairmanship of the ACS (Home) as envisaged in the Maharashtra DMP and made operational by GR No. EQR-I096/CR-I05/ER-I, dated 22 July, 1998.
- (v) The GR specifically provides that ACS (Home) will coordinate disaster mitigation functions with the help of the state level coordination committee using the medium of the EOC. Since the EOC itself was non functional ACS (Home) on his own initiative held two pre monsoon coordination committee meetings where all the concerned agencies were present. Similarly in the post disaster occurrence phase also the EOC remained out of the picture. Most of the communication with the State level officials

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happened via direct telephonic messages to them rather than through the EOC. As reported by ACS (Home) he was constantly in touch with the BMC and other Control Rooms for monitoring and guiding relief actions. The absence of the EOC was, therefore, not by itself of great significance because the BMC Control room did perform to a large extent the coordination function required for a disaster of this magnitude.

- (vi) There can, however, be important consequences of the failure of the EOC to perform its functions even in a disaster of this relatively small magnitude, for ego the numbers and locations of disaster events mentioned in Part I of the report are culled from the reports of the BMC, Police, Press reports and NGOs. None of these reports by themselves cover all locations. Had the EOC been operational information in respect of all incidents could have been relayed to all agencies and the benefits of this coordination would have flown to all areas.
- (vii) The reason for these acts of commission and omission on the part of the EOC lie in the R & F Department's inability to coordinate the transfer of the EOC from the Earthquake Rehabilitation Cell to Principal Secretary, Relief & Rehabilitation as provided for in the DMP document and the EOC Manual. The reports of Principal Secretary R & R, Principal Secretary to Chief Minister and Earthquake Rehabilitation Department, and ACS (Home) at II, XIII, and XIV may be seen. The GR issued by ERC (dated 24.4.2000) appears to have been done on the basis of a decision in a meeting of the Central Implementation Group under the chairmanship of the Chief Secretary. However, the GR appears to have been processed and issued without consulting either R & R or R & F Department's (which is the administrative wing for both the ERC and R & R) and possibly without the formal approval of GAD. ACS (Home) has stated that the DMP itself was not formally adopted for implementation by the state government through a Government Resolution (following presumably a cabinet decision) and therefore the coordination meetings held by him were

not in the context of the DMP's mechanism viz. the EOC.

- (viii) Thus it would appear that at the point of time of the downpour the EOC was in a state of limbo in that the R & R department under which it is to lie as per the DMP had not accepted the transfer. The result was that the EOC, despite the high tech equipment provided under the World Bank Project, was in effect functioning exactly like the earlier Mantralaya Control Room (i.e. in normal times a purveyor of messages from the field to senior officers and concerned departments). It was only after the intervention of the CS that Principal Secretary (R&R) took charge of the EOC on the afternoon of the 12th July, 2000. Further, as per the DMP the EOC is to be manned by a permanent well trained officer of the rank of Deputy Secretary, an EDP manager, Computer Operator, Communication Operators and Driver cum messenger. However, the Control Room even today is manned by Officers on rotation as per rosters prepared by GAD. This is in line with the decision taken in respect of the earlier Mantralaya Control Room in the aftermath of Latur. Even the equipment installed in the EOC was not in proper working condition. Principal Secretary R & R has reported that even the expensive equipment purchased for the EOC was found to be defective till as late as 13th July, 2000 when messages could not go through the V'Sat system of the EOC. The IMD report has reported that the fax machines of the EOC were not functioning. The wireless equipment installed through the EOC in various Control Rooms was also not operated/operable in many Control Rooms. Thus, it may be stated that the EOC does not perform nor is it equipped to perform either its normal time activities or its post disaster occurrence activities as envisaged in the DMP.
- (ix) Steps to suitably man the EOC under the formal charge of Principal Secretary, R & R should be taken and an appropriate budget provision made to enable it to perform its activities, both normal time as well as post disaster, on a continuing basis. It should be formally approved by the government as a part of the DMP which itself should be adopted

under a Government Resolution. Principal Secretary R & R should look after the normal time activities of the EOC as envisaged in the DMP and play a supporting role to ACS (Home) in times of Mumbai related crises. In the case of Non-Mumbai crises the DMP designates the Chief Secretary as the Chief of Operations. Thus a comprehensive GR on these lines will need to be issued by O & M (GAD) with suitable additions in the Rules of Business.

6.1.2 DMP (MUMBAI)

- (i) The DMP sets up a BMC Disaster Management Committee to ensure speedy response and effective implementation and monitoring of disaster relief activities. It is not clear whether any meeting was held under the formal umbrella of the BMC Disaster Management Committee mentioned in the DMP was held. It is reported that on receiving information about the possible rainfall the Additional Commissioner, BMC sent a series of circulars to ward officers and line departments giving them detailed instructions as mentioned in para 5.2.4 of part IV.
- (ii) It is also not clear whether any meetings of the DMP Committee were held under the Chairmanship of the BMC Commissioner to monitor the relief/ rescue actions being taken on the ground at regular intervals as required under the provisions of the Mumbai DMP.
- (iii) As at the state level, the Mumbai DMP at the district (BMC) level was also never disseminated. Although MC, BMC has reported that the provisions of the Mumbai DMP have been substantially implemented this is a derived observation since he has also reported that a copy of the DMP became available to the BMC only after the 11th July and the EOC Manual was obtained only on the 19th of July, 2000. It has been stated that in view of this the requisite reports in the prescribed formats can be sent to the EOC/ Government only in the future. In fact although the Mumbai DMP was prepared in 1998 it was printed only in early 2000 and copies of this document have not been formally circulated to the concerned departments /agencies.
- (iv) Another lacuna noticed is that although it was

the responsibility of the ward officers to enlist the active support/participation of NGOs/ Community groups, etc. in relief and rescue operations this aspect was not monitored at the level of the BMC Commissioner/Control Room and ward officers were left to deal with these organisations themselves. Once the district level DMC becomes operational this item should be a permanent item on the agenda for review and fresh inter action on a proactive basis.

6.2 RISK ASSESSMENT AND VULNERABILITY STUDIES

- (i) From the information made available by the BMC it is noted that:
 - a. Out of 15 railway stations which were actually flooded during downpour five stations have not been identified as vulnerable in the respective ward plans;
 - b. Seven slums affected by landslide during the downpour between 2nd July, 2000 and 13th July, 2000 have all been identified in the ward plans.
 - c. Drain choking incidents were reported at 14 places. Of these 6 have not been mentioned in the ward plans.
- (ii) The BMC report lists 61 separate incidents of landslides, house/wall collapses However, the BMC has not been able to provide comprehensive information on whether all the areas actually affected by flooding (including transportation bottlenecks) and landslides in the downpour of July 11th & 12th have been identified in the concerned ward plans.
- (iii) On the basis of above it may be concluded that the risk and vulnerability analysis carried out in the Mumbai DMP and Ward DMPs was not accurate in all respects and there were a few trouble spots that had not been identified in the DMP/Ward plans. This work will need to be undertaken afresh by R & R Department which should make an exhaustive list on the basis of experience gathered during the recent downpour.

6.3 MITIGATION STRATEGY AND MEASURES

- (i) The Mumbai DMP which carries an exhaustive list of various types and the details thereof of

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the mitigation measures required to be taken to reduce/ eliminate risks had not been made available to the BMC till 12.7 .2000.

- (ii) The ward level plans which were prepared at the BMC level do not contain any chapter on mitigation strategy. *These should include specific measure proposed to be taken up by them to remove bottlenecks and improve / upgrade civic infra structure which will give it the capacity to cope with storm water accumulation/flooding.*
- (iii) The BMC has however has reported that preemptive actions were taken to clean, sole and de-silt Nallas and drains and remove encroachments etc. to ensure free flow of rain waters. Three reasons identified for choking of drains are:
 - § Un-authorized construction on open Nallas and alongside Nallas and drains that has narrowed the width of the drains thus reducing their clearing capacity;
 - § Location of cattle sheds in these areas has also resulted in the disposal of animal and other waste into the open nallas; and
 - § The widespread use and disposal of plastic bags is an important factor choking the free flow of water in the drains, etc.

Further, it has been mentioned that specific works under the Brimstowad Plan had been started to increase the storm water drain capacity. However, no indication has been given about when these works under the plan will be completed. In effect this means that the mitigation measures required to be taken to ensure adequate carrying capacity of the drainage system would remain pending and the danger of flooding which causes avoidable disruption of normal life once or twice every season will continue. One of the constraints mentioned in this regard is the lack of adequate outlays. The main point here is that the storm water drainage system is 70 years old and is designed to take not more than 25 mm of rain during high tide. All Nallas and other drains discharge waste water into the sea and therefore start overflowing whenever rain in excess of 25mm per hour takes place as

happened on 12th July, 2000. A medium term solution would, therefore, appear to lie in reprioritizing activities under Brimstowad plan and raising requisite funds to undertake these activities.

- (iv) Regarding *communications*, as per the report of the IMD the fax machines of the Traffic Police, City Police, Mumbai, Western Railway Control Room, Central Control Room, and EOC Mantralaya were found to be out of order on 9th July, 2000. Again on 11th July, 2000, the fax machines of City Police and Mantralaya (Control Room - 2850919 i.e. EOC) were not functioning. Thus an action point would be for these control rooms to enquire into why their equipment was allowed to remain in a state of disrepair even after the ACS (Home) had asked them to ensure that communication lines should be kept open in his pre monsoon meeting.
- (v) Further, no weather warnings are reported to have been received by Home Guard & Civil Defence Control Rooms, Collector Mumbai Suburban District and Collector Mumbai. The BMC and Western Railways have observed that the weather intimation from the IMD did not indicate the intensity of the rains which would have helped them to prepare better for the heavy downpour. It may be advisable to require the IMD to communicate weather warning messages to all Control Rooms instead of just the EOC and BMC Control Rooms.

6.4 COORDINATION MECHANISM AND CONTROL ROOM FUNCTIONS

6.4.1 THE BMC CONTROL ROOM:

- (i) At the outset, the BMC have made it clear that the Mumbai DMP was made available to them only on 12th July, 2000. Various pre-monsoon coordination functions normally carried out by BMC through the Crisis Management Group and as contained in the ward plans were however carried by the BMC control Room. Pre-monsoon guidelines/ instructions were issued to all control rooms to carry out preparatory actions such as

cleanliness drives and simulation exercises. Post disaster actions were also coordinated at the BMC level. The following shortcomings are however noticed:

- a) The *railways'* representatives did not attend the A, B, G/N & T premonsoon ward meetings, the *tahsildars* did not attend any of the ward meetings except the T ward meeting and the *fire brigade* did not attend the P /S and R/S ward meetings.
 - b) The coordination between the railways and BMC needs to be strengthened and deepened. Neither the BMC nor the railways have reported on the important joint responsibility of cleaning areas adjoining the tracks before monsoons to ensure that there is no flooding. The railways have also commented about the adverse effect of closing sluice gates at *bandhs* during high tides which lead to flooding of the tracks.
 - c) Efforts to coordinate with NGOs, etc. to enlist their active participation in flood related relief and rescue actions met with very little success.
 - d) Detailed *feedback* required to be given to EOC in the prescribed format was also not forthcoming owing to the fact that the Mumbai DMP document prescribing the same was not made available to BMC before the 12th of July, 2000.
- (ii) The BMC have suggested provision of punitive measures for ensuring strict compliance with the DMP procedures. BMC have also proposed proper training for all concerned and authority to requisition private vehicles lodging, boarding, engaging labour, hiring machinery etc. on the same lines as those available to Collectors'. These suggestions may be considered at the appropriate level in the BMC.
 - (iii) It may be expected that with the availability of the Mumbai DMP and appropriate follow up action as prescribed there under can be undertaken.

6.4.2 POLICE CONTROL ROOM

- (i) It is clear that relief actions under the DMP could be taken only in South Police Station areas. Although detailed instructions appeared to have been issued to the concerned police stations the same were issued as late as 1800

hrs onward on the 12.07.2000. No details of the actual relief actions taken on the ground have been furnished mainly because, as stated above, no reporting system seems to be in place. Since the report received is of a very general nature it is difficult to state whether all actions prescribed under the Mumbai DMP in respect of the Police Control Room especially in respect of shifting of the affected people, corpse disposal, setting up an information centre for sharing information with the media/public etc. could be carried out effectively.

- (ii) It is not clear whether public information centres required to be set up as per provisions of DMP and as directed by ACS (Home) in the pre monsoon meetings were actually set up. Both the media and the public have criticised government's inability to keep the public suitably informed.
- (iii) The department of R & R may like to carry out a separate study by more intensively interacting with the police machinery once EOC supervision gets going.

6.4.3 TRAFFIC POLICE

- (i) To the question as to whether the provisions of the Mumbai DMP had been put into practice, the reply given by the traffic police is "not applicable". This is because the response structure on occurrence of disaster in the Mumbai DMP does not mention the Traffic Police Control Room. The DMP may need to be amended to include the same.
- (ii) In the DMP the functions relating to Traffic Management is reflected under the Police Control Room. No details of the information made available to the public have been furnished. However, the traffic police have stated that their main task of diversion of traffic could not be carried out successfully in areas of heavy flooding where the diversion routes themselves could not be accessed.
- (iii) Thus the DMP is still to be internalized by the traffic police and this will be an important task of the EOC for the future. Some technical help to the traffic police may be needed to anticipate problems and look for solutions within the available infrastructure in the city.

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- (iv) Learning from the experience of the recent downpour or a detailed / comprehensive review needs to be undertaken and plans revised to ensure that all affected areas can be reached in times of flooding and evacuation of stranded passengers carried out smoothly.

6.4.4 THE MUMBAI FIRE BRIGADE.

- (i) The guidelines prescribed under the DMP were not acted upon in any detail. However, as per normal practice all fire stations/ fire appliances were kept in readiness to deal with all eventualities adequate manpower was available to handle the crisis situations. Actions were carried out under the supervision of the BMC control room.
- (ii) The Fire Brigade has not been provided with a wireless set and the chief mode of communication was telephone. Non availability of portable boats, sufficient life jackets and other appliances were stated to be the main handicaps. The Fire Brigade control room did not communicate its requirement of additional resources to the BMC as per provisions of DMP.
- (iii) The Fire Brigade should ensure a proper line of communication between itself and the IMD, BMC and other Control Rooms in the city to ensure timely actions on its part.
- (iv) The wireless system provided under the DMP should be got installed and people in the Control Room trained in its use.
- (v) The Fire Brigade Control Room should communicate to BMC it's requirement of additional resources for performing rescue evacuation and salvage operations. .

6.4.5 RAILWAYS:

- (i) As a preparedness measure the railways are required by the DMP to clear all obstruction and garbage around the railway tracks especially in drains and *nallas* in the low lying areas to ensure free flow of rain water. No action on this has been reported.
- (ii) No details have been given of the releases to the media informing the public of the position of rail services or about any advise to the public to stay at home wherever services affected. *It is not clear whether the public address systems*

were used at stations such as Dadar, Bombay Central and stations on the Harbour Lines, where the people were stranded Inability to keep the public suitably informed at all places - received adverse comment in the media and also among the citizens at large.

- (iii) The Wireless sets installed to enable communication with the EOC and other lateral Control Rooms were never used. In the Central railway the wireless set provided under the Mumbai DMP has not been installed in the Control Room but in the room of stenographer to the Chief Freight Manager and is therefore not available for use by the Control Room staff.
- (iv) No information has been provided regarding the steps taken to monitor the floodwater and to evacuate stranded passenger to safer places, which is one of the major mitigation action proposed in the DMP to be undertaken by the railways.
- (v) The railways did not attend many important co-ordination meetings held at the ward level. Clearly, the involvement of the railways in the DMP is. minimal and a mechanism will need to be set up to establish inter action on a regular basis within the coordination framework envisaged by the DMP.
- (vi) Communication equipment should be maintained in proper working condition. Fax machines of the both railways were reported to be out of order on the crucial days by the IMD. The wireless sets installed to ensure better communication should be commonly used during disasters. The wireless set of Central Railways should be relocated in the Control Room. Concerned people should be trained in the use this equipment.
- (vii) Better coordination should be ensured between the Railways on the one hand and BMC on the other in such areas as pre-monsoon activities to clear the Railway property adjoining the tracks of obstructions etc. affecting drainage of rain water as well as post down pour activities to drain flood waters.
- (viii) Enlist assistance of NGOs and Voluntary groups in carrying out rescue and salvage operations.

6.4.6 CIVIL DEFENCE AND HOME GUARDS:

- (i) As per the report received the Civil Defence Control Room lacks the basic equipment / manpower / infrastructure necessary to enable it to participate effectively in relief measures.
- (ii) The IMD did not keep the Civil Defence Control Room informed of the weather conditions.
- (iii) No details of the rescue and evacuation actions taken by the Civil Defence have been given nor have any details been furnished of the additional resources sought from BMC Control Room to meet any gaps. There appears to be no coordination with the BMC Control Room.
- (iv) The need to provide additional resources for achieving requisite levels of Home Guard enrollment and equipment should be examined and adequate resources made available to achieved requisite standards necessary for effectively discharging its disaster related activities.

6.4.7 THE BEST CONTROL ROOM:

- (i) No services could be operated on the central and northern routes of the city as even the diversion routes could not be accessed and stranded passengers could not be evacuated from these areas. These people had to wait for the waters to recede and many of them had to sleep on railway stations etc~ Lessons learnt from the recent downpour should be incorporated in the traffic plans to include additional diversion routes as required to facilitate smooth flow of traffic.
- (ii) The feedback received from the members of the community indicates that the overall efforts made by BEST to transport stranded passengers from flooded areas were commendable.
- (iii) BEST also actively participated in efforts to keep the public informed of bus services at important points especially in South Mumbai.
- (iv) Mitigation measures should be reviewed/ revised to ensure that proper access to all areas is possible to facilitate necessary evacuation during flooding of roads.
- (v) Even though the ward plans have elaborated on the duties to be discharged by various

functionaries of the BEST it is noticed that Section 7 of DMP which deals with functions of various Control Rooms does not list the specific functions of the BEST. Action to detail the functions of BEST and to include the same in the Mumbai DMP may be taken by R & R Department.

6.4.8 DISTRICT CONTROL ROOMS (Collectors of Mumbai and Mumbai Suburban Districts):

- (i) No intimation about heavy rain was received from IMD by the MSD Collectorate.
- (ii) There was considerable delay in transmitting information about incidents by the BMC and Police Control Rooms. Report about the Ghatkopar incident was received 5 hrs late. Similarly, report of the fire at Suyog Industries, Vikhroli was received much after the event.
- (iii) No efforts seem to have been made to keep the public informed through the media etc. or by setting up public information centres as required by the DMP.
- (iv) The wireless equipment could not be used as this equipment was not shifted to the new location of the Control Room in Administrative Bldg. Bandra (E).The wireless set in the *Tahsildars* offices were also not working. Neither had any training regarding the use of wireless system had been given by the M/s. Global Tele-Systems Ltd. Fax machines provided in *Tahsildars*' offices were also not working. The main mode of communication was by telephones.
- (v) Channels of communication between the District Collectors' Control Rooms on the one hand and the BMC and the Police Control Rooms on the other hand need to be strengthened to ensure that important disaster related messages are transmitted without any delay.
- (vi) The wireless equipment should be shifted and located in the Control Room of the Mumbai Suburban District.
- (vii) Both Control Rooms should ensure that they are in receipt of all ward plans pertaining to their jurisdiction.

- (viii) Information centres for keeping the media / public informed should be set up without fail to educate the public and to control panic.

6.4.9 NGO/ VOLUNTARY AGENCIES / COMMUNITY PARTICIPATION

- (i) Although the BMC report states that efforts were made to enlist participation in pre-monsoon ward level meetings/drills it is clear that the response elicited was very poor. Reasons for this will need to be identified and a proper dialogue started with NGOs to ensure that NGOs directly involved in the type of activities where their assistance is envisaged i.e relief and rescue, information dissemination, first aid, disposal of dead and traffic management are contacted. In fact each ward plan lists the names of the NGOs who are to be contacted for assisting in relief since the response evoked from these NGOs was very poor the level of contact may need to be re-examined. It is possible that if the ward level failure had been communicated to the BMC or EOC level then contact at that level may have obtained more active responses from the concerned NGOs. The lists themselves may also be taken up for review in the light of the current experiences. However, before this is contemplated it should be ensured that the NGOs have fully understood the role expected to be played by them and have been involved in joint simulation to clarify further the specific actions required of them.
- (ii) To enable NGOs, voluntary agencies, etc to play a meaningful role in disaster management it has been prescribed that such organisations should receive due training either directly through YASHADA or through Resource persons trained by YASHADA under DMP. Details of training imparted, if any, are not available. Overall it appears that this aspect has not received the attention it deserves.
- (iii) It is significant that the Police have reported that they were successful in obtaining the help of NGOs and other volunteers for transporting stranded passengers, arranging food packets and providing necessary shelters. The method and point of contact and the NGOs concerned need to be studied to determine

whether the lessons from the success of the police can be adopted by the Wards/BMC and, if necessary, the ward plans/DMP be amended to that extent.

6.5 REPORTING SYSTEMS

6.5.1 Status and Action Taken Reports in the prescribed formats were not sent by any of the six agencies to ACS (Home) and the EOC as required by the DMP (*see para 4.8.1*) The main reason is that the DMP itself has not yet been operationalised and the document has not been sent to the concerned agencies so there is no awareness that these detailed reports have to be sent on a continuing basis.

6.5.2 The importance of these reports cannot be undermined because they help the recipient to decide on the future course of action. The flow of information also ensures proper record of the actions taken and lapses if any. Information thus gathered can later also be used for review and evaluation. Besides, the efficacy of institutional arrangements and procedures can be enhanced with proper reporting.

6.5.3 Once the DMP is operationalised these reports should become an important part of the training curriculum because their accuracy will determine the efficiency with which the disaster is handled on a continuing basis.

6.5.4 As per the DMP all the reports are to be sent to the ACS (Home) and EOC. However, in a 10caJised disaster like the downpour of our concern the EOC has a much lesser role to play in decision making than then BMC control room. Therefore, the DMP should provide for these reports to be sent to the BMC Control room in addition to or in place of the EOC in certain types of disaster.

6.6 PLAN DISSEMINATION

6.6.1 The Mumbai DMP lays the responsibility of disseminating the plan on the MC, BMC, not only among various central/state departments / agencies but also to members of the public / media etc. This has not been done. In fact dissemination to each agency

should be accompanied by proper training sessions / drills / conferences so that the duties and functions of each agency vis-a-vis itself and vis-a-vis others become clear to all. The implications of a task wrongly done or not done by one agency on the functioning of another agency have to be understood by all and meaningful dissemination rather than mere distribution is needed to ensure this. Both the Mumbai DMP and the Ward Plan documents may be disseminated as required.

6.6.2 The TV and other media, as suggested, may be used for spreading awareness about the existence of the Plan and the need to understand it but dissemination proper has to be an in depth affair if the concerned agencies are going to be expected to perform their functions in the detailed manner expected of them by the DMP.

6.7 WARD LEVEL PLANS AND RESPONSES

6.7.1 Ward level responses to disaster situations have been detailed in the DMP on the basis of risk assessment and vulnerability studies of each ward. The areas prone to flooding leading to road and rail transportation bottlenecks, the drains likely to get choked exacerbating water accumulation, the settlements likely to get affected by floods and landslides have all been identified. The nature of work required to be done for meeting this situation has been listed viz. anti flooding operations, rescue operations, transportation/ Medical care/ temporary shelter of people and salvage operations. The agencies that should do this work have been mentioned i.e. under the overall coordination of the Ward officer the BMC line departments, the other state and central agencies and the NGOs and voluntary agencies.

6.7.2 Despite detailed ward plans it is clear that coordinated ward level responses did not happen. In most cases where action was taken the individual Control Rooms acted on their own initiative rather than in coordination with the BMC/Ward level control rooms.

6.7.3 The authority of the Ward Level Control Rooms to set priorities and direct and monitor

action should be defined in relation to the Control Rooms of the State and Central Agencies so that a coordinated approach is adopted.

6.7.4 Responses, wherever recorded, do not show that they were pre-planned as per the DMP i.e. on the basis of anticipated problems and prepared solutions. They were reactive rather than pro-active.

6.7.5 At the site level the technical aspects of how to tackle crises of various types becomes more important than merely who should do what. The ward level plans like the Mumbai DMP itself are heavily slanted towards administrative arrangements to the exclusion of advice to line departments on how to handle various types of likely disaster situations. A separate chapter should be included on the identified crisis situations detailing the technical issues and advise as necessary without which the concerned persons will continue to depend on local level spontaneous ingenuity which is not what a Plan should seek to do.

6.7.6 The Ward level DMPs appear as prescriptive top down documents. For familiarization, involvement and internalization of the Plan the responses of the ward level agencies including NGOs etc should be invited in the form of critical comments on the document itself. This will not only help to evolve a more relevant document but help to ensure that those concerned with implementing it are well versed with its contents and committed to its solutions so that an actions fan smoothly in place when a disaster happens.

6.8 CONCLUDING REMARKS

6.8.1 The exercise to conduct a detailed evaluation of the implementation of the Mumbai DMP is handicapped by the fact that the Mumbai DMP document itself has neither been formally operationalised through issue of requisite government orders nor were copies of the same available with the implementing agencies including the BMC and the Control Rooms whose actions the BMC is required to coordinate. Ward Plans prepared at the District Level are reported to have been distributed at

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the Ward Level (15 copies each) but no mention has been made about whether copies of the same were made available to all the Control Rooms. Collector Mumbai has mentioned that he had been given copies of only 3 ward plans. By and large the response of various district agencies to the disaster was on the same lines as during similar deluges in the past. Under the circumstances an attempt has been made to evaluate the efficacy of the actions taken by various agencies only on the basis of the reports submitted by them. Gaps noticed in terms of the DMP have been separately indicated and actions have been suggested keeping in mind the provisions of the DMP and the feed back received from the media / NGOs/ public.

6.8.2 The relatively minor disaster caused by the downpour on 12th July can be used as a micro model to learn lessons for the future if and when a genuinely major disaster strikes the city.

6.8.3 One factor which stands out clearly is that precipitation beyond a certain point cannot be absorbed by the city's infrastructure. This kind of precipitation happens once or twice in each monsoon season and a mega city like Mumbai which is the commercial, business and financial hub of the country can ill afford the nuisance that such deluges bring on. Clearly, the implementation of the BRIMSTOWAD PLAN is likely to take several more years. Those mitigation measures which can contribute directly to augmenting the storm water drainage system in the city and such premonsoon actions as are necessary to ensure a clean and unclogged system will need to be given top priority and funds will need to be sourced.

6.8.4 In the short run the preventive measures have to concentrate on

- (i) Doing a more thorough job of clearing the storm water drains as a normal pre monsoon activity and augmenting capacity at the places already identified as vulnerable. Although the BMC claims that the necessary pre-monsoon drives in this regard were carried out, the public perception and feedback from the press does

not support the claim as will be amply clear from the observations of the public media contained in Part II.

- (ii) Preventing encroachments on, in and around nallahs and drains so that the entire capacity can become available for draining off the excess water.
- (iii) De-silting / soling of nallas and river beds such as the Mithi and Vakola rivers.
- (iv) pre monsoon drills for curative action as prescribed in the DMP at vulnerable places as identified for the kinds of problems anticipated in the DMP.
- (v) As important as taking preventive / mitigative actions is the need to keep the media and the public informed about "what to do?" and details of facilities offered on the ground. There has been stringent comment both in the media and the public about "the total break down of communications".

6.8.5 In the long run the DMP has to be made active by putting its management in place at the state level in the first instance. Keeping it alive will need to be a continuous exercise. This can only be done by giving the R & R Department the requisite resources in terms of material and manpower not only for itself but for all the concerned agencies at the state, district and site levels. It can then be made to inter act at all the lower and higher levels to see that the DMP is a reality.

Annexure 8

REPORT ON KONKAN FLOODS – PRAYAS, PUNE.

'Konkantil Arishtavar Upay Sthanikancha Nazaretun' – Prayas, Pune

This when translated into English means "Remedies on the disaster in Konkan area – especially from the eyes of the local residents" and this report has been prepared on the disaster in Konkan area on the 24th and 25th July 2005 by Prayas Study Group, Pune.

The sixty-six-page report takes into consideration the various causes, manmade and otherwise which led to the disaster. The methodology for preparing this report was to have dialogues with residents and civil groups working in the area.

The first few chapters of the report deal with a general description of the ecosystem of the coastal area, the floods of July and the government's response.

The report points out that while normal rain in the area is around 2000 to 5000 mm, on 24th and 25th July 543 mm rainfall was registered and within a span of ten days the region experienced 1544 mm of rain. The report makes a rather strong point about the fact that the deluge which hit Mumbai on the 26th took away all the attention from the Konkan and it took some time before government aid could actually reach Konkan

Mumbai is a metropolis and Konkan is a coastal region so the problems faced were different. But uncontrolled human activity in the name of development wrecked the eco-systems of both regions. If one looks at the Konkan region, one notices the following happenings.

The mining of coal to Mumbai and neighbouring industrial belts have severely denuded thick forest cover and led to large scale erosion

Chemical factories in the region led to water and air pollution.

New employment opportunities dried away sooner than expected and old ones like the mills in Mumbai had already collapsed. The long awaited Konkan Railway did little to create employment for locals but brought commercial tourism, which further eroded the delicate ecosystem of the region.

Fishing communities suffered a setback because of the huge trawlers.

The floods of the 24th and 25th July swept away entire villages. Railway tracks were washed away. Government grain depots were submerged which left the grain unfit for human consumption.

The government helped in the form of cash, coal and food grains; however they was a considerable population especially from the deprived sections who were denied this relief. Also the unlisted farmers (Bedakhalkul) who cultivated the land of the owners could not claim any help. Several hectares of farmland have fallen uncultivable due to the stony deposits from landslides. The government will have to come up with something concrete for the livelihood of these farmers.

The salient point of the report is that it is gender friendly. It highlights the plight of women along with the fact that they are the real disaster managers.

Finally the report also talks about the need for people's participation in the rebuilding of the region.