

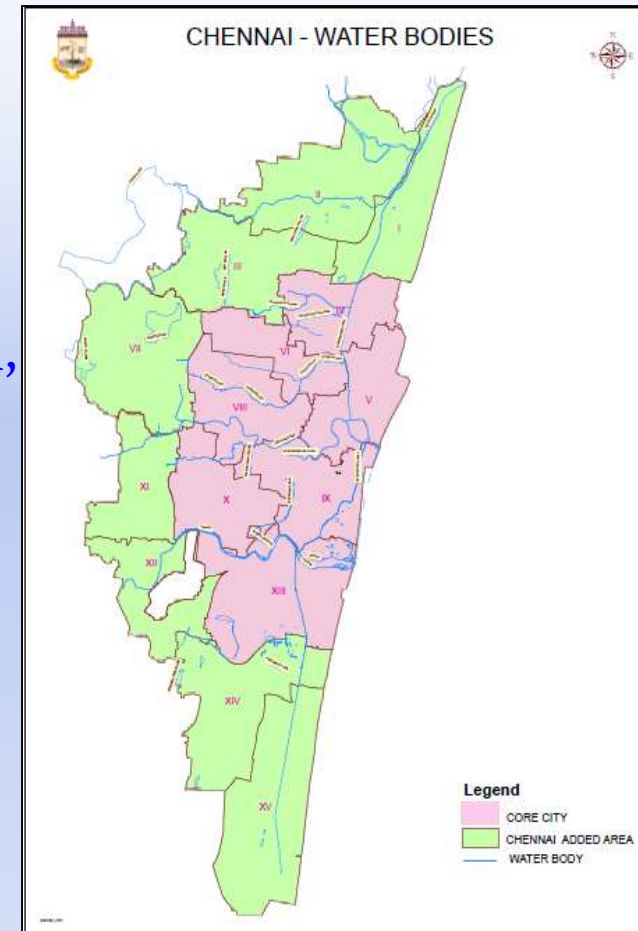


CHENNAI FLOODS – LESSONS FOR URBAN GOVERNANCE

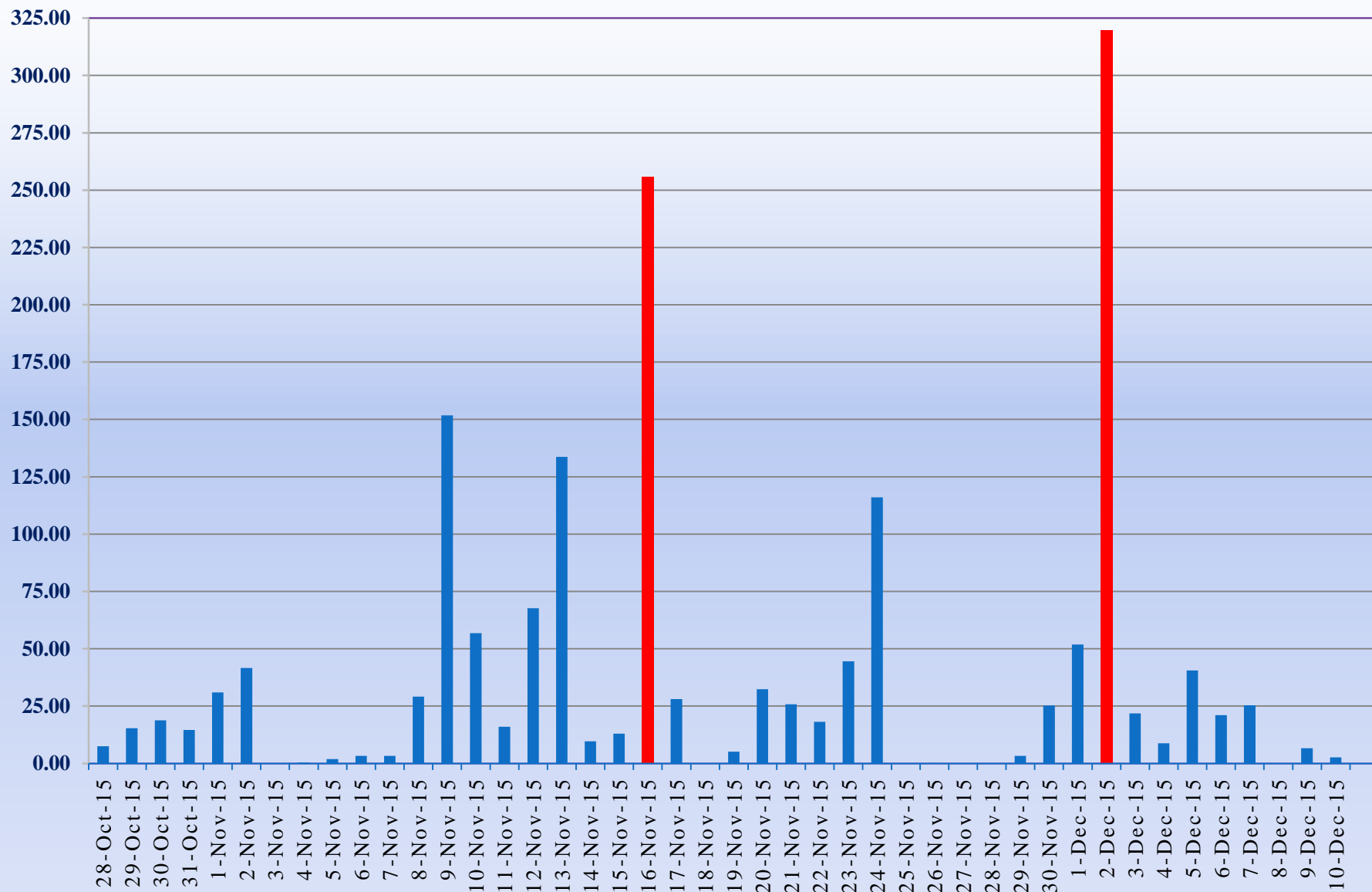
**Vikram Kapur, IAS
Commissioner
Corporation of Chennai**

CHENNAI – WATER DRAINAGE

- ❖ Area of Chennai city - 426 sq.Km
- ❖ Major Water ways
Adyar River ,
Coovum River,
KosasthalaiarRiver,
Buckingham Canal,
Captain Cotton Canal,
Otteri Nullah,
Virugambakkam
Canal,
Mambalam Canal
- ❖ Storm Water Drain Network - 7,351 drains
for a distance of
1896 km (30% roads)
- ❖ Annual average rainfall - 958.5mm
- ❖ Share of NE Monsoon - 48%

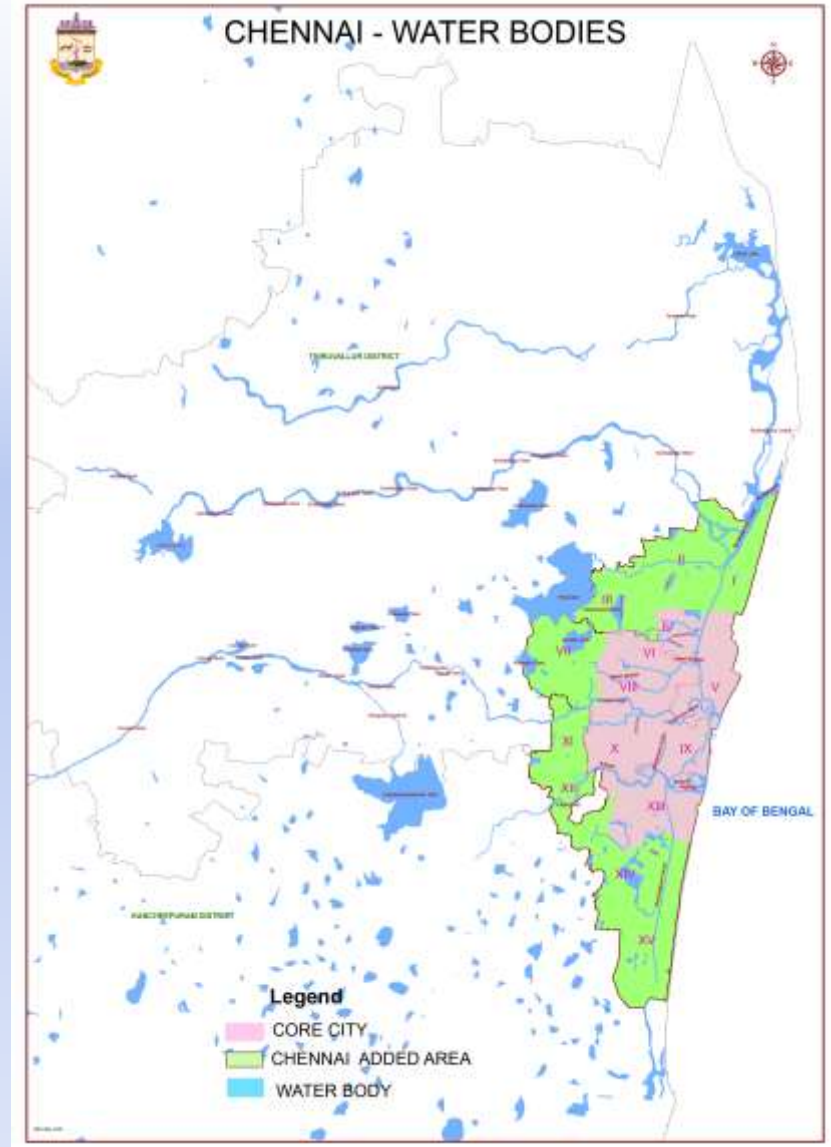


NE Monsoon 2015 - Rainfall (in mm)



RAINFALL

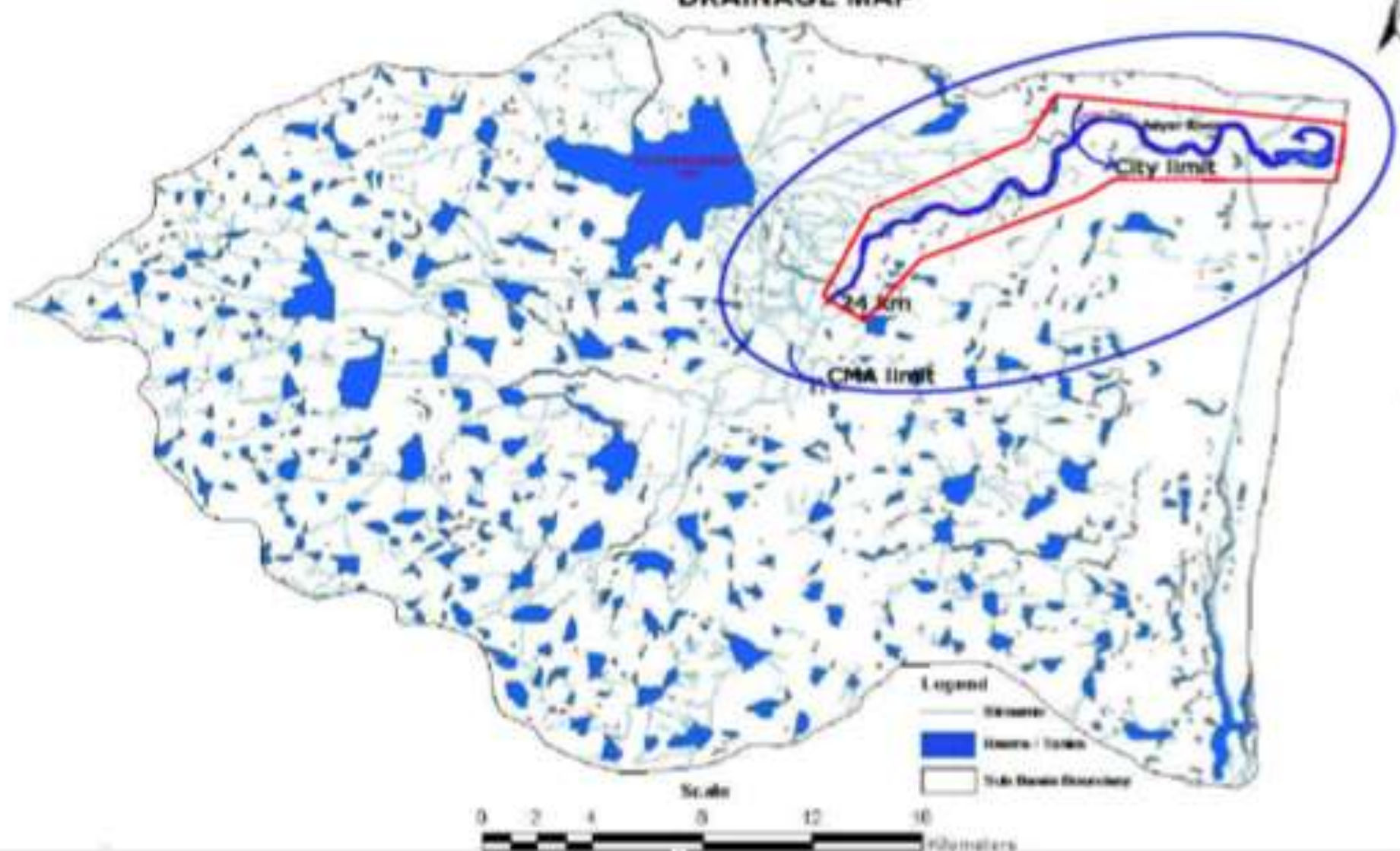
- Nov 2015 was the wettest month ever with 1113.80 mm of rainfall, beating the record of 1918 when Chennai received 1088.40 mm.
- Rainfall of 319.60 mm recorded on 1/2nd Dec 2015 in Chennai was the highest single day rainfall in its history.
- Some of the suburbs of Chennai in Kanchipuram and Tiruvallur districts registered nearly 500 mm rain.
- Hundreds of lakes and tanks dotting the Chennai metropolitan region filled up during November rains and nearly all surplused during the heavy rain during early December.
- Heavy discharge of water into Chennai's rivers – viz. Adyar, Cooum and Kosasthalaiar – especially as a result of release from Chembarambakkam, Redhills and Poondi reservoirs.



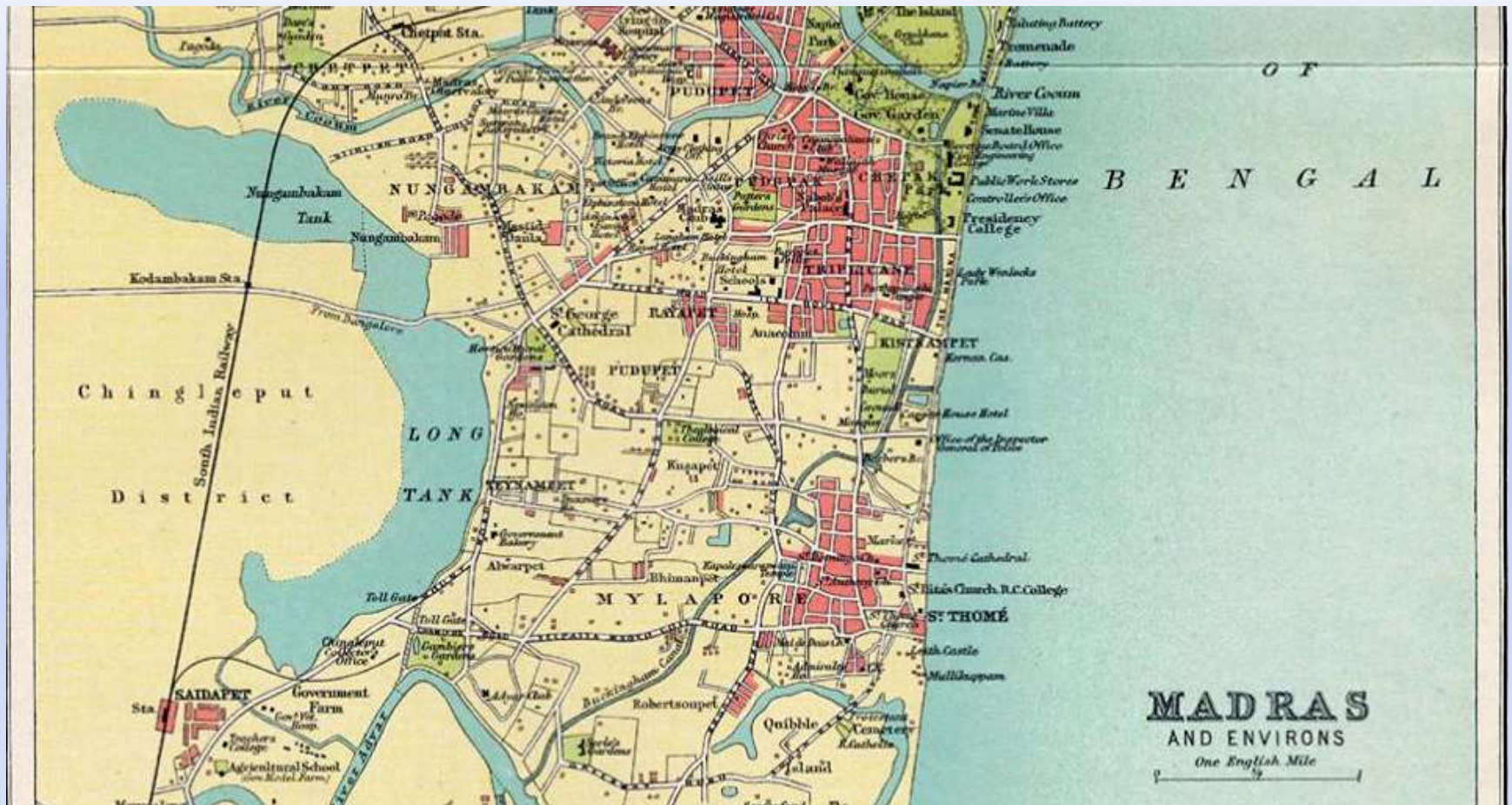
EXTENT OF FLOODING



ADAYAR SUB BASIN (CHENNAI BASIN) DRAINAGE MAP



CHENNAI IN EARLIER TIMES



DISASTER PLANNING AND YET...

- City Disaster Plan had identified 558 water inundation prone areas and contingency micro plans prepared months in advance
- Measures taken to construct / repair / desilt drains, instal motor pumpsets, keep relief centres and boats in readiness, stock food
- Periodic coordination meetings conducted at Govt and Corporation level with all State and Central agencies to assess flood preparedness
- Flood control room set up and over 1100 wireless handsets given
- During every episode of heavy rain in November 2015, the micro plans were activated and city was quickly restored to normalcy
- However the last episode on 1/2nd December was a deluge and 859 places in Chennai City were heavily inundated due to flooding of Adyar

UNFOLDING OF A DELUGE

- Metrological Department forecast of isolated very heavy rain but no indication of 30-50 cm across Chennai, Kanchipuram and Tiruvallur districts
- Heavy rainfall commenced on 1st December
- PWD sounded warning during the day of heavy discharge from a full Chembarambakkam reservoir due to huge inflows from overflowing tanks and catchment areas
- As Collector and Police started warning river bank colonies' residents to move to higher ground, discharge into Adyar stepped up to 29,000 cusecs by evening

UNFOLDING OF A DELUGE

- Rainfall continued well into 2nd December, with extremely heavy inflows from hundreds of water bodies outside Chennai other than Chembarambakkam accounting for major share of water in Adyar and Cooum rivers
- Heavy discharge from other drinking water reservoirs like Puzhal led to flooding of Kosasthalaiar river
- Major canals like Buckingham Canal too overflowed
- Adyar river overflowed major bridges and engulfed most localities adjoining its course, including airport

UNFOLDING OF A DELUGE

- By 3rd December water had flooded most parts of the city, including interiors which had never seen floods
- Low lying colonies saw upto 15-17 feet of water
- Most arterial roads and subways flooded
- Power supply switched off in most areas
- Public transport and civic services severely affected
- Communication networks down; Call centre affected
- Essential commodities like milk supplies disrupted
- Water supply and sewerage systems affected

STAGES OF FLOOD MANAGEMENT

- Rescue
- Relief
- Inundation removal
- Cleanup
- Disease prevention
- Rehabilitation
- Restoration



RESCUE

- As news came in of extremely heavy discharge into Adyar, request sent out to NDRF and Army to help evacuate low lying areas especially on river banks
- Central rescue teams were either deployed in Kancheepuram or were expected only next day
- Chennai Corporation, along with Fire & Rescue Services, evacuated over 31,000 people from Adyar banks in an overnight operation on 1st December
- Rescue continued on 2nd December with assistance from NDRF, SDRF, Fisheries, Police and Fire departments
- Army joined the efforts in the night and next day (3rd)

RESCUE

- Air rescue by IAF / Coast Guard choppers limited due to adverse weather conditions
- Sustained massive efforts by local fishermen and volunteers
- By 3rd December 1,20,000 people evacuated and 62,000 persons accommodated in 199 relief camps of Chennai Corporation in schools and community halls
- Casualties were minimal due to timely action
- Thousands of families preferred to stay put in upper floors of their houses and not be rescued
- Flood of calls/SMS/social media messages calling for help to rescue individuals but several could not be responded to immediately due to communication / transportation problems and lack of adequate rescue resources

















280 boats were mobilized for rescuing people and supplying relief materials to the low lying areas which were flooded.

RELIEF

- State Govt swung into action by providing food, water and provisions like milk, bread, candles, torchlights etc.
- An unprecedented 1.28 crore food packets cooked in 252 nos. Amma Canteens and 4 kitchens supplied at relief camps and door to door in affected colonies by boats and vehicles
- Nearly 4,000 water tanker trips a day and over 30 lakh water bottles supplied free of cost
- Milk powder and sanitary napkins supplied to all women in inundated areas and relief centres
- Medical services and free medicines provided by Corporation and Govt doctors / paramedic staff through static and mobile camps in all flooded areas

Relief Centres and Food Distribution







RELIEF

- Corporation started a centralized relief material processing centre in Nehru Indoor Stadium
- Relief material started pouring in from Central / State agencies and corporates; this was systematically received, sorted, re-packed and distributed efficiently
- 1648 MT of relief material was seamlessly reached to most badly affected areas through NDRF/Army/State Govt/Corporation employees/volunteers
- Private agencies like NGOs and corporates pitched in with food, water, dry rations, clothes, bedding, toiletries
- NGOs under the banner #chennairainrelief2015

RELIEF MATERIAL AT JAWAHARLAL NEHRU STADIUM



Despatch of relief materials





RELIEF

- State Govt carried out survey of affected families and transferred Rs 5,000-10,000 amounting to over Rs 700 crore to 14 lakh families through their bank account
- Replacement textbooks, notebooks and school uniforms given to all students who had lost them in the floods
- Special camps organized to provide free duplicate copies of documents destroyed in the deluge, such as property documents, ration cards, school certificates etc
- Automobile servicing camps organized with the help of leading private dealers to attend to damaged vehicles
- Free bus transport for a week immediately after deluge

REMOVAL OF INUNDATION

- Chennai Corporation, along with other departments like Metrowater, Fire, Metrorail and PWD cleared most areas of water stagnation within a week.
- Flood waters were cleared by using 470 pumpsets, 82 JCBs, 49 fire tenders and 75 super sucker machines
- Corporates pitched in with heavy duty pumps, which came from as far as Delhi by airlift
- An uphill task, given that most receiving water bodies were flowing at higher level for several days
- Water continued to enter the city from overflowing tanks located outside the city limits despite rains subsiding

Draining of flood water











Water stagnation in 16 subways of Corporation and 6 subways of Highways department was cleared using additional heavy duty pumps



REMOVAL OF FALLEN TREES





A total of 911 fallen trees
were cleared in record time



CLEANUP

- During initial days of flood, difficulty in mobilizing Corporation's 25,000 sanitary workers, drivers and vehicles
- After waters receded, huge quantity of soiled / damaged articles put out continuously by households and businesses
- Additional 16,000 sanitary workers, 675 lorries and 120 JCBs mobilized from other districts within a short time
- Accumulated garbage of 2.19 lakh MT was removed over 3 weeks (double the normal average)
- Masks, gloves, raincoats, gumboots distributed to all sanitary workers and all of them given ex gratia Rs 2,000 each
- TT vaccination given to all workers involved in operations
- One of the fastest ever cleanups in the history of floods

GARBAGE DISPOSAL



DISEASE PREVENTION

- Street level disinfection using lime and bleaching powder
- Cleaning of homes, sumps and chlorination of water sources
- Intensive IEC activities aimed at promoting hygiene, water boiling and handwashing, prevention of vector breeding etc
- Over 12,000 static and mobile medical camps conducted for over 2 months since the rains commenced
- 17.58 lakh persons treated in these camps and free medicines given for ailments like fever, diarrhoea and skin rash
- **No outbreak of epidemic as a result of these measures**





REHABILITATION

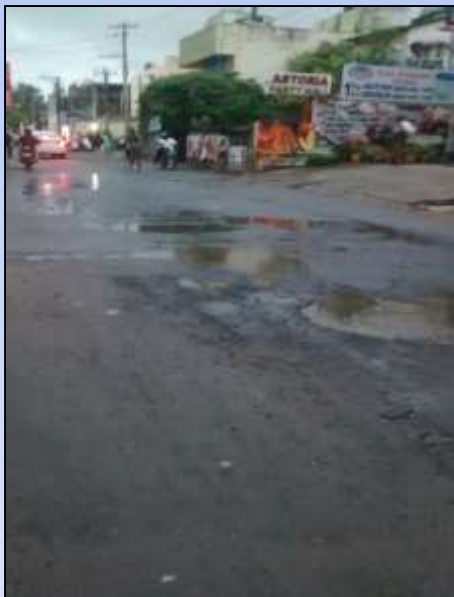
- Estimated 14 lakh families affected, of which 50,000 families on the banks of Adyar, Cooum, B Canal etc
- During floods 1.20 lakh persons evacuated; of them 62,000 accommodated in 199 relief camps
- Relocation of slums on river banks to 10,000 Slum Board tenements commenced
- Waiver of 10% contribution (Rs 65,000); subsistence allowance of Rs 2,500 pm for 1 year; one time shifting allowance of Rs 5,000; food for 3 days
- Skill training for livelihood and admission in schools

REHABILITATION

- Traders offered additional credit and deferral of loan repayment
- Small traders given Rs 5,000 interest free loans
- Training norms relaxed to give loans for setting up small and micro enterprises
- Repairs to industrial estates
- Replacement of damaged power meters in MSMEs

RESTORATION

- Damage to public infrastructure in Chennai alone estimated to be over Rs 3,000 crore, mostly roads
- Massive programme for repair of over 12,000 roads taken up with assistance from Centre and State Govt
- Critical infrastructure like power restored as soon as water receded and drinking water supply maintained
- Subsequently major problem of sewage overflows due to blockages / collapse of sewerage lines attended to
- Milk supply restored fully within a couple of days
- Vegetables and provisions made available in cooperative outlets and ration shops expeditiously
- Bus services brought to normalcy within a day of the floods and free travel for a week helped restore normalcy









REVIEW & MONITORING



OVERSIGHT BY OFFICIALS

- Central Team inspected flood affected areas in November 2015 and later in January 2016
- State Govt appointed 15 senior IAS officers to assist the Commissioner in flood relief work monitoring
- Entire State machinery mobilized for the effort
- Use of social media like whatsapp, twitter (#resilientchennai)



LESSONS FOR URBAN GOVERNANCE

- **Strengthen city governance to plan and coordinate disaster management more efficiently**
 - All natural resources, including water bodies, be brought under the ambit of the local body
 - Specialized disaster response agencies like Fire & Rescue Services be strengthened and placed under the local body
 - Multiplicity of agencies to give way to city government

LESSONS FOR URBAN GOVERNANCE

- **Comprehensive drainage plan be prepared and implemented for entire region with basin approach**
 - Chennai basin has sub basins like Arniyar, Kosasthalaiyar, Adyar, Cooum and Kovalam, with numerous watersheds
 - Macro drainage covering thousands of lakes, reservoirs, canals emptying into the rivers needs periodic maintenance
 - Micro drainage should be expanded to all expanded areas and individual local bodies in the region and funds provided for periodic maintenance using mechanized equipment

LESSONS FOR URBAN GOVERNANCE

- **Metropolitan planning and development should give primacy to environmental issues and drainage**
 - Reclassification of land for urban development and layout approval process should ensure that developer or local body preserves water bodies /courses and develops key infrastructure like drainage before construction
 - Encroachments on water bodies, canals and rivers should be ruthlessly curbed and dumping of debris, garbage or wastewater in them prevented through severe penalties
 - All wastewater from the urban areas be fully treated and recycled as far as possible through tertiary treatment

LESSONS FOR URBAN GOVERNANCE

- Sophisticated sensors and models be developed based on remote sensing and ground data that can provide timely alerts and location specific inundation projection
- Disaster relief guidelines be revised to incorporate entitlements such as standardized relief kits and adequate stock of non-perishable items
- Failsafe communication systems / helpline be established
- Media management, especially social media, for proper information dissemination
- Huge scope for citizen engagement through volunteer effort; however need for coordinated action
- Need for documenting the disaster experience



THANK YOU