CHENNAI'S WATER SYSTEM

Building and Improving Resilience

27th September 2018

Madras Boat Club, Chennai

RESILIENT CHENNAI
PIONEERED BY THE ROCKEFELLER FOUNDATION

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Background

Over the past six months, the Resilient Chennai team has worked with multiple stakeholders from government, industries, academia, and civil society to understand the city's context and identify the key resilience challenges. Based on this stakeholder-driven process in Phase I, six broad areas have been prioritized for deeper engagement in the next phase of strategy development. These six discovery areas are: *Water, Metro Governance, Civic Engagement, Informal Settlements, Healthy & Planned Urbanization* and *Urban Finance*.

Resilient Chennai's Phase I work and pre-existing knowledge offers a strong basis for understanding the current state of affairs and key problems around each of these discovery areas. In Phase II, the focus is more on the relevant interventions and strategies that can help address the current challenges these discovery areas face.

Therefore, on the 27th of September, an Opportunity Assessment Session was organized to call upon the Water Systems working group to come together and brainstorm around actions and interventions that present an opportunity to make our city more resilient with respect to its water resources.

The experts (r*efer Appendix 1*) on water resources from government, civic, academic, private institutions were invited to:

- Map out Chennai's water related challenges
- Ideate to find ways of addressing these challenges through technical, research-based, regulatory, and/or infrastructural interventions and
- Develop a priority list based on their understanding of what is relevant, feasible, and necessary to address Chennai's water woes.

Session 1: Problem Mapping

The discovery area was broken down in to six pertinent diagnostic questions (DQ) and the participants engaged in a brain-storming exercise to map out the relevant challenges for each of the questions. Based on the secondary research, some challenges were identified and were provided to the participants for reference.

Observations

Based on the inputs from the session, the following challenges were identified under each DQ.

DQ1: How do we promote efficient and responsible water management among end users (households)?

- Lack of awareness on importance of water management.
- Lack of community engagement and ownership.
- Current technology and appliances waste water.
- Waste water recycling: Limited sewage treatment capacity, social acceptance, cost.
- Effective water pricing: No metering, no political will, costs of installation.
- Lack of monitoring at ward level.

DQ 2: How can we better plan for, and deal with, water related shocks (drought/floods), and stresses (climate change, sea-level rise and waste)?

- Lack of Integrated flood/drought management: reactive measures.
- Poor maintenance of infrastructure.
- Illegal dumping of garbage on river banks / sewage into water bodies.
- Inadequate outreach activities by government on climate change: perceived as distant threat.

DQ 3: How can we foster greater dependency on waste water recycling? How may decentralized waste water treatment systems help? (Industrial, commercial and domestic.)

- Lack of awareness of what recycling options exist.

- Lack of data on best practices – what works where & what doesn't.
- Expensive alternative.
- Sociological and psychological inhibitions.
- Lack of decentralized waste water treatment facilities.

DQ 4: How do we redesign our storm water drain systems to maximize water storage and improve water management practices?

- Lack of appropriate design: implementing design that can serve multiple functions of draining excess water and recharging water bodies.
- Poor implementation.
- Encroachment of SWDs.
- Suitability of design for Chennai's geography.

DQ 5: How can we leverage more coordinated and collective efforts by multiple agencies for better management of our water system? For instance, while multiple agencies are working in silos on lake restoration, how can we make these efforts more effective through coordination?

- Lack of willingness to collaborate.
- Lack of a single database with details on ongoing interventions.
- Lack of integrated planning.
- Lack of communication between line departments implementing on the ground.

DQ 6: As the city grows into its peri-urban areas, how do we restore, protect and reintegrate the water bodies in our water catchment areas (Kancheepuram and Tiruvallur) in a sustainable manner?

- Lack of regional plan.
- Lack of research on existing structures / water channels that are critical.
- No elaborate mapping exercise to identify ecologically vulnerable areas.
- Lack of institutional arrangement for more coordinated management of land and water resources in expanded CMA.
- No clear timeline on the intended expansion.

Session 2: Interventions

This session comprised of a prioritization exercise to help identify stakeholder-driven preferences. This exercise was meant to capture possible solutions relevant to each DQ.

Based on the secondary research, a list of possible interventions was provided to the participants for reference. *Please refer Appendix 2 for the initial list of interventions.*

Further, they were given the bandwidth to add other interventions/solutions of their choice. The interventions recommended (added) by the participants are listed below:

S.NO	INTERVENTIONS
1	Mapping Linkages Between Waterbodies
2	Creating More Smaller Ponds Than One Big Reservoir
3	Incentivising Water Management
4	Decentralized Water Management Systems
5	Dual Plumbing for Grey Water Recycling
6	Data Repository on Best Practices for Water Recycling for Commercial and Industrial Purposes
7	Awareness Campaign on Vulnerable Areas
8	Climate Adaptation Strategy for Larger CMA
9	Flood Monitoring and Forecasting Tool
10	Common Database on Underground Infrastructure
11	Multi-Hazard Mapping Tool

Following this, the participants identified and ranked the top ten interventions from the list, based on what they thought were absolutely necessary for building resilience within Chennai's water system. The following list of interventions (see below) were consistently placed in the top ten. This prioritization will be crucial in identifying the interventions that should be shortlisted for Chennai's Resilience Strategy.

Top Ranked Interventions

RANK	INTERVENTION
1	Restoration and Protection of Water Bodies and Waterways within CMA
2A	Integrated Eco-Restoration of Rivers
2B	Decentralized Waste Water Management Systems
3	Water Supply Network - Augmentation and Rehabilitation
4	Multipurpose and Green Storm Water Drains
5	Policy Mandate Requiring Installation of Water Meters in Domestic Buildings
6	Awareness Campaign Advocating the Use of Recycled Grey Water
7	Review and Monitoring of RWH Systems in Domestic and Commercial Buildings
8	Policy Mandate Requiring Usage of Recycled Grey Water Across CMA
9	Decentralized Waste Water Management Systems
10	Sensors for Monitoring Groundwater

The second session also sought to flesh out low priority interventions identified by participants (see below). It is worth noting that all the interventions chosen as low priority were pertaining to source augmentation. While, water source restoration and conservation practices and policies were predominantly chosen as high priority interventions. This corroborated the findings from our secondary research and was consistent with the water management narrative among key stakeholders in the city who have advocated for restoring existing water bodies and implementing comprehensive water conservation measures against adding new sources for water supply (desalination plants, additional reservoirs etc.)

Low Priority Interventions

S.NO	INTERVENTIONS
1	New Desalination Plants
2	Fifth Reservoir for Chennai
3	New Sewage Treatment Plants

Session 3: Opportunity Assessment

In this session, participants were tasked with justifying their selection for three high priority and one low priority, chosen in the earlier exercise, based on the following parameters:

Funding, Cross cutting impact, Immediate requirement for the city, Alignment with ongoing plans/visions, Political will and *Major policy change*.

Based on the parameters, the following list of interventions were scrutinised.

HIGH PRIORITY INTERVENTIONS	Integrated Eco-Restoration of Rivers
	Restoration and Protection of Water Bodies and Waterways Within CMA
	Multipurpose and Green Storm Water Drains
	Review and Monitoring of RWH Systems in Domestic and Commercial Buildings
	An Integrated Water and Waste Water Strategy for the Larger CMA
	Decentralized Waste Water Management Systems
	Embedding Green Infrastructure in Urban Planning
LOW PRIORITY INTERVENTIONS	New Desalination Plants
	Fifth Reservoir for Chennai

Observations:

High priority interventions

- Most of the interventions required high willingness from the political establishment.
- The impact from the interventions were cross-cutting and moved beyond the realm of water systems.
- The interventions were deemed as immediate requirements for the city.
- High political willingness was observed for interventions advocating for source augmentation and interventions for source conservation did not produce enough political traction.
- Interestingly, most of the chosen interventions were in alignment with existing policies/visions/plans.

Low priority interventions

- Despite the high funding requirement, restricted impact, long time required for implementation, these interventions had high political will.

Session 4: Call to Action

In the final session, with the problems and respective solutions marked and prioritized, participants provided open ended suggestions on how they, as an individual or organization, may support better implementation of the discussed interventions. Their modes of engagement could be related to the following:

Funding, Data, Knowledge, Technology, Training, Volunteer, Advisory, Design and Implementation

This exercise was positioned to understand if specific interventions have higher stakeholder support and interest. Participants chose to contribute to the following interventions:

INTERVENTION	NO. OF STAKEHOLDERS WILLING TO PARTNER
Integrated Eco-Restoration of Rivers	8
Restoration and Protection of Water Bodies and Waterways Within CMA	9
Embedding Green Infrastructure in Urban Planning	4
Water Supply Network – Augmentation and Rehabilitation	3
Sewage Network - Augmentation and Rehabilitation	3
Decentralized Waste Water Management Systems	4
Awareness Campaign Advocating the Use of Recycled Grey Water	6
Review and Monitoring of RWH Systems in Domestic and Commercial Buildings	4
Developing Comprehensive Guidelines and Blueprints for Lake Restoration	4

Observations

- Most of the participants chose Advisory/Consulting as their preferred mode of engagement

- Other preferred modes of engagement were spread across knowledge transfer, training, technology, project design and implementation.
- None of the participants chose Funding.
- Very few participants, including stakeholders from the government, were willing to engage in data sharing.

Conclusion

The findings from the workshop proved crucial for shortlisting a definite set of interventions for improving Chennai's water systems. The recurring theme from the responses revealed that the participants were more inclined toward protecting and conserving water bodies than augmenting sources for water supply.

Based on the response from Sessions 2, 3 and 4, the following list of interventions are likely to make their way into Chennai's resilient strategy.

S.NO	INTERVENTIONS
1	Restoration and Protection of Water Bodies and Waterways Within CMA
2	Integrated Eco-Restoration of Rivers
3	Decentralized Waste Water Management Systems
4	Water Supply Network - Augmentation and Rehabilitation
5	Multipurpose and Green Storm Water Drains
6	Policy Mandate Requiring Installation of Water Meters in Domestic Buildings
7	Awareness Campaign Advocating the Use of Recycled Grey Water
8	Review and Monitoring of RWH Systems in Domestic and Commercial Buildings
9	Policy Mandate Requiring Usage of Recycled Grey Water Across CMA
10	Policy Mandate Requiring Usage of Recycled Grey Water Across Industries in CMA
11	Sensors for Monitoring Groundwater
12	Embedding Green Infrastructure in Urban Planning
13	An Integrated Water and Waste Water Strategy for The Larger CMA
14	Sewage Network - Augmentation and Rehabilitation
15	Developing Comprehensive Guidelines and Blueprints for Lake Restoration
16	Electromagnetic Flow Meters for Monitoring Water Supply

Appendix 1

List of Participants

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Appendix 2

Initial List of Interventions

1	INTEGRATED ECO-RESTORATION OF RIVERS	13	POLICY MANDATE REQUIRING USAGE OF RECYCLED GREY WATER ACROSS INDUSTRIES IN CMA
2	RESTORATION AND PROTECTION OF WATER BODIES AND WATERWAYS WITHIN CMA	14	DEVELOPING COMPREHENSIVE GUIDELINES AND BLUEPRINTS FOR LAKE RESTRORATION
3	NEW DESALINATION PLANTS	15	DEVELOPMENT OF A DASH BOARD ON STATUS OF RESTORATION EFFORTS FOR PUBLIC VIEWING
4	INTEGRATED STORM WATER DRAINAGE NETWORK	16	FLOOD MONITORING AND FORCASTING TOOL
5	NEW SEWAGE TREATMENT PLANTS	17	AN INTEGRATED WATER AND WASTE WATER STRATEGY FOR THE LARGER CMA
6	FIFTH RESERVOIR FOR CHENNAI	18	SENSORS FOR MONITORING GROUNDWATER
7	ELECTROMAGNETIC FLOW METERS FOR MONITORING WATER SUPPLY	19	WATER SUPPLY NETWORK - AUGMENATION AND REHABILITATION
8	MANDATORY WATER RECYCLING PLANTS FOR NEW METROWATER CONNENCTIONS	20	SEWAGE NETWORK - AUGMENATION AND REHABILITATION
9	REVIEW AND MONITORING OF RWH SYSTEMS IN DOMESTIC AND COMMERCIAL BUILDINGS	21	COMPARTMENTALIZING GRIEVANCE REDRESSAL MECHANISMS
10	POLICY MANDATE REQUIRING INSTALLATION OF WATER METERS IN DOMESTIC BUILDINGS	22	DECENTRALIZED WASTE WATER MANAGEMENT SYSTEMS
11	AWARENESS CAMPAIGN ADVOCATING THE USE OF RECYCLED GREY WATER	23	EMBEDDING GREEN INFRASTRUCTURE IN URBAN PLANNING
12	POLICY MANDATE REQUIRING USAGE OF RECYCLED GREY WATER ACROSS CMA		

Appendix 3

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