



WORKSHOP PROCEEDINGS

Strengthening Vulnerable Community-Focused Guidelines

&

Action Framework for Urban Flooding

Prepared by

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This document is an outcome of the national workshop on "**Strengthening Vulnerable Community-Focused Guidelines & Action Framework for Urban Flooding in India**," held on 12th December 2023 and jointly organised by IRADe & Mahila Housing Trust (MHT).

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Table of Contents

1. Background	4
2. Executive Summary	6
3. Opening Remarks	8
4. Setting the Context	8
5. Policy Perspectives for Inclusive Urban Flood Resilience	9
6. Community Perspectives for Flood Resilience	10
7. Expert Consultation on Vulnerable Community Urban Flood Policies	11
8. Way forward	15

1. Background

Floods are the most frequent natural disaster across the globe. India's high vulnerability to flooding is accentuated by its diverse geography and rapid urbanisation. Over 40 million hectares (12%) of the land in India is prone to flood and river erosion (MHA, 2015)¹. Floods cost India INR 4.7 lakh crore (about \$63 billion) in crop damage, house damage, and other property damage between 1983 and 2018 (DTE, 2020)². The Intergovernmental Panel on Climate Change (IPCC) special report on "Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation" clearly explains a strong link between climate change and extreme weather/climate events like storms, cyclones, floods, droughts and heatwaves³.

Factors such as rapid urbanisation and climate change have amplified the frequency and intensity of these floods, affecting an average of 75 lakh hectares of land, claiming 1600 lives, and causing damage worth Rs.1805 crores annually (NDMA, 2023)⁴.

In 2023, a cascade of floods wreaked havoc across various Indian cities, including Chennai, Mumbai, Kolkata, Delhi, Bangalore, Gangtok, Jalpaiguri, Darjeeling, Jaipur, Kota, Bikaner, Junagadh, Jamnagar, Shimla, Hamirpur, Ambala, Ghaziabad, and Cuttack. By July 2023, the estimated loss due to floods is reported to be over 2 billion USD. (SBI ECOWRAP, #18, July 2023)⁵

Most Indian cities are vulnerable to flooding due to unplanned urban development. Urban poor and low-income groups are particularly susceptible to the impacts of urban flooding due to the high risk of exposure, lack of adequate infrastructure access, housing location and low adaptive capacities.

Developing effective strategies for urban flood risk management and resilience enhancement is essential. One such strategy is to adopt a community-based approach involving various stakeholders such as government agencies, local authorities, civil society organisations, private

¹ MHA (Ministry of Home Affairs), 2015. Lok Sabha unstarred question no.†1238 retrieved from <https://www.mha.gov.in/MHA1/Par2017/pdfs/par2015-pdfs/ls-030315/1238.pdf>

² DTE (Down to Earth), 2020. Floods cost India Rs 4.7 lakh crore in last 6 decades. Retrieved from <https://www.downtoearth.org.in/blog/climate-change/floods-cost-india-rs-4-7-lakh-crore-in-last-6-decades-72401>

sector actors, media outlets, and vulnerable communities. A community-based approach can help identify the needs and priorities of different groups of people living in flood-prone areas, enhance awareness and preparedness for potential hazards, empower them to take action for mitigation and adaptation, foster social cohesion and trust among diverse communities, and promote sustainable development practices. However, comprehensive guidelines and frameworks for urban flood risk management that adequately consider vulnerable communities are needed.

Mahila Housing Trust (MHT) and Integrated Research and Action for Development (IRADe), with support from the Adaptation Research Alliance (ARA), are partnering on the project “Supporting India's National Disaster Management Guidelines by Developing Community-led Templates for Managing Urban Flood”. The project aims to support relevant nodal agencies at the national and state levels by developing templates for urban flood management focused on vulnerable communities’ conditions or preferences.

The national workshop on "Strengthening Vulnerable Community-Focused Guidelines & Action Framework for Urban Flooding in India," jointly organised by IRADe and MHT, brought together experts, policymakers, and stakeholders to formulate strategies focusing on vulnerable communities, often residing in low-lying areas or informal settlements. The goal is to strengthen guidelines and action frameworks tailored to these communities, ensuring their needs and vulnerabilities are central to urban flood management strategies. The proceedings of this workshop will provide a comprehensive overview of the current challenges, potential solutions, and future directions in urban flood management, particularly concerning vulnerable communities in India. The ultimate goal is to foster resilient cities that can manage urban flooding, protect their most vulnerable residents, and ensure sustainable urban development.

³ IPCC, 2012: Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change [Field, C.B., V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor, and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, UK, and New York, NY, USA, 582 pp.

⁴ National Disaster Management Authority, 2023. Retrieved from <https://ndma.gov.in/Natural-Hazards/Floods>

⁵ SBI ECOWRAP, #18, July 2023

https://sbi.co.in/documents/13958/36530824/170723-Ecowrap_20230717.pdf/e034c29d-fd3b-ab9b-ab2a-43fb51d97c29?t=1689589388381

2. Executive Summary

The national workshop on "*Strengthening Vulnerable Community-Focused Guidelines & Action Framework for Urban Flooding in India*" was co-organised by IRADe and MHT. The workshop commenced with Prof. Jyoti Parikh, Executive Director, IRADe delivering a welcome address, acknowledging the collaborative efforts of IRADe and MHT in advancing urban flood management. Prof. Parikh emphasised the crucial need to foster city-level resilience through strategic investments, particularly in vulnerable communities, reiterating IRADe's commitment to assisting developing nations in minimising the impact of disasters. Subsequently, Ms. Aprajita Singh, *Consultant*, MHT, contextualised the climate burden on women, highlighting MHT's role in empowering women across the region. She discussed the global impact of floods, particularly on South Asia's informal settlements, introducing a collaborative project focussing on community-led templates for managing urban floods. Ms Bindiya Patel, Programme Manager, MHT said that the impact of urban floods and excess precipitation in slums is a significant concern. She shared community insights from Ahmedabad, where many women reported that waterlogging on roads and in houses was a considerable issue.

The subsequent section delved into policy perspectives, with Mr. Rohit Magotra, Deputy Director, IRADe emphasising the imperative of inclusive policies in India's urban flood resilience. The discussion highlighted gaps in existing policies, including the absence of vulnerability mapping and community integration. He noted that the project aims to formulate community-consulted guidelines and address resource distribution, evacuation plans, and post-flood issues, with intensified efforts to inform the government and engage city-level stakeholders. The community-oriented expert consultation was chaired by Prof. Ajit Tyagi, Senior Advisor, IRADe, and Former Director General, IMD who guided discussions on policies safeguarding vulnerable urban communities. Prof. Chandan Ghosh, Professor, National Institute of Disaster Management highlighted practical strategies for coexisting with urban floods, proposing flood wall barrier systems and innovative water management solutions. Dr. G N Qasba, Senior Advisor, IRADe Former Municipal Commissioner of Srinagar Municipal Corporation shared insights from the Srinagar flood, emphasising resilience-building efforts, while Dr. Gaurav Bhatiani, Director, RTI India addressed resource inefficiency in urbanisation. Dr. Priyanka Kochhar, Advisor, RTI India showcased Dhaka's innovative flood management strategies, and Dr. Sreeja Nair, Fellow, TERI stressed the importance of dual-focused preventive and curative approaches in managing urban floods.

The sessions provided a comprehensive overview of the challenges and solutions in urban flood management, encompassing inclusive policies, community-led action plans, and innovative technological interventions. The multidimensional perspectives from experts underscored the significance of collaboration, resilience-building, and sustainable strategies to address the complex nature of urban flooding.



Fig 1. A Glimpse of the National Workshop on Strengthening Vulnerable Community-Focused Guidelines & Action Framework for Urban Flooding in India

3. Opening Remarks



Prof. Jyoti K Parikh
Executive Director, IRADe

Prof. Jyoti Parikh warmly welcomed the participants and conveyed appreciation for the collaboration between IRADe and MHT in advancing effective urban flood management. Emphasising the overarching goal of fostering city-level resilience through strategic investments in disaster management and infrastructure, she underscored the vital role of such initiatives in bolstering the capacity of developing nations to withstand the impacts of disasters. Further, she drew attention to the importance of building resilience for vulnerable groups, such as women, recognising the need for inclusive approaches in disaster preparedness and response.

"Investments in disaster management and infrastructure yield returns in the form of sustained economic activities, even in the face of disasters and hazards."

4. Setting the Context



Ms. Aprajita Singh
Consultant, MHT

Ms. Aprajita Singh discussed the issue of climate burden on women, highlighting MHT's role in empowering women across India, Nepal, and Bangladesh since 1994. Actively demystifying climate change impacts, MHT aims to make it relatable and encourage adaptive actions. With floods posing a major global disaster, impacting 1.47 billion people, she emphasised the vulnerability of South Asia's informal settlements, with an anticipated impact on 190.7 million residents in India. She introduced the collaborative project with ARA and IRADe and highlighted ARA's research for impact principles and how they informed the action research focusing on creating community-led templates for managing urban floods and supporting national disaster management guidelines. Further, she shared a video titled "Sinking Houses", depicting the severe impact of urban floods in Bhagwatinagar, Ahmedabad. Watch the video here: <https://vimeo.com/846404910>.

"There is a crucial need for policies to translate into clear guidelines and actionable steps at the community level for the urban poor. They reside largely in informal settlements and are often excluded from policy implementation."

5. Policy Perspectives for Inclusive Urban Flood Resilience



Mr. Rohit Magotra
Deputy Director, IRADe

Mr. Rohit Magotra shared perspectives on enhancing India's urban flood resilience, placing a significant emphasis on fortifying policies and operations to engage communities proactively. His discourse underscored the global importance of urban flood resilience, particularly in the Global South, highlighting India's critical need for inclusive policy scenarios. The deliberation delved into the governance mechanisms for managing urban floods, encompassing multiple levels of administration and key agencies. Despite existing mechanisms, there is room for improvement, emphasising the pivotal role of robust strategies that prioritise community involvement to mitigate the impact of urban floods and foster adaptability amidst escalating climate challenges.

He advocated for inclusive policy design in India, noting the complex nature of urban flooding, influenced by meteorological changes, hydrological factors, and human activities. The conversation highlighted gaps in current policies, such as the absence of vulnerability mapping and community integration. The discussion underscored the need for comprehensive policy analysis to rectify the need for more community focus in action plans. He emphasised the necessity for the Indian Meteorological Department's early warning network to translate alerts into impact-based forecasts, urging the establishment of effective multilingual communication channels. Disparities in flood response, particularly for low-income groups in flood-prone regions, were acknowledged and discussed.

The project aims to formulate community-consulted guidelines that address resource distribution, information access, evacuation plans, and post-flood issues. This initiative seeks to elevate these concerns to the policymaking level, ensuring the inclusion of currently overlooked vulnerable populations in discussions. While current policies lack inclusivity, the short-term project aspires to intensify efforts in informing the government and engaging city-level stakeholders, emphasising communication and inclusivity in defining an action framework that is not exclusive but centred on the needs of the community.

"The existing policies and guidelines lack inclusivity, indicating a clear need for substantial improvements in this area."

6. Community Perspectives for Flood Resilience



Ms. Bindiya Patel
Programme manager,
MHT

Ms. Bindiya Patel highlighted the impact of urban floods on slum communities in Ahmedabad. The Mahila Housing Trust proposed an Action Plan tailored for these communities to mitigate damage and protect against flooding. Issues included waterlogging, health risks, and economic losses. In collaboration with the Ahmedabad Municipal Corporation and City Health Department, the plan focuses on critical areas such as flood and waterlogging management, mosquito control, rainwater drainage maintenance, identifying unsafe buildings, and emergency communication. The goal is to empower and protect slum communities from both immediate and long-term impacts of urban flooding.

"Tailored action plans are key to empowering slum communities, addressing immediate and long-term impacts of urban flooding, from waterlogging to health risks and economic losses."

7. Expert Consultation on Vulnerable Community Urban Flood Policies

7.1 Prof. Ajit Tyagi, Senior Advisor, IRADe and Former Director General, India Meteorological Department



Prof. Ajit Tyagi
Senior Advisor, IRADe,
Former Director General,
IMD

Prof. Ajit Tyagi was the session chair and moderated the panel discussion and recognised IRADe's contributions to address urban vulnerability. Leveraging his extensive experience, Prof Tyagi guided discussions, ensuring a comprehensive exploration of policies to safeguard vulnerable urban communities from the impacts of floods. He provided valuable insights to develop effective and inclusive strategies for urban flood resilience.

Prof Tyagi highlighted the increased vulnerability of poor communities, particularly in slums, due to their location and development progress. He stressed the role of spatial mapping in warning systems and action plans, guiding individuals in flood-prone areas. With technology advancements, an impact-based warning system, including a real-time flood warning mobile application, is now possible. The governance issues, particularly in cities where unplanned development has led to blocked water bodies and drainage systems, causing frequent flooding. The challenge is to find a solution while ensuring future development doesn't worsen the situation. Strategies include rainwater harvesting and creating water storage for monsoon rainfall. He acknowledged the project's challenges and emphasised the importance of developing an effective flood warning system.

"Many people, especially those in slums, lack sufficient warning to prepare for floods. This constitutes a significant challenge that requires urgent attention."

7.2 Prof. Chandan Ghosh, Professor, National Institute of Disaster Management



Prof. Chandan Ghosh
Professor, National
Institute of Disaster
Management

Prof. Chandan Ghosh emphasised practical strategies for coexisting with urban floods, advocating implementing flood wall barrier systems as easily deployable flood protection measures to minimise property damages. He highlighted the effectiveness of floating city concepts, emphasising the importance of micro-planning, particularly for vulnerable areas. Furthermore, he underscored the significance of accurate rainfall measurement, suggesting alternatives such as lake rejuvenation using nature-based methods for aquifer recharge. In line with sustainable water management, he proposed micro-storage systems like geomembranes for efficient water storage, contributing to

flood resilience and water conservation. These innovative approaches offer immediate solutions and promote a harmonious co-existence with the dynamic nature of urban flood challenges.

"There is a need for practical strategies to coexist with urban floods, such as easily deployable flood wall barrier systems and protective measures to minimise property damage."

7.3 Dr. G N Qasba, Senior Advisor, IRADe and Former Municipal Commissioner of Srinagar Municipal Corporation



Dr. G N Qasba
Senior Advisor, IRADe
Former Municipal
Commissioner of Srinagar
Municipal Corporation

Dr. G N Qasba underscored the extensive efforts in response to the catastrophic Srinagar flood of September 2014. Acknowledging the challenges of unprecedented rainfall, the Municipal Corporation implemented impactful post-flood initiatives, directing attention towards robust relief mechanisms and proactive mitigation measures. Dr Qasba emphasised adopting resilient strategies, aiming to address immediate impacts while fortifying the city against the potential recurrence of such disasters in the future. This comprehensive approach included immediate relief efforts and extended to a thorough reassessment of policies, ensuring

a more adaptive and resilient urban infrastructure. The commitment to learning from past experiences was evident in the municipality's endeavours, reflecting a proactive stance in safeguarding the city's future against the ever-growing threat of urban floods, highlighting the importance of multifaceted strategies and continual adaptation in the face of evolving climate challenges.

"It is crucial to enhance the resilience capacity of people in urban flood scenarios."

7.4 Dr. Gaurav Bhatiani, Director, RTI India



Dr. Gaurav Bhatiani
Director, RTI India

Dr. Gaurav Bhatiani highlighted the pressing issue of resource inefficiency, emphasising the environmental impact of construction and demolition materials on water bodies, intensifying urban flooding. He stressed the imperative of optimising resource utilisation in construction, drawing attention to the lack of waste recycling facilities in many Indian cities. Dr. Bhatiani proposed a solution for establishing fully functional waste management facilities by local bodies, emphasising the vital link between urban planning and waste management. This approach addressed the immediate challenge of inadequate recycling infrastructure and offers a sustainable strategy to mitigate environmental impacts and curb the risk of urban flooding.

"There is a need for collaborative efforts to responsibly manage urban waste and mitigate its impact on water channels and overall environmental health."

7.5 Dr. Priyanka Kochhar, Advisor, RTI India



Dr. Priyanka Kochhar
Advisor, RTI India

Dr. Priyanka Kochhar provided insights from Dhaka, Bangladesh, showcasing innovative solutions for managing urban flooding. She highlighted strategies such as rainwater harvesting, utilisation of urban parks, implementation of green roofs and the use of permeable roads. These interventions operate at urban planning and infrastructure policy levels, demonstrating a holistic and integrated approach to urban flood management. Dr. Kochhar also underscored the importance of leveraging advanced technologies, including surveys for identifying damaged pipelines and regular maintenance of sewage and water lines, as critical elements in comprehensive urban flood management strategies. Additionally, she emphasised the imperative of collaborative efforts among stakeholders to implement and sustain these solutions effectively, fostering resilience in the face of urban flooding challenges. Her insights from Dhaka serve as a valuable blueprint for cities worldwide seeking sustainable and innovative approaches to mitigate the impact of urban floods.

"A holistic approach to urban flood management, including sustainable strategies and collaborative efforts for global cities, is the need of the hour."

7.6 Dr. Sreeja Nair, Fellow, TERI



Dr. Sreeja Nair
Fellow, TERI

Dr. Sreeja Nair emphasised the importance of a dual focus on preventive and curative approaches to managing urban floods. While highlighting the significance of preparedness through proactive measures, she underscored the necessity of addressing curative aspects and conducting comprehensive flood risk assessments. By integrating robust infrastructure planning, early warning systems, and thorough risk assessments, communities can enhance their overall resilience, effectively minimising the adverse impacts of urban floods. This holistic approach fortifies cities against potential disasters and promotes sustainable urban development, ensuring a safer and more secure environment for all residents, underlining the imperative of adopting a multifaceted strategy encompassing preventive and responsive measures to build resilient urban landscapes.

"We must reassess flood evaluations before implementing any approach for comprehensive and effective flood management."

8. Way forward

Addressing the complex challenge of urban flooding requires a multi-faceted approach that combines innovative solutions, policy revisions, and community engagement.

First, policy perspectives must evolve to include comprehensive definitions of urban flooding, embrace nature-based solutions, and provide clear guidelines and mandates for the multiple policy actors and government agencies. Collaborative efforts between government agencies, NGOs, and local communities are crucial for effective implementation. Moreover, the role of vulnerable communities, especially women, should be prioritised in disaster management plans, emphasising inclusivity and participation.

Second, there is a need to translate policy into actionable steps with clear roles and responsibilities supported by physical and financial infrastructure.

Third, insights from the community reveal that micro-level action plans like the monsoon action plan have effectively prevented life and livelihood losses. Integrating these learnings to inform the policy actors and policies is necessary.

Finally, nature-based solutions need to be integrated into urban planning, such as rooftop rainwater harvesting systems, green roofs, and permeable roads. These measures enhance water retention and contribute to sustainable and resilient urban landscapes. The key insights from the workshop will be collated and presented to policymakers at the city, state, and national levels.

ANNEXURE

Agenda

National Workshop on Strengthening Vulnerable Community-Focused Policy and Practices for Urban Flooding in India

10:30 AM- 10:40 AM	Opening Remarks - Prof. Jyoti K Parikh, Executive Director, IRADe
10:40 AM: 10:50 AM	Setting the context - Ms. Aprajita Singh, Consultant, Mahila Housing Trust
10:50 AM-11:05 AM	Policy Perspectives for Inclusive Urban Flood Resilience: Mr. Rohit Magotra, Deputy Director, IRADe
11:05 AM- 11:20 AM	Community Perspectives for Flood Resilience- Ms. Bindiya Patel, Programme Manager, Mahila Housing Trust
11:20 AM- 12:40 PM	Expert consultation on Vulnerable community Urban Flood Policies
Session Chair	Prof. Ajit Tyagi, Senior Advisor IRADe, Former Director General, India Meteorological Department
Panelists	Prof. Chandan Ghosh - Professor, National Institute of Disaster Management Dr. S C Bhan - Scientist G, India Meteorological Department Dr. G N Qasba, Sr Advisor IRADe, Former Municipal Commissioner of SrinagarMunicipal Corporation Dr. Gaurav Bhatiani, Director; Dr. Priyanka Kochhar, Advisor (Research Triangle Institute, India) Dr. Sreeja Nair, Fellow, TERI
12:40 PM-1:00 PM	Discussions
	Vote of Thanks Ms. Ananya Bhatia, Consultant, IRADe

About IRADe

IRADe is a reputed think tank and research institute in Asia. IRADe carries out multidisciplinary and multistakeholder perspectives concerning development issues and promotes broader consensus through research and analysis on effective policies. Since 2008, it has been designated as the Center of Excellence (CoE) in the area of "Climate Change Vulnerability and Adaptation" by the Ministry of Housing and Urban Affairs (MoHUA), Government of India, addressing critical issues related to urban development and climate resilience in India. IRADe has been actively supporting the National Disaster Management Authority (NDMA) in designing and implementing heat action plans in India. IRADe's work has supported policymakers at the national, state, and city levels. MoHUA has recommended Disaster resilience guidelines developed by IRADe for integration into Smart city plans in India. More: www.irade.org

About MHT

Mahila Housing Trust (MHT) works to strengthen grassroots collectives of women in the urban informal sector to advance constructive dialogue and action on improving their housing, living, and working environments. MHT works in cities across the Global South, including in India, Nepal, and Bangladesh, to provide services to the poor and make the voices of women heard at the intersection of climate resilience, city-level planning, and governance processes. Since its establishment in 1994, we have mobilised women to exercise their civic rights and empowered them to take charge of their habitat improvement process. This has led to the development of over 15,000 women leaders and directly impacted the lives of 3.7 million poor individuals. MHT's work has been recognised nationally and internationally and has received numerous awards, such as the Ashden Award for Cooling in Informal Settlements, the United Nations Global Climate Action Award for Women's Action Towards Climate Resilience for Urban Poor in South Asia, and the United Nations Sasakawa Award for Disaster Risk Reduction, among many others. More: www.mahilahousingtrust.org

Adaptation Research Alliance (ARA)

The Adaptation Research Alliance (ARA) is a global coalition committed to action for adaptation research that strengthens resilience in communities most vulnerable to climate change. ARA membership comprises researchers, funders, policymakers, development bodies and community-based organisations that support a paradigm shift in the way adaptation solutions are generated. ARA endorses the Adaptation Research for Impact Principles framework for action-oriented research driven by user needs, co-produced with local experts, and equitable in practice. As an advocate, facilitator, and catalyst for action-oriented research, the ARA delivers resources to those working for adaptation in countries at the frontline of climate change. The ARA is funded by UK AID from the UK Foreign Commonwealth and Development Office (FCDO) with support from the Australian Centre for International Agricultural Research (ACIAR), and its secretariat is hosted at South South North. More: www.adaptationresearchalliance.org

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