



Long-term implications of humanitarian responses

The case of Chennai

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Following the Indian Ocean tsunami in 2004, Tamil Nadu lost about 8,000 people and the lives and livelihoods of over 897,000 families were affected. In 2015, Chennai, the capital city of Tamil Nadu, was brought to a standstill by floods which killed 289 people, left 1,000 injured, and damaged property and livelihoods worth US\$2.2 billion. These extreme events and others, such as the 2003–04 drought and the 2016 cyclones, mobilised humanitarian action from a range of actors in Chennai. This study examines how humanitarian responses and post-disaster relocations fit into the wider development vision of large and fast-growing metropolises such as Chennai.

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Acronyms

CAG	Citizen Consumer and Civic Action Group
CBO	Community-based organisation
CDRRP	Coastal Disaster Risk Reduction Programme
CMC	Chennai Municipal Corporation
CMDA	Chennai Metropolitan Development Authority
CREDAI	Confederation of Real Estate Developers' Associations of India
CRRT	Chennai River Restoration Trust
DAC	Development Assistance Committee
DEM	Digital Elevation Model
DPH	Department of Public Health
DTCP	Department of Town and Country Planning
GO	Government order
GoI	Government of India
GoTN	Government of Tamil Nadu
Ha	Hectare
HH	Household
IAS	Indian Administrative Service
ID card	Identity card
IFRC	International Federation of Red Cross and Red Crescent
IPS	Indian Police Service
JNNURM	Jawaharlal Nehru National Urban Renewal Mission
KI	Key informant
KII	Key informant interview
KNG	Kannaginagar
MAWS	Municipal Administration of Water Supply
MoEF	Ministry of Environment and Forests
NDRF	National Disaster Response Force
NDVI	Normalised Difference Vegetation Index
NGO	Non-government organisation
NOC	No Objection Certificate
OCHA	Office for the Coordination of Humanitarian Affairs
OECD	Organisation for Economic Co-operation and Development
OSM	OpenStreetMap data sets
PBM	Perumbakkam
PDS	Public Distribution System
PHC	Public Health Centre
PWD	Public Works Department
SDMA	State Disaster Management Authority
SHG	Self-help group
SMY	Semmencherry
SOCHARA	Society for Community Health Awareness Research and Action
SRTM	Shuttle Radar Topography Mission
SSI	Semi-Structured Household Interview
TNSCB	Tamil Nadu Slum Clearance Board
TNSPC	Tamil Nadu State Planning Commission
TNTRC	Tamil Nadu Tsunami Resource Centre

Executive summary

Humanitarian action in the context of city-wide or regional disasters is hard to accurately characterise and analyse. The scale of the problem, the widespread and ad hoc nature of responses, and the relatively transient character of many of these actions, make it difficult to fully grasp and analyse humanitarian interventions and their implications. Yet, in the emerging context of recurrent, intensifying, and intersecting disasters in the city of Chennai, and the fact that some of these actions may have significant medium- or long-term effects on socioeconomic and ecological trajectories of the city, understanding the nature and implications of such actions is pertinent. Therefore, with this research, we set out to understand the socioeconomic, environmental, and political outcomes of these humanitarian actions in the medium and long term.

While the state continues to figure as the primary institution responsible for disaster response and rehabilitation, disasters have typically witnessed a vast mobilisation of many non-state actors. There is an outpouring of humanitarian voluntarism, bringing a large amount of resources in various forms – skills, human resources, materials and funds – into play. These non-governmental resources sometimes exceed the state's resources and capacities. Government agencies are therefore seen depending on such actors for response activities. In 2015, Chennai, the capital city of Tamil Nadu, was brought to a standstill by floods which killed 289 people, left 1,000 injured, and damaged property and livelihoods worth US\$2.2 billion (SwissRe, 2016). Chennai's experience showed that in the absence of readily available institutional platforms to absorb and channel these energies and motives, large-scale voluntarism can pose problems for humanitarian intervention at the aggregate level.

Extreme events invite a moment of assessment. They are inevitably followed by evaluations in various public fora – from the press to formal and informal public discussions – of rescue and relief efforts and the role of various

actors. The emotional, and often traumatic, registers of the experience make these moments stick in public memory. Thus, public image-building becomes a central element of humanitarian efforts, and of the discourses that follow. In this and other ways, interventions during disasters may bring collateral benefits of different kinds for all actors. Like state agencies, NGOs also gain mileage from the visibility of their outreach efforts. Such times also often enable NGOs to deepen engagement with assisted communities, sometimes altering the character of the NGO's ongoing work. State agencies access new sources of funds and get the opportunity to build their capacity in critical areas. It is evident that relationships among different actors also get built, although the sustainability of such relationships is questionable. Many individuals who witness havoc at such scale also often find themselves moving on new paths.

Not surprisingly, then, there is a strong element of 'everybody loves a disaster'.¹ Disasters provide opportunity for various agendas to be furthered. Although it is not always a case of misplaced intentions, there are often veiled agendas behind humanitarian action. Our study found that disasters in Chennai provided Tamil Nadu an opportunity to construct a discourse of responsiveness and good governance. While these discourses in some instances fed into actions that seemed to strengthen the city's resilience, they also served to justify and support prior agendas of the state. As the study found, post-flood governance discourses institutionalised technical parameters of vulnerability, pushed towards a formalisation of urbanisation processes including stricter implementation of building codes and regulations, and justified action against encroachments. However, the state's business-as-usual repertoire of selectively defining encroachments as referring only to dwellings of the urban poor, with a continued failure to act against elite encroachments, continued during post-disaster response. Extreme events have long been used as an

¹ Adapted from the title of P Sainath's book 'Everybody loves a good drought', which made a similar point, that extreme events provide opportunities for various actors to leverage a perceived crisis for self-interested gains (Sainath, 2000).

entry point for reshaping agendas related to land and development. They have been used to justify relocating poor people and clear squatter encroachments from lands that the state plans to allocate to more lucrative purposes. This continued unchanged in post-disaster Chennai.

Temporal aspects are also important in distinguishing extreme events and their effects. Duration, timing, phasing, and the relationships between short- and long-term actions are important. Immediate actions have a different valence than those taken over a longer term, but in either condition, the actions must 'do no harm' at the very least. However, this study found that certain interventions after disaster tend to have a ratchet

effect. The manner of distribution of humanitarian assistance often altered local economies and social relations by introducing resources of inappropriate scale or type. We also collected instances of post-disaster responses undermining the dignity and autonomy of vulnerable communities.

Differing value systems among humanitarian and development actors shape decisions for development as well as disaster preparedness, and carry outcomes for the city's ecological and social systems, what and who gets prioritised, and whose agenda is furthered. In the aftermath of disasters, metrics of value and worth get redefined, and decisions about what stays in the city and what is removed become particularly crucial.

1

Introduction

1.1 Humanitarian action in India and its implications for structural risks

The government of India uses the terms ‘humanitarian assistance’ or ‘disaster relief’ to refer to activities that address human suffering caused by natural disasters like cyclones, droughts, earthquakes or floods (Meier and Murthy, 2011). Earthquakes, drought, floods and cyclones are some of the major disasters across India in the last two decades. While effective disaster management practices helped minimise loss of life in Odisha and Andhra Pradesh in 2013 post-cyclones, failure to respond to early warnings and prepare for floods in Uttarakhand (2013), Kashmir (2014) and Chennai (2015) have raised serious concerns about the effectiveness of India’s disaster management system (Menon, 2016).

In India, states hold primary responsibility for disaster management. The central government provides assistance in terms of financial support and military forces on request. While a central audit of flood management systems reveals that flood planning, preparedness and early warning systems are insufficient, delayed, non-integrated or non-functional in most states (CAG, 2017), there is still limited research done on the long-term implications of post-disaster response actions undertaken by the government as well as other actors.

Although civil society and humanitarian agencies have significant contributions post-disaster, in India their role is largely complementary and the state, along with national governments and military forces, are the biggest responders to most emergencies (Falcao, 2012). Civil societies are under-utilised in the event of a disaster, due to their complex relationships with the government and the absence of standard operating procedures (SOPs) for local and international NGOs to follow up and coordinate with the state post-disaster (Price and Bhatt, 2009).

Like the post-flood situation in Chennai, an outpouring of inappropriate and often unwanted relief is reported by many NGOs coordinating relief distribution, “*Many clothes that were provided following the tsunami were later shipped on to victims of other disasters, including the 2005 Gujarat floods. This recurred in the 2008 Bihar floods, leading the chief minister to ask for relief supplies to be halted because of a lack of storage capacity in the state*” (Price and Bhatt, 2009). Similarly, oversupply of Fibre Reinforced Plastic (FRP) boats by various agencies post-tsunami in Tamil Nadu resulted in an increased number of boats and overfishing, leading to an environmental disaster (Barenstein and Iyengar, 2010; UN *et al.*, 2006). Instead of using the disaster as an opportunity to train fishermen in more sustainable livelihoods, it morphed into a competition to supply unsustainable boats (Price and Bhatt, 2009). IFRC’s World Disaster Report (2015) suggests that strengthening the role of local actors may address the challenges of humanitarian aid, such as shrinking access, fragmentation and incoherency in operations,

and the gaps between response, recovery and development (IFRC, 2015).

Geophysical calamities such as earthquakes have attracted large reconstruction programmes and funds, whereas frequent events such as floods and cyclones in Bihar, Assam, and Andhra Pradesh, have not initiated post-disaster reconstruction programmes at scale (Barenstein and Iyengar, 2010; Thiruppugazh, 2014). The post-tsunami rehabilitation phase was not as successful as the relief phase and many affected families continued to live in temporary shelters even two years after the event (Price and Bhatt, 2009; UN *et al.*, 2006).

Once the response and relief phase ends, the task of reconstruction and rehabilitation (as part of the recovery process) lies with the government. The reconstruction process takes a long time and it is challenging for the government to make it a consistent development opportunity (Shaw, 2006) and thereby to build resilient communities (Thiruppugazh, 2014). A CARE (2016) study on long-term impacts of shelter projects found more focus on delivering houses and completing projects than on beneficiary participation and quality of work. Meanwhile, the provision of durable housing, which is safe and dignified, can reduce future disaster risk, provide security, and allow beneficiaries to focus on other priorities. However, implementing reconstruction projects without addressing livelihood issues has been largely unsuccessful because the poorest and most vulnerable were unable to utilise provided housing since they lacked economic resources to sustain themselves (CARE, 2016).

Often, relocated families are forced to survive by migrating because of delays or shortfalls in the provision of government housing and job opportunities (Development Initiatives, 2016; Menon, 2016). The loss of livelihoods among the unorganised sector due to natural disasters is rarely accounted for nor compensated (Menon, 2016). Post-disaster compensation is linked to either land or house titles; the poor and vulnerable, many of whom do not have a title, are often denied compensation.

Jigyasu (2002) points out that the existing development processes and post-disaster rehabilitation is highly interlinked because existing societal vulnerabilities shape the rehabilitation process post disasters. Additionally, new vulnerabilities are created because of the rehabilitation process itself. In Tamil Nadu, Dalits and women were neglected in the post-tsunami relief and response by the state and the NGOs. Relief was distributed on the basis of caste; Dalits were denied relief by the fishing and other upper caste communities as there were not many deaths in the Dalit communities

(Banerjee and Chaudhury, 2005; Human Rights Watch, 2005; Price and Bhatt, 2009; Srinivasan and Nagaraj, 2007). This continued in the reconstruction phase where some rich and powerful castes joined hands to buy land for relocation with Dalits having no option but to stay back (Barenstein and Iyengar, 2010).

Experiences and learning from past disasters are often ignored. Successful outcomes of owner-driven reconstruction approaches after the Gujarat earthquake were not followed after the Indian Ocean tsunami or the Kashmir earthquake (Barenstein and Iyengar, 2010). The agency-driven construction approach after the tsunami only aimed at delivering houses and spending allotted funds. In the process, existing villages, including houses that weren't damaged in the tsunami, were demolished to construct new settlements as the agencies could not find land for relocation (Barenstein and Iyengar, 2010).

With this research, we set out to understand the long-term implications of post-disaster humanitarian action on people and the cities at large. We aimed to recognise the various humanitarian actors, and the context and modes through which they act. We also aimed to recognise the existing vulnerabilities, both before and due to the disasters, and whether the actions undertaken indeed responded to these vulnerabilities.

1.2 Post-disaster housing provisions

There seems to be a significant challenge faced by government agencies in India in distinguishing between the short-term response phase and longer-term rehabilitation. Rehabilitation must be undertaken as part of a long-term recovery process following detailed socioeconomic and risk assessments, with relevant monitoring frameworks in place. But undertaking resettlement within a short time after the disaster is unable to address underlying inequalities or vulnerabilities that may have caused the losses. Such 'quick-fix responses' can have poor developmental outcomes.

Much of the development literature defines housing as not just a shelter or dwelling unit (ie a physical space occupied by one or more households), but as a 'viable' interaction of this physical asset with the surrounding system. Viability of housing could be further dependent on achieving access to socioeconomic services, including livelihood opportunities, tenure security, capacity for the house to be an economic asset, affordability, and adequacy to needs (Bhan, Anand *et al.* 2014).

Yet, post-disaster rehabilitation and reconstruction are often done under urgency and many aspects of viable housing tend to get overlooked. Providing housing tends to only reduce physical vulnerabilities, and potentially embeds other negative risks pertaining to the socioeconomic needs or environmental dependencies of people and city systems.

Housing provision is often done in coordination with or led by various government departments involved in delivering the physical asset (a house), land, and the associated services (water, electricity, sewage disposal) at various scales (national, state, and local). These post-disaster housing provisions are often made in line with an existing vision, plan, and strategy for meeting housing needs. While this could be advantageous in post-disaster situations when urgent housing is required, various implementation challenges tend to negatively affect the outcomes (Col, 2007).

Lack of coordination between agencies in delivering suitable and viable housing is well documented across development and disaster response literature (Rwomire, 2001, Begum, 2015, Yazdani *et al.*, 2015). Challenges related to land tenure, which are recognised as central to reducing vulnerabilities in the long term, also continue to exist (Caron *et al.*, 2014). Existing plans and strategies may or may not be suitable for the affected population or meet new needs created after the crisis. Yet, providing physical support, such as housing, which is visible, measurable, and clearly demonstrates post-disaster action, often garners more political mileage than longer, more holistic rehabilitation.

1.3 Chennai as a site of multiple hazards and rapid development

Chennai faces multiple hazards. It faces coastal flooding due to extreme storm surges and cyclones and is classified as a 'very high damage risk zone' (GoTN, 2014). In 2004, a tsunami that hit Tamil Nadu killed nearly 8,000 people and affected more than 1 million people. Most recently, Chennai was among the most affected regions after the heavy rains in December 2015 that led to severe floods in Tamil Nadu. Many lives were lost, over 6 million people were affected, and 1.5 million houses were damaged.

The city also has seen a high incidence of flooding with significant flooding events recurring since 2005. However, analysis of meteorological data in Chennai over the past 200 years does not show any significant trend in precipitation amounts (Drescher *et al.*, 2007).

This points to the fact that rainfall amount has remained the same, and it is the increased built-up area over natural drainage channels, and wetland fragmentation and degradation that are leading to increased flood incidence.

Chennai also has a history of recurrent water shortages (GoTN, 2014, Srinivasan, 2008, Janakarajan *et al.*, 2007). In 2003–04, it suffered from a severe drought stemming from poor monsoonal rains. This led to a drop of groundwater by seven to eight metres, the shutting down of the city's piped water supply, the complete drying out of local reservoirs, and reports of rioting in informal settlements (Thomas, 2013; Srinivasan, 2008). Adaptive action during and after the drought was either individual (people drew water from private wells, shifted to labour intensive sources of gathering water, reduced water use, among others) or from the private or informal sector (water tankers, use of bottled water). State-led responses included supply augmentation by Chennai Metrowater by hiring agricultural wells in peri-urban areas, setting up pipes and sumps, and passing the rainwater harvesting regulation, which made capturing rooftop rainwater mandatory in every house² (Thomas, 2013).

Climate change is projected to exacerbate existing risks and expose vulnerable populations to more erratic and extreme rainfall and temperature. Chennai is projected to see an increase in maximum temperature by 1°C and a 9 per cent decrease in average annual rainfall by 2040 (GoTN, 2014). Taken together, these projections indicate that the city is going to see hotter and drier seasons in the future with direct implications on drought incidence and severity. Although the frequency of cyclones hitting the Tamil Nadu coast is projected to decrease, the intensity (measured through wind speed) may increase (MoEF, 2010). Sea level rise along the Chennai coast is projected to increase by 0.37mm/year, which is equivalent to a change of 0.10 feet in 100 years (GoTN, 2014).

Chennai's population increased from 1.7 million in 1961 to 7.1 million in 2011. This rapid urbanisation and population growth are putting pressure on Chennai's ecological, infrastructural, and social systems (Venkatesan *et al.*, 2014; Janakarajan *et al.*, 2007). A growing IT-industry and large-scale labour migration intersecting with issues of inadequate housing, growing unemployment, water shortages, and insufficient waste disposal, are resulting in multi-dimensional vulnerabilities (GoTN, 2014; Drescher *et al.*, 2007).

Chennai is expected to urbanise at, potentially, an exponential rate, with an increasing investment pumped to fuel the rhetoric of the smart city, as well as provide for the needs of its growing population. The city needs

²For more information, visit www.chennaietrowater.com

space, but it needs to realise that any encroachment into ecologically sensitive zones would only increase the city's vulnerability to natural hazards like urban floods and water scarcity, apart from the more severe events like a tsunami or the gradual increase in sea water levels due to anthropogenic climate change. Given that Chennai is a site exposed to multiple risks (flooding, cyclones, tsunami, and water scarcity), humanitarian action from various actors presents itself as a rich case to understand how these dynamics come together to shape the city's development trajectory and multidimensional vulnerability.

1.4 A historical overview of housing and slum clearance in Chennai

Chennai, formerly Madras, has often been dubbed a city of slums. Well into the twentieth century it was marked among Indian cities for its large concentration of Dalit (formerly 'untouchable') hamlets. These settlements, known as *paracheris*, had established themselves from the 18th century on the edges of agricultural villages and small urban centres that were incorporated into Madras city when its first boundary was drawn in 1789 (Neild, 1979; Ahuja, 2001). The *paracheris*, which housed the majority of the city's unskilled labour force and a growing stream of low-caste migrants from the hinterlands, occupied these lands, linking the scattered settlements of the region into a coherent urban space.

In the 1920s and 30s, as depressed agrarian conditions in the rural hinterlands brought landless agricultural labourers in large numbers to Madras, census figures record surges of population growth, yielding decadal growth rates of 24 per cent and 20 per cent respectively (Office of the Census Commissioner, 1961). Accompanying this was a marked spread of slums, which inspired many institutional developments.

In 1946, the City Improvement Trust (CIT) was formed in Madras as a statutory body under the CIT Act of 1945, with a mandate to decongest urban areas, clear slums, demolish old buildings, lay out streets and parks, and acquire lands for these purposes (Gol, 2006). Until 1951, slum clearance largely meant shifting slums to the outskirts of or outside the city (*ibid.*). In 1952, however, a housing advisory committee constituted by the government of Madras recommended a shift from clearance to 'improvement'. A slum improvement scheme was drafted on the principle of ameliorating conditions in existing slums by providing proper layouts and basic amenities. Surplus families were to be

rehoused in sites that would be acquired and developed not far from their workplaces (*ibid.*). In 1954, the Madras Slum Acquisition of Land Act (1954) was passed to enable the government to acquire and develop slum lands. Through the 1950s, the CIT acquired large tracts of land around the city and attempted to build their way out of the housing shortage by constructing tenements and single-room houses for slum dwellers with state government funds (Venkat and Subadevan, 2015).

In 1961, the Tamil Nadu Housing Board (TNHB) was established by the state government, absorbing the CIT that had hitherto functioned as part of the Corporation of Madras. The TNHB was mandated to provide a solution to the looming housing crisis by developing housing for all classes of the population. However, it fell severely short of its targets in numbers of dwelling units (MIDS, 2011). By 1961, when the Census of India conducted a special study of slums in Madras city, there were nearly 100,000 families living in 548 slums, of which a fifth were located on the coast or on the banks of waterways (Office of the Census Commissioner, 1961; Gol, 2006).

The slum dwellers of Madras became a political constituency with the rise of the regional party Dravida Munnetra Kazhagam (DMK), which won elections to the municipal corporation of Madras in 1962 and to the state legislature in 1967. Following on its campaign promises of providing concrete homes for slum dwellers, the DMK government began to implement a radical housing agenda by reconstituting the institutional framework for housing (Venkat and Subadevan, 2015). A key moment in the city's history of slum clearance was the formation of the Tamil Nadu Slum Clearance Board (TNSCB) in 1971, under the Tamil Nadu Slum Areas (Improvement and Clearance) Act, 1970. The Act protected slum dwellers from arbitrary evictions and provided for security of tenure and improvements in living conditions. From this point on, slum-clearance initiatives in Chennai can be broadly categorised into four types that followed a chronological sequence (Coelho *et al.*, 2015).

In the 1970s, the TNSCB predominantly constructed in situ multi-storeyed tenements to rehouse slum dwellers, aiming to free Madras of slums in seven years by constructing 20,000 tenements a year (Raman, 2011). However, as elsewhere across the world, this approach had limited success due to its high costs, heavy dependence on state funding, and the tendency for the benefits to be captured by powerful or politically connected households. By 1981, only 17 per cent of the 0.22 million households of slum dwellers in Madras had been rehoused in tenements (*ibid.*).

In the late 70s and 80s, the state's policies shifted from tenement construction to in situ slum upgrading and sites-and-services (S&S) schemes, implemented in Chennai under the World Bank-funded Madras Urban Development Projects (MUDP) I and II. Influenced by John Turner's writings on Peru, and by concerns of financial sustainability and replicability of its interventions, the Bank advocated for approaches that would allow slum dwellers to invest in improving their own housing once provided with tenure security, adequate infrastructure, and low-interest credit. MUDP I and II made significant advances in providing affordable shelter to the urban poor, together providing plots or improved slums for 76,000 slum households over 10 to 12 years (Pugh, 1990).

But by the mid-1990s, evictions and the resettlement of slum dwellers in tenements outside the city had surfaced again, this time through well-funded and mass-scale programmes. Growing pressures on urban land as real estate and for advanced infrastructure, an emerging emphasis on environmental improvements including

waterways restoration and city beautification projects, and the availability of large-scale funding through projects like the Tamil Nadu Urban Development Project (TNUDP) and the JNNURM, contributed to this shift. Since 2000, over 50,000 resettlement tenements have been built by the government of Tamil Nadu (GoTN) in the southern outskirts of Chennai alone. Although the JNNURM's policy guidelines advocated in-situ slum upgrading as the preferred approach, large amounts of funds received under its Basic Services for the Urban Poor (BSUP) component were spent by the GoTN on building resettlement tenements on urban peripheries, mostly on lands reclaimed from marshlands and floodplains (details in **Table 1**, Section 3.3.2). The TNSCB's role had shifted from one of protecting slum dwellers from evictions and improving their living conditions to that of releasing slum lands for 'development purposes'. By late 2015, many of these housing units were laying vacant, awaiting the eviction of slum dwellers from the city. This forms the backdrop for the resettlement drives that have routinely followed disasters in Chennai since the 1990s.

2

Research framework

2.1 Research questions

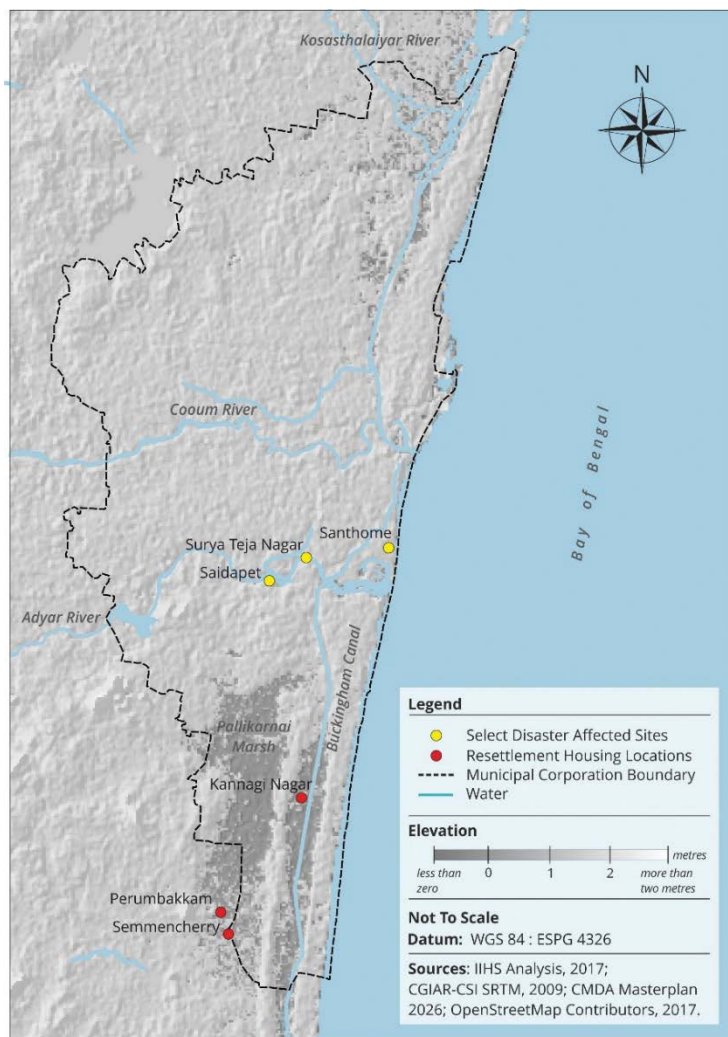
The key research question we asked is, “What are the long-term risk implications of post-disaster humanitarian action?” We unpacked this further in the following sub-questions:

- 1) What are the varied modes through which humanitarian actors intervene in a disaster, and what do disasters reveal about the capacities, agendas, and compulsions of different actors?
- 2) What are the existing vulnerabilities before and due to the disasters, prior to any humanitarian action?
- 3) What are the socioeconomic, environmental, and political outcomes of these humanitarian actions in the medium and long term, and is there a mismatch between the existing vulnerabilities from question no. 2 and the actions taken?
- 4) What are the insights and lessons in terms of innovations and gaps in humanitarian interventions during and after disasters?

2.2 Scope of the study

In this study, we examine humanitarian action in Chennai city. We focus on extreme events post-2000 that affected Chennai: the 2005 Indian Ocean tsunami and the 2015 heavy rainfall and flooding events. We briefly talk about 2016 Cyclone Vardha, since it occurred during the research was underway, but understanding long-term implications of the actions taken during this is outside the scope of this research. We also recognise the extreme water scarcity experienced in the city in 2002, but this was not declared as a disaster, and therefore there was no active humanitarian action undertaken. We do however, through this study, attempt to understand the implications of humanitarian action on the potentially increasing risk of water scarcity in the city. Among humanitarian actors, we focus on action by the government and how it interfaces with other actors, such as local civil society workers and activists. The research examines trends and action taken in Chennai as a whole, with a specific focus on the relocation sites of Kannaginagar, Semmencherry and Perumbakkam, all three of which are located within the wetland of Pallikarnai marsh (See Map 1).

Map 1: Ground elevation, water bodies and drainage networks along with disaster-affected sites and resettlement sites



Source: IIHS Analysis, 2017; CGIAR-CSI SRTM, 2009; CMDA Masterplan, 2026 (CMDA, 2008); OpenStreetMap Contributors, 2017.

2.3 Research methods and tools

This study combined a use of primary and secondary research methods. Secondary research included:

1. **Literature review:** We reviewed literature covering government documents, newspaper articles related to the two disasters of interest, NGO reports on humanitarian action, peer-reviewed publications on conceptualising risk, and past cases of humanitarian action. We also conducted a detailed policy review to map key stakeholders and their roles pre and post event, charted policy evolution around risk management post extreme events, and analysed if urban planning in Chennai includes a multi-hazard, area-based approach to disaster management.
2. **Spatial analysis:** We used spatial analysis to understand Chennai's urbanisation pattern and how this has shaped land use and land cover change, imperviousness, and relocation locations. The built-up land cover was extracted using supervised classification of Landsat imagery for the years 1996, 2001 (Landsat 5 TM), and 2016 (Landsat 8 OLI) (Sivakumar, Chatterji *et al.* 2016). Shuttle Radar Topography Mission (SRTM) 90m Digital Elevation Model (DEM) was used to visualise the terrain and to understand the natural drainage patterns (Jarvis, Reuter *et al.* 2008). Locations of water bodies, Pallikarnai Marsh boundaries, IT corridor, groundwater aquifer recharge zones, and proposed locations for housing projects were extracted from the CMDA Master Plan 2026. The mapping of housing sites was carried out using information

from government and media reports, and on-ground cross-referencing.

We used primary data to understand how multiple actors address and plan for current and future risks and whether these also address structural vulnerabilities and risk from hazards in an integrated manner.

1. **Key informant interviews (KIIs):** We conducted a total of 20 KIIs (Appendix 2), of which eight were with government officials working in relevant departments, such as disaster management, housing, urban development, and revenue department. Four KIIs were conducted with academics and activists working on issues of urban planning, risk management, hazard studies, and relevant environmental problems such as water scarcity and wetland deterioration. Eight interviews were conducted with humanitarian actors, such as NGOs providing post-disaster relief and citizen activists. These key informants (KIs) were identified as important actors based on literature reviews and snowballing from informants.
2. **Semi-structured household interviews (SSIs):** To explore the effectiveness of humanitarian action in the short and long term, we conducted semi-structured interviews with 55 households across the three research sites (**Appendix 1**). Households were chosen to represent humanitarian action after relocation following the tsunami in 2002 and after the flood in 2015. Within each location, households were chosen based on type of relocation package provided (based on housing type), and most importantly, willingness of participants to give 45 to 60 minutes of their time. Table A1 in Appendix 1 lists the study neighbourhoods, and the labels used for each. These labels, along with an acronym for the interviewee, are used throughout the report to refer to the semi-structured interviews (SSIs) with the specific household (eg KNG/AIB/01 stands for an SSI with the first household interviewed in Kannagi Nagar by Aishwarya Balasubramanian).
3. **Stakeholder consultations:** Multi-stakeholder consultations were organised before and after the primary data collection phase. Participants included government officials, actors from civil society, researchers, and activists. The first consultation was organised around themes such as disaster management for slow and rapid onset disasters, government action in the form of relocation and housing provision, short-term implications on lives,

livelihoods and infrastructure, long-term implications on ecosystem functioning, social vulnerability and development trajectories. The second consultation was used as a platform to present initial findings from our study and to collectively engage with issues of trade-offs involved in decisions of urban planning in general and its implications for social vulnerability and humanitarian action, to identify what works and what doesn't, and to construct a common understanding of how multiple actors can work together.

2.4 Methodological challenges and resolutions

Studying the implications of past events and actions after ten years of the event is ridden with significant challenges of recall and biases of reporting (Singh, 2014). Researchers have documented that when it comes to disaster recall, human cognition gives more weighting to 'impressionable' events (Ferrier and Haque, 2003) and the immediate often takes precedence over the past (Hertwig *et al.*, 2004). This also leads to people over-reporting rare, high-impact events such as floods and cyclones while downplaying more commonly occurring but low-impact slow-onset phenomenon such as drought (Singh, 2014). To overcome such biases, we supplemented the enquiry with a review of literature on past events in Chennai as well as interviews with key informants from government, civil society, and academia (**Appendix 2**), and used the events they mentioned as probes for the household-level SSIs. In addition to recall bias, there could also be some implications of political bias involved, which we have tried to resolve by getting multiple voices from different types of actors. There may also be a researcher bias, considering we had a small team conducting primary study and analysis, but we have tried to remain as factual as possible using quotes from the KIIs and SSIs to arrive at conclusions.

Since the research was dealing with risk management in post-disaster situations, care was taken to be sensitive to any potential mental trauma that the respondents could face while recounting situations of post-event loss. Wherever questions caused visible discomfort, they were dropped and care was taken to change the line of enquiry. The team followed ethical protocols (Diener and Crandall 1978) and received clearance from the IHS Ethics Committee prior to fieldwork.

3

Research findings

3.1 Mapping humanitarian actors in Chennai

What are the varied modes through which humanitarian actors intervene in a disaster, and what do disasters reveal about the capacities, agendas, and compulsions of different actors?

We used primary and secondary methods to map the actors involved in humanitarian actions during the tsunami and the 2015 floods. Four broad categories were identified:

1. Multiple government agencies, some of which, eg the state revenue department and the Chennai Corporation, were directly responsible for providing flood relief, and several others that were not directly responsible yet which intervened actively in their respective domains, eg the state and municipal health departments, police, and fire services.
2. A range of civil society groups, from established NGOs to resident welfare associations, community-based organisations (CBOs), professional associations, and trade unions.
3. Corporate bodies and private companies, which in many cases, saw their staff and managers venture out personally to provide direct assistance after the floods, but mostly reached out through NGOs to target their efforts effectively.
4. Individuals who volunteered to assist in humanitarian efforts.

3.1.1 Government actors

3.1.1.1 Post-disaster immediate relief

The Chennai Corporation is the principal actor in disaster management for the city. At the metropolitan level, the Chennai Metropolitan Development Authority (CMDA) is the policy and advisory agency for disaster management. Its second master plan carries a chapter on disasters, articulating disaster management and mitigation policies and strategies to be followed by local bodies. At the state level, policy bodies include the state disaster management authority, headed by the chief minister and established in 2005, with the revenue department and district collectors being key agencies responsible for disaster management and relief. Legally, a government institution is supposed to have a disaster management cell, with a person heading it, whose role would be to educate people on how to handle disasters. However, according to local disaster management experts, most departments are unaware of this requirement.

In practice, government agencies have developed a standard protocol to deal with what they perceive as a fairly predictable pattern of climate events that have the potential to intensify into disasters. Storms and floods typically occur with the erratic northeast (NE) monsoons that begin in October, and droughts are caused by inadequate rainfall during this time, although they typically manifest by the summer months, between April and June, of the following year. This pattern forms the framework for the disaster management strategies of the city. While the city corporation does not have a dedicated department or personnel for disaster response, it allocates a part of its machinery

for preparedness and response in the months leading up to the NE monsoons. Standard preparations in this period include desilting drainage channels and cleaning out canals and waterways in the city. However, given the impacts of the 2015 floods in Chennai, the effectiveness of these basic measures, even in years of normal rainfall, is questionable, and deep-rooted environmental issues may need more attention.

In terms of the state's role in relief actions during and immediately after the 2015 floods, a mixed picture emerged. Many respondents commented that the government was absent during the initial days of the floods. When they did move into action, they did not cover all regions evenly. Respondents from NGOs noted that certain pockets within the city, particularly some of the more remote and vulnerable areas (eg Korukkupet) remained underserved.

It is important, however, to disaggregate government agencies in terms of their responses and capacities. Some government agencies were slower than others in response. The City Corporation responded efficiently and promptly, deploying rescue efforts and setting up relief camps. During the relief and rescue period, the corporation also called for a meeting with NGOs to streamline relief efforts, identify synergies and overlaps, and coordinate action. However, state-level bodies such as the revenue department and SDMA were largely missing in the crucial phase just after the disaster. The National Disaster Response Force (NDRF) also reportedly arrived only four days after the floods occurred. As one volunteer noted, *"By then most of the people had actually found a way out or were washed out or had died, or volunteers had helped them"*. However, it must be noted that the NDRF comes into play only after the state declares an emergency and requests help from central government. In the case of the 2015 floods, the state declared an emergency on the evening of 2 December, after incessant rains and widespread flooding since 1 December. The government's relief operations were hampered by a significant shortage of resources in relation to the scale of the disaster. In particular, large numbers of city corporation workers were themselves stranded by the floods and unable to report to work, rendering the agency radically short-staffed. The state government announced 5 billion rupees (approximately US\$78 million) for relief and rehabilitation across the affected region. The implementation for the Chennai flood relief was in the hands of the Chennai Corporation who immediately established systems to receive, sort, pack, and distribute the massive volumes of relief supplies that were coming in. This infrastructure was an on-the-spot innovation by a senior officer of the corporation, using the vast space of the Nehru Stadium and the assistance of about 2,000 volunteers a day for a period of about two weeks.

There were other instances of highly effective but isolated instances of government effort reported from the 2015 flood event. One such was the dynamic networking hub set up in one of the zones of the corporation by the zonal officer who was called in as part of a special inter-departmental architecture of disaster response at the zonal level, set up by the state government. Being a veteran in handling disaster-related situations, the zonal officer succeeded in liaising effectively with schools, the health department, the corporation, and NGO volunteers including medical teams, to ensure that potential disease outbreaks were kept under check. He did this by setting up processes for self-reporting disease outbreak, and providing health facilities for sanitation workers helping in the post-disaster debris removal, among other initiatives.

The corporation and the revenue department drew heavily on the skills, manpower and boats of fisher communities across the city in their rescue efforts. Other government agencies like the fire and the police departments also anchored rescue and relief work in many areas. As one key informant noted, *"A good example is the Kotturpuram police station. They took charge of that entire area. They made sure that they took care of the residents"*. Yet, apart from these few examples, the government's capacity to coordinate across its departments and with civil society bodies to provide a convergent and organised rescue and relief effort for the city emerged as weak.

3.1.1.2 Beyond relief: the medium term

The period of post-disaster rebuilding revealed the unfolding of prior agendas and modus operandi of the state under new discourses of disaster relief and management.

The timing of the floods accentuated the state and local government's compulsion to appropriate the provision of humanitarian action for political mileage. In Chennai, the December 2015 floods coincided with the run-up to the state assembly elections scheduled for May 2016. The government in power, led by Chief Minister Jayalalitha, keenly promoted an image of proactive outreach and intervention to compensate and rehabilitate flood victims. These political compulsions, combined with the authoritarian political culture in the state under her regime could also partly explain why state bureaucrats tended to fall back on standard disaster management protocol despite their inadequacy in the Chennai floods, and felt hesitant to partner closely with non-governmental actors in the city. Thus, it was officers from the neighbouring state of Karnataka, Manivannan (IAS) and his team of IAS and IPS officers, that helped initiate the Chennai Rain Relief Centre. Working from Bangalore, he *"could do a lot of things local officials couldn't"*, as stated by the head of an NGO that was part of Chennai Rain Relief.

The state government's lack of capacity and data for assessing disaster impacts on the population, and the inflexibility of its institutional architecture for providing relief were evidenced by the nature of post-flood compensation undertaken in Chennai. This compensation was provided in the form of a standard cash amount of ₹5,000 per household (approximately US\$80) across the board to save time and resources for targeting specific vulnerable groups or those who could not afford self-recovery. This amount was found by studies to be extremely insufficient for the affected (Arunodhaya *et al.*, 2016). The nature of the compensation involving cash distribution as against assistance tailored to specific needs (such as job opportunities, livelihood assets, improved transport facilities) had arguments both in favour and against. While some pointed to the state's lack of orientation to post-disaster needs and vulnerabilities of those affected, others perceived this as an open compensation for people to self-assess their needs and spend accordingly.

The period after the floods also saw a resurgence of exclusionary aspects of the state's development agenda under the guise of rehabilitation. Extreme events have been used as reasons to justify the relocation of poor people and clear squatter encroachments from lands that the government plans to allocate to more lucrative purposes (Jain, Bazaz *et al.* 2016). The 2004 tsunami, for instance, "came in handy" [KII_NGO] for the state's plans to remove fishing villages along the coast to build a coastal highway and for other infrastructure and commercial projects. A concerted effort was made to relocate fishers to inland sites, but they had limited success because of local resistance. Nevertheless, the large resettlement sites of Kannaginagar and Semmencherry received influxes of slum dwellers and fisher families from the city in the months following the tsunami, enabling the state to clear lands in the city for higher-value uses. Thus, the post-disaster moment demonstrates tensions between the government's role as a provider of relief and rehabilitation, and its pre-existing agendas of land acquisition and commercial development.

3.1.2 NGO actors

Wide variations were evident in the scale and form of humanitarian action by NGOs, which constitute a highly diverse group, ranging from small grassroots groups, to loose collectives, social movement secretariats, specialised agencies, and policy think-tanks.

3.1.2.1 Short-term relief action

Grassroots NGOs typically reached out to their own constituencies, making efforts to source relief materials, raise funds, and take care of their immediate and medium-term needs. In doing so, they forged new

relations and partnerships that sustained after the event, and opened up opportunities and directions in their ongoing work. For instance, a small trade union working with informal women workers found that they were approached by funding agencies and corporate bodies for help in the disbursement of relief supplies during the tsunami and the floods. The experience of assisting such agencies turned into ongoing working relationships after the events, whereby the union acquired new funding support. Some NGOs also described how their prior efforts at building community resilience through livelihood strengthening, training, and capacity building helped mitigate losses during the floods. For example, in several government-run shelters in schools, people were given no food. So, NGOs mobilised food and healthcare through their existing networks in the affected communities (KII from Arnodaya, November 2016).

The extreme events provided an opportunity for several local NGOs with a strong ground presence to leverage their understanding of the local context to **improve the efficacy of humanitarian action** (both relief targeting, and provision), as well as support other actors such as the government. Their strong roots in community relationships also **enabled innovations by NGOs and civil society groups in relief outreach** during the floods of 2015. For instance, respondents from the organisation Arappor Iyakkam described the system they had developed for equitable and dignified distribution of relief supplies. Citizen volunteers who took relief supplies to an affected area often did not know how to reach interior parts of the neighbourhood. The organisation devised a system where one individual, usually an educated woman, was selected from each of the severely affected streets within the neighbourhood. Women were selected as they typically tend to families during disasters. The selected women visited each home to fill out forms recording numbers of residents, their age and gender. Each family was then given a token:

"The token was ... a psychological thing. When they receive a token, they feel reassured, they don't have to worry about not receiving relief material. We issued tokens to everyone. Once we got the forms back, we knew how many people, infants, women, aged members, etc., there were, and based on that we categorised our relief material into different packs. A garment factory was converted into a stocking place, and the relief material was segregated there. It went absolutely smoothly... People were taking things in a dignified manner" (KII from Arappor Iyakkam, December 2016).

A significant form of humanitarian action by civil society groups in Chennai was the **organic convergence of several organisations and individuals onto coordinated platforms**. Among the most prominent platforms in the 2015 floods was Chennai Rain Relief.

This platform was, interestingly enough, initiated by a government (Indian administrative services) officer from Bangalore. However, in Chennai, it was maintained and run by a group of NGOs (Bhoomika and AID India included) that had acquired expertise in disaster response from their experiences in other contexts, such as the earthquake in Goonj, Gujarat, or the 2004 tsunami. This platform soon became the central clearing house for humanitarian efforts of individuals, NGOs, CBOs, and corporate groups across the city.

Technology played a key role in leveraging the volunteer efforts, including coordinating relief supplies between Bangalore and Chennai. After a day or two of being cut off, the volunteer effort was animated through vigorous ground-up development and the deployment of innovative information and communication systems that used mapping and social media. Information became open source, organically communicated, and widely accessed. An activist from Arappor lyakkam recalled:

"[Initially], we had to wade and swim through the water to see how many streets were submerged and to what level. We began putting all this information online because people who lived outside the state or the country did not know what was happening to their loved ones. Information was not coming in, cell phone signals were gone, electricity was disrupted and hence no communication was possible [directly from affected areas]. We then went to the affected areas and began mapping out how many streets were affected, we clicked photographs, shot videos and uploaded those on Facebook. ... The response from the public was enormous, everybody started asking for information. Even the NDRF contacted us" (KII, December 2016).

The effect of flooding on connectivity and communication was not city wide, which made it possible for the volunteers to make information available online instantly.

Another activist recalled that Chennai Rain Relief filled gaps in inter-governmental communication:

"The strangest thing was when I got a call from the coast guard asking to know where to send trucks of stuff that had to be put on boats and sent to places. I asked them why were they calling me and then directed them to the Chennai Rain Relief. So, the coast guard had no connection with the government" (KII, November 2016).

This suggests the role of informal actors as information brokers in Chennai's post-disaster period, which was characterised by poor information and connectivity between humanitarian actors.

In fact, key protocols, inputs and innovations on disaster response seemed to come primarily from the non-

governmental sector. As one member of the platform Chennai Rain Relief commented:

"We have a disaster management division in the government, but I don't think they take any proactive measures. [It] surfaces only after the disaster. So, there is no coordinated plan by the disaster management committee. But, some NGOs have actually thought through what to do, how to do it... Across India, if you look, there are a very few groups who do coordinated, sustainable, long-term rehabilitation process. Groups like Goonj, Aid India, Bhoomika Foundation, they know the process of how to get onto the ground and what sort of implementation they need".

NGOs were also more resourceful; as one respondent said, "NGOs are cash strapped so we don't like to duplicate our work and were careful with giving relief". This contrasts with other reports, particularly on bigger international NGOs, as well as government sponsored relief, of mismatches between relief demand and supply, and unused relief creating a waste issue (Arunodhaya et al., 2016).

3.1.2.2 The medium term

Several NGOs in Chennai became involved in long-term rehabilitation and reconstruction after the tsunami. Organisations like Bhoomika and Arappor in Chennai, after their active role in coordinating relief and rescue efforts across the city during the 2015 floods, found themselves taking up some – albeit limited – long-term rehabilitation projects, specifically in building some houses in Mudichur and Samathuva Periyar Nagar. As one NGO staff noted:

"we realised we would not be able to handle long-term rehabilitation work as well. But we decided to do it in just one area. We allotted some of the amount from the donations that came, into that and we had private owners coming in and helping".

Conversely, while many NGOs focus on long-term developmental work, they are not necessarily trained and equipped for post-disaster action. While the deep engagement of small NGOs in specific locations allows for better targeting, their context-specific knowledge often limits their geographical scope of action. After the floods, NGO workers themselves commented on their lack of formal training and preparation for humanitarian action:

"We had no training for the rescue operations. We had no idea of what we were going to face. In order to train others, we too needed to have certain details. We couldn't go to certain areas because water levels were too high. At night, there was absolute darkness and we could see nothing. A few of us who had inverters were able to connect to the internet and use maps so that we could plan out which areas

could be visited. On the previous days, people had informed us about who needed to be rescued. We had to prioritise which areas to visit, the most affected ones, because we could only handle so much” (local activists)

It is critical to note that the issues mentioned above, such as limited training, difficulties accessing areas, and no electricity were as limiting for the government as for NGO actors. However, the critical difference was that throughout our interviews, we found NGO and civil society actors more reflective of their own shortcomings, while government respondents (barring a few) tended to showcase their efforts as positive and effective.

3.1.3 Community-level and individual actors

Extreme events, such as the tsunami and the floods of 2015, evoke an overwhelming scale of response from individual citizens, motivated by empathy and the urge to ‘do something’. After the floods, the outpouring of individual voluntarism yielded significant human resources equipped with a range of skills and capacities, which also mobilised vast amounts of material resources, such as food, clothing, medical supplies, and funds. Where platforms to coordinate the collection and distribution of relief were established by government agencies or NGOs, as outlined above, voluntary efforts were used effectively. Where individual efforts were not coordinated, the results were often mismatched demand and supply. For example, many individuals distributed cooked food to communities that had already received food, and where the need was for dry provisions or other kinds of supplies.

Humanitarian action by individuals was mainly in the nature of short-term charity actions such as distributing food and clothes, with little deeper engagement in the locations. We also interviewed volunteers who, on witnessing the scale of devastation after the tsunami, took months of leave from their jobs to devote time to the relief effort. In some cases, the experience also changed the trajectory of their ongoing work. Illustrative examples include an engineer working in IT who became actively involved in the outreach efforts of AID India, while another individual started a school for tribal children orphaned by the tsunami in Nagapattinam, devoting several years to this initiative.³

More generally, both disasters brought specific landscapes, vulnerable populations, and issues of the city to the public’s attention. Respondents noted

how the tsunami brought to the larger urban public a ‘discovery that Chennai had fisher folk’. After the floods, public attention was drawn to informal settlements on river banks and lake edges, and more crucially to questions about the repercussions of Chennai’s urbanisation choices on its ecology and natural resources. The medium term saw a rise in the critical engagement of large numbers of youth volunteers across the city in reflections and action on ecological governance through various platforms that were formed in early 2016.

In communities that were most severely affected by the floods, relief supplies were channelled in by individuals who acted as gatekeepers. Often, these were youth or established community leaders who found their way out of the area to liaise with NGO or government relief efforts and bring them to the community. However, NGO relief workers noted that while these gatekeepers eased micro-level distribution, especially in areas where the need was acute, they wielded considerable power in deciding who got which goods. This sometimes prevented effective and equitable relief distribution. One NGO respondent claimed that these gatekeepers were often not established local authorities, but individuals or groups who had emerged to capture power in the crisis, when large numbers of outsiders were looking for entry points to distribute relief.

In conclusion, the humanitarian actors and actions mapping highlighted, in the context of Chennai:

- How various compulsions and capacities come to the fore during and immediately after the disaster, complicating normal relations between government and civil society.
- That responsiveness, flexibility, and capacity to innovate made NGOs effective actors in a large-scale disaster, despite their limited reach and scale.
- That despite holding the resources for city-wide scale and reach, the city government was constrained by several characteristics typical of a public bureaucracy.
- That there were differential styles, capacities and performance of different government agencies, necessitating the need for disaggregated analysis of the government’s role as a humanitarian actor. It also pointed to a strong imperative for effective partnership-building between government agencies and civil society bodies to share skills and enhance the overall preparedness of the city for events in the future.

³ <https://scroll.in/article/695450/how-the-2004-tsunami-changed-the-fate-of-tamil-nadus-poorest-nomads>
www.outlookindia.com/magazine/story/nobodys-child-goes-to-school/229716

3.2 Entrenched vulnerability and disaster impacts

What are the existing vulnerabilities before and due to the disasters, prior to any humanitarian action?

The two prominent disasters that hit Chennai over the past decade impacted two distinct sets of landscapes and their occupants. The tsunami was a coastal disaster, primarily affecting fisher communities and other coastal residents, while the floods affected low-lying lands, the edges of waterbodies, and rivers within the city. Although it was hypothesised that these disasters had 'levelling' impacts across social classes, in reality, certain sections of the urban population in Chennai were more deeply impacted due to the consolidation of multiple vulnerabilities (for example, a poorly networked family in a flood-hit area was worse off than a family with strong social networks in the same site).

The government's definition of vulnerability in the context of disasters in Chennai is predominantly technical, defined by physical submergence levels of land and housing. As spokespersons for state agencies described it, Chennai's extremely flat deltaic terrain, with a maximum gradient of 2.5m from west to east, made the discharge rate of water slow, making drainage a major preoccupation in thinking about disasters. However, as findings in this section reveal, disaster risk and vulnerability are constituted through the interaction of socioeconomic, institutional, and biophysical factors (such as the availability of good drainage systems).

A historical and ongoing shortage of affordable shelter in Indian cities has resulted in the dwellings of the urban poor being concentrated in hazardous locations on river floodplains, low-lying areas or the edges of the coast. Not only are they thereby exposed to more severe impacts of flooding, cyclones, or tsunami than other urban residents, the set of quotidian risks they face aggravates these impacts, creating a highly unequal landscape of disaster impacts. Humanitarian actions, whether by government or non-government actors, typically address the immediate impacts, but do little to mitigate these underlying and unequal vulnerabilities. The following discussion identifies the impacts of various extreme events on these vulnerable people and communities, as revealed after the tsunami and the 2015 floods, and as emerged from our interviews with slum and resettled households in our study.

3.2.1 Disaster impacts on vulnerable communities

Loss of productive and non-productive assets, and livelihoods emerged as the single-most devastating outcome experienced by most people during the recent floods and cyclone as well during the tsunami. Homes, household assets such as TVs, fridges, other electronic goods, bicycles, and livestock were counted as among the significant losses, although these were offset against the fact that their lives were saved.

["We lost everything in the house, we only saved ourselves" (PMB/AIB/01);

"All household assets – TV, utensils – were washed away in tsunami and electronic gadgets got damaged. However, in my family there was no loss of lives for which I am grateful" (KNG/AIB/06)].

Reflecting on Moser and Dani's perspective on asset accumulation as a household strategy for poverty reduction (Moser and Dani 2008), these losses could have a long-term implication on people's vulnerability outcomes.

For those who had recently spent their **life savings (often also with loans) in upgrading** their existing houses, they lost all that too during floods (PMB/AIB/05). No forms of insurance were available for them or support to help repay their loans. Some households mentioned how their **regular sources of livelihoods were affected**, often for long periods of time, in some cases because they were required to attend to more immediate needs at home. [*"After the tsunami, we lost all household assets and I lost my job" (KNG/AIB/02); "We were not able to step out of the house to even buy a packet of milk for my granddaughter. We did not go for work for nearly a month" (KNG/AIB/06); "We lost our coffee shop" (KNG/AIB/07)].*

The second most important loss identified was that of identity cards, especially in cases where people had to evacuate at very short notice. Many, however, said that they prioritised these items in what they could salvage. Thus, these vulnerable urban households, who had borne **the brunt on multiple hazards over these years**, had clearly learned some key lessons of surviving disasters, among them that identity (ID) cards function as valuable assets in getting them access to entitlements from the government. These ID cards form a key differentiator between those 'identified' as poor and vulnerable and those who are excluded from that category despite real needs. [*"Luckily I gave ID cards in my brother's house and so did not lose that" (KNG/AIB/06)].*

Box 1. LESSONS FROM THE FLOODS: THE UNIQUE VULNERABILITY OF CHRONICALLY ILL PATIENTS

The disaster management machinery of the state and city governments received widespread accolades for having successfully averted a potentially massive epidemic of cholera or other communicable disease following the floods of 2015. A senior official commented:

“This reflected the efforts, the planning, the leadership of the state, with the Chief Minister herself closely monitoring the situation. It was a learning about our own strength. ... It is easy to criticise the government, but there has to be recognition for the tremendous work that has been done after this flood”.

Representatives from an NGO working in the field of health affirmed that the state health department had done a good job in averting a health crisis. Here again, they distinguished among state health bureaucracies. They described the GoTN's Department of Public Health (DPH) as a reasonably well-equipped institution, engaged in research and capable of responding effectively to events like the floods. On the other hand, the Chennai Corporation's health department did not have the technical capacity to manage health outreach during disasters. There was a long-term demand to merge the corporation's health section with the DPH. Five large corporations in Tamil Nadu have separate health departments.

After the floods, the Tamil Nadu State Planning Commission (TNSPC) held a special meeting to

discuss the unique vulnerability during floods of patients with chronic illnesses such as HIV/AIDS, TB and diabetes. Many HIV patients, for instance, had lost their medicines in the floods and were unable to reach government dispensaries to replace them. According to doctors among our key informants, most did not know what medicines they were taking. Typically, each patient was administered a specific configuration of antiretroviral (ARVs). Because of the stigma associated with the disease, they often tore up the packaging. It was only by going back to the dispensary that had their medical records that they could refill their prescriptions. What made this more serious was the potential of developing drug resistance if patients missed their medications for a week.

At the TNSPC consultation, a group of disaster management and health experts, health activists, and doctors discussed these issues. The outcome was an agreement by the state that during disasters of this kind, emergency ad hoc groups would be set up to carry out special outreach for these patients, visiting them at their doorsteps to administer their medications. Since these patients were registered with the health department, the government would have the information necessary to reach them. This incident highlights the proactive role played by some state agencies to identify special vulnerabilities, learn from experiences, consult with a range of stakeholders, and devise solutions for the future.

Challenges to health and safety and fear of disease were reported in most areas, since sewage and solid waste had mixed with the rainwater that entered houses. The damage caused to homes by this water took several weeks to repair. Such conditions carried a high potential for causing outbreaks of disease. However, this was effectively prevented by state campaigns that encouraged people to scrub their homes with bleaching powder, and widespread provision of supplies of this.

Within these vulnerable households, the elderly, disabled, pregnant women, children and chronic patients were most acutely vulnerable, as they were often stranded with no immediate help. [*“I was pregnant and had to rush to hospital but couldn't find any auto or bus, hence had to walk for nearly two hours to the hospital in Thiruvallikani”* (SMY/AIB/04)].

Access to services was disrupted. Many who lived on higher floors, although they did not have to evacuate their homes, suffered from lack of water, electricity, and even food for several days. There was a **price inflation of daily needs-based consumables**. Banks were not accessible for several days. [*“Though the houses did not get damaged, we were unable to step out of the house to buy groceries. There was no drinking water available and no electricity. Half litre milk which is usually sold at ₹25 was sold at ₹100”* (KNG/AIB/07)]. Many people ended up **borrowing money to pay for the immediate needs** and recovery (KNG/AIB/09).

3.2.2 Disaster impacts in resettlement colonies

Resettlement colonies face especially harsh impacts both during and after disasters, as their routine set of vulnerabilities gets exacerbated during episodes of stress, whether due to floods, drought, or cyclones. This accumulation of effects highlights the fact that disaster vulnerability is strongly related to inequity and is a function of broader socioeconomic and spatial patterns of vulnerability.

Baseline vulnerabilities and siting

All the three resettlement colonies in the southern part of the city are located on highly vulnerable geo-hydrological sites, where heavy construction and mass settlement are, as many experts have noted, a priori disasters. In Semmencherri, the risk of flooding is further accentuated by the fact that it is bordered on all sides by elite residences or commercial buildings which have insulated themselves against flooding by elevating their plinths or constructing walls. All of these block the drainage of water and lower the level of the resettlement colony relative to the surrounding areas, drawing in the floodwaters. In the 2015 floods, Semmencherri resettlement colony obtained relief only by breaking the wall built by Chettinad Cements, which allowed the water to drain out. However, the wall was promptly rebuilt. Consequently, the rains that accompanied Cyclone Vardah on 12 December 2016, although not particularly heavy, brought flooding again to Semmencherri, which lasted more than four days.

Inadequacies in infrastructure and service

Apart from the small size of units, which made it difficult for families to offer shelter to each other during the floods, a number of other shortages in infrastructure exacerbated the suffering of residents. Kannaginagar and Semmencherry do not have community halls which could be used for shelter or relief supply. Since electricity had been disconnected, the colonies received no water for several days. Broken sewage lines meant that the floodwater that entered the ground floor houses was filled with sewage. Health facilities in Semmencherry are limited to a poorly-equipped part-time PHC, which mostly refers people on to other hospitals in the city.

Neglect

The distance of these resettlement sites from the centre of the city turned into isolation during the floods. The colonies were unreachable for several days by relief volunteers. Most crucially, despite the fact that these were neighbourhoods created by the government, they were abandoned by the government in the key moments of crisis. Offices of state agencies in these colonies

were unattended for several days and residents claimed that they did not receive any visits from state officials in the immediate aftermath of the floods. Relief supplies were dropped by helicopter onto the main roads, and there were scuffles and fights to access them. Without social mechanisms for equitable distribution, those who did not have the capacity to struggle for access to relief supplies in this situation went without.

Vulnerability is constituted, then, by a convergence of factors including spatial isolation, poor amenities, lack of social organisation, and institutional neglect.

3.2.3 Challenges for humanitarian action: insights from the Semmencherry case

The physical and institutional conditions in resettlement colonies create a special set of challenges for the provision of humanitarian assistance. Drawing on the Semmencherry case, we identified a cascade of challenges:

1. **Concentration of vulnerable populations:** Resettlement colonies have very large concentrations of income-poor and socioeconomically vulnerable families, the majority of whom are dependent on casual or informal employment. Even small disruptions in the routine order can spell a loss of employment for large numbers, with few resources within the neighbourhood on which to draw.
2. **Acute sense of helplessness and vulnerability:** Volunteers who arrive with relief supplies face a rush of people trying to grab material before it disappears. Distribution of relief supplies becomes undignified and unsatisfactory, leaving volunteers with a bad taste, and large number of households unserved. Families who do not have members that can successfully struggle and obtain supplies are left with nothing. All this is due to the lack of functioning CBOs who can liaise with providers of humanitarian assistance and ensure effective distribution. A mismatch between materials supplied and needed also emerges rapidly, as volunteers have little information on the differentiated needs.
3. **Disconnection from mainstream governance:** Distance from the city makes these settlements often the last to be reached with relief efforts, particularly from the state, which was absent for many days after the floods.
4. **Spatial disposition:** The Semmencherry colony of over 6,500 households and 100 streets has a single entry point, constraining distribution of humanitarian assistance. This, combined with the absence of any form of sociospatial organisation of the community into smaller units, brings about a highly-skewed

distribution. Given the size of the settlement, very few non-government providers of assistance are able to provide enough relief material to cover all the families. Consequently, there are either skirmishes or the quiet appropriation of benefits by more powerful residents who prevent materials reaching the inner area.

5. **Poor state of infrastructure:** Dysfunctional sewage systems render flooding extremely hazardous as the floodwaters have high sewage content. Similarly, since electricity wires are exposed and poorly connected, they get promptly disconnected and take much longer to be restored than in the rest of the city. While much of south Chennai lost power after the floods for four to five days, in Semmencherry, power was restored after ten days. This also has repercussions on the water supply. As there are no overhead water storage tanks in Semmencherry, electricity is needed to pump water up from the distribution lines. After the cyclone, houses did not receive water for several days as electricity was not available.
6. **Lack of effective community-level organisation:** In Semmencherry, a representative of an NGO working in the colony noted: *“If I want to do something for Semmencherry, what should I do? What is needed? Is there a holistic or collective action group for Semmencherry? Not at all”*. There are many causes explained by experts for this including the heterogeneity of communities brought together to live in one place under varying circumstances and terms of payments.

From the above, we surmise that it is pertinent to identify or create local social infrastructure, such as CBOs, local leaders, to liaise with providers, receive and effectively channel context-relevant relief assistance according to need. Also, care should be taken to ensure that relief materials should not exacerbate risks. Plastic packaging of relief supplies caused a major problem after the 2016 floods, choking the already malfunctioning drainage system and adding to sanitation risks. A representative from Thozhamai noted that following their efforts to prevent a recurrence of this, in the cyclone relief efforts in December 2016, people brought their own vessels to receive food and water.

It is important to ensure that humanitarian efforts preserve and enhance, rather than diminish, the dignity and self-esteem of the residents. Current modes of distribution such as air-dropping and single-point distribution provoke grabbing and scuffles which may contribute to conflicts and disharmony in the medium term.

3.3 Ratchet effects: long-term implications of humanitarian action on the people and the city

What are the socioeconomic, environmental, and political outcomes in the medium and long term of these humanitarian actions?

3.3.1 Implications of humanitarian action on people and communities

Vulnerability to disaster is constituted and exacerbated by wider socioeconomic processes such as poverty, precarious livelihoods, informal housing in hazardous locations, dependence on state services, and a chronic neglect by the state. As events such as floods, droughts, and cyclones increase in frequency and intensity in Chennai, this acute vulnerability turns chronic. In such a context, the humanitarian action taken often fails to account for such deeply engrained processes, and has a long-term effect on the precarious socioeconomic and political conditions. The following are some such outcomes:

Loss of dignity

The manner in which humanitarian actions have been targeted at vulnerable and poor sections of people seems to render these communities heavily dependent on external assistance, and negatively affects their dignity. This was noted as a concern by many NGO actors, who found that the style of relief distribution often *“reduced proud communities to being like beggars”*. The ‘pathology of giving’ following a large-scale disaster also produces pathologies of receiving. There were reports of fights, scuffles, and truckloads of relief supplies being hijacked by groups of people from villages en route to their destinations. As one local NGO respondent noted,

“the point that I want to make [is], that people have dignity. They are not asking for handouts. They lived dignified lives before the disaster struck. ... [They] can be helped while keeping their dignity intact”.

An important ongoing challenge, then, is to devise modes of relief distribution that maintain or even enhance the dignity of vulnerable people. The use of tokens distributed by Arrappor Iyakkam (discussed in Chapter 1) was one such innovation.

Lack of choice and autonomy in post-disaster resettlement

On the question of agency over their decision to move, families evicted after the tsunami and the floods offered a range of complex perspectives. While post-tsunami relocation drives were widely resisted, especially among fishing communities who were most affected by the disaster, many families (Dalits, renters, and some fishers) moved 'voluntarily' as their demands for housing within the city had not yielded results, eviction seemed inevitable, and allotments in the resettlement colonies were perceived as an opportunity to acquire an asset. Some SSIs noted:

"After the tsunami, when we were informed that we were allotted houses here, people went to see the place. We did not like the house – it was too small and very far from the city. Initially we protested, demanding houses in Santhome itself, but since we didn't have a house, we had to move here" (KNG/AIB/07).

The decision-making process of identifying those who were living in hazard-prone areas and those being allotted housing was complex, but did not include any participation from the affected communities. Evictions were carried out based on a line drawn by the PWD to mark the boundary of the riverbanks. All houses within the line were removed, while those just beyond the line were allowed to remain. Accommodation in resettlement colonies was offered based on an enumeration of residents conducted in 2012 for the centrally sponsored Rajiv Awaas Yojna (RAY) housing programme. Those not on the list did not receive an allotment. Organised opposition to resettlement was encountered in certain areas along the riverbanks where many incremental houses had been built over the years on highly valuable lands.

Those who had been resettled after the 2015 floods felt that they did not have much of an option, as the plan to remove them had been long pending. Many claimed that they had very little notice before being moved, but had been prepared for this eventuality for a long time:

"We were already warned [in 2012] that people living near river banks will be evacuated and moved to other places. The government asked us to move and they said if we did not move, our houses will be demolished and we would not be allotted houses. People came and took photos; when we asked who they were they said 'census', but we knew that they were going to remove us from here" (PMB/AIB/05).

"We did not have a choice. We were threatened that if we did not move we would not be helped in the future if there are floods. But there are still 250 families living there who did not want to move here" (PMB/AIB/06).

*"Our houses often get flooded as we lived along the Adyar river. So we were **advised to move out** of the place"* (PMB/AIB/01).

Although a few families had welcomed the promise of resettlement, and even actively pursued its implementation, some noted:

"Our houses in Surya Nagar often got flooded and we had lost many of our assets. We did not want to face these risks again so moved here. Initially, many people opposed their proposal to move us here, but a few [of] us were anxious to get a house. So we approached the Chief Minister to request a house here (in Perumbakkam). We also requested them to speed up the process because it was winter and we could not live on rubble with open roof" (PMB/AIB/03).

*"Actually, **we requested [for] these allotments.** It was our decision (to move) as **we had no other choice.** The floods had frightened us and we realised that it isn't easy to rebuild everything we lost. If not for the floods we would have never vacated [from] our locality"* (PMB/H/01).

*"We wanted to own a house so we chose to move here... Our houses and possessions got washed away in the tsunami; we were not even able to identify our land. So we decided to move here. A house was what we [got] as assistance from the government, because we were living on the streets and eating whatever we got. **We protested for [a] house and got it.** But till date we don't have patta [legal title] for this house"* (SMY/AIB/06).

However, for many, the realities of the move had sunk in only after the resettlement:

"We had no option but to move here, the government had given us this place. But after coming here, most people are suffering because there are no jobs. In Kotturpuram we had some source of income" (PMB/H/03).

"We were happy there and we had everything. Although all our people are around we don't feel at home here. The government allotted us a place in Kannaginagar, but we were not willing to go and stay amongst those people. So we demanded this allotment. But this is very far from the city and we do not have proper bus facilities and medical facilities" (PMB/H/01).

Loss of political agency

Some families categorically pointed out that in the previous location

“we knew our MLAs [local elected members to the legislative assembly] and other party leaders and we used to get help from there. But here we are new and we do not know anyone yet” (PMB/AIB/01; PMB/AIB/03).

“We want to put up shops here, and would like government support. This area falls under Kanchipuram district so [we] not sure if we have to approach the Kanchipuram collector or Chennai collector” (PMB/AIB/07).

They also claimed that if they went alone to complain about anything (eg leaking walls, etc.) it didn't make any impact, although if they went as a group then it did (PMB/AIB/03).

Mistrust

Many households claimed they didn't trust the government much, especially after it started asking for rent once they moved, even though they were told initially that they would not be required to pay rent in the new location. Many also did not trust that the services, such as overhead tanks, were cleaned or well-kept and so did not end up using the water for drinking (PMB/AIB/01; PMB/AIB/06).

Loss of identity

Despite being moved and now living in new places for a long time, people still identify themselves with places where they lived earlier. For example, Santhome remained a site of identity because of the church, the access to schools, opportunities to do domestic work. Even after 10 to 13 years of living in Kannaginagar, people called it 'a new place'. This points to issues of belonging and identity – if they didn't self-identify as being a resident, what incentives did they have to invest in and take care of the 'new' relocated spaces? Moreover, such mass handouts do not offer a sense of ownership and uniqueness to the beneficiaries.

“Older house was built by us, so it was big. This one is not as big as the old one. All the houses here look the same” (PMB/AIB/01);

“This is a jail. We all feel like prisoners. Older place was bigger and safer. Almost every day there are fights in the neighbourhood. Due to crime and bad reputation residents of Kannaginagar

(KN) don't receive jobs. Recently, a politician was murdered here. This place is very unsafe. I live with granddaughters and we survive on the pension that I get. But [a] few government officers take bribe[s] from me to give me my widow pension” (KNG/AIB/11).

Inappropriate infrastructure causing long-term resistance to change

Following the tsunami, humanitarian assistance made a range of investments in infrastructures and services, from housing, toilets, and school buildings, to boats, livelihood training, and economic programmes. While some of these assets added significant value to the lives of communities in the long run, many failed the test of time. Many programmes started for children – new school, theatre initiatives, community radio and TV programmes – are reported to have worked well and been sustained over time. However, there are large numbers of houses standing abandoned due to their location. One respondent described how toilets were built by various NGOs in the coastal areas after the tsunami to reduce open defecation, without taking into account the high water table in these areas. The resulting overflows in toilets discouraged communities in the long run from using toilets. But there was no follow-up action for improvements.

Distorting local economies and causing conflicts

As experiences after the tsunami suggest, the massive influx of development agencies bringing humanitarian resources and funds into affected areas can leave in its wake new problems. After the tsunami, a sum of ₹50 lakhs (approximately US\$77,000) was given to all women's self-help groups (SHGs) in the affected areas by international aid agencies. This led to a spike in the loan amounts, along with an increase in interest rates, making repayment difficult. Some social activists also noted how these large injections of cash assistance created conflicts, including reports of suicide among recipient communities:

“When [so much] money is pumped into a self-governed system, then the stakes become high. Repayment of up to a lakh (approximately US\$1,500) could have still been resolved within the people. But 10 lakhs (approximately US\$15,000) were too much”.

Most of these organisations also **never returned to evaluate** their actions.

Long-term financial and economic implications

Many households reported difficulties in finding jobs close by and spending much of their incomes and time in travelling. This is particularly a challenge for **women who cannot afford to leave their homes for too long**. Several livelihood options are closed: for example, selling small goods is not feasible because there is a **limited market**. They are unable to pay the required rents (an additional cost after relocation) because **incomes, and therefore, savings have reduced**. They also reported **a lack of clarity around rental amounts and duration**, after which the house is registered in their name. Some also said they did not receive **any financial assistance while relocating**, which was an additional burden.

Those who **used their houses as an economic asset** in their original locations by renting a room or two found this was not an option in the new location. Those who set up shops in the resettlement colonies are also being asked to remove them. They feel it would have been better if the government had pre-allocated spaces for markets and shops. There is a clear distinction between how government officials define risks and how people perceive their risks. While housing and slum-improvement agencies see rehabilitation as compensation (*“providing them a house worth ₹10 lakh [approximately US\$15,000] free of cost”*) and moving them to places *“where the risk is less”*, they fail to sufficiently ameliorate the economic and social implications of relocation. Some public officials questioned the meaning of ‘outside’ in a city where for instance, *“North Chennai was also outside the city at one time but now it is fully urbanised”*. What they fail to account for are the **adversities experienced in that time period until these far-off places get urbanised**. Yet, those affected would want to return to their original places if they continued facing these challenges, particularly of finding jobs:

“Though in Kotturpuram, our houses often got flooded (water from Anna University side and water from Adyar river), the job was good” (PMB/AIB/01).

Facing resistance from people regarding the move, the slum improvement board and the employment board organised a ‘job mela’, but its efficacy in helping people secure jobs was not high [*“All of us did go to the job mela in DB Jain college. They took phone numbers but never called. I don’t know of anyone who got a job there”*](PMB/AIB/01). Some said that issues included not meeting the eligibility criteria, or distrust since signed agreements were mandatory. They were also required to provide different kinds of identity cards which many didn’t own.

Early settlers lost out

Resettlement housing offered to families evicted in 2016 after the floods were in Perumbakkam and Ezhil Nagar, areas within or adjoining the existing (abovementioned) colonies. The housing was significantly improved over the 2005 allotments: the units were larger –over 320 sq. ft.– fitted with running water and electricity, and infrastructure in the colonies had developed over time. Roads, transportation, schools, access to markets, employment, and health care had improved, yet manifested strong discrimination in the level and quality of services in comparison to other urban neighbourhoods of Chennai. The older colonies had turned into large ghettos, marked with the stigma of poverty, alcoholism, drugs, and crime.

Many, particularly those who were resettled during the tsunami (early settlers) also complained that while they too were affected during the 2015 floods, they **received no aid help or support**. When they moved, *“this place was a forest”* and there were no markets, bus services, hospitals, schools, street lights or jobs in the vicinity, although over time it has improved to an extent (KNG/AIB/07); (KNG/AIB/10); (SMY/AIB/01); (SMY/AIB/04). Some reported many co-settlers moved back in the initial years because they could not sustain themselves (SMY/AIB/06). More recent movers seemed to have a slight advantage since some services were already in place.

Effects on the local economy depleting natural resources

Widespread distribution of fishing boats after the tsunami was another example of humanitarian interventions leaving negative long-term impacts. As many fishing communities had lost their wooden boats, large numbers of new fibre boats were distributed. Since these were much lighter, people could take them farther into the sea and carry much more fish back than they could before. Some experts indicated that this had short-term implications of lowering market prices, and in the long-term has led to over-fishing and depletion of marine resources, adversely affecting the sustainability of livelihoods in fishing communities. These boats have been referred to by many as a major environmental hazard for this region.

Indiscriminate distribution of fishing boats to all families by development agencies and the government has other effects as these donors did not take into account *“the traditional rules in the community where for instance, Dalits [people belonging to a lower caste] and women were not allowed to do fishing”* (as many social activists and NGO actors noted in their interviews). According to a local activist, *“these ‘well-meaning’ inputs were*

feeding into traditional conflicts that weren't understood well". Dalit families and women who received boats were neither able to use the boats nor sell them as there was no market left after the widespread distribution. This resource thus became a liability for them, and there were many instances where their safety was compromised when they were threatened by other members of the community to give up their newly acquired asset. Critiques of this action raise some important questions about the possibilities of using moments of humanitarian action to break through traditional forms of exclusion and reach for inclusive social outcomes. But a social activist working as a relief volunteer at the time of the tsunami commented: "If the fishing communities don't allow their women to the sea, you can't just buy five boats and change that".

Other limitations

The houses provided were also said to have **privacy issues** (PMB/AIB/07). In Kannaginagar, interviewees reported a pregnant woman had to constantly cross the neighbour's house to use the toilet and was sneered at each time she crossed. This social stigma was reported as one of the reasons that the woman eventually committed suicide. Some families also claimed that space constraints also meant that men were pushed out to public areas or other alternatives like sitting in parked auto-rickshaws, etc. Many also **took to drugs and alcoholism in other men's company**. These have had many **repercussions for children, families, livelihoods and general safety**. Some families also said that while the house was better, there were limitations such as having the **tap only in the toilet** that prevented them from using the water for cooking/drinking (PMB/AIB/01). They also said that **outlet of the toilets overflowed**, which prevented them from using the toilets despite having them inside their houses (SMY/AIB/01). Water leakage from toilets and above floors was often quoted as a problem (PMB/AIB/05); (PMB/AIB/06); (PMB/AIB/07), and it was noted that individual complaints were not heard. One household also complained:

"The house is too small and there are open drains that flow just outside the kitchen and hence we cannot keep the windows open. Already there is not enough ventilation and because of the bad odour from the open drain and mosquitoes we can't even leave the windows open. The quality of water is very bad. Initially it was slightly better but now we are getting salt water" (KNG/AIB/09).

"When we moved in, my sons were 16 but now they are 26 and they don't have a separate room for themselves. When we lie down, we can't even stretch ourselves and sleep comfortably" (SMY/AIB/05).

Long-term effects of post-disaster traumatic stress

One of the most neglected post-disaster challenges is the psychological health of people, both those affected directly by the event and those who intervene to assist. The failure to recognise and address this issue can produce long-term mental health effects, but data on such effects remains scant. Health professionals in our study reported that a mental health survey had found that people were suffering from post-traumatic stress several months after the Chennai floods. An NGO head also described signs of trauma found among children in their work areas, and claimed that they had requested the assistance of counsellors (trained by NIMHANS) to work with them. As **Box 2** highlights, trauma suffered by relief teams following the tsunami has also been noted, but not dealt with in a concerted fashion.

Positive impacts: For some families, moving has led to some improvements. A few families reflected that they always lived in fear of floods and cyclones in their earlier locations but now they were hopeful towards leading a safer life:

"There if we knew that they have opened (the gates of) Chembarambakkam eri [lake], we couldn't sleep. We would live in fear" (PMB/AIB/07).

Some said that after changing their livelihood (from a daily wage worker earlier to a shopkeeper in the new place), they had more time for family, and savings improved to pay back loans. Some even said that it had become easier in getting jobs here, because instead of them going out to look for work, some companies are coming to them with job offers:

"Many private companies, even from Apollo hospitals, they come here and call us for housekeeping jobs" (SMY/AIB/06).

Box 2. LONG-TERM HEALTH AND SOCIAL IMPLICATIONS ON PEOPLE AFTER RELOCATION

Health, education, and basic services

Many people who were moved to Semmencherry and Perumbakkam noted that the **health and education facilities** available in the new locations were either **very limited or very expensive** as compared to where they lived earlier. Some were also worried that with more families being relocated to the same area, the limited available services would be even more stressed.

["There is a government school here but most kids go to [the] private school. Actually we need better school and hospital facilities here. We were also told 20,000 families (living on the river banks) are going to move in, don't know what will happen" (PMB/AIB/07);

"The government school lacks facilities and hygiene" (PMB/H/01)].

This is a problem that they have to deal with every day after being relocated and not just immediately after the floods. Although some residents pointed out that this experience was different for those who had moved from Kotturpuram (as compared to those who moved from Adyar and Saidapet).

["In Adyar and Saidapet they had schools. But in Kotturpuram we had no school van services even though we were willing to pay. But here in Perumbakkam, school van picks up kids from the doorstep so looking at all these, it is better here. Because if it rains, the route to Chinnamalai (Little Mount) cannot be accessed and hence no van will come there. And moreover our streets in Suryatej Nagar were very small, so van cannot enter our place. But here the roads are bigger so even 5 to 6 vans come in and pick up children" (PMB/AIB/03)].

Many of these residents also noted that the **quality of water** they get in their apartments is very poor and tanks are not maintained regularly, so they have to buy packaged water for consumption purposes.

Some also indicated that the water clogged in certain parts of the relocation sites *"breeds mosquitos and stinks"* and many people suffered with skin rashes after bathing (PMB/AIB/01); (PMB/AIB/03); (PMB/AIB/06), (PMB/H/01), (SMY/AIB/05).

Communal differentiation

Even after living together for several years, the post-tsunami resettled communities find it difficult to mingle with the other groups of people living in these areas (often moved here post-development led acquisition and relocation). Other people being relocated move with the notion of getting what is rightfully theirs. They perceive the tsunami-affected people as *"getting a house for free"* and this seems to be creating divisions and conflict within the community. When people are relocated, a false sense of community is created but this does not result in maintenance of public spaces or cooperative behaviour because these people have been cobbled together to **create** a community. This differentiation could also have **implications for political agency and collective action**.

Safety

These resettlement colonies have a general **reputation of being "unsafe, unhygienic places where hooligans stay"**. This makes it difficult for people from here to get jobs (*"you say you are from Kannaginagar, and post is closed for you"*, said some currently living in Kannaginagar since the tsunami.) This is leading to **higher rates of unemployment** in these areas amongst the youth, and also a potential cause for **wide-spreading alcoholism**. Many, despite being educated, are finding it hard to get jobs because of this reputation (KNG/AIB/01); (SMY/AIB/05). *"The old settlement was safe and women had more freedom and were able to move around even during late hours."* (KNG/AIB/10); *"Other than fights in the neighbourhood, this place seems ok. Policemen are very cooperative. It is also unsafe for people especially women to go out at night"* (KNG/AIB/06).

3.3.2 Long-term ecological implications on the city

Until the 1980s, Pallikarnai marshland played a role of a critical wetland for the city of Chennai as well as the state of Tamil Nadu. The marsh, located to the south of Chennai, is a contiguous low lying area, that receives run-off from a catchment area of 235 sq.km (CMDA, 2008). Rainfall run-off enters the marsh starting from

Velachery in the north to Arsankalani and other villages in the south. The water that gets accumulated in the marshland flows through the only outlet, Okkiyam Maduvu, into the Buckingham Canal and then south to the Kovalam estuary.

Between 1992 and 2012, the marshland provided an opportunity for housing development in the fast-growing city, which is limited by the coast on the east and the state administrative boundary in the north. The

TNSCB built large-scale resettlement colonies filling the marshland, largely using funds from the central government sponsored JNNURM scheme. A total of 26,376 units were built on the marsh in Ezhil Nagar (Okkiyam Thoraipakkam), Ezhil Nagar (Perumbakkam), and Perumbakkam Phase I and II, costing nearly 70,000 crores (approximately US\$109 billion) (**Table 1**). These are in addition to the 15,656 houses that are built by the state in Kannaginagar and 6,734 houses in Semmencherry.

Table 1: List of houses under the JNNURM scheme

SERIAL NO.	NAME OF THE SCHEME	NO. OF UNITS	PROJECT COST (RUPEES IN MILLIONS)
1	Ezhil Nagar (OTP)	6,000	2286.00
2	Ezhil Nagar (Perumbakkam)	3936	1,753.60
3	Perumbakkam Phase I	10,452	6,860.30
3A	Perumbakkam Phase II	5988	59,880.00
3B	Gudapakkam	1,024	714.40
3C	Navalur	2,048	1,421.10
3D	AIR Land	416	278.40
	Total	29,864	17,760.00

Source: TNSCB

This housing construction was followed by a series of government-led relocations. In 1996, 1,600 families were relocated to Velachery (northern part of the marsh) from metro reconstruction sites. After the 2005 tsunami and 2015 floods, many affected families were moved from inner-city or coastal locations such as Santhome Church, Surya Teja Nagar, and Saidapet to these housing sites over 25km away from their original residences (**Map 1**).

A government-funded assessment of Pallikarnai Marsh (Vencatesan, Daniels *et al.* 2014) found the marshland critically degraded by urbanisation, high groundwater extraction, waste dumping, and building upon its recharge areas. The area of the marsh has decreased from 6,000ha in 1906 to a tenth of its size by 2008. Much of the water from the wetland has been pushed southwards onto what used to be 'low and high density vegetation'. It is now replaced by 'moderate to dense built-up'. There has been significant land use conversion into residential (3,527 ha to 5,742 ha) and industrial uses (95 ha to 915 ha), while wetland and water bodies have drastically reduced in size (1,045 ha to 385 ha).

The connection with the Bay of Bengal has also narrowed down substantially and is not adequate to carry storm water after the annual rains. The area reserved for aquifer recharge next in the master plan is also entirely built upon. Many argue that these developments are in turn leading to the increasing frequency of disasters (Drescher *et al.*, 2007) (Jayaraman 2017). The city master plan also recognises that built-up areas in the watershed region get flooded during monsoons (CMDA, 2008). Water scarcity in Chennai has also been attributed to excessive groundwater extraction and increased concretisation of peri-urban areas blocking natural percolation, resulting in the invasion of brackish ecology in coastal areas around the city (Srinivasan, Seto *et al.* 2013).

The most significant long-term implication of humanitarian interventions after the tsunami and the floods, are most likely the transformations in the social and ecological landscapes of Chennai. Overlaying post-disaster relocation sites on topographical and hydrological information shows the discriminatory resettlement of displaced populations and disregard for the region's natural ecology (see **Map 1** for more details). The humanitarian actor here was the state government, acting out a convergence of multiple governance roles: (i) as a provider of affordable housing; (ii) as a provider of post-disaster relief assistance as well as long term rehabilitation; and (iii) as an implementer of disaster prevention and mitigation strategies.

It is also important to notice a certain pattern in the government's actions and decision on what to keep in the city and what to move to the peripheries. Apart from housing, the marsh has been used to expand a government-managed landfill site. The 2004 tsunami in Chennai threatened the fishing communities' hold on their customary rights to coastal lands in Chennai, as the government rushed in to remove fishing villages from the coast to protect them from future risk. That effort was only partially successful, but in the intervening decade, Chennai's southern coastline exploded with high-rise housing, luxury resorts, institutional campuses, and a large desalination plant, all springing up amidst the shrinking fishing villages of Kottivakkam, Neelangarai, Nemmeli, and Kovalam. Thus, while the stated motive for relocation include reducing people's exposure to local flooding, activists argue that

“the agenda is not to reduce physical risk but to vacate land for other commercial purposes (thus) removing the land from the hands of people considered ‘unworthy’ of it”.

In a similar vein, the removal of more than 800 households living along the riverfront after the 2015 floods emerges as a selective targeting of vulnerable

groups in the name of rehabilitation, especially when seen against the fact that numerous other 'encroachments' by the state and elite actors on river banks and flood plains are left untouched (including the city international airport that is extended on top of the same river Adyar, from the floodplains of which people are being relocated on the pretext of their risk reduction).

Many KIs reflected on the processes with which land uses and revenue categories change from being pastureland and wetlands (Baden-Powell 1892) to 'wastelands'. This accompanies a change in ownership from community owned and used lands (commons), to the hands of the public or the government.

"(People) would largely drain the (waterlogged) water into the neighbouring area which was a lake. Initially the area (now built upon) was the dried tracks on the wetland periphery. Then the agricultural patches came in followed by wastelands and the wetland buffers. This was the pattern. Slowly they got designated as wastelands", noted Jayshree Vencatesan, a leading environmentalist.

These 'wastelands' are then used for public buildings, including affordable housing, without taking into account their environmental purpose.

Many activists, NGO heads, and government officials accepted that the relocation sites identified for flood or tsunami-affected people were in marshy environmentally-sensitive areas. An official from the Chennai River Restoration Trust pointed out that since the houses were already built on those sites, it was easier to move people there, although going forward, they would be focusing on improving the infrastructure there. Some experts also noted that government still prioritises post-disaster relief distribution over preventative action.

*"Ironically, they have moved these people to places which are also very flooded. The attitude itself is very startling. The chief secretary who went to the central government committee to speak about the disaster said that **it is economically easier for the government to pay people after the disaster rather than preparing for the disaster**",* said an NGO head.

"I do agree with you that the environmental impacts of resettlement need to be looked at more seriously. I think not paying attention to environment is going to bring a lot more perils to humanity", said an official from the State Disaster Management Authority.

Despite the move from flood-prone/high hazard risk areas, people are clearly being moved to locations which are still exposed to floods and potentially pose a greater environmental hazard for the city.

"Building more houses gives water no space to flow out hence there is flooding even if there is less rain" (KNG/AIB/08);

"Here the water remains stagnant for a long time, whereas there it drains off soon after the rains" (PMB/H/01);

"Water from first floor toilets are leaking to the ground floor. During rainy season, water overflows from the toilet and roads get flooded where the water stagnates" (SMY/AIB/07)].

Other humanitarian relief also had poor environmental outcomes. Many experts noted that after the tsunami and again after the 2015 floods, much of the relief material distributed was environmentally harmful. As an environmentalist noted,

*"the immediate response could have been more mindful of materials used (eg plastic bottles/sachets of water). In the seven days of relief distribution following the floods, **more than 100,000 tonnes of garbage went to the landfill**".*

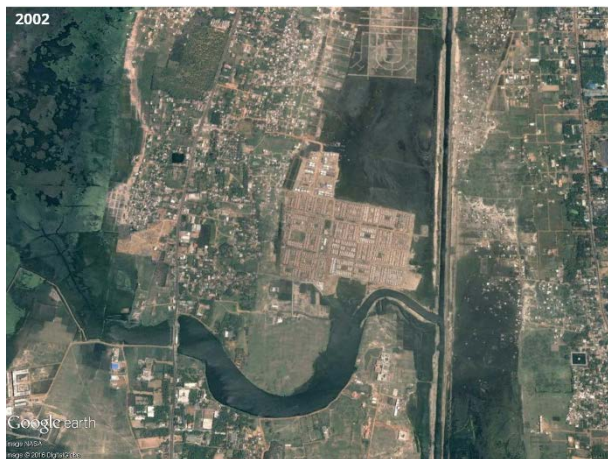
In summary, this section has highlighted that:

- Apart from the direct implications of facing a disaster, there were social, political, psychological, physical, economic and environmental implications for affected households following humanitarian interventions.
- For the relocated communities, these implications included limited access to livelihoods and basic physical and social infrastructure, communal differentiation, increased safety concerns, loss of political agency, identity and autonomy, and thereby growing mistrust in the government institutions.
- There were also many long-term implications for the city at large, including environmental issues like depletion of marine resources affecting the livelihoods of many, solid waste hazards, and wider land-use changes from sensitive wetlands to resettlement housing sites.

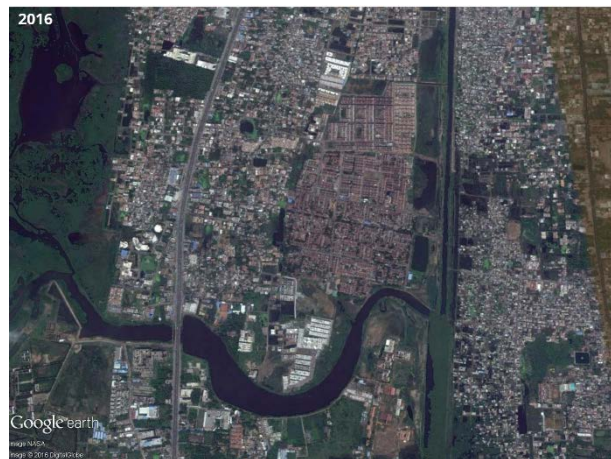
The image in Figure 2 was taken in Perumbakkam during the non-rainy season. Construction over environmentally sensitive areas, apart from degrading the waterways, could also have health implications of water- and vector-borne diseases.

"The moment there is an unplanned building without a clear understanding of public health principles, what you're doing is creating large pockets of water collections so things like dengue, chikunguniya, and whole range of viruses that are spreading is concerning" noted Dr Rakhal Gaitonde from SOCHARA.

Figure 1: Changes in built-up areas in Kannaginagar, Semmencherry and Perumbakkam over the last decade



Kannaginagar located on Okkiyam Maduvu, 2002



Increased built-up, 2016



Semmencherry and Perumbakkam, 2002



TNSCB housing along with other development built on the drainage channel, 2017

Source: GoogleEarth Images

Figure 2: Housing built on marshy land is usually water-clogged which could have health implications in the long term



Credit: Garima Jain

3.4 Looking back and learning from humanitarian action during disasters

What were the insights and lessons in terms of innovations and gaps in humanitarian interventions during and after disasters?

Extreme events have strong heuristic effects. They leave in their wake an ethos of reflection, insight, and learnings from hindsight. However, they also evoke a discourse of lessons and learning that reinforces rationales for pre-determined agendas, particularly of the powerful actors. In this section, we attempt to reflect on the lessons learnt by various actors.

3.4.1 Government's discourses of lessons

State officials from various departments interviewed for this study highlighted a range of new initiatives undertaken as a result of the insights and lessons gleaned from the 2015 floods. These initiatives are outlined below under four categories.

3.4.1.1 Data collection efforts

State officials described concerted efforts undertaken to analyse the nature and causes of the flooding. The State Disaster Management Authority (SDMA) asked various agencies and departments to prepare assessment reports of the floods, and launched a detailed district-level vulnerability analysis as a part of a state preparedness exercise. Areas were classified according to a ranking from 'very vulnerable' to 'not vulnerable', based on their submergence levels, not only in the 2015 floods, but also using legacy data. Once classified, areas were mapped, and the sources and causes of past and potential flooding analysed. Assessment of the magnitude of the problem also involved indicators such as the number of people evacuated, the number of relief centres that were set up, the number of days they functioned. The vulnerability exercise also recorded temporary to medium-term and permanent disaster mitigation measures taken. The assessment was conducted by the district administration, and in Chennai by the city corporation. The corporation exercise identified three categories of vulnerability: areas that are chronically flooded, or get flooded with even slight rainfall; those that get flooded with heavy rainfall; and those that get flooded with very heavy rainfall. Vulnerability to floods was thus established through these exercises as a technical metric, ignoring the complex social, economic, and political factors that shape disaster vulnerability in a city like Chennai.

State agencies also focused on improving and strengthening their databases after the floods. Officials from the CMDA, for instance, confessed that, previously, planners did not use, or even have, slope and contour maps of the city. Following the disaster, the Corporation initiated preparation of a contour map of Chennai at intervals of 10cm. It also embarked on a detailed GIS mapping of its drainage network at the zonal level, tracking the length and size of drains, the location of feeder drains, and the location of flashpoints. A senior city corporation official noted,

"This is a major advance for us, as we can work on the drains in a more systematic way. Earlier, water would just go round and round in our drainage network without flushing out. We also know what HP pumps we need at which vulnerable points in the network – the right pumping power to match the points – so that water does not stagnate as it did the last time, for days. So, in engineering preparedness we are much better now. In terms of dealing with disaster, the corporation has become much better equipped in terms of knowledge and technology and capacity since the floods".

3.4.1.2 Institutional strengthening, capacity building, and coordination

Based on their analyses of gaps and failures, various state agencies undertook measures to strengthen their operations. The CMDA, which came under public criticism for the damage caused by widespread unauthorised constructions across the city, strongly defended the Chennai Master Plan's provisions for flood prevention. A respondent from the agency said:

"If you see our master plan, you will see that all the low-lying areas have been deferred for urban development. We have marked them for non-urban and agricultural uses. ...all the eco-sensitive areas have been fully preserved".

What the floods had emphasised, according to a senior planner from the CMDA, was the need for fuller and stricter implementation of the master plan. This included the need for creating detailed development plans and action plans for each area, and particularly for flood-prone areas, drawing from the master plan and supported by annual budgets. The responsibility for producing such action plans was with local bodies within the metropolitan area, who, according to this respondent, failed markedly in these respects. Senior planning experts blamed local bodies for implementation failures, as they granted building permissions that violated the provisions of the plan. These planners also emphasised the need to articulate area-specific development regulations, for instance, to disallow ground-floor construction (even for a generator room) in flood-prone areas and mandate that the ground floor should be kept as a stilt floor for parking, play areas,

or open space. This analysis was supported by a spokesperson of CREDAI, an association of large real estate developers, who laid the blame for the disaster at the door of unapproved constructions carried out by small informal builders. He insisted that in all approved constructions in low-lying areas, builders were required to raise the ground to a set minimum level:

“There are records with the government showing which areas are lying close to the lakes, which are in low-lying areas. CMDA and DTCP have those plans. For any plan you have to go to the PWD and get an NOC. When you [do this], the PWD tells you that you have to raise it to this particular level. That gives you lot of safety”.

Another problem identified as responsible for construction in flood-prone areas was the disconnect between CMDA's plans and developments occurring in smaller towns and municipalities in the urbanising peripheries of Chennai that came under the planning jurisdiction of the Directorate of Town and Country Planning (DTCP). The DTCP, according to senior planners in Chennai, lacked adequate expertise and capacity to develop plans that were ecologically sensitive.

Among the most recurrent themes that state officials emphasised as learnings from the 2015 floods was the need for better coordination at all levels, with most gaps and failures of the flood-relief effort attributed to lack of coordination. Senior personnel of the city corporation, for instance, pointed out that urban floods and disasters necessitated inter-departmental coordination among the Public Works, Highways and Revenue Departments, and in the case of Chennai, Metrowater. Many state officials pointed out that after the floods, senior officials such as the Secretary of the Municipal Administration and Water Supply (MAWS) Department had created a strong thrust on inter-agency coordination, calling for periodic consultations among all agencies and taking care to ensure that agencies maintained linkages on ongoing flood prevention measures. Respondents from all departments reported a marked increase in the number of inter-departmental coordination meetings on disaster preparedness had been held since December 2015, which had significantly strengthened mitigation efforts.

An important innovation instituted after the floods was an infrastructure of inter-departmental zonal disaster response teams, headed by a zonal officer from the IAS, to be supported by a team of ‘first responders’. These teams would comprise mostly young community volunteers who could be mobilised to carry out immediate ground assessments at the moment of disaster and alert the zonal team, which would then proceed to decide on evacuation or relief measures

needed. The Corporation of Chennai had issued a call for volunteers on its website and was in the process of registering volunteers, along with their details. Training for these volunteers by the Red Cross was being planned. The corporation has created a window for Resident Welfare Associations (RWAs) to talk to the zonal commissioners. This system built on and extended the already existing monitoring structure for the NE monsoon that existed across the state, headed by the Principal Secretary of MAWS. In Chennai, this structure comprised an IAS officer who served as a zonal officer for each of the 15 zones. Across the state, district collectors had also been advised to rope in civil society and NGOs in building early warning and disaster preparedness systems. Many NGOs had also come forward proactively to help develop plans with the government.

3.4.1.3 Flood-proofing and preventive actions

Various major and minor engineering interventions had been carried out by state and local government departments to prevent floods or mitigate their impacts. Major interventions included large storm-water drains constructed by the Corporation of Chennai in poorly drained areas like Velachery. An official commented:

“That area was earlier like a water basin, holding all the water it received... The whole area is now being drained out through drains that are so large you can drive a car through them”.

It should be noted that most of Velachery was constructed on a lake. Thus, mitigating actions of draining out a lake into the sea were being profiled as progressive measures.

Minor interventions included desilting of waterways and waterbodies. Following the 2015 floods, a concerted inter-departmental flood-prevention drive was launched, comprising the desilting, cleaning and clearing of encroachments not only on waterbodies and waterways, but, for the first time, on the inlet and outlet channels. State-wide, a fund of ₹10 crores (approximately US\$1.5 million) had been sanctioned by the government for cleaning of river courses and another ₹100 crores (approximately US\$15 million) for Kudimaramath (the traditional system of community maintenance of irrigation tanks and water bodies). Officials highlighted unprecedented actions that were being taken to desilt the Buckingham Canal and Ennore Creek. They also described large-scale efforts to remove vegetation, debris and other obstructions choking bridges and culverts on waterways. In vulnerable areas, these efforts extended up to 500 metres upstream and downstream of culverts. Numerous state departments, including highways, PWD, corporations, and local bodies had been directed to clear the bridges and culverts under

their jurisdiction. Official figures claimed that 15,800 bridges and 1,43,500 culverts had been cleared across the state in 2016. There were also plans to redesign culverts from pipe to box type and to change the size of vents.

Other long-term strategies like the World Bank-funded Coastal Disaster Risk Reduction Programme (CDRRP) and the Comprehensive Flood Protection Plan were being developed. Government officials described these efforts as addressing multiple disaster risks:

“Proper flood plans and strategies can by and large minimise drought risk as well, because they are about conserving and recharging water. ... And wherever rainfall is deficient, we are working on building recharge structures like check dams, recharge pits, percolation ponds, and turning defunct bore wells into recharge wells—all this especially in and around water sources”.

The SDMA described the disaster management strategy of the state as integrally tied to its development goals:

“We are trying to mainstream disaster management into development plans. That is, whatever the development plans are doing should reduce risk. Or, if they do not reduce risk, at least they should not create more risks. Or if they do, the risk should be minimised”.

3.4.1.4 New understandings of urban ecologies

In the aftermath of the floods, state-level officials identified a set of administrative deficiencies that were responsible for the floods, including failure to maintain protocols in infrastructure building and maintenance. They identified the culpability of actions such as roads being built against the slope, the dumping of solid waste and debris into drains and waterbodies, and the failure to regularly desilt drains and waterways.

The months after the flood also saw several discussions and deliberations held across all domains of civil society in Chennai, from educational institutions and social movements, to NGOs and business organisations. Our study identified a set of themes and concepts that seemed to emerge from these discussions as central lessons defining the future agenda for both the government and civil society.

The first theme, which received city-wide public spotlight, was **the role of waterbodies and floodplains in protecting the city from floods and drought**, and the extent of their destruction over the past decades in the name of urban growth and development. Discussions in the public domain included historical mappings of encroachments on waterbodies resulting in their steady disappearance in the city, and examination of the roles and culpability of various government agencies as well as of civil society in these

processes. They also addressed issues of land-use planning, zoning, and building violations. The discourse of disaster in Chennai thus came to comprise serious debates on the politics of urban ecology, on a scale that had rarely been witnessed in the city before. As one state-level government official pointed out, these discussions also encouraged citizens to take the onus for disaster preparedness on themselves:

“People have realised the importance of waterbodies, and how to prepare themselves. In Velachery, even in smaller deluges, people used to evacuate. Now they stay. Associations work with engineers to clean channels. There is more cooperation between state and people. After 2015, people themselves are taking steps at prevention. Earlier they were not bothered. People are more prone now to come forward, and to work with government”.

Encroachment became a key focus after the floods. The term had been associated almost exclusively with informal settlements of the poor, in the usage of both the government and the larger public. This allowed the government to present eviction of these settlements, which had long been part of a dominant agenda of urban renewal, as a post-flood rescue and rehabilitation measure. However, discussions in the press and in various civil society platforms attacked this selective usage, and pointed to large numbers of elite and state encroachments that had revealed more damaging effects on the flood ecologies of the city than the informal settlements on the river banks (Coelho 2016, Jayaraman 2016, Jayaraman 2016).

Government officials acknowledged that several encroachments on the river banks were by large elite institutions, but claimed that these encroachments were difficult to evict as they had legal title (or ‘patta’) for their lands. When asked why the large mall called Ampa Skywalk constructed on the edge of the River Cooum was not being demolished, a key informant from CRRT pointed out,

“Yes, it is right on the edge of the river, but patta was given by the Revenue Department. So we cannot say it is an encroachment because it is on patta land”.

A senior official of the SDMA when asked about the selective demolition of encroachments said,

“Defects and gaps will always be there, but the larger effort is going on. For the poor, resettlement and rehabilitation is being addressed”.

Both officials cited the 2005 court-ordered demolition of parts of the elite MGR University that had been located on *poromboke* (government common) lands belonging to the Cooum River, as an example of the willingness of state agencies to take action against large encroachers.

State officials from revenue and land-owning departments also expressed awareness that resettlement of poor families living on the edges of waterways was not a straightforward matter:

“Removal of encroachments is a sensitive issue, as it involves humanitarian concerns, which we are also more aware of now. These issues may delay the process. Of course for us there is a focus and an urge to evict, because these encroachments are a problem for the larger area as their actions are disturbing the larger community”.

Government agencies were also forced to rethink the nature of their restoration plans. For instance, restoration plans for the River Cooum in Chennai had earlier included large components of river-front beautification and commercial development. However, a key informant from the Chennai River Restoration Trust interviewed after the floods claimed that these agendas had been de-emphasised in current river restoration plans:

“This is flood management – restoring the original design of the river. We will not compromise on river width. They [not clear who this referred to] were asking for space for hotels and entertainment areas, but we said, ‘No, we are removing people from here to restore the river, why would we bring more construction on the banks?’ The PWD said they would not give even a single inch of river land for any purpose”.

3.4.1.5 Improvements in resettlement processes

The post-flood resettlement of families evicted from river banks was carried out with care and sensitivity to the fact that the people had suffered enormous losses, and were in a troubled ‘state of mind’ (KII, TNSCB Community Development Wing).

A priori preparations made two years earlier for the removal of informal housing from the banks of waterways in Chennai helped significantly. A TNSCB official highlighted that a major factor facilitating this was the availability of enumeration data on households to be resettled, from the RAY survey of 2014.

“So, fortunately we had the list of people living along the Adyar river... (Given) their state of mind, it would not be right to ask (about their tenure in the area) because they have lost their ration card, voter id, everything had been washed off” (KII, TNSCB official).

Three state agencies coordinated the resettlement process. The RAY enumeration, carried out by the corporation, had identified 36 slums along the Adyar River to be evicted and resettled. From these, 28 slums were shortlisted as most affected by the floods. The corporation verified and de-duplicated beneficiary

lists with biometric identification data they collected. The PWD and the corporation, responsible for the maintenance of major and minor waterways respectively and therefore the ‘land-owning agencies’ in this context, earmarked the boundaries and extent of land to be cleared for waterway restoration. The role of TNSCB was to implement the resettlement to the colonies it had built. Teams were formed representing the three agencies, to liaise with the families to be relocated.

According to TNSCB officials, there was some resistance to resettlement. Families living in temporary shacks on the river edge were ready to move, while those who lived in concrete structures, some of them, more than one storey, resisted the move. In addition, slums closer to Adyar, like Mallipoo Nagar, refused to move. TNSCB officials, however, contended that problems within these slums meant that a few powerful interests prevented large numbers of eligible families from claiming resettlement tokens. Resettlement tokens were intended for families who could produce evidence of having resided in the slums for several years. However, according to officials, many families were tenants and could not make claims as their ‘landlords’ ensured that they did not have any documentation for their residence.

“This is the maximum vulnerability (of many rental residents)—that the (house) owner will not allow a renter (to benefit from the resettlement scheme), although they are taking ₹1000 or ₹3000 from them.”

Consequently, ‘house owners’ claimed several allotments by producing documentation for houses in their relative’s names.

The post-flood resettlement package, based on a government order (GO), was generous in comparison with the protocols of eviction and resettlement for infrastructure or other projects. There is no resettlement policy for the state, and the agency usually follows the provisions of the Slum Clearance Act of 1971. The agency had made efforts to ease the move by providing a shifting allowance of ₹5,000 per family, even though the corporation provided transport facilities for the move in most cases. In addition, a subsistence allowance of ₹2,500 per month for one year was sanctioned for each family, and the community development wing assisted families to open bank accounts where this amount would be transferred. Families were given the key to the new house along with the shifting allowance as soon as they entered. The monthly maintenance fee collected by the TNSCB in Perumbakkam, however, was ₹750 (approximately US\$12), much higher than in other resettlement colonies. This was for maintaining the lift, including provision of a back-up generator.

Arrangements were made for the prompt transfer of ration cards. All relevant departments were present at the site to assist with a smooth transition, and there

was significant coordination among line departments in this move. School admissions were facilitated, with school principals or authorities seated at the site during the shift, ready to register students based on the class they had been enrolled in before the move, without demanding evidence of study. A medical camp was also organised at the site. Care was taken that if there were aged or chronically ill people in a household, they would be allotted a ground floor house. Two months later, a large job fair was organised by the TNSCB.

There were also efforts to form watch committees and sanitation committees. Collaborations were built with NGOs to provide education on health and sanitation. Although Perumbakkam is outside the boundaries of the Chennai Municipal Corporation (CMC), a decision was taken by the government that the corporation would extend services such as water and sanitation to Perumbakkam. The apartments now have piped water and toilets inside. The aim was to ultimately form associations which would represent each block, and take up responsibilities for maintaining the blocks.

3.4.2 Lessons from individuals and community groups

The tsunami contributed to strengthening early warning systems, particularly in coastal areas. An SDMA official claimed that it had also resulted in greater heed being paid to forewarnings by the administration. Yet, the flood warnings of December 2015 were reportedly largely ineffective. Our interviews with households that had been living on the banks of the Adyar River at the time of the floods provided some insights into how families located in vulnerable areas reacted to early warnings of disaster.

Many of these families acknowledged that they had received official warnings of the floods and been advised to evacuate. However, the warnings did not have the intended effects for several reasons. Flooding was a routine occurrence in these areas, and people usually waited to gauge its intensity before deciding to move to temporary shelters. Families who lived on elevated parts of the banks felt secure that they would not be inundated. Repeated flood warnings had been issued from as early as November, which reduced the perceived seriousness of the warning. Almost unanimously, respondents claimed that they had never expected or experienced a flood of this magnitude. And finally, the warnings were related to rain-based floods, but the opening of the Chembarambakkam dam, which caused the disastrous early morning inundation of 3 December, was not in the equation.

One respondent recalled that relief centres had filled up by the time they were evacuated:

“The RI [Revenue Inspector] came and cautioned us around 5:30pm that the people on the banks should vacate immediately to save their lives. Around 3am the floods hit and washed away everything. Since the places arranged by the government for the victims were all full, we rented rooms in a lodge on the main road and checked in around 12:00pm” (PBM/H/01).

Some families, however, claimed that they were not given clear instructions to evacuate:

“We were warned that there might be floods... but they never told us to evacuate, or never told us it will be this bad. At midnight a police van came and rushed us out” (PMB/AIB/06).

Families residing in flood-prone areas had long learned to prioritise their identity and other documents over all other possessions in preparation for floods. As one recalled:

“We were told earlier that there are going to be floods, so I had already packed all IDs, and when we were asked to move out, I just took this bag with the IDs and left. I did not even carry any clothes with me” (PMB/AIB/05).

Another respondent said:

“Before the flood, the police gave us warning, so we were safely staying in Anna Gem school during the flood in the last week of November. But during the second massive flood we didn't receive any warning about the release of water from the dam. At the last minute we got the information and we saved important documents and things, but still some documents were washed away” (PBM/H/02).

The last minute evacuation had resulted in substantial losses to their property, including livestock. As one household reported:

“We all stayed at Anna Gem school for 15 days. We did not carry anything with us. We were evacuated at 12 at midnight and we only safeguarded our lives. Our goats and hens died” (PMB/AIB/06).

When asked what they had learned from the experience, respondents from these families focused mainly on the risks to their lives:

“We can't do anything (if flood comes again). We have to face it. We will save our lives and move to a safer place” (PMB/AIB/05).

“The only thing we learnt from the tsunami is to save our lives. During floods, water came up until the fifth step and we were really worried about what to do if the water came to the top floor. Then we decided, if that happens, we will first save our lives. We would go to our terrace and stay. Actually, there was no way to go up to the terrace but after the floods, we have got a ladder so that we can go up and stay if there are such events” (SMY/AIB/06).

Box 3. PUTTING AT RISK THE HEALTH OF POST-FLOOD SANITARY SERVICES PROVIDERS

Offsetting the state's success in averting disease outbreaks after the floods was its near-disastrous handling of the health and disease exposure of 10,000 sanitation workers that had been brought in from other parts of the state to clean the city immediately following the floods.

The workers were sent in batches, each municipality sending 20 per week. The emergency situation in which these workers were recruited and deployed meant that there was no thought or planning given to the health and safety of the workers themselves. They were housed in schools, which lacked bathing and washing facilities to clean themselves after returning from their work. No kitchen arrangements were made for them; they either used the small allowances provided to eat at hotels, or skipped meals. The supply of gloves, masks, and boots was woefully short, hence only senior male workers could use them, while females and younger workers worked without any protection to clean drains choked with sewage, garbage, and a variety of hazardous wastes.

There was little coordination among departments to oversee the safety and health of these workers. While the state DPH was unaware of the living arrangements of these workers, the CMC had no health plan for them. It was only after two to three weeks, as the programme was winding down, that any systems came into place. The only system devised was that whenever any of the mobile clinics deployed by the

DPH came across one of these workers, they would attend to them, ensure they had gloves and administer immunisation to them. This was at best an ad hoc arrangement. The best that could be done in a bad situation but it was ad hoc. *"Ideally the workers should receive all this as they come in"*, observed a medical volunteer.

What made this riskier was that many of these workers were not working as cleaning staff in their source locations, and hence were neither trained for nor accustomed to such work, making them less able to adapt to the demands of the job in a crisis situation and thus highly vulnerable to disease. The workers were brought in as a headcount, with no documentation of who came from where and where they went back to after they finished work, making it difficult for health teams to follow up on their health outcomes once they had returned.

While serious concerns were raised about these issues by a group of medical volunteers in Chennai after the floods, there was practically no documentation of the effects to inform any future action. The care and protection of service providers that intervene in post-crisis situations is an issue that remains neglected. Key informants in our study recalled that there were medical teams that returned from the tsunami-affected areas in 2004 with signs of mental trauma, but no concerted attention was paid to this issue.

3.4.3 Gaps and margins

The sustainability of the learnings and actions provoked by the floods of 2015 came under serious question a year after the disaster. A longer-term perspective on the government's response to floods reveals that the widespread convergence of attention and efforts on the restoration of waterbodies and waterways was seen after the floods of 2005 in Chennai. Yet, the intervening decade had seen, if anything, an increase in unplanned and unofficially sanctioned urbanisation of sensitive floodplains and marshes on the southern edges of the city, uncontrolled construction on waterways, and ongoing pollution and siltation of waterbodies.

An example of the shallowness of the government's disaster-proofing actions is seen in the highly publicised clean-up of the Buckingham Canal in its northern reaches near the Ennore Creek. This clean-up was provoked by the sustained campaign of environmental

activists and fisher communities from the Ennore region, who argued that the choked state of the canal posed serious threats of flooding during the 2016 monsoons. However, these monsoons were accompanied by cyclonic activity, but not much rainfall. By February 2017, the threat of flooding had passed, and the cleaned sections of the canal had returned to their original polluted state. Thus, while the clean-up was an opportunity for the state to demonstrate its responsiveness to disaster risks, the medium and longer term saw a return to business as usual.

In other cases, longer-term urban development agendas were presented as disaster mitigation measures. For instance, a tender to prepare the master plan was announced in 2013 and, according to a representative of CRRT, had been prepared by 2015, although it had not been publicly released. The plan identified 200 lakes, of which 38 were prioritised for restoration on the

basis of being free of heavy encroachment and not used for irrigation.

“Our restoration would be in terms of preventing the entry of sewage water, preventing dumping of garbage and debris, creating pathways, fencing and vegetation around it so that the lake will not be encroached in the future. The idea is to protect the lake in a sustainable way... to act as a buffer to receive storm water and recharge groundwater. So although this is not disaster management at present, these measures will prevent future disasters like floods as well as water shortages.”

Yet, the lakes prioritised for restoration were not those that triggered the floods in 2015. Adambakkam, Thazhambur and Perumbakkam lakes had breached their banks and were the cause of very heavy flooding in the southern sections of the city in December 2015. But the CRRT's selection criteria emphasised the feasibility of restoration, which precluded lakes where there was heavy encroachment.

“For example, Medavakkam, Adambakkam are dumped on and fully encroached, we would be dealing there mostly with social issues. The channels are so blocked that water does not reach the lake. ... Here the threat of floods is severe. [But] we have not taken these lakes on our list. ... [Perumbakkam and Thazhambur] lakes got breached because the encroachers on the lakes broke the bunds. Now more teams have been appointed to monitor those areas. We are concentrating on three to four lakes in north Chennai. And our list, which was made in 2015, focused on high-density areas, whereas those were open areas at the time.”

In general, the actions taken by the state, even when they went beyond business-as-usual, revealed a reluctance to undertake robust disaster-proofing measures.

Activist and civil society key informants also identified a range of gaps that pointed to the limitations in the state's efforts at coordination and consultation, evidence-based policymaking, and transparency. First, innovative and effective systems that had been deployed during the floods were not replicated across state agencies during the disaster response period, nor were they incorporated into ongoing protocols for future response or mitigation efforts. Activists who had worked closely with government departments during the floods observed that simply holding inter-departmental meetings could not produce coordination in an institutional culture where functionaries were most comfortable operating within their silos. Consequently, some effective work done by innovative individuals or groups, whether in state or civil society domains, during and immediately after the disaster, remained isolated in

those moments and spaces (see for example Boxes 1 and 2 on health implications).

Civil society activists who had conducted a social audit and a public hearing on losses and damages during the floods claimed that the state had made little effort after the disaster to consolidate learning from their experiences:

“The government [should] come up with a learning document from these floods. We asked the government if there is any such document, but they said that they didn't have any. After we did the social audit and the public hearing, we were once called by the corporation to talk about the issues that we had raised. But apart from that ... we have seen absolutely no action and no consultation by the government” (KII_NGO, December 2016).

Indeed, learnings about disaster management over the long run appear to have been sparse. An activist from an organisation that had built substantial experience in post-disaster intervention commented:

“As a group of people, or even the government, we have not learnt anything from previous disasters. I feel we are apprehensive about learning. This would reveal how unprepared we are, which makes us insecure. If a tsunami occurs tomorrow, we still won't know what to do”.

Another activist who had taken an active role in humanitarian action during and after the tsunami corroborated this. She asserted that ten years after the tsunami would be a good time to revisit the tsunami-affected areas and assess the actions taken, but no such effort had been undertaken:

“... [T]he NGO's wouldn't dare to go back to look at what they have done. Maybe there are a few who did well. But a lot of it was problematic. The state also does not take learnings from different places, for example Gujarat and apply them in Nagapattinam. They keep reinventing the wheel because it works for them”.

Even state officials commented on the failure to develop systematic learnings or standard protocols for disaster management:

“SOPs do not exist – we should have manuals for people – for floods, droughts, earthquakes, cyclones. What to do when there is no current, no water, whom to approach. After the floods, how to prevent diseases. What to do if sewage has got mixed with water” (KII_Gov, November 2016).

Despite the state's emphasis on data collection and documentation to analyse and prevent future disasters, activists also identified several key areas where information was deliberately suppressed to avert a

perception of crisis (See Boxes 2 and 3 for more details on health outcomes).

Another activist observed:

“There are some inherent problems with the rescue and relief infrastructure. I think there are 35 fire and rescue stations in Chennai ...and I think each police station could at least be equipped with little infrastructure. Very clearly, the city has a lot of young people who are willing and are able to do a lot, with no training from the ground. Just imagine if they had actually been trained. They would have been able to help even with rescue efforts. Rescue efforts are more difficult, especially in a flood like situation... Only the fishermen and the army could do it”.

Another activist noted that the government had leaned heavily on volunteer efforts for rescue:

“...[But] none of the volunteer groups were trained enough to do rescue. You can't ask anyone like me or ... anyone who wants to volunteer to go and rescue, but people were willing to go. Unfortunately, they had to stop them because ... without experience, if you get in... we lost two lives. Two volunteers died in the rescue process. They were not equipped in this”.

While most commentators acknowledged that the scale of the disaster exceeded the government's capacity to respond, the baseline inadequacy in capacity and coordination was also exposed by the disaster.

Moreover, we found that marginalisation of resettlement colonies by government agencies still continues. Despite unique vulnerabilities faced by the resettlement colonies, there is little evidence of any recognition, assessment, or discussion on the challenges in these colonies during disasters. Respondents listed various efforts undertaken to flood proof the city such as physical measures such as building, expanding or repairing storm water drains and restoring waterbodies and their channels, and social/institutional efforts such as enhancing inter-agency coordination and establishing platforms for citizen-led 'first response' systems. However, while these efforts were clearly needed, the settlements appeared to be left out of city-wide disaster-proofing efforts.

For instance, while it was the breaching and overflowing of the Perumbakkam and Thazhambur lakes that caused the severe flooding in both Semmencherry and

Perumbakkam, these lakes did not figure on the list of waterbodies identified by the CRRT for desilting and restoration. Efforts to create volunteer platforms for disaster response had not been extended to places such as Semmencherry.

While several NGOs and civil society groups in Chennai were called in for consultations on how to prepare for disasters, Thozhamai, one of the most active NGOs in Semmencherry, reported that it was not called for any consultation. In fact, Thozhamai called for two meetings with residents and various state agencies – from the PDS, the PHC, the police, and the TNSCB – after the floods, but no government official attended.

In sum, this chapter has highlighted the following points:

- The dimensions and determinants of vulnerability to disaster risk are contextual and complex. They not only vary by the type of disaster, but are shaped by a host of factors, including histories of state policy on urban housing and settlement, social structures of caste, class and gender, and most importantly, patterns of institutional discrimination in services and amenities among different sections of the urban population. Families relocated by the government to resettlement colonies on the peripheries of the city revealed multiple converging aspects of vulnerability to disaster risk. However, the government's analysis of vulnerability remains focused on technical parameters, failing to recognise the socioeconomic and institutional processes that render particular sections more vulnerable to strong impacts from extreme events.
- The discourse of new understandings and lessons learned, as articulated by state agencies and officials remained shallow. These learnings had not succeeded in bringing about substantial changes in state action in terms of urban development plans, policies, and projects after the immediate post-flood period, perhaps because of the lack of catalysts for deep change such as change in leadership, amended legislature, or institutional shifts.
- Important opportunities for recognising, learning from, and institutionalising innovations and positive experiences from civil society actions during the 2015 floods and the 2004 tsunami were not taken up by the state.

4

Conclusion

We started out trying to understand the long-term implications of immediate humanitarian action in urban areas. Using Chennai city as a site illustrative of facing multiple risks (exposed to various environmental hazards, seeing rapid urbanisation, increasing pressure on existing resources and services), we examined humanitarian action in the city post major disasters: The Indian Ocean Tsunami in 2004 and the extreme flood event of 2015. Separated by more than a decade, we examined the mix of humanitarian actors and nature of humanitarian action after and in between these two events. Our findings are sobering with a few sparks of hope.

The different hazard events that Chennai has seen over the past decade reveal distinct patterns of impact and varied responses from humanitarian actors. While the tsunami was short-lived, lasting only for a few hours, the floods of 2015 endured for several days. Yet, the tsunami attracted much more international attention and assistance than the floods, perhaps owing to its international scale of impact and the scale of loss of life and other damage suffered. The floods, despite their intensity, were perceived as more a 'regular' occurrence and seen as a local issue.

We find that multiple actors carried out disaster relief (with more international NGO presence in the tsunami) and their actions are highly varied – within the government, different agencies deliver to different degrees and in different ways; within civil society, motivations to undertake disaster management is multifarious, with varying results. In some positive cases such as the Chennai Rain Relief, different actors come together to provide useful relief, in other cases, mismanagement, redundancy, poorly defined operating guidelines, inadequate data, and fuzzy decision making constrain relief efforts.

We started with a thesis that disaster responses are based on different actors' prior commitments and agendas. These agendas shape their extent of involvement in and processes undertaken towards humanitarian action. We find that while the experience of the tsunami helped build resources and capacities for disaster management in multiple ways, the experience of extreme events changed institutional pathways and processes of operating among humanitarian actors to different degrees. Disasters can thus, often jolt the system out of the business-as-usual pathway and provide opportunities to innovate, gain mileage, or create new partnerships. We also, on the contrary, found that for the vulnerable groups and systems, the impacts of disasters are disproportionately larger, and are made worse by post-disaster actions and interventions.

The government, despite the scale of resources and disaster management infrastructure it had built up since 2005 (following the tsunami and establishment of the State Disaster Management Authority (SDMA) in 2005) displayed relatively low preparedness and capacity for handling large-scale disaster. Barring some pockets of energetic and innovative action from individual representatives of government agencies, the overall institutional machinery was overwhelmed by the scale of the 2015 floods. Inbuilt characteristics of government functioning in the given context, including poor coordination across agencies and departments, inflexible operating procedures, and constraints to innovation also curtailed the government's ability to respond effectively to the floods, even in comparison with civil society efforts.

Although humanitarian actions by NGOs and civil society were limited in scale and reach, three factors contributed to the relative effectiveness of their relief

interventions. First, most organisations used their grassroots relationships and knowledge to target assistance, often much more effectively than the state was able to do. Second, non-governmental actions were guided by a few groups that had proven expertise in responding to disasters and leveraged their learnings and experiences from other contexts to establish effective protocols from the start. Third, strong coordination and collaboration across many NGOs was achieved through a few platforms that sprang up in the city, to receive and store relief supplies, package them, and receive requests for relief.

What also emerged from the actor-mapping exercise was that although patterns of overlaps and coordination among these groups were observed during and in the immediate aftermath of the floods of 2015, government and civil society actors worked in relatively separate spheres, with few instances of partnership.

We found that there have been some lessons from the tsunami which have helped humanitarian actors deal more effectively with recent flooding. Initiatives were set up to establish networking and collaboration among state agencies, international donors, NGOs, and citizens. Consultations were held, and experts from numerous countries and sectors were brought together to pool knowledge and learnings. One such initiative was the Tamil Nadu Tsunami Resource Centre (TNTRC), which aimed to consolidate and advance the process of learning and building disaster-preparedness in the state. KIIs informed us that the TNTRC has eventually become dormant because of lack of commitment from government, including funding, appropriately skilled staff, and a sustainable continuity plan (tsunami being a low frequency event).

However, several critical gaps remain – such as continued views that reducing exposure to risk can be solved by relocating vulnerable communities. Such static views of exposure and vulnerability ignore conceptual and empirical advances in the disaster management discourse which argues for a multidimensional understanding of vulnerability which is contextual and dynamic. The second glaring gap is the government's continued blindness to the impact of broader development processes and investments on risk creation and consolidation, at the watershed, city, settlement, and household levels.

The 2015 floods however, highlighted the inadequacy of the measures that had been adopted over the past decade, and of the overall state of disaster preparedness in Tamil Nadu. Thus, the floods were presented by government agencies as a new landmark in disaster-related learning and governance. This

raises critical questions about institutional memory and sustainability of learnings for disaster preparedness in the state, and why the 'wake-up call', as the tsunami was reported, did not last after 2004.

Drawing on the specific cases of post-disaster relocation, we demonstrated how disasters impact multiple facets of peoples' lives and livelihoods. These cases, rooted in empirical evidence and rich in personal narratives, showcase how the physical manifestations of disaster impacts – broken houses, loss in assets – are often outweighed by the psychosocial impacts and breaks in kinship and day-to-day ties.

Finally, we examined the impacts of humanitarian action itself on a longer timescale – moving beyond the immediate to uncover cascading effects of relief and relocation, both on resettled families, as well as on the city. At both scales, we found dissonances between intent and action, but the range of experiences and outcomes of humanitarian action are critical to highlight. While most families interviewed narrated poor living conditions, inadequate access to basic services, and unsafe living conditions post relocation, there were some instances of improved living conditions with further improvements through better infrastructure and services over time. However, at the city scale, no such silver linings were found. Unplanned urbanisation and a development agenda devoid of ecological empathy has and continues to make Chennai's people and ecosystems severely vulnerable.

In conclusion, we highlighted that Chennai's geographical location predisposes it to certain environmental hazards. Typical of India's metropolises, Chennai too is seeing tremendous growth and consequently, burgeoning pressures on its resources. Its current governance regime, characterised by many of the conditions seen in other large Indian cities, is crippled by a unidimensional understanding of vulnerability and risk creation and accumulation, inadequate capacity and lack of leadership to put in place institutional systems and procedures towards effective disaster management (relief, impact mitigation, preparation, etc.), and a narrow vision about how current development decisions (of which relocation as humanitarian action is one) are locking the city's growth into unsustainable and inequitable development pathway.

It will take concerted actions from policymakers, NGOs, civil society and concerned citizens to find and finance creative solutions to undermine the risks created and perpetuated by the current development trajectory and hold the state accountable to more forward-looking, adaptive planning in the coming years.

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Appendices

Appendix 1: Summary of findings from household interviews

After the reconnaissance visits, relocation sites of Kannaginagar, Semmencherry and Perumbakkam were identified as the study sites. All three sites are located within the wetland of Pallikarnai marsh.

In the three selected sites, two kinds of respondents were identified: i) affected households (HHs) who were relocated to Kannaginagar and Semmencherry after the tsunami in 2004; and ii) affected HHs who were relocated to Kannaginagar and Perumbakkam after the recent floods in 2015. A simple random sampling method was used and a total of 55 HHs were interviewed as part of the study. Of the total 55 responders, 50 HHs have allotted/registered units and 5 HHs were renting units at the time of the survey in the government-built housing units. Of the total 5 HHs who were renting, 3 HHs were tsunami-affected families, but have not received the allotment and have relocated to be part of the community, and the other 2 HHs are regular renters.

Of the total 55 HHs, 23 HHs are from Kannaginagar, 16 HHs each from Perumbakkam and Semmencherry. In Kannaginagar, 16 were families relocated after the tsunami (KNG-T) and 5 HHs were relocated after the 2015 December floods. All the HHs surveyed in Semmencherry were relocated after the tsunami and all HHs surveyed in Perumbakkam were relocated after the floods. See Table A1 for the sample description. The listed labels are used (along with an acronym for the interviewee) throughout the report to refer to the semi-structured interviews (SSIs) with the respective households.

In the sample, none of the families who moved after the floods experienced the tsunami in 2004, because of their location on the banks of Adyar away from the coast. Whereas the families who suffered the traumatic experience of tsunami also experienced floods in the sites to which they were relocated.

Table A1: Sample description by location and type of responders

SITE	RELOCATION TYPE	LABELS	TOTAL
Allottees			50
Kannaginagar	Post 2015 floods	KNG-F	5
Perumbakkam		PMB-F	16
Kannaginagar	Post 2004 tsunami	KNG-T	16
Semmencherry		SMY-T	13
Renters			5
Kannaginagar	Post 2004 tsunami	KNG-T	2
Semmencherry		SMY-T	3
Total			55

We found that the process of relocation was implemented immediately (one to two months) after the floods in 2015. However, the relocation process after the tsunami continued for many years. In the relocation sites of Kannaginagar and Perumbakkam, most families were relocated from the river banks of the Adyar in the areas of Saidapet and Surya Nagar. In the housing built for those affected by the tsunami, most families were relocated from the coastal areas of Santhome and Pattinampakkam.

Table A2: Location and time of move post disaster by type of responders

LOCATION AND TIME FROM MOVING	KNG-F	PMB-F	KNG-T	SMY-T	TOTAL
Allottees	5	16	16	13	50
<i>1–2 months</i>	5	16	8	1	30
Santhome			8		8
Surya Nagar		12			12
Pattinampakkam				1	1
Jyothi Nagar		1			1
Little Mount		3			3
Saidapet	5				5
<i>Less than a year</i>			6	9	15
Santhome			6	1	9
Pattinampakkam				4	4
Besant Nagar				1	1
Odakuppam				1	1
<i>1–5 years</i>			2	3	5
Santhome			1	1	2
Pattinampakkam			1	1	2
Besant Nagar				1	1
Renters			2	3	5
<i>1–2 months</i>				1	1
Pattinampakkam				1	1
<i>Less than a year</i>			1		1
Santhome			1		1
<i>More than 5 years</i>			1	2	3
Besant Nagar			1		1
Thiruvanamalai				1	1
Triplecane				1	1

Within the sample, 95 per cent of the families had lived for more than ten years in their previous location before they were relocated.

Table A3: Number of years of stay in previous location before relocation

TIME OF STAY IN PREVIOUS LOCATION	KNG-F	KNG-T	PMB-F	SMY-T	TOTAL
Allottees	5	16	16	13	50
1–5 years		1	1	2	4
6–10 years				1	1
More than 10 years	5	15	15	10	45
Renters		2		3	5

We found that the majority of the housing stock was already built and ready when the disaster occurred. The housing was allocated right after the disaster, except in the case of Semmencherry, which was constructed after the tsunami, and the relocation process took much longer. This highlights the potential mismatch of housing provision, and the specific needs of the beneficiaries identified for relocation in this pre-constructed housing, and it also has implications for any kind of participation by the affected communities in the housing project design.

A majority of the respondents said that they did not get enough notice before they were forcefully moved. Within a few days and weeks of the floods and tsunami, they were moved to these sites. However, during the surveys, a few respondents said that before the floods, the government had officially informed them that the housing units were ready for occupation and that the families could move in when they wanted. But none of the families were willing as the units were located far away from the city.

Table A4: Time of notice before eviction

NOTICE BEFORE EVICTION	KNG-F	PMB-F	KNG-T	SMY-T	TOTAL
Less than a day		4	2	2	8
Less than a week	3	6	10	1	20
Less than a month		4	3	4	11
A few months				3	3
More than a year	2	2	1	1	6
Don't know can't say (DKCS)/ Did not ask (DNA)			1	1	3

Of the families surveyed under this study, all the HHs either moved as part of or with the whole community (except the two renters who moved from Thiruvanamalai and Triplecane). The renters who moved from Pattinampakkam, Santhome along with the community have continued to rent as they were not allotted a house. The renter who moved from Besant Nagar said that she was initially staying in a temporary structure in Semmencherry, and as they had evicted her from there, she moved to Kannaginagar and has been renting for the last five years.

Table A5: Continuity of the original community networks

MOVING WITH COMMUNITY OR ALONE	KNG-F	PMB-F	KNG-T	SMY-T	TOTAL
Allottee	5	16	16	13	50
Part of the original community			1	1	2
As entire community	5	16	15	12	48
Renters			2	3	5
As entire community			1	2	3
Family alone			1	1	2

The average number of family members is four across all sites. Most of the families are nuclear in nature, and of the total 55 HHs, four HHs have six or more members within one family. When asked if the provided housing units had sufficient space for the families, 44 responders said that it was not sufficient. The allotted housing designs vary across projects built in different time periods. The housing units that were built in the early 2000s which were allotted to tsunami-affected families in Kannaginagar and Semmencherry are ground+1 structures, and each individual unit contains one room per unit, a shared toilet and bath between two units. Later, the design was changed to ground+2 and each individual unit contains one room, one bedroom and an attached toilet.

The housing units that were allocated recently to the flood affected families are ground+3 blocks in Kannaginagar and ground+13 tenement blocks in Perumbakkam. These units also follow a similar design, where an individual unit has one room, one bedroom, and an attached toilet.

Families in Kannaginagar, who had received houses in the first phase of allotments, complained about lack of space. Female members of the family complained about lack of privacy as they had to share a toilet with other families and said that some women have committed suicide because of these reasons.

Table A6: Sample description: number of family members in the survey sample

NUMBER OF FAMILY MEMBERS	KNG-F	PMB-F	KNG-T	SMY-T	TOTAL
1		4	1	1	6
2	1	6	1	1	9
3	2	2	1	3	8
4	1	2	6	8	17
5	1	2	6	2	11
6			2		2
More than 6			1	1	2

Table A7: Sample description: number of family members in the survey sample

SUFFICIENT SPACE IN THE ALLOTTED HOUSE	KNG-F	PMB-F	KNG-T	SMY-T	TOTAL
Yes	3	5		2	10
No	2	10	18	14	44
DNA		1			1

A majority of the surveyed sample were predominantly female-headed households or jointly-headed households. We assessed the head of family by asking 'who took the important decisions in the household?'. Although, the majority of houses are allotted in women's name, and there is a significant increase in this number when compared to the situation before relocation.

Table A8: Head of the family in the surveyed sample by gender

HEAD OF THE FAMILY	KNG-F	PMB-F	KNG-T	SMY-T	TOTAL
Male		8	4	7	19
Female	3	6	6	7	22
Both male and female	2	2	8	2	14

Table A9: Allotment certificates of the relocated site by genders

ON WHOSE NAME THE ALLOTMENT CERTIFICATE IN THE RELOCATION SITE	KNG-F	PMB-F	KNG-T	SMY-T	TOTAL
Yes	5	16	16	13	50
Male	1	6	2	3	12
Female	4	9	7	9	29
Both		1	7	1	9
Rent			2	3	5

Table A10: Number of HHS with *patta* before relocation

HHS WITH <i>PATTA</i> BEFORE RELOCATION	KNG-F	PMB-F	KNG-T	SMY-T	TOTAL
Yes	3	8	11	7	29
No	2	8	7	5	22
Rent				4	4

The predominant level of education in both male and females is up to matriculation or class 10. The reasons for dropping out of the school after relocation were not explored in detail as part of this study. Some respondents attributed it to the lack of educational facilities in the proximity post relocation. While the older generations were not well educated, the conditions in the relocated site are such that the younger generations might also suffer from a lack of access to facilities, or may face a break from school for years until facilities are provided. Safety for girls is also an issue that was mentioned during the conversations.

Table A11: Level of education by gender

LEVEL OF EDUCATION	TOTAL
Male	92
Illiterate	15
Below primary	1
Yet to start	3
Primary (1st to 4th)	11
Middle (5th to 7th)	15
Matriculation/secondary (8th to 10th)	25
High secondary/ intermediate/ pre-university / senior secondary (+1/+2)	7
Technical diploma or certificate not equal to degree	1
Graduate and above	6
DNA	8
Female	100
Illiterate	26
Yet to start	5
Primary (1st to 4th)	9
Middle (5th to 7th)	17
Matriculation/secondary (8th to 10th)	21
High secondary/ intermediate/pre-university/ senior secondary (+1/+2)	11
Graduate and above	2
DNA	9
Total	192

The average age of the surveyed sample was 32 and the average number of working members in a HH was two. Of the total 55 HHs and 192 family members, 87 were working and 105 were either still pursuing education or not working. Post relocation, a majority of women were self-employed and most of them either owned a small shop or a tailoring unit in the neighbourhood. This was in addition to HH work in the neighbourhood. Very few women were involved in daily wage work or were salaried, which was the prominent category of work for men.

Table A12: Number of HHs by number of working family members

NUMBER OF WORKING FAMILY MEMBERS	KNG-F	KNG-T	PMB-F	SMY-T	TOTAL
No working members	1	2	2	1	6
Single working	1	5	7	9	22
Two people working	3	7	6	3	19
Three people working		3	1	2	6
Four people working		1		1	2

Table A13: Type of work by working members by gender

WORK STATUS, TYPE OF WORK BY GENDER	TOTAL
Male	52
Daily wage/casual labour	24
Regular wage/salaried	23
Self-employed	5
Female	35
Daily wage/casual labour	2
HH work	11
Housewife	3
Regular wage/salaried	3
Self-employed	16

When asked if they or their family members had lost their job after relocation, 20 of them responded yes.

Table A14: Status of the job post relocation

LOST JOB AFTER RELOCATION	KNG-F	PMB-F	KNG-T	SMY-T	TOTAL
Yes	3	6	5	6	20
No	2	9	11	8	30
DNA / NA		1	2	2	5

The three sites of relocation were at least 10–15km away from their previous place of stay. When asked about the distances they travelled to reach their workplace, a majority of them said they had to travel long distances after relocation. After relocation, 21 of them travelled more than 5km to reach their workplace.

Table A15: Distance to work place after relocation

DISTANCE	KNG-F	PMB-F	KNG-T	SMY-T	TOTAL
Less than 1km		2	1	2	5
1–2km				1	1
2–5km	1	1	5	5	12
More than 5km	1	8	8	4	21
DKCS/DNA/NA	3	5	4	4	16

Table A16: Distance to work place before relocation

DISTANCE	KNG-F	PMB-F	KNG-T	SMY-T	TOTAL
1–2km	1	4	2	2	9
2–5km	1	4	6	4	15
Less than 1km	2	3	6	2	13
More than 5km			1	1	2
DKCS/DNA/NA	1	5	3	7	16

Tables A15 and A16 indicate that most families were living closer to their workplace before relocation. Even though the government organised job fairs a few months after the floods, the surveyed families claimed that neither their family members nor others they knew in the community got a job. When asked for the reason, they said either the jobs required skills that they did not have or that they were too far from their current location. Many of them also said that while their phone numbers were taken, no one called back.

Post-disaster relief

Contrary to social media, news reports, and expert interviews, most of the respondents said that the government was the first responder in the case of both the tsunami in 2004 and the floods in 2015. In terms of the relief, most people said that money provided post disaster is the most helpful form of relief compared to any other kind. However, many news reports and interviews with humanitarian actors reveal that there was political influence used for tagging the relief material that was being distributed by other actors post the recent floods. There could also be a built-in bias in the responses, if the households being surveyed had some fear or not receiving or hope of receiving more government support from/through us (they had not understood that we were independent researchers).

Table A17: First relief providers after tsunami

TYPE OF RESPONDERS	KNG-F	PMB-F	KNG-T	SMY-T	TOTAL
Government			13	10	23
Monetary			11	8	19
With food/clothes			2	2	4
Community/community organisations			3	2	5
With food/clothes			3	2	5
NGO			1		1
With food/clothes			1		1
Other				2	2
Monetary				1	1
With food/clothes				1	1
NA	5	16	1	2	24

Table A18: Type of relief and whether the provided relief was helpful or not

TSUNAMI RELIEF-HELPFUL OR NOT	KNG-F	PMB-F	KNG-T	SMY-T	TOTAL
Monetary			11	9	20
Yes			11	8	19
No				1	1
With food/clothes			6	5	11
Yes			3		3
No				2	2
DKCS/DNA			3	3	6
NA	5	16	1	2	24

Table A19: First relief providers after the floods

FIRST RESPONDERS AFTER FLOODS	KNG-F	PMB-F	KNG-T	SMY-T	TOTAL
Government	3	5	3	7	18
Monetary	2	4	2	3	11
With food/clothes	1	1	1	4	7
Community/community organisations		6	2	4	12
Monetary				1	1
With food/clothes		6	2	3	11
NGO	2	4			6
Monetary		1			1
With food/clothes	2	3			5
Other			3	3	6
Monetary			2	1	3
With food/clothes			1	2	3
Did not receive any relief		1	10	2	13

Table A20: Type of relief and whether the provided relief was helpful or not

HELPFUL/NOT: FLOODS	KNG-F	PMB-F	KNG-T	SMY-T	TOTAL
Monetary	2	5	4	5	16
Yes	2	5	4	5	16
With food/clothes	3	10	4	9	26
Yes	3	3	2	5	13
No		2	1	3	6
DKCS/DNA		5	1	1	7
Did not receive any relief		1	10	2	13

Work/job opportunities were noted as the most preferred kind of assistance by the families that were relocated after the floods, whereas better house and housing was the most preferred assistance by the families that were relocated post-tsunami and living in these sites.

While the families who moved after the tsunami have established their networks and do not have issues with regular income opportunities after living for many years in the new sites, they have complained about the poor or deteriorated quality of house and facilities. Families that were relocated after the recent floods are comparatively happy about their houses, as most of the units are newly constructed and the families feel safe in the relocation sites. However, since they moved recently, they still have to travel to their old workplace and complained about lack of work opportunities.

Table A21: Preferred assistance post disaster

PREFERRED ASSISTANCE	KNG-F	PMB-F	KNG-T	SMY-T	TOTAL
House/better housing	1	3	11	9	24
Work	3	10	4	2	19
Money		2	1		3
Food/water/medicines			1		1
Others	1	1	1		3
No assistance needed				5	5

Long-term implications

When asked if it was their decision to relocate, 39 respondents (18 flood victims and 21 tsunami affected) said that they were willing to move there at the time of relocation and 15 of them (of which 11 are tsunami affected living in Kannaginagar) said the government or the community influenced/forced them to move to these relocation sites.

Table A22: Whether relocated on their own or motivated

DECISION TO MOVE	KNG-F	PMB-F	KNG-T	SMY-T	TOTAL
Own decision	4	14	7	14	39
Motivated	1	2	11	1	15
Government	1	2	9	1	13
Other			2		2
DKCS				1	1

There was a very interesting set of responses when asked whether they thought that their life was better in the new sites compared to the conditions before, and if they wanted to stay there or go back to their previous locations. Of the total 55 respondents, 24 said their life was better in these sites and 31 responded negatively. However, 41 respondents said that they preferred to go back to their previous location of residence, predominantly for better jobs and other facilities. Only a few said they preferred to stay back, of those most are from Semmencherry who have lived there for nearly a decade and said they have got used to the life there and had made this their home. Of the 24 respondents who said that their life was better now compared to what it was before in terms of housing and facilities, etc., 14 of them said they preferred to go back to their previous location.

Table A23: Quality of life and preference to move back to earlier location

QUALITY OF LIFE AND PREFERENCE TO MOVE	KNG-F	PMB-F	KNG-T	SMY-T	TOTAL
Better after relocation	4	4	4	12	24
Go back	3	2	4	5	14
Stay here	1	2		7	10
Better before relocation	1	12	14	4	31
Go back	1	9	14	3	27
Stay here		3		1	4

Table A24: Reasons to move back and staying in the relocation site

GO BACK/STAY HERE – REASONS	KNG-F	PMB-F	KNG-T	SMY-T	TOTAL
Go back	4	11	18	8	41
Better life and facilities	1	5	3	1	10
For jobs	1	3	6		10
This place is far from the city		1	1	2	4
Unsafe here	1		2	2	5
Only if they give us a house		1	2		3
Community			1		1
DKCS		1	3	3	7
Go back if provided with all facilities	1				1
Stay here	1	5		8	14
Got used to the place / made this home				4	4
No place to go back		2		1	3
Safe here	1	2		1	4
Better life and facilities here		1		1	2
DKCS				1	1

Asset loss

Table A25 indicates the losses experienced during the tsunami. As the families who were staying on the banks of the River Adyar did not experience the tsunami, the responders only included tsunami-affected families in the relocation sites.

Table A25: Losses during the tsunami

KIND	KNG-T	SMY-T	TOTAL
Vehicles	1	5	6
IDs and other papers	6	5	11
Shop	3	2	5
Work-related assets	4	4	8
Household assets	9	6	15
Sources of financing	1	4	5

Table A26 indicates the losses experienced by families during floods. This also includes families that were relocated after the tsunami, but who have experienced losses in floods.

Table A26: Losses during floods

LOSSES DURING FLOODS	KNG-F	PMB-F	KNG-T	SMY-T	TOTAL
Vehicles		4	1		5
Sources of financing		6			6
Household assets	5	16	2		23
Work-related assets	2	11		2	15
Shop		3			3
IDs and other papers	2	7		2	11

Table A27 indicates the number of families who lost specified assets in the tsunami and again during the floods.

Table A27: Losses during tsunami and floods

LOSSES DURING BOTH TSUNAMI AND FLOODS	KNG-T	SMY-T	TOTAL
IDs and other papers	3	2	5
Work-related assets		1	1
Household assets	3	8	11

Only 7 out of 55 respondents said they had insurance. These had only life insurance, none of them had asset-related insurance or insurance to cover catastrophes. Monetary assistance/relief provided by the government was the only money they had received and none of these losses were recovered.

Table A28: Number of responders with access to life insurance

STATUS OF INSURANCE	KNG-F	KNG-T	PMB-F	SMY-T	TOTAL
Life insurance	1	3	1	2	7
No insurance	4	15	15	14	48

Early warning and preparedness

It was a mixed response when respondents were asked whether they received early warnings of the floods: 24 out of 55 respondents said they had received early warnings. While some said they had received early warning a few days before the floods, a few said that the government announced a few hours before that the dam gates had been opened and that they needed to move out of their houses immediately, leaving them no time to safeguard their assets. Some responded that they ignored the warnings, expecting that there would be only a few feet of water and didn't expect this kind of flooding.

Table A29: Early warning before the floods

FLOODS EARLY WARNING	KNG-F	PMB-F	KNG-T	SMY-T	TOTAL
Warning received	4	15	3	2	24
Few hours before	2	6	1		9
Government	2	6	1		9
Few days before	2	7	2	2	13
Government	2	7	1	1	11
TV			1	1	2
DNA		2			2
No warning received	1	1	15	14	31

Nearly half the respondents said that they were better prepared for an extreme event in the future after their past experiences.

Table A30: Preparedness to future extreme events

BETTER PREPARED THAN YOU WERE BEFORE?	KNG-F	PMB-F	KNG-T	SMY-T	TOTAL
Yes	3	5	11	6	25
No		3	1	2	6
DKCS	2	6	6	7	21
DNA		2		1	3

Appendix 2: List of key informant interviews

The project team conducted semi-structured interviews with the following individuals:

REF. NO.	TYPE OF ACTOR	NAME	ORGANISATION	DATE/MONTH OF INTERVIEW
1	Activist	Nityanand Jayaraman	The Vettiver Collective	6 February 2017
2	Academic and NGO	Jayshree Vencatesan	CARE Earth	7 February 2017
3	NGO	Selva	AID India	February 2017
4	Government	Bhuvana	Retired Chief Community Development Officer, Tamil Nadu Slum Clearance Board	8 February 2017
5	NGO	Virgil Desai	Arunodaya, Kannaginagar	8 February 2017
6	Government	Sathyagopal	State Disaster Commissioner	February 2017
7	NGO	Chandramohan and Jayaram	Arappor Iyakkam	8 February 2017
8	Activist	Revathy	Political activist	6 February 2017
9	Academic and NGO	Dr Rakhai Gaitonde	IIT Madras and SOCHARA	9 February 2017
10	Government	Vishwanath	Chennai Rivers Restoration Trust	February 2017
11	Government	Chithra	Chennai Metropolitan Development Authority	February 2017
12	Government	Rosie	Tamil Nadu Slum Clearance Board	9 February 2017
13	Government	Praveen Nair	Corporation of Chennai	February 2017
14	Private Sector	Sridhar	CREDAI	February 2017
15	NGO	Devaneyan	Thozhamai	February 2017
16	NGO	Ameer Khan	SOCHARA	February 2017
17	Government	Suresh Maria Selvam	Tsunami Resource Centre	February 2017
18	Activist	Sujatha Mody	Penn Thozhilalar Sangam (a labour union)	9 February 2017
19	Government	Rajendra Ratnoo	Ex-Collector, Director of Municipal Services and a senior IAS officer	7 February 2017
20	NGO	Latha Subramaniam	Bhoomika Trust	7 February 2017
21	NGO	Aruna Subramaniam	Bhoomika Trust	7 February 2017

Appendix 3: List of participants at the consultation held on 28 February 2017 at the Madras Institute for Development Studies, Chennai

NAME	ORGANISATION
Ameer Khan	Society for Community Health Awareness Research and Action (SOCHARA)
Amir Bazaz	Indian Institute for Human Settlements
Aruna Subramaniam	Bhoomika Trust
Ayushman Banerjee	Okapi Research and Advisory
Bhoopati	Tamil Nadu Housing Board
Bhuvana R	Chief Community Development Officer (Retd.), TNSCB
Chandni Singh	Indian Institute for Human Settlements
Chandramohan	Arappor Iyakkam
David Sadoway	Nanyang Technological University
Ganapathy. G.P.	Centre for Disaster Mitigation and Management, VIT University
Garima Jain	Indian Institute for Human Settlements
Geetha Ramakrishnan	Tamil Nadu Housing Board
Janakarajan S	Madras Institute of Development Studies
Jayshree Vencatesan	CARE Earth
Karen Coelho	Madras Institute of Development Studies
Karine Hochart	PhD Student, Anna University
Kavita Wankhade	Indian Institute for Human Settlements
Krishna Kumar	Okapi Research and Advisory
Latha Subramaniam	Bhoomika Trust
Lily Margaret	Thozhamai
Nityanand Jayaraman	Coastal Resource Center
Praveen P.Nair, IAS	Corporation of Chennai
Prithvi Mahadevan	WeBe Design Lab
Rajendra Ratnoo, IAS	Managing Director, Poompuhar Shipping Corporation Ltd. Director, Tamil Nadu Institute of Urban Studies
Rajesh Rangarajan	Institute for Financial Management and Research
Revathi R	Activist
Rosie	Tamil Nadu Slum Clearance Board
Satyarupa Sekhar	Citizen consumer and Civic Action Group
Santha Sheela Nair, IAS	Government of Tamil Nadu

NAME	ORGANISATION
Sindhuja Janakiraman	Indian Institute for Human Settlements
Sugattho Dutt	State Planning Commission
Sujatha Mody	Penn Thozhilalar Sangam
Tara Murali	Citizen consumer and civic Action Group
Teja Malladi	Indian Institute for Human Settlements
Udhaya Rajan	WeBe Design Lab
Vanessa Peters	Information and Resource Centre for the Deprived Urban Communities
Vidhya Mohankumar	Urban Design Collective

Following the Indian Ocean tsunami in 2004, Tamil Nadu lost about 8,000 people and the lives and livelihoods of over 897,000 families were affected. In 2015, Chennai, the capital city of Tamil Nadu, was brought to a standstill by floods which killed 289 people, left 1,000 injured, and damaged property and livelihoods worth US\$2.2 billion. These extreme events and others, such as the 2003–04 drought and the 2016 cyclones, mobilised humanitarian action from a range of actors in Chennai. This study examines how humanitarian responses and post-disaster relocations fit into the wider development vision of large and fast-growing metropolises such as Chennai.

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